No.

Japan International Cooperation Agency (JICA)
Ministry of Tourism and Antiquities
Ministry of Planning
The Hashemite Kingdom of Jordan

Detailed Design for Tourism Sector Development Project in the Hashemite Kingdom of Jordan

Final Report

Main Report

Volume 6MR

Karak Tourism Development Sub-project

August 2000

Pacific Consultants International
Yamashita Sekkei Inc.

S S F
J R
00-153

N O T E

The following exchange rate was adopted through out this report

US$ 1.00=JD 0.708 = Yen 106.08 (March 2000)

JD 1.00 = Yen 150

PREFACE

In response to a request from the Government of the Hashemite Kingdom of Jordan, the Government of Japan decided to conduct the Detailed Design Study on Tourism Sector Development Projects in Jordan and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Takahide Fujihira of Pacific Consultants International and consist of Pacific Consultants and Yamashita Sekkei Inc. to Jordan, three times between March 1999 and July 2000.

The team held discussions with the officials concerned of the Government of Jordan and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the implementation of the Project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Jordan for their close cooperation extended to the Study Team.

August 2000

Kimio Fujita

President

Japan International Cooperation Agency

August 2000

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to formally submit herewith the Final Report and tender documents of "The Detailed Design Study on Tourism Sector Development Project in the Hashemite Kingdom of Jordan." Which is composed of 7 sub-projects.

This report compiles the results of the Study including planning, design and tender documents (draft) of each sub-project.

During the study period we had been assisted by many people for the accomplishment of the Study, and we would like to express our sincere gratitude and appreciation to all those who extended their kind assistance and cooperation to the Study Team, in particular, the Ministry of Tourism and Antiquities who acted as the counterpart agency.

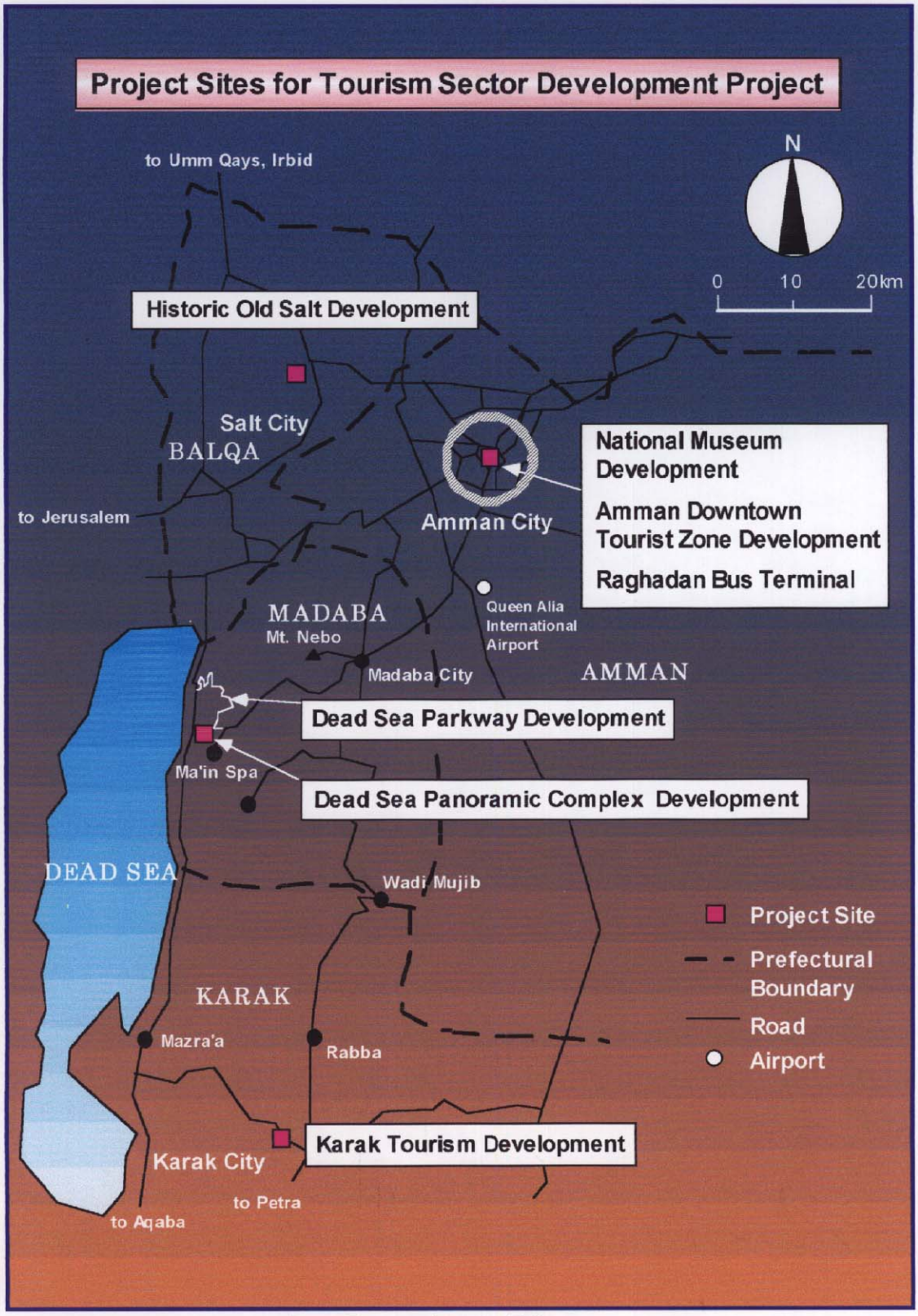
Also, we acknowledge the effective assistance by all the officials of your Agency and the Embassy of Japan in Jordan.

We hope that the report will be able to contribute to the implementation of Project and to the further development of Jordan through the completion of the Project.

Very truly yours,

藤平卓英

Takahide Fujihira
Team Leader,
The Study Team for
the Detailed Design Study on
Tourism Sector Development Project in
the Hashemite Kingdom of Jordan



Location Map

Table of Contents

In addition to this Main Report, Final Report and Draft Tender Documents for Karak Tourism Development Sub-project consist the following volume of reports and documents, separately.

GENERAL TABLE OF CONTENTS

List of Tables

List of Figures

Abbreviations

ADTZ	:	Amman Downtown Tourist Zone
B/D	:	Basic Design
CDD	:	Civil Defence Directorate
CERM	:	Cultural Environment Resources Management
D/D	:	Detailed Design
DOA	:	Department of Antiquities (of MOTA)
DOE	:	Department of Environment (of MMRAE)
DSPC	:	Dead Sea Panoramic Complex
DSPW	:	Dead Sea Parkway
EIA	:	Environmental Impact Assessment
GAM	:	Greater Amman Municipality
GCEP	:	General Corporation for Environmental Protection
GDP	:	Gross Domestic Product
GEC	:	General Environment Corporation
GOJ	:	Government of Japan
HOSD	:	Historic Old Salt Development
ICB	:	International Competitive Bidding
IEE	:	Initial Environmental Examination
I/P	:	Implementation Program
JAM	:	Jordan Archaeological Museum
JBIC	:	Japan Bank for International Cooperation
JD	:	Jordan Dinar(s)
JICA	:	Japan International Cooperation Agency
JST	:	JICA Study Team
JVA	:	Jordan Valley Authority
JY	:	Japanese Yen
KDC	:	Karak Development Corporation
KM	:	Karak Municipality
KTD	:	Karak Tourism Development
LB	:	Local Bidding
LCB	:	Local Competitive Bidding
MMRAE	:	Ministry of Municipal, Rural Affairs and Environment
MOP	:	Ministry of Planning
MOT	:	Ministry of Transport
MOTA	:	Ministry of Tourism and Antiquities
MP	:	Master Plan
MPWH	:	Ministry of Public Works and Housing
NGO	:	Non-Governmental Organisation
NIC	:	National Information Center
NM	:	National Museum
OECF	:	Overseas Economic Cooperation Fund of Japan
PMU	:	Project Management Unit
PSC	:	Project Steering Committee
RBT	:	Raghadan Bus Terminal
RSCN	:	Royal Society for the Conservation of Nature
SAPROF	:	Special Assistance for Project Formation
SDC	:	Salt Development Corporation
SM	:	Salt Municipality
S/V	:	Supervision (of Works)
TCC	:	Telecommunications Corporation
TD	:	Tender Documents
TOR	:	Terms of Reference
T/P	:	Tender Package
UNESCO	:	United Nations Educational Scientific and Cultural Organization
USAID	:	United States Agency for International Development
WB	:	World Bank

List of Participants

Name	Title
JORDANIAN SIDE	
•**National Museum Steering Committee**	
H.M. Queen Rania	Head of National Museum Steering Committee
H.E. Dr. Reema Khalaf	Former Deputy Prime Minister/Minister of Planning
H.E. Akel Biltaji	Minister of MOTA
H.E. Eng. Nidal Al-Hadid	Mayor of Greater Amman Municipality
H.E. Dr. Taleb Al-Refai	Minister of Information
Dr. Alia Hatough Bouran	Secretary General of MOTA
Dr. Abu-Ayyash	Executive Manager, PMU
Dr. Ghazi Bisheh	Former Director of DOA
Prof. Dr. Zeidan Kafafi	Dean of Research and Graduate Studies
Mr. Bilal Hammad	Architect/Private Sector
•**Project Steering Committee**	
Higher Committee	
H.E. Akel Biltaji	Chairman of the Committee, Minister of MOTA
H.E. Michael Marto	Minister of MOF
H.E. Husni Abu Ghaida	Minister of MOPWH
H.E. Jawad Al-Hadid	Minister of MOP
H.E. Reema Khalaf	Former Deputy Prime Minister/Minister of MOP
H.E. Abdul Rahim Okour	Minster of MoMREA
H.E. Nidal Al-Hadid	Mayor of GAM
Executive Committee	
Dr. Alia Hatough Bouran	Secretary General of MOTA
Eng. Abdelmajid Kabariti	Secretary General of MOPWH
Dr. Jamal Salah	Secretary General of MOP
Eng. Abdal-Rahim F. Boucai	Deputy Mayor of GAM
Mr. Mahir Abu Al-Saman	Mayor of Salt Municipality
Mr. Khalid Al-Dmour	Mayor of Karak
•**Project Management Unit (PMU)**	
Dr. A. Abu-Ayyash	Executive Manager
Mr. Khalid Laham	Financial Manager
Eng. Essam M. Jabri	Project Engineer
•**Relevant Authorities**	
Ministry of Planning	
Dr. Nael T. Al-Hajaj	Director of Multilateral Co-operation
Eng. Benitta Saad	Tourism Section
Ministry of Public Works and Housing	
Eng. Sami Jiries Halaseh	Director of Highway Studies Directorate
Jordan Valley Authority	
Eng. Avedis Serbekian	Secretary General of JVA
Mr. Mahannad Qudah	Former Assistant Secretary General, JVA
Mr. Jamil Itijazai	Town Planner, Executive Department, JVA

Name	Title
Department of Antiquities	
Dr. Fawaz Khreshah	Director of DOA
Dr. Ghazi Besheh	Former Director of DOA
Dr. Abdel Sami Abu Dayyeh	Cultural Resources Management, Department of Antiquities
Dr. Mohammad Najjar	Excavation Section, Department of Antiquities
Ms. Tamara Bermamet	Assistant Curator, National Archaeological Museum

Advisory and Technical Committees for the respective sub-projects

- **Amman Downtown Tourist Zone**
- **Raghadan Bus Terminal**
- **National Museum**

Advisory Committee

H.E. Eng. Nidal Al-Hadid	Mayor of GAM
Eng. Abdal-Rahim F. Boucai	Deputy Mayor of GAM
Eng. Falah Omoush	Under Secretary of GAM
Eng. Shehada Abu-Hdeib	Consultant for Planning, GAM

Technical Committee

Eng. Mohammad Khalifat	Direcctor of Design Department, GAM
Eng. Ahmed Armouti	Traffic Department
Arch. Fadwa Abu Ghaida	Chief Architect of Design Department of GAM
Eng. Majid Nimri	Tech. Assistant of GAM
Eng. Bakker K. Abbadi	Landscape Engineer, Design Department of GAM
Eng. Meshal J. Halaseh	Work Department, GAM
Eng. Wasfi Mseis	Traffic Department, GAM
Eng. Mohammad Basheer	Director of Finance Department
Eng. Anwar Manasra	Planning Department of GAM
Arch. Alma Al-Fahham	Architect, Design Department of GAM
L.Arch. Raud Al-Nsour	Landscape Architect, Design Department of GAM
Dr. Nawzat Abidah	Director of DOA, MOTA
Dr. Sahar Mansour	Archaeologist, Department of Antiquities
Eng. Asma Shhaltoug	Archaeologist, Manager Amman Citadel Project

- **Dead Sea Parkway**

Advisory Committee

H.E. Husni Abu Ghaida	Minister of MOPWH
Eng. Abdelmajid Kabariti	Secretary General of MOPWH
Mr. Nasir Madadha	Director General, Government Tenders Directorate

Technical Committee

Eng. Sami Jiries Halaseh	Director of Highway Studies Directorate, MPWH
Dr. Mohammed Al-Smadi	Geotechnical Engineer, MPWH
Eng. Iman Ramahi	Head of Geometric Design Section, MPWH
Eng. Wafa J. Haddadin	Senior Highway Engineer, MPWH

Name	Title
•Dead Sea Panoramic Complex	
Advisory and Technical Committee	
Dr. Alia Hatough Bouran	Chairman of Committee
H.E. Mr. Shafiq Zawaydeh	Former Minister of MPWH
Mrs. Muna Shafiq Zawaydeh	Madaba Heritage Society
Mr. Qasem Abu Dl-Haija	Mayor of Madaba
Mr. Ali Abu Rbeiha	House of Parliament
Dr. Abdel Ilah Abu-Ayyash	Executive Manager/PMU
Mr. Ahmed Eddissi	Doctor at University of Jordan
Mr. Khalid Shawabkeh	Geologist of Natural Resource Authority (NRA)
Dr. Khalid Moumani	Quaternary Geologist (NRA)
Dr. Mohammad Waheeb	Archaeologist of DOA
Dr. Abdel Sami Abu Dayya	Archaeologist of DOA
•Karak Tourism Development	
Advisory Committee	
Mr. Ahmad Al-lawzy	Governor of Karak
Eng. Khalid Dmour	Mayor of Karak
Mr. Saber Aljwazneh	Director of KDC
Mr. Jamil Salman	Head of Commerce Chamber, KDC
Mr. Husain Tarawneh	Representative of KDC
Ms. Arwa Masadeh	Director of Museum
Dr. Ghazi Bisheh	Former Director of DOA
Mr. Amir Qimish	Archaeologist, DOA
Mr. Hakim Mohamid	Archaeologist, DOA Karak
Technical Committee	
Arch. Emad Suhimat	Architect, KDC
Eng. Yousef Al-Bustangy	Engineer, KM
Arch. Nahla Nasraweeen	Architect, KM
Eng. Mustafa Sakhniny	Electrical Engineer, KM
Eng. Radi Mahadeen	Communication Engineer, KM
Mr. Ghaleb Al-Jamaya	Traffic Management, KM
Mr. Jafar Shihadeh	MOTA
Eng. Nayef Al-Nawayseh	Public Works
Eng. Tawfiq Al-Habashneh	Water Authority
Arch. Luma Al-Majalieh	Architect, KM
•Historic Old Salt Development	
Advisory Committee	
Mr. Mahir Abu Al-Saman	Mayor of Salt Municipality
Prof. DR. Mohammed Al Ma'aney	Assistant Professor, Department of Architecture at University of Jordan
Eng. Ranwa Yahyaa Khatib	Building Research Centre, Royal Scientific Society
Eng. Mervat Ma'moun Habbsh	Field Liaison Officer, King Hussein Environmental Management Training Program
Eng. Mo'ayad R. Mihyar	Engineer, Private Office
Eng. Andrew de Carpentier	General Director of the Holy Land Institute for the Deaf, Salt
Ms. Maisoon S. Shaheen	General Corporation for Environment Protection (GCEP)

Name	Title
Ms. Lamia Shareef	Regional Planning Department, Ministry of Municipalities, Rural and Environment Affairs
Mr. Hesham Al-Abbadi	Director of Belqa Tourism Office
Mr. Jawad Al-Bana	Representative of SDC

Technical Committee

Mr. Salah Ibrahim Salah	Director, Engineering Department, SM
Mr. Abdul Rahman Al-Hyari	Director, SM
Mr. Mohammed A. Hiasat	Architect, SM
Ms. Lina S. Abu Salym	Architect, SM

Consulting Services-Construction Supervision

Tender Technical Committee

Eng. Mahmood Murad	Government Tenders Directorate
Eng. Mohamed Al Hazaymeh	Government Tenders Directorate
Dr. A. Abu-Ayyash	PMU/MOTA
Eng. Smai J. Halaseh	MOPWH
Eng. San’a Al Nazer	MOPWH
Eng. Ismi’l Al Osta	GAM
Eng. Hana KaKish	Government Audit Bureau

Name	Title
JAPANESE SIDE	
・Embassy of Japan	
Mr. Koichi Matsumoto	Ambassador
Mr. Takashi Ashiki	Former Counsellor
Mr. Tohru Kuramata	Counsellor
Mr. Masaya Tanaka	First Secretary, Economic Section
Mr. Tadateru Nakazawa	First Secretary, Economic Section
・JICA Headquarters	
Mr. Takao Kaibara	Director, First Development Study Department, Social Development Study Division
Mr. Hidenori Kumagai	Deputy Director, First Development Study Department, Social Development Study Division
Mr. Tetsuro Ikeda	First Development Study Department, Social Development Study Division (Predecessor)
Mr. Kazuya Narukawa	First Development Study Department, Social Development Study Division (Successor)
・JICA Jordan	
Mr. Yoshio Yabe	Resident Representative
Mr. Hiroshi Kurakata	Deputy Resident Representative
Mr. Masaaki Iwai	Assistant Resident Representative
Eng. Adel O. Zureikat	Research Coordinator
Mr. Koji Oyama	Member of Japan Overseas Cooperation Volunteers
・JICA Technical Appraisal Team	
Mr. Toshikatsu Omachi	Advisor for Urban Facility Design
Mr. Hideo Matsuzono	Advisor for Highway Design
Mr. Hiroo Oda	Advisor for Construction Plan/Tender Documents
Mr. Miki Watanabe	Advisor for Building Design
・JICA Study Team	
Mr. Takahide Fujihira	Team Leader
Mr. Takanori Tanaka	Deputy Team Leader/Architect
Mr. Yasuhiro Nakajima	Deputy Team Leader/Landscape and Street Design
Mr. Sotaro Watanabe	Facility Design
Mr. Ryunosuke Okamoto	Structural Design
Mr. Kazuo Tonoshi	Mechanical/Electrical Design
Mr. Shigeyoshi Kurihara	Road Design
Mr. Fumio Arai	Construction Planning/Cost Estimation (1)
Mr. Hisao Matsumura	Civil Design/Construction and Cost Planning (2)
Mr. Hidejiro Ushizaki	Bus Terminal Design/Road Facility Planning
Mr. Akira Ogiwara	Environmental Impact Assessment
Mr. Youichi Kumakura	Exhibition Planning
Mr. Naoki Watanabe	Exhibition Facility Planning
Mr. Akio Ishikawa	Operation Planning
Mr. Yuichi Fukuoka	Maintenance/Landscape Planning
Mr. Makoto Harada	Tender Document Specialist
Mr. Shoji Kumita	Geotecnic Engineer
Mr. Hirotsugu Kato	Administration Coordinator

Chapter 1 Introduction

1.1. Background of Sub-project

Main tourism attraction of Karak City is it's history, with Karak Castle and its surrounding township. Karak City is an important tourism destination located 125 km south from Amman City, and Karak is included in the one-day trip area from Amman tourism centre. Karak is one of the important cities along the King's Highway, which runs through the country from south to north in the mountain areas, and it links the highway to the Dead Sea.

Karak tourism development was given high priority in the JICA Master Plan Study, and was selected by the SAPROF Study as a sub-project of the Tourism Sector Development Project, which will be implemented with the financial assistance of JIB. According to such assessment, the JICA D/D study includes the sub-project to prepare the detailed design and the tender documents.

1.2. Study Objectives

The study objectives are summarised as follows:

1) Review and reassessment of previous studies of the Project such as JICA Master Plan Report (February 1996) and SAPROF Report (March 1997);

2) Conduct supplemental site investigations, topographic surveys and existing building condition survey;

3) Establishment of the definitive plan including preliminary design provisional cost estimates in consideration of the amount of construction cost allocated in JIB loan agreed with HKJ;

4) Preparation of the detailed design of the facilities to be constructed under the Project including construction plan and cost estimates in consideration of the amount of construction cost allocated in JIB loan agreed with HKJ;

5) Preparation of the tender documents of the Tourism Sector Development Project;

6) Preparation of the study report to conclude the overall study; and

7) Pursuing technology transfer to Jordanian counterpart personnel in the course of the Study.

1.3. Study Area

The location of the study area for the tourist street and upper and lower castle observation points has been changed from the JICA Master Plan Study and the SAPROF Study by the Technical Committee of Karak in coordination with the Study Team. The locations of the respective work-components are as follows:

(1) Karak Castle Presentation

Inside Karak Castle

1) Karak Castle Museum

The existing museum at the northwest corner of the Castle.

2) Visitor Pathway

The lower corridors and roof top areas.

(2) Tourist Street

The way to Karak Castle in the Downtown of Karak connecting with the visitor centre and the major shopping streets.

(3) Castle Observation Points

Upper and lower viewing spots to Karak Castle along perimeter of Karak Old City

(4) Visitor Centre

Adjacent to Karak Castle along the tourist street

1.4. Scope of Works

The main objectives of the sub-project aim to create and foster a new tourist attraction to enhance the existing tourism in Karak, to attract tourists travelling from Petra, the Dead Sea or Amman to the improved tourist street, Castle observation points, improved Karak Castle presentation and visitor centre.

The objectives of this sub-project are summarised as below:

1) To promote tourism of Karak with
   - Improving tourist uses of the heritage assets of Karak
   - Encouraging conservation of heritage assets and prevent them from deteriorating
   - Improving tourist services
2) To contribute to tourism of Amman Tourism Centre
   - Enhancement of one day trip from Amman
3) To contribute to the regional economy of Karak by the tourism sector
4) To vitalise local community development and participation of the community

The major components included in this sub-project are as follows:

(1) Improvement of Karak Castle Presentation

The Castle is situated in the southeastern corner of the city. The western side of the Castle overlooks the Dead Sea. The lights of both Jerusalem and Hebron could also be easily seen on clear summer nights. From the eastern side it is over looking the eastern entrance of Karak and the deep Zayatine Valley. The Castle is rectangular in shape, the length of its eastern wall is 170m long while that of the western wall is 205m, and the northern wall is 120m long.

A 90m wide moat separates the Castle from the Hill of Thalajeh in the south, with a depth of 6.23m, and there is another big moat that separates the Castle from the city of Karak with a depth of 6-8m.

The Castle has various types of room, and pathways to connect the rooms inside and on the roof. One of the rooms is now used as a museum space, which is so called “Karak Castle Museum”. The JICA Master Plan Study has recommended improving the existing Museum as well as the inner pathways to improve the tourists’ convenience and to raise the attractiveness of the Castle.

1) Improvement of the existing museum space and the extension of the exhibition space
2) Improvement of pathway in the castle

(2) Improvement of Tourist Street

1) Improvement of the shopping streets

2) Recommendation of building guidelines for conservation and development of pilot-plan for distinguished historical buildings selected

(3) Castle Observation Points

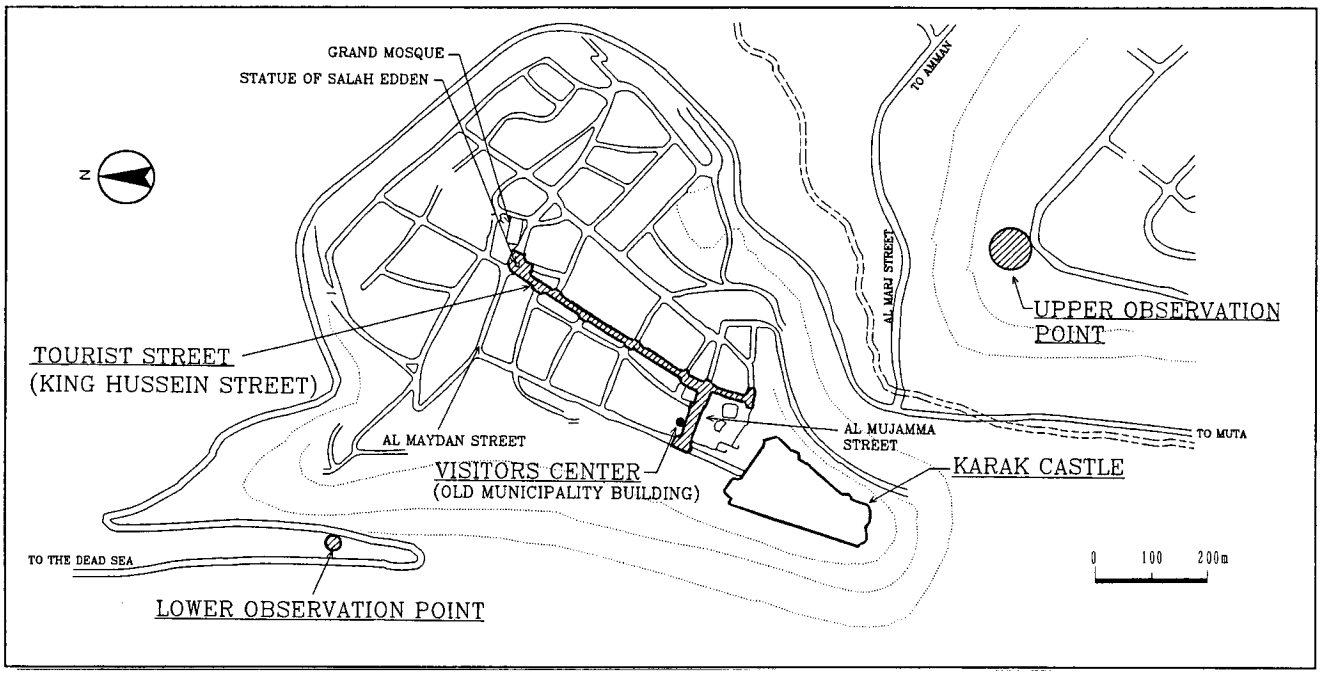
1) Development of 2 castle observation points (Lower and Upper)

(4) Visitor Centre

1) Improvement of the existing visitor centre

The location of the components included in this sub-project are shown in Figure 1.1.

Figure 1.1 Location Map of Karak Tourism Development



Source: JICA Study Team

1.5. Responsible Agencies

The following are the relevant agencies responsible for coordination of the Karak Tourism Development:

(1) Responsible Agencies

1) Karak Municipality (KM) for Tourist Street and Castle Observation Points

2) Ministry of Tourism and Antiquities (MOTA) for Karak Castle Presentation and Visitor Centre

(2) Specific Agencies relevant to the Work-components

1) Special coordination required regarding on archaeological aspects by the Department of Antiquities, MOTA, for Karak Castle Presentation including Karak Castle Museum and Visitor Pathway in the Castle.

Chapter 2 Karak Castle Presentation

Karak Castle is the most important archaeological heritage site of in Karak. The component of Castle Presentation is divided into two sub-components namely 1) Karak Castle Museum and 2) Visitor Pathway.

2.1. Existing Conditions

2.1.1. Location

The Castle which is situated in the south eastern corner of the city. On the west side it is overlooking the Dead Sea, and the lights of both Jerusalem & Hebron could be easily seen on clear summer nights.

The Castle is rectangular in shape, the length of its eastern wall is 170 m while that of the western wall is 205m, and the northern wall is 120m.

A 90m long moat separates the Castle from the Hill of Thalajeh in the south, and there is another big moat that separates the Castle from the city of Karak. It is approximately 25 m long and 6-8 m deep.

Karak Castle was built around 1136 by the Crusaders and with later additions from the Islamic eras. Karak is located between Petra an Amman. Therefore, many bus package tours include Karak on their destinations. It is also possible to take a one-day trip to Karak from Amman including viewing of the magnificent panorama of Wadi al Mujib on the way back through the King's Highway.

Location of Karak Castle is shown in Figure 1.1.

2.1.2. Site conditions

(1) Museum

The structure system of the existing Museum is of stone masonry with a vaulted roof. The inner space is about 352 m^2 (36m by 8.5m). The maximum ceiling height is about 6.7m. The thickness of the stonewalls is approximately 4m.

An adjacent chamber, which is currently used for storage, is to be utilised as an additional Museum space. The structure system of this chamber is the same as the Museum but smaller, the area of the inner space about 136 m^2 (24m by 5.7m) and lower ceiling height due to the debris heaped in the chamber.

(2) Visitor Pathway

The Visitor Pathway starts at the present entrance, bringing the tourist to the museum and tourist facilities of the lower plateau of the Karak Castle leading to the different components of the upper plateau, and ends at the newly consolidated gateway overlooking the Castle Plaza.

The general condition of the paths mainly provides access to areas of attraction and is of a temporary nature and does not accommodate any interpretation facilities. The present conditions can be summarised as follows:

- Stone stairs
- Uneven sand & sloping paths with heaps of rubble
- Even sand paths with appropriate slopes

(3) General Condition of the Karak Presentation

1) Structural Conditions and Constraints

The general condition of the museum and the adjacent chamber were found to be good. No restoration or retrofitting work is required from the structural point of view.

However, any modifications to the structure were studied carefully coordinating and confirming with DOA prior to its design and implementation.

Waterproofing systems are required for the roofs of the museum spaces. The requirement of the waterproofing will be clarified after removing the sedimentary soil by DOA prior to the construction.

2) Conditions of Mechanical Installations

Water Supply and Sewerage

Since no water supply is provided for the visitors such as toilet facilities, water supply and sewerage systems have not been employed.

Ventilation and Air-conditioning

Mechanical ventilation and air-conditioning systems are not employed

3) Conditions of Electrical Installations

General lighting

The museum is lighted through floodlights fixed on suspended ceiling track, some niches have recessed spotlights.

Exhibition Lighting

No exhibition lighting is available.

(4) Conditions and Constraints of Exhibition

1) Some exhibition materials are not labelled and difficult to relate to historical interests.

2) Because the exhibition case is made by wood and not hermetically sealed, the exhibition materials are not well preserved.

3) Although spotlights are hung from the ceiling with rod bolts, the illumination level is very low and lighting intensity is not well designed, and visitors have difficulty to view exhibition materials.

4) The contents of the exhibition are rather technical for the layman and limited to part of Prehistoric, Roman and Islamic ages without proper explanation of the period of Crusaders, a memorable period for European tourists visiting Karak Castle.

(5) Safety Measures for visitor pathway

Safety measures such as handrail are not installed along the steep steps and the edge of slope and holes.

(6) Definition of the visitor path

The pedestrian way is not well defined or raised or sunken from other debris and structures.

(7) Pavement materials and conditions

The pavement material of the steps is concrete, however, the majority of the pavement is bare soil with debris.

(8) Signs and lighting

There is no proper interpretation boards nor direction signs to guide tourists in the Castle, and this makes it more difficult to walk and observe the interior of the Castle without proper lighting.

2.1.3. Physical Condition Survey

(1) Topographic Survey

Although topographic surveys were not anticipated for this work-component, base-line topographic surveys were conducted by plane table survey for the additional subject area, which is situated on the roof top area of the Castle, in order to establish a base map for the design.

(2) Soil Investigations

Soil Investigations were not conducted since this component had no heavy structure to be constructed and sub soil in the Castle could not be disturbed for archaeological reasons.

(3) Existing Building Condition Survey

The existing museum space and storage space for the extension of the future exhibition space were surveyed to determine size, specification of finishing materials, utilities and the conditions of the structure.

2.1.4. Other Donor Activities

In addition to the sub-project, two other projects are proceeding in parallel with financial assistance from the World Bank: (1) Plaza Castle Project, and (2) Preparation of Urban Regeneration and Tourism, Development Plans, Programs and Action Projects for the Old City of Karak, of which outlines are shown below and locations are also indicated in Figure 1.1.

(1) Plaza Castle Project

The project site for the Plaza Castle is directly facing to the north wall of the Castle beyond the dry-moat and connected by a pedestrian bridge with the exit of the Castle. The site is linked with two major tourist streets, Al-Sarayah Street and Al-Mujamma Street.

The location of the Plaza Castle Project is very important from the tourism point of view, because all tourists who visit the Castle shall enter there after the Castle. Al-Sarayah Street, which is one of the Tourist Streets to be improved and the starting point for the centre of the old city, faces to the Plaza Castle Project site. The Castle, the Plaza Castle and Tourist Street are the core zone of Karak tourism. Therefore, the strategic and functional co-ordination between the two projects is essential for the tourism development of Karak City.

(2) Preparation of Urban Regeneration and Tourism, Development Plans, Programs and Action Projects for the Old City of Karak (hereinafter refer to the Action Projects)

The Action Projects are intended to overcome various urban issues arising and enhancing the potential opportunities that exist in the City of Karak. The major issues and potential opportunities concerned in the project are as follows:

- Traffic circulation, parking area and public transport
- Economic regeneration
- Urban enhancement (conservation of selected areas, pavement widening, the removal of ugly signs and restoration of buildings of historical significance)
- Development or upgrading of utilities and public services
- Technical assistance and training

The best result can be achieved by implementing the Action Projects prior to the commencement of detailed design for the Sub-project. However, because the Sub-project has already been commenced before the commencement of the Study for the Action Projects, the modification of the existing street and facilities made by the Sub-project should be reflected onto the Action Projects.

2.1.5. Major issues of Karak Castle Presentation

(1) Co-ordination with DOA

It was required that any changes and additions should be coordinated with DOA for conformity with severe conservation and restoration rules, prior to the finalisation of the design for the improvement of the museum.

(2) Level of improvement

As a result of the site investigations, most areas of the existing pathways in the Castle were found to be buried with debris. In order to remove this debris, an intensive archaeological survey is required beforehand. The archaeological excavation and removal of the debris will be done by DOA prior to the implementation of further improvement for the pathway.

As a result of discussions with PMU and DOA, MOTA, it was confirmed that the improvement works for the pathway should be done on the existing surface level of the pathways without interfering the subsurface as much as possible, where there is no debris on the pathway.

2.2. Review of Scope of Work

Based on a series of discussions with the Technical Committee representing DOA, Karak Municipality and PMU, MOTA, as well as various site investigations, review of the sub-project in the SAPROF Study was made as shown below:

2.2.1 Comparison of Scope

Table 2.1 shows a comparison with the major items in the scope of works between the SAPROF Study and the Final Results of the detailed design study of JICA.

Table 2.1 Comparison of Scope between SAPROF and JICA D/D Study

SAPROF Study	JICA D/D Study
1) Improvements of the existing Karak castle museum with appropriate museum equipment, furniture and materials.	1) Improvements of the existing Karak castle museum with appropriate museum equipment, furniture and materials. - Adding an exhibition space of 136 m^2 - Improvement of the storm water drainage and entry area of the existing museum - Providing a connection between the existing museum and the additional exhibition space - Improvement of the roof drainage of the additional exhibition space
2) Improvement of the visitor pathway including pavement, provision of interpretation boards, sign posting, and safety measures (lighting, hand railing, steps, etc.).	2) Improvement of the visitor pathway including pavement, provision of direction signs, safety measures (lighting, handrails, steps, etc.) and additional improvement of 2,000 m^2 of upper areas.

Source: JICA Study Team

2.2.2. Major Changes from SAPROF Study

As shown in the above table, the major changes in the scope of the work-component are as follows:

(1) Museum

1) Additional exhibition space

Based on the result of discussions with PMU and DOA, MOTA, and site investigations, an additional exhibition space (136 m^2) currently being utilised as storage space was confirmed and the provision of a connection between the existing museum and additional exhibition space was included in the scope.

The level of the additional space is higher than the existing exhibition space apparently due to fill and debris, and an access between the existing museum and the adjacent chamber by removing the infill wall is necessary. The difference in level between the two halls requires archaeological excavations to the required level which will be done by DOA prior to the construction.

2) Improvement of the roof drainage on the additional exhibition space

The existing storage space, which will be utilised for the additional exhibition space, currently has a roof drainage problem due to the excessive debris on top of the roof. In order to solve this problem, improvement of the roof drainage and application of water proofing measures were planned as part of the scope.

3) Improvement of the storm water drainage and entry area of the existing museum

As a result of the site investigation, the existing entrance was found to allow the infiltration of storm water. In order to solve this problem, an improvement of the entry area was included in the scope of this work-component.

(2) Visitor Pathway

1) Based on the result of discussions with PMU and DOA, MOTA, and site investigations, the length of the visitor pathways was reduced from 2.1km to 1.35km in total. The reason for the reduction of the length of the visitor pathway was resulted from the site investigation, primarily due to inaccessibility of pathways due to deep debris..

2) Adding an open space of 2,000 m^2 in total, on the upper area of the Castle, was included in the scope for improvement.

(3) Signage

As a result of site investigation and a series of discussions with the Technical Committee, the interpretation signage in the Castle was cancelled due to the duplication works with the British Archaeological Counsel.

2.2.3. Work Items

The following are the work items included in this Component according to the study results of the existing conditions and the review of the SAPROF Study as well as discussions with the responsible agency(ies).

(1) Improvement of Karak Castle Museum:

1) Renovation of the existing museum (348.83m^2) and adjacent chamber (136.6m^2) to be included in the museum

- Removing soil and debris in the chamber, entrance plaza of museum, and on the roofs of the chamber and pathway under the strict supervision of DOA
- Water proofing for the roof of the existing museum and adjacent chamber
- Renovation of adjacent chamber for the new museum space
- Maintenance of the existing museum hall
- Improvement of entrance area inside and outside of museum
- Consolidation of the existing museum walls, if any
- Improvement of rainwater drainage system

The soil and debris may be removed by DOA.

2) Provision of Exhibition equipment and materials

- Provision of showcases

(2) Improvement of Visitor Pathway of 1.35km length and 1.8 – 2.4m width with the additional space at the roof top area

1) Pavement
2) Provision of steel stairs
3) Provision of lighting and safety measures
4) Provision of direction signs
5) Provision of seating place

2.2.4. Functions Required

(1) Exhibition

To exhibit and present the history of Karak from the Stone Period to Islamic Period as well as the architectural interest of Karak Castle to the visitors and the citizens, including children.

The archaeological museum contains antiquities, which go back to all historical periods that passed through Jordan, from Palaeolithic to Islamic ages.

The museum collections consist of ceramic artefacts such as coins, statues, jewellery and others found either through the archaeological excavations in Karak or purchased from citizens who found them by chance during the building process.

(2) Visitor Services

In order to support activities of and to provide convenience to visitors, necessary visitor services should be provided.

2.2.5. Required Facilities for the Museum

The following are the required facilities and provisions for the Museum:

(1) Entrance Plaza

(2) Information desk/ Museum Shop

(3) Office Area

(4) Exhibition Area:

- History of the castle
- Site and history of Karak

(5) Storage Area

(6) Connection Passage between the existing museum and new exhibition space

2.3. Design Premises

2.3.1. Design Standard

(1) General

1) Jordanian codes and standards

2) BSS/BSI: British Standards and codes of practice

(2) Electrical

Design should be mainly based on the following standards and shall be carried out accordingly:

- National Electrical Code (NEC).
- International Electrical and Electronics Engineers Association Regulations (IEEE).
- National Fire Protection Code (NFPA).
- The requirements of Jordan Civil Defence Department.
- The Jordan telecommunication corporation requirements.

Any other standards and/or regulations and/or codes of practice and norms issued by institutes and/or authorities of other countries such as Japan and Europe, provided they are found applicable and acceptable to perform the job.

2.3.2. Planning and Design Criteria

(1) Pavement

1) Type of Pavement

Type of Pavement	Areas to be applied
Stone pavement	Areas located inside the Castle
Gravel pavement	Areas located on the roof top

2) Basic Structure

Stone pavement	Basalt, Limestone or Concrete tile
	Mortar
	Gravel (Compacted)
	Ground
Gravel pavement	Gravel
	Gravel (Compacted)
	Ground

3) Width of Pavement

The walking speed of tourists is assumed around 100 – 130 steps/minute in flat areas and around 40 – 60 steps/minute in steep areas and stairs.

Based on this premise, the occupancy width of a person is 0.80m including 0.60m for net width of human figure and 0.10m for an allowance of the movement on both sides. If two persons are passing each other, a minimum of 1.50m is required.

4) Longitudinal Grade

If the maximum longitudinal grade for the pathway is more than 18%, steps should be adopted for safety. If the existing longitudinal grade is more than 18%, the pedestrian path should be re-graded to reduce the slope to less than 18% or steps should be adopted. The longitudinal grade should be smooth to avoid sudden changes and be consistent with the topography as much as possible.

5) Horizontal Grade

The horizontal grade of the pathway situated outside should be 1.5 – 2.5% in order to discharge surface water.

(2) Steps and Stairs

1) Longitudinal gradient

Maximum slope of the stairs should be limited to 60% for safety. The existing grade of stairs is more than 60%, and so the stairs should be re-graded to reduce the slope to less than 60%. If the length of steep steps becomes more than 3m, a landing area should be provided.

2) Size of steps

Minimum width for stairways should be 1.5m.

The height of the riser should be designed more than 10cm in order for pedestrians to easily identify the existence of the step, but maximum height should be less than 16cm in

order for children to walk safely. The width of the tread should be designed from 26cm to 40cm. For ease of ascent and decent, and for safety reasons, tread of riser ratios are always held constant within a set of stairways.

3) Basic structure

Nosing of the step is easily chipped off, so that the edge should be rounded. The surface of the steps should be graded towards the front of the step in order to discharge surface water.

(3) Seating

1) Size of seating

The height of the seating should be designed to be 35 – 40cm for both adult and child users. The width of the seat should be designed between 38 – 43cm. The length of the seating should be more than 1.20m for 2 persons. The angle of the backboard should be designed between 100 - 110°.

(4) Electrical

Museum

Electrical design should be developed under the following conditions.

Low voltage: 0.4 kV, 3 ph., 5 wire, 50 Hz.

(5) Design illumination level

Museum

Provide lighting track system and attachable track mounted spotlight to preserve original condition of building. Target illumination level should be 100 to 300 lx, depending on the exhibition object.

Pathway(Illumination level 30-70lx)

Minimum distance between lighting fixtures: 10 meters.

2.3.3. Remarks to be considered in the Design

The design application within Karak Castle is restricted due to its archaeological and historical importance. Any changes of structure, ground level and appearance should be made in close consultation with DOA, MOTA. Particular attention should be given to the change in ground level, because excavation is prohibited except by DOA.

On the other hand, the accumulation of soil and debris is one of serious issues concerned in the Castle. Based on these conditions, the Technical Committee instructed the Study Team to design under the following premises:

(1) The improvement works for the visitor pathway should be done on the existing surface level without interfering with the subsurface as much as possible.

(2) As for the places where accumulated soil and debris are causing serious problems onto the museum building, the design solution should be applied in the state after the removal of soils and debris.

2.4. Design Framework

2.4.1. Number of Visitors

It can be said that the Castle Presentation will not have a problem accommodating an increase in number of visitors, since the Castle has a lot of overflow space. Table 2.2 shows the number of visitors to Karak Castle in 1998 as a reference.

Table 2.2 Numbers of Visitors to the Karak Castle in 1998

Month	Number of Visitors per month	Number of days recorded	Average number of Visitors per day
January	2,953	31	95
February	5,519	28	197
March	6,260	31	202
April	4,278	29	147
May	10,008	31	323
June	4,200	30	140
July	4,048	30	135
August	6,214	31	200
September	5,957	30	198
October	13,640	30	455
November	8,507	30	284
December	4,128	31	133
Total	75,712		

Source: Based on MOTA

2.4.2. Number of Staff and Structure of Operation and Management

According to the structure of responsibilities, defined by the Department of Antiquities, personnel working in the field of antiquities in Karak should have responsibility to report to the Karak Antiquities Inspector Office.

Table 2.3 shows the existing number of staff and structure of operation and management in the museum facility in Karak Castle.

The museum space is too small to accommodate all the personnel shown below, therefore, some personnel are working outside the museum, such as in the regional office of MOTA, etc.

Table 2.3 List of Staff for Karak Castle Museum

	Number of Staff	Remarks
Director of the Museum	**1**	Staff of DOA
Curator	**2**	Staff of DOA
Administration Staff	**11**	
Accountant	1	
Ticket supervisor	2	
Ticket salesman	2	
Janitors	2	
Typists	2	
Storekeeper	2	
Total	**14**	

Source: Based on MOTA

2.5. Detailed Design

2.5.1. Planning and Design Policy

Design planning policy addresses and respects the authenticity of the site with a priority to provide appropriate access for visitors, applying a minimum intervention policy and based on reversibility.

(1) Museum

The following are basic policies for the planning and design for the improvement of the museum:

- To provide an exhibition which can attract international visitors to the Museum
- To improve the exhibition program and system with modern technology
- To show the heritage of Karak City as well as Karak Castle
- To improve the management and operation system

(2) Pathway

The basic design policy for the improvement of the inner pathway is as follows:

1) To address and respect the authenticity of the site to provide appropriate access applying a minimum intervention policy

2) To provide various types of routes to meet the diversified needs of the visitors

   The tourist routes in the Castle can be provided for both short stay visitors and long stay visitors. It depends on the time available and visitors' interest. Generally it takes between 30 minutes and 3 hours per visit.

3) To demonstrate is chronological sequence, including Islamic, Crusaders and earlier times, the story of Karak Castle.

   This can also be identified through the type of stone used as the building material. While the Crusaders used basalt rubble stone with red or black colour, the Muslims used rubble limestone with grey or yellow colours. Those stones were often brought from nearby stone quarries located toward the western side of the castle. In comparison, the Crusaders have obtained the basalt stones from the area of the castle.

4) To provide measures for the safety and convenience of tourists

2.5.2. Design Concept

(1) Museum

To identify proper floor use for the required functions as well as the exhibition of (1) History of Karak City and (2) History of Karak Castle.

1) The museum collections consist of ceramic artefacts such as coins, statues, jewellery and others found either through the archaeological excavations in Karak or purchased from the citizens who found them by chance during the building process.

   - Introduce archaeology & historical studies in Jordan and Karak area
   - Present history of castle construction and building technology through artefacts, panels

- Present crusaders in Arab History
- Model of Karak Castle
- Signage system inside and outside the museum

2) To improve the entrance area to make it more comfortable and attractive

In order to maintain the convenience and comfort of the visitors, the existing entrance area is to be improved. The improvement should take into consideration the rainwater drainage system of the area, especially rainwater infiltration of the museum space.

3) To improve mechanical and electrical conditions of the museum

To provide a controlled environment to maintain exhibits and comfortable ambience for the visitors. A new ventilation system with pre-heater equipment is proposed by JST.

4) To provide weather free conditions for the museum

The moisture on the ceiling is caused by leakage of storm water through the roof of the museum and the adjacent chamber. New waterproofing system is required with bituminous membrane waterproofing.

5) To harmonise contemporary exhibition system with the historically ancient ambience

Free curved lines and vivid colour of the showcases make a contrast and give fresh feeling to the visitors in the ancient building.

(2) Visitor Pathway

Circulation and paths through the castle provide for two visitor routes, a route to accommodate visitors with limited time, thirty (30) minutes, and the second for a longer stay of up to three (3) hours.

1) Pavement system applied for the pathway which will be constructed on the layers of soil shall be a type that can be removed easily and can be re-used.

2) The direction signs should be described with at least Arabic and English.

3) The lighting for the inner pathway is foot light type and not too bright in order not to disturb the ancient ambience of the paths.

4) On difficult slopes, hand rails or stairs and pedestals of steel frame and galvanised steel grating is provided.

2.6. Architectural Planning and Design for Museum

Beside the improvement of the exhibition in the Karak Castle Museum, some modification and renovation of the building is required, as shown below:

(1) Provide an opening in a niche of the wall

An opening between the existing museum and the additional exhibition space is provided. However, the additional exhibition space has 1-2m thick of layers of soil on the floor, and so an additional step to connect the different floor levels between the two spaces needs to be provided in the wall.

The opening of the niche is possible because the vault forming the niche extends all the way to the adjacent chamber. If the wall is removed below the arch without care some of the vault's stones may be dislodged thus compromising stability.

(2) Removing soil on the floor of the existing entrance space

The entrance area is located in front of the existing museum. The floor level of the area with the layers of soil is higher than the museum space, therefore, rainwater often flows into the museum space in the rainy season. In order to prevent the rainwater flow to the museum, the soil should be removed to provide a proper rainwater drainage system. Regarding the above modification, new stairs should be provided on the access route from the main gate of the Castle to the museum.

In parallel to the above, the entrance area should be improved to provide comfort to the visitors.

(3) Waterproofing on the entrance space

Layers of soil cover the area and the soil is to be excavated by DOA as shown in Item (2) above. Underneath the area the Hall of Al-Naser Daoud is located. The Hall is used as a space for banquets, various gatherings, events, etc. The Hall may also be used as a space for the exhibition area occasionally. Waterproofing of the floor may be required after removing the soil, although it will only be clarified after the soil has been removed.

(4) Waterproofing on the roof of the additional exhibition space

As mentioned in Item (1), 2) of Section 2.2.2, the existing storage adjacent to the existing museum space is planned to be used as additional exhibition space. However, since some water penetration has been found on the ceiling/wall of the storage, a waterproofing system may be applied to the roof of the storage, which is covered by layers of soil. The soil should be removed by DOA to apply the waterproofing.

The above modification and renovation of the building should be controlled by DOA according to the rigorous restoration rules for archaeological sites. However, from the structural viewpoint, these may be applied without compromise to the structural safety of the Castle.

(5) Flooring

The present stone floor paving in the main hall was maintained, but a strip of flooring was removed to accommodate an electrical trench at the sides and the middle of the hall. The trench was covered by Karak acid etched stone that could be removed at certain points for maintenance. The new exhibition hall is paved with Ajloun acid etched stone.

Stairs that connect the existing exhibition hall with the new hall are constructed with Ajloun acid etched stone treads.

(6) Walls

Basically, the walls were kept intact.

(7) Doors and Windows

All existing doors and windows are removed. The front door is substituted by tempered glass (clear and brushed water jet engraved) with the lion motif. The inner door is in steel with the lion motif.

The existing windows and burglar proof steel are removed and replaced by clear tempered glass.

(8) Materials

The main basic materials that were used in the museum are stainless steel, glass and Karak acid etched stone. The materials that were used are modern materials to stress on the difference between old and new. Stone, an old material that goes in harmony with the museum walls (in terms of colour & material) took a modern texture. All stone was fixed on a steel structure (mechanical fixing) in order to be dismantled easily. The use of concrete is not considered for reversibility reasons.

2.7. Exhibition Program

2.7.1. Outlines of Exhibition Plan

The exhibition in the museum is broadly divided into 2 categories; (1) History of Karak City and (2) History of Karak Castle. The detailed items of the exhibition in each category are shown below:

(1) History of the Castle

- The Crusade and Karak Castle theatre.
- The offence and defence of Karak Castle and activity of the heroes.
- Structure and function of the Castle.
- Arms of the Crusaders.
- Life of the armed forces.

(2) History of Karak

- The chronological sequence is presented as follows:
- The Islamic Period.
- The Byzantine Period.
- The Roman and Nabataean Period.
- The Hellenistic Period.
- The Iron Age and the Persian Period.
- The Bronze Age.
- The Stone Age.

2.7.2. Floor Use/Exhibition Zoning

The exhibition area is divided into the following zones:

(1) Entrance Zone

- Reception desk and a multi media screen at the back of the desk.
- Presenting the symbolic exhibit (Archaeological Stone) taken from the Karak Castle.
- Museum shop.

(2) Informative Zone

- Visual and photographic panels representing chronological tables and structures of the castle.
- Huge multi media screens.

(3) Costumes Zone

- Reproduction of historical models representing costumes of the Crusaders and the Islamic Armies with their armoires.

(4) Multi-Media Interpretation Zone

- A display of computer screens shows the strategies of defending the Castle.
- Digital images of Karak Castle (walk through).
- Digital presentation for the construction of the Castle.

2.7.3. Chronological Presentation for the Different Periods of the Castle

The archaeological museum contains antiquities that go back to all historical periods that Jordan has passed through, from Palaeolithic to Islamic ages.

The museum collections consist of ceramic artefacts such as coins, statues, jewellery and other found either through the archaeological excavations in Karak or purchased from the citizens who found them by chance during the building process.

(1) STONE AGE (Pre-Historic Ages) (8000 BC – 3000 BC)

- Artefacts of stone were used as tools for hunting animals and for self-defence.

(2) BRONZE AGE (2100 BC – 1200 BC)

- Bronze was used in making different tools.
- Spread of cities with walls.
- Invention of writing in Mesopotamia.
- Hexose occupied Egypt and Jordan.

(3) IRON AGE (1200 BC – 330 BC)

- The rise of several kingdoms, such as the Ammonites, Moabites and the Adomites.
- Pieces of pottery from that age were discovered in Sahab and Karak.

(4) HELLENISTIC AND ROMAN PERIOD (331 BC – 636 AD)

- Arab tribes worked in trades like the Safawieen, who left scripts with names of tribes and people, and pictures of animals on basalt stones.

(5) BYZANTINE PERIOD (324 AD – 636 AD)

(6) ISLAMIC PERIOD (636 AD)

- Prosperity of the region.
- Islamic art appeared strongly in glazed pottery.
- Pieces of pottery from the Umayyad and Ayyubian periods were found.
- Mosaics and coins.

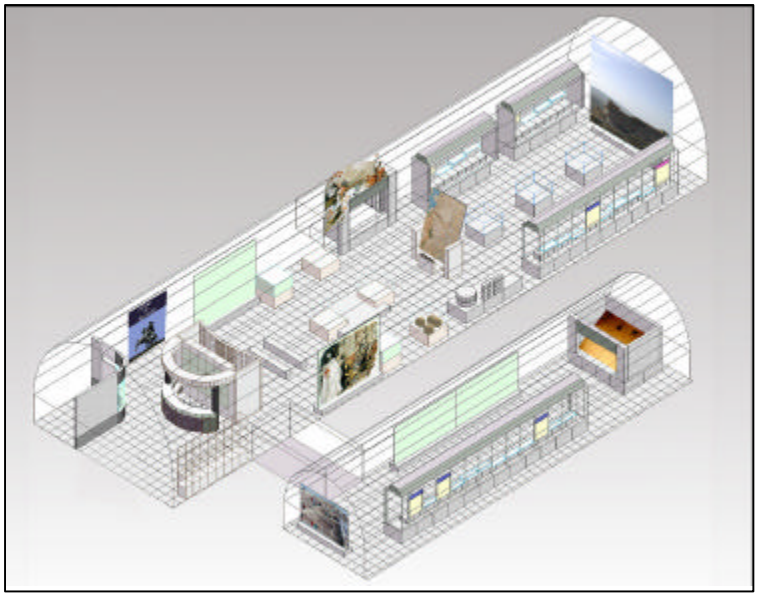
2.7.4. List of Exhibition Materials and Equipment

Table 2.4 List of Major Exhibition Materials for Karak Castle Museum

Theme & Sub-theme		Exhibition Subject (Major Items)	Media	Amount	Exhibition Type
1.	History of Karak Castle	Structure of Karak castle	model	1	stage/open
		Drawing of Arms	drawing	1-2	panel
		Technology of Karak castle architecture	drawing & text	1	panel
		Armed forces view	scene reconstruction	1-2	model
		Tools or feature for olive oil production	original	1	
2.	Site and history of Karak	Topographical map of Karak	model	1	stage/open
		Islamic Funeral stele	original	1	
		Stone with Arabic writing	original	1	
		Pottery bowl with decoration & writing	original	1	case
		Pottery dish with Arabic inscription	original	1	case
		Pottery jug with human picture	original	1	case
		Iron helmet	original	1	case
		Alabaster human face	original	1	case
		Pottery lamp	original	1	case
		Ring lamp from Lejjun	original	1	case
		Large glass jug & vessel	original	2	case
		Roman pottery dish with decoration	original	1	case
		Nabatean jar	original	1	case
		Nabatean funeral stele	original	1	case
		Nabatean lion head figurines from Kh.ed-Darah	original	2	case
		Kh.Balu Moabite inscription	original	1	case
		Mesha stone	model(replica)	1	open
		Basalt with writing	original	1	case
		Pottery figure from phynes on Egyptian style	original	21	case
		Human bone	original	2	airtight case
		Gold necklace	original	1	case
		Gold earring	original	24	case
		Gold ring	original	2	case
		coin	original		case

Source : JICA Study Team

Figure 2.1 Image of Exhibition Plan



Source: JICA Study Team

2.7.5. Components of Display

The museum is provided with a stone and glass reception counter to provide information for the tourists and a small side control office, behind the introductory panels.

An Audiovisual system is used to give the tourist an idea of the history of Karak and a historic sequence is adopted along the display unit (showcases and panels).

Listed below are the proposed display units:

1) Glass panels sitting on acid etched stone base with flex fixed to it. A study of the text and photographs displayed on the flex was carried out.

2) Telescopic window showcase: a modern look of an old image displaying an armed forces view.

3) Stone tomb (made of steel structure) to provide for human bone exhibition.

4) Trade map is displayed. Provision is made for different coloured lights to indicate the different trade eras.

5) Coins showcase is designed with acid etched stone base housing the fiber optics generator and stainless steel frames that incorporate light (the use of fiber optics was proposed since it doesn't generate heat). The coins are displayed on velvet pyramid.

6) Main showcase is composed of acid etched stone base that houses the fibber optics generator with louvered door for ventilation. The upper part is composed of main frames that are made of stainless steel tubes (incorporating fiber optics) with angles to hold the tempered glass panels. The inner shelves are in tempered glass carried by stainless steel cables. The showcase is crowned with a stainless steel head that houses the fiber optics. The collection is displayed either on glass shelves or velvet shelves.

7) The Karak Castle model is proposed as a tool for presentation of the Karak Castle to visitors.

2.8. Pathway Design

Pavement will be laid in a limited area, and main measures for the improvement are levelling, removing of stones and installation of temporary stairs. Lighting is focused to the extremely dark places only, and safety measures are classified into two types, physical and indicative protection.

Areas of intervention were selected to enhance the experience and interpretation of the site while making it accessible and safe, such as:

(1) Terrace overlooking the western main gate: steel structure stairway with wooden treads are designed to lead up to the terrace. Addition of a safety handrail and levelling the terrace floor are recommended.

(2) Terrace overlooking Karak City.

(3) The area along the prison, suq and church where the following works are implemented:

- Cleaning of stone facades from roots of plants
- Consolidation of the walls in the lower area in front of the prison entrance
- Moving existing signage board from the southern wall of the church to northern wall
- To widen the pathways to ease the movement of the visitors at the church location
- Addition of handrails where needed.

2.8.1. Pavement

Principally permanent pavement is prohibited, because the archaeological survey is still required. Therefore, the provision of the pavement is a temporary improvement. In this regards, stone pavement is laid only in the "Soldiers' Dining Hall" as a multi purpose space. Stones are just put on the compacted sand, and the same stone as the wall or ceiling will be used for the pavement.

External pathways (upper level) are in great part levelled and consolidated with the top surface of yellow natural crushed wadi gravel with stabiliser. The soil stabilizer used is a non-toxic, colourless, odourless, non-staining, concentrated organic powder that binds soil and crushed gravel together, creating a natural-appearing, firm trail surface.

Internal pathways (lower level) finishes are of loose yellow crushed wadi gravel, the levels of the designed internal pathway of the lower level remains as it is with:

- the possibility of slight adjustment at certain parts besides the addition of a gravel layer including aluminium edging
- excavations not more than 30cm for lighting extensions

2.8.2. Guide Maps and Direction Signs

Various guide maps were already prepared by DOA under the assistance of the British Council of Archaeology in August 1999. JST requested DOA to confirm that the work of the guide maps will be deleted from the scope of work by JICA. JST has not yet received an answer from DOA.

2.8.3. Safety Measures

It is generally considered on the archaeological site that the installation of the safety measures shall be limited in order to conserve the original status of the site. Therefore, two types of the safety measures are proposed by JST. One is a permanent installation for the dangerous

area, which is physically secured. However another type of safety measure is temporary and indicative for the collapsed ground or internal small scale stairs.

Handrails are added in unsafe areas or pathways such as:

- The pathway adjacent to the western wall of the upper layer.
- The pathway adjacent to the southeastern edge of the upper layer.

Elevated steel paths and stairs are used for steep slopes and wherever needed.

2.9. Engineering

2.9.1. Electrical Works

(1) Lighting

All the interior pathways of the lower level are lit with simple indirect lighting units. Feeding cables are buried in ground conduits. Electrical distribution boards are designed to accommodate most of the lower level path, taking into consideration a future increase of loads of 20%.

Reopening the existing skylight of some pathways to improve the interior lighting is adopted.

2.9.2. Storm Water Drainage

Storm water will be collected by gutters located at the entrance area of the museum, which is an open space and the water will be connected by the existing pipe network to discharge.

Design Standards to be applied to the design of the storm water drainage are as follows:

1) General and specific requirements of the local water and drainage authority, local public health officer, and the regulations of the local Civil Defence Department
2) British Standards
3) Plumbing Engineering Services Design Guide

2.10. Design Drawings

The following general drawings for Karak Castle Presentation are shown in the end of this Report.

2.10.1. Design Drawings of Museum

(1) Architectural Drawings

1)	Proposed Plan	(1:100)
2)	Proposed Sections & Elevation	(1:100)

(2) Exhibition Drawings

1)	Exhibition Panels & Models	N.T.S.

(3) Electrical Drawings

1)	Lighting Layout	(1:100)

2.10.2. Design Drawings of Visitor Pathways

(1) Architectural Drawings

1)	Key Plans Pathway & Levels	(1:100)
2)	General Layout Pathway Design, Museum Level Area & Finishing Schedule	(1:500)
3)	Museum Plaza Plan & Sections	(1:100, 50)
4)	Terrace Overlooking Main Gate, Details	(1:50, 100)
5)	General Layout Pathway Design (Lower Level) Area & Finishing Schedule	(1:500)
6)	General Layout Pathway Design (Upper Level) Area & Finishing Schedule	(1:500)

Chapter 3 Tourist Street

3.1. Existing Conditions

3.1.1. Location

The area of the Tourist Street is limited to Al Mujamma Street, Al Salaya Street and Al Malik Hussein Street. These streets are the main commercial streets of the old city of Karak and running in the centre of the old city.

Al Malik Hussein Street is one of the 3 major North-South streets in old Karak. Its width is approximately (12 m) including sidewalks. All of the above are one-way traffic at present. The main commercial street in the city of Karak, King Hussein Street, divides the old city into two equal parts.

The project area for the Tourist Streets leading to the Castle starts at Al Mujamma Street, down to Saraya Street and Al-Malik Hussein Street.

Al Saraya Street is connecting the plaza project with Al Malik Hussein Street.

Location of the Tourist Street is shown in Figure 1.1.

3.1.2. Site conditions

(1) General Conditions

The Tourist Street has one lane of carriage way with asphalt pavement of 12m width in total and the street also has sidewalks of 2m width on both sides. The sidewalks generally are paved with pre-cast concrete tiling.

The conditions of the sidewalk is summarised below:

1) Tourist Street is paved with asphalt, and both sidewalks are paved with pre-cast concrete tiling (PCT).

2) The asphalt of the street is generally in good condition. Some shop owners changed PCT to terrazzo tiling. The level of the sidewalk is mainly above the street level, but some shops are below the street level.

3) There are no plants on the sides of the Tourist Street expect two trees, one at Al Malik Hussein Street, the second near the end of Al Mujamma Street.

4) Traffic signage is provided along the streets, but it will be reconsidered and improved if necessary by the traffic authorities for the Project.

5) No arcade exists at the Tourist Street.

6) Sidewalks of Al Malik Hussein Street are mostly occupied by the merchants to expose their various goods such as fruits, vegetables, clothes, shoes, kitchen utensils. Some of the sidewalks of Al Mujamma Street are needed mostly as extension of coffee shops.

7) The existing electrical poles along the Street are installed on the sidewalk at an interval of approximately 20m, and made of steel, 3m in height. The surface of the poles is dirty.

8) Dimensions of the pre-cast concrete kerbstone for the sidewalks are 20x20x40 cm, and usually painted in black and white.

9) The sidewalk has different levels, therefore steps are provided to connect them. Numbers of the steps are different in each place, and size of each step is irregular in height and width. The distribution of the steps is not regular.

10) Slope of the Street is approximately 6 to 8 %.

11) The difference of floor level between the shop entrance and facing sidewalk varies. Many shops have higher floor level than the sidewalk, or same level. However, some shops have lower floor level than the sidewalk. In this case a small barrier is provided in between in order to protect against storm water.

(2) Requirements

The works require:

1) To improve the streets with;

- Improvement of pavement of the sidewalks,
- Improvement of street lighting poles
- Providing street planting
- Provision of direction signage

2) To recommend guidelines for protection and development of streetscape

3) To recommend a development concept to modify to tourism use on several selected distinguished buildings

3.1.3. Physical Conditions Survey

(1) Topographic Survey

Topographic surveys are conducted to provide topographic map at a scale of 1/200 of the subject areas for the tourist street with a plane table survey.

(2) Soil Investigations

Soil Investigations are not conducted for the work-component since there is no heavy structure to be constructed.

(3) Existing Building Survey

1) Façade Surveys

The façade surveys of the existing building were conducted on both sides of the street for providing enhancement measures of the existing facades by taking photographs and establishing elevation drawings.

2) Heritage Surveys

The heritage surveys of nominated buildings with traditional historical contexts were conducted to provide recommended functions to be converted for tourism facility uses.

3.1.4. Visitor Circulation Pattern

Package tour visitors, which are the majority of total visitors, alight at Al Mujamma Street in front of the Visitor centre. Then they visit the Castle and the Museum, and come out of the new exit of the Castle to enter the Plaza Castle Area. After staying in the Area, it is planned

that visitors come out to Al Salaya Street and follow to Al Malik Hussein Street to enjoy shopping or taking refreshments and so on. Then they return to Al Mujamma Street to re-join the coaches.

3.1.5. Major issues of Tourist Street

1) Lack of sophisticated shops and amenities to draw attention of pedestrian tourists.
2) Modern intrusion onto historical façade, and lack of conformity in the streetscape.
3) Damaged or missing pavements especially at the entry of shops and markets
4) Disordered car parking problems obstruct pedestrian way, due to unavailability of parking space in appropriate spots.
5) Difficult for foreign tourists to find public toilets
6) Only one tree along the Street creates a dry urban atmosphere.
7) Streetlights are not uniformed.
8) Uncontrolled signage and shop front design

3.2. Review of Scope of Work

Based on a series of discussions with the Technical Committee representing Karak Municipality and PMU, MOTA, as well as various site investigations, review of the sub-project in the SAPROF Study was made as shown below:

3.2.1. Comparison in scope

Table 3.1 shows a comparison between the SAPROF Study and the Final Results of the detailed design study of JICA.

Table 3.1 Comparison of Scope between SAPROF and This Study

SAPROF Study	JICA D/D Study
1) Upgrading of the streets - Improvement of pavement, drainage, underground electric wiring, lighting and landscaping - Street furniture (benches, bus stop, rubbish bins, flower pots), signs and art works	1) Improvement of the streets - Improvement of stone pavement, sub-surface utilities, lighting and landscaping - Street furniture (benches, bus stop, rubbish bins, flower pots), signs and art works
2) Encouragement measures - Establishing guidelines for the suitable building façade and activities - Establishing incentives and guidance for the establishment of high standard souvenir shops, restaurants, stylish hotels	2) Enhancement measures - Recommendations for the suitable building façade and activities - Recommendations for the establishment of high standard souvenir shops, restaurants, stylish hotels

Source: JICA Study Team

3.2.2. Major changes from SAPROF Study

As shown in the above table, the major changes in the scope of the work-component are as follows:

(1) Subject area of the Street

Originally, Al Qal'a Street was included with the subject area of the Street. However, the Technical Committee has determined that Al Qal'a Street shall be improved under the Plaza

Castle project, financed by World Bank, and excluded from the scope of this work-component.

As a result of the site investigation and discussions with the Technical Committee, Al-Maydan Street was also excluded from the scope for the following reasons:

1) Because the Street has been maintained in a good condition since it has recently been re-paved, and

2) Because Al-Maydan Street is important for traffic circulation in the old Karak city and it is not feasible to close off the Street to only pedestrians due to heavy traffic flows all day along the street leading to Aljami Alumari Street at the intersection of the statue of Salahdin and Al-Malik Hussein Street.

As a substitution to the exclusion of the above streets, Al-Saraya Street was included in the scope, because the street is a straight continuation of the Tourist Street connecting to the Castle and provides further attraction for more future tourism activities in conjunction with the plaza project.

Thus, the length of the Tourist Street was reduced from 750m to 610m in total.

(2) Enhancement measures

In addition to establishing general guidelines for the enhancement measures, recommendations for functions and improvement in particular buildings will be made in order to improve the effectiveness of the work-component.

3.2.3. Work Items

The following are the work items included in this Component according to the study results on the existing conditions and the review of the SAPROF Study as well as discussions with the responsible agency(ies).

The improvement of Al Mujamma Street, King Hussein Street and Al Saraya Street of which total area is approximately 8,900m^2 as a tourist street, and main access to the Karak Castle.

(1) Improvement of street pavement of 4,700m^2 with stone and partially with asphalt

(2) Improvement of sidewalk pavement of 4,200m^2 with stone

(3) Provision of parking area of 250m^2 (4 tourist buses)

(4) Provision of street furniture and direction signage

(5) Provision of underground water supply and sewage lines including house connections

3.3. Design Premises

3.3.1. Design Standard

(1) General

1) Jordanian codes and standards

2) BSS/BSI: British Standards and codes of practice

(2) Mechanical

The design of the mechanical work should generally be in accordance with the following standards, codes, and regulations where applicable:

1) ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.

2) LPC: Loss Prevention Council.

3) CIBSE: The Chartered Institution of Building Services Engineers-U.K.

4) General and specific requirements of the local water and drainage authority, local public health officer, and the regulations of the local Civil Defence Department.

(3) Electrical

Design should be mainly based on the following standards and should be carried out accordingly:

1) National Electrical Code (NEC).

2) International Electrical and Electronics Engineers Association Regulations (IEEE).

3) National Fire Protection Code (NFPA).

4) The requirements of Jordan Civil Defence Department.

5) The Jordan telecommunication corporation requirements.

Any other standards and/or regulations and/or codes of practice and norms issued by institutes and/or authorities of other countries such as Japan and Europe, provided they are found applicable and acceptable to perform the job.

3.3.2. Planning and Design Criteria

(1) Pavement/Pedestrian walks

Width: a function of expected pedestrian volume, acceptable density, desirable rate of movement, and requirement of physical obstructions (i.e. platform of residences or shops, rubbish bins, light fixtures, benches, etc.)

(2) Mechanical

Potable water and sewerage network should be connected to each house for future use.

(3) Electrical

Street lighting

- Lux at ground: 50 – 100 lx
- Height: 5 m

3.4. Planning and Design Policy

The aim of this component is to establish a strong axis of tourist flows though the middle of Downtown Karak between Karak Castle and the commercial area of Karak City.

The design aims at maintaining the vitality of the Al Malik Hussein Street and makes it more attractive and appealing to the pedestrian tourist.

The basic planning and design policy is summarised as below:

1) To reinforce pedestrian linkage among the Castle and the intersection (Statue of Salahdin) leading to Aljami Alumari.

2) To provide appropriate street furniture and signage.

3) To recommend building guidelines for the protection of streetscape such as height, extension, new projects, landscape, maintenance and restoration measures in order to ensure the comprehensiveness of the project and sustainability of the Tourist Street, as an attraction.

4) To coordinate with the Projects by the World Bank as well as the improvement of the Castle Presentation.

5) To contribute to the residents along the streets as well as the economy of Karak City.

The design policy aims at realising and enhancing the urban character of the Tourist Street, which would serve as a model for urban continuity in Downtown Karak.

3.4.1. Design Concept

The basic design concept is summarised as below:

- To utilize the local materials as much as possible for the improvement of the pavement in order to raise the design identification of the street
- To maintain a car access to each house/shop
- To maintain existing slopes and steps on the sidewalk as much as possible in order to maintain the current situation and reduce readjusting works between the sidewalks and houses/shops
- To take a design of traditional lamps for the street lighting fixtures
- To provide at least two languages: Arabic and English for signboards

(1) Pavement Design

The Al Salaya Street and Al Malik Hussein Street will be paved by basalt stone, the same as the original material. However, Al Mujamma Street will be paved by asphalt, because of two reasons. One reason is due to heavy traffic circulation in this Street. Another reason is to correspond to the improvement for the future development of this area. Currently some governmental buildings exist between the Plaza Castle Area and Al Mujamma Street, but in the next few years they will be demolished for the new project.

(2) Signage Design

1) Site Interpretation Sign

Site interpretation in historic areas is part of the overall cultural resources management of a certain historic and cultural resource. Site interpretation could address resources of various spatial modules (singular houses, complexes, streets and steps, plazas, whole areas, and neighbourhoods). Interpretation could even address a conservation spatial module as large as a whole historic city core.

Signage would provide interpretation boards that would address direction, interpretative remarks, historic contexts and identity of the place (how it was the centre of religious, civic, political, or social life in Karak).

2) Common Sign

In addition, the notice of accessibility, warnings and common direction signs with sequential manner will be included. However, the design of signage should be readily

visible to all people and harmonised with the existing landscape without confusion with other graphics.

(3) Outdoor furniture design

The following outdoor furniture is proposed.

1) Waste Baskets
2) Stone Seats
3) Metal Trellis
4) Stone and ceramic planters

3.5. Detailed Design

3.5.1. Street Layout

Al-Malik Hussein Street (from Majamma' to Salahdin Square) and Saraya street are designated for pedestrians only and Al-Mujamma' Street is to provide for parking facilities. Emergency and service traffic during limited hours are allowed.

Collapsible bollards are located at street intersections to prevent car traffic and allow the passage of emergency vehicle.

Due to the constraints of existing threshold and drainage issues the sidewalks are maintained and widened. The sidewalk expands in areas deemed important: in front of historic buildings, and in front of existing shops requiring a large sidewalk area. The rhythm created by the expansion and contraction of the sidewalk is in tune with the casual rhythm of the existing fabric.

To determine the street visually, the Statue of Salahdin is relocated to a central location and a plaza is developed around it. The plaza is intended to serve as a meeting place for tourists and provides both outdoor seating and shade and visually opens up towards El-Jaimi Alumari.

3.5.2. Pavement Design

The streets of Karak were originally paved with Ma'an stone, a local stone from Ma'an city which is very close to Karak City. It is hard, durable and of beige colour.

The stone paving is recommended of Karak basalt stone for pavement and white Ma'an stones is used for sidewalks.

Mujamma' street is to allow for traffic as well as parking. Hence the pavement is of asphalt and the sidewalks of the same design as the tourist street.

3.5.3. Planting Design

In determining the location and type of planting for the tourist street the following factors were considered:

1) Historical references
2) Visual continuity
3) Maintenance requirements

After looking at historical aerial photos and collecting historical data, a garden that existed at the intersection of King Hussein Street and Al Mujamma' street was discovered. Accordingly

the design responded by providing a green area that recalls the old garden. A group of Judas and Carob trees provide shade and relief from the heat in summer, and a display of flowers in the spring.

The tree planting suggested for King Hussein Street is intended to maintain the visual continuity of the street. The tree canopies help to unify the varying heights of the existing buildings and to screen others that are visually unappealing.

Various planters are suggested to define and emphasize areas with wider sidewalks.

The species of plants chosen are drought resistant and require little maintenance:

Trees	
Ceratonia Siliqua	Carob
Cercis Silquastrum	Judas tree
Cistrus Limon	Lemon
Robina Psuedoacacia	Honey Locust
Shrubs	
Polzrgonium Domestium	Common Geranium
Lantana Comara	Lantana

3.5.4. Street Furniture

Two types of street furniture are designed:

1) A traditional style light from early this century is recommended for buildings.

2) A more contemporary style is adopted for the design of bollards, outdoor seats, tree grates, and planters, where applicable.

3.5.5. Utility design

Mechanical

1) Piping network

House connections up to the property line (wall of shop) are designed and must be implemented before stone paving. Water lines are plugged above street level and sewage pipes are plugged underground just beyond the wall. This way no work will be done in the shop at this stage and no work shall be done in the street in the future.

Potable water network is connected to each house. Water is branched from the main city water line buried along the street. Galvanised steel is used in all pipe work.

Sewerage lines also connect to the city sewerage network buried under the street. The pipe work used for drainage service will be concrete drainage pipes.

No storm water system is currently applied in the street. Since the street is sloped, it permits natural flow of the storm water.

Maintenance of sewage and water networks, where needed, is carried out by WAJ before stone pavement is executed. Timing of project implementation may be scheduled in coordination with WAJ to ensure that a contractor is ready to do such maintenance activities.

Electrical

1) Street lighting fixture

By using decorative type lighting poles and lanterns. The street and asphalt-coated trails are served by utilising 5-meter decorative poles of either aluminium or powder coated stove enamelled steel poles headed by 2 or 3 oriental lanterns of 70 watt high-pressure sodium lamps and 100 watt tungsten lamps.

The proposed distance between poles is 25 meters. The sections of street and trails are treated separately depending on whether one or more control panel serves each. Feeder cable from the electrical authority is taken into consideration and fused cut outs for each pole are provided.

2) Telephone and electricity networks

Telephone and electricity networks shall be kept at present. It is necessary for the utility providers to upgrade the network in relation to safety and aesthetic standards to conform to acceptable levels. Funding shall be sought for replacement by underground networks. This must be secured before the installation of street paving if such network is to be implemented. Design of these networks will be provided by the providers of the utility.

3.6. Design Drawings

The following general drawings for the Tourist Street are shown in the end of this Report.

(1) Architectural Drawings

1) Location Map
2) General Street Layout Plan (1:1000)
3) Maydan Salah Edden Layout (1:100)

Chapter 4 Castle Observation Points

4.1. Existing Conditions

4.1.1. Location

(1) Upper Observation Point

The site is located in the Almarje area, opposite to the old city of Karak. It provides a very good and high panoramic view of the Old City and the Castle. The site is located below the street level and has a steep slope.

(2) Lower Observation Point

The site is located at a lower point from the Castle along the Dead Sea-Karak Road. The Castle can be seen from the eastern side of the site as an edge of a panoramic boundary of Karak on top of a steep mountain. The site has a gentle slope towards the west overlooking a good view of the adjacent valley. An old oil pit exists on the site and should be demolished to provide space for the new design.

Location of the Tourist Street is shown in Figure 1.1.

4.1.2. Constraints and Opportunities on the Site Conditions

(1) Upper Observation Point

1) Parking space for visitors

Traffic nuisance is a serious concern around the Upper Observation Point. There is no proper parking area available for big coaches or commercial vehicles in this residential area, thus parking on the street is currently the only way for visitors to the observation point. However, because the project site is situated along a curving slope, it is very dangerous to park on the street in front of the observation point.

2) Wind Direction

The prevailing wind in the Upper Observation Point is blowing from the west, and this direction is exactly against the view to the Castle.
Because the observation point is exposed to the west-facing slope, which can also obtain a magnificent panorama view to the Castle, tourists may hesitate to visit the observation point on a rainy winter day without shelter.

(2) Lower Observation Point

1) Accessibility

Because the site is currently situated off street, the area is difficult to be noticed by tourists coming from the Castle or the Dead Sea.
A lot of land in front of the observation point is a reservation area for the future road expansion, and if this expansion is implemented, the observation point will be exposed.

2) Parking space and layout

The land area of the observation point is large enough to accommodate big coaches and visitor cars. However, because the land is relatively flat and entry area to the observation point is available only from the eastern side, where the access road is statuated, the layout of large coaches and visitor cars needs to avoid any obstructions of the view to the Castle.

4.1.3. Physical Conditions Survey

(1) Topographic Survey

Topographic Surveys are conducted to provide topographic maps for two observation point sites at a scale of 1/200 with an optical micrometer survey system. As a result of the topographic surveys, the survey area of the Upper Observation Point was found to be very steep. The average grade of the subject site is 20-30%, facing to the West direction.

The access point is available from the upper part of the site. As for the Lower Observation Point, the subject site is relatively flat with a grade of 5-10%, but the access point is limited from the East side.

(2) Soil Investigations

Soil Investigations were not conducted, since this component has no heavy structure to be constructed. However, for the areas for constructing retaining walls and small structures to be built in the sites, a geological inspection was taken for confirmation of the size of foundation structures (footings). As a result of geological inspection, it was confirmed that boring is not necessary for all the areas concerned.

4.2. Review of Scope of Work

Based on a series of discussions with the Technical Committee representing Karak Municipality and PMU, MOTA, as well as various site investigations, the scope of the Castle Observation Points work-component was reviewed and confirmed with the Jordanian side.

The comparison of the proposed facility component and scope with the SAPROF Study is shown below:

4.2.1. Comparison in scope

Table 4.1 shows a comparison between the SAPROF Study and the Final Results of the detailed design study of JICA.

Table 4.1 Comparison of Scope between SAPROF and This Study

SAPROF Study	JICA D/D Study
1) 2 observation points - Interpretation board, benches, shelter, rubbish bins, signage	1) 2 observation points - Soft and hard landscaping including shelter and signage

Source: JICA Study Team

4.2.2. Major changes from SAPROF Study

As shown in the above table, the major changes in the scope of the work-component are as follows:

(1) Study area of the observation points

Originally, the subject area of each observation point was calculated at approximately 500 m^2. However, as a result of the site survey and the discussions with the Municipality, KDC and the Technical Committee, the land area is too small to satisfy the design conditions required by the Municipality and KDC. The available land area of each observation point far exceeds 500 m^2.

The land for the observation point at the lower level was moved from the designated site described in the JICA Master Plan Study and SAPROF Study, and the transfer of the ownership to the Municipality was confirmed by JST. The land area is approximately

1,600m^2.

As for the upper observation point, the subject site was also changed by the Municipality, and a larger plot of land was proposed for the Study area. The land area is approximately 3,672m^2.

4.2.3. Work Items

The following are the work items included in this Component according to the study results of the existing conditions and the review of the SAPROF Study as well as discussions with the responsible agency(ies).

In order to provide tourists the best spots to get beautiful outside views of Karak Castle it is planned to construct two observation points; 1) Upper Observation Point and 2) Lower Observation Point, with site areas of 3,670m^2 and 2,400m^2 respectively.

(1) Upper Observation Point

1) Observation building of 207.18m^2 floor area in total
2) Parking area of 170m^2 (1 bus and 12 cars)
3) Retaining walls
4) Landscaping

(2) Lower Observation Point

1) Observation building of 97.56m^2 floor area in total
2) Parking area of 250m^2 (2 buses and 10 cars)
3) Landscaping

4.3. Design Premises

4.3.1. Design Standard

(1) General

1) Jordanian codes and standards
2) BSS/BSI: British Standards and code of practice

(2) Mechanical

The design of the mechanical work should generally be in accordance with the following standards, codes, and regulations where applicable:

1) ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.
2) LPC: Loss Prevention Council.
3) CIBSE: The Chartered Institution of Building Services Engineers-U.K.
4) General and specific requirements of the local water and drainage authority, local public health officer, and the regulations of the local Civil Defence Department.

(3) Electrical

Design should be mainly based on the following standards and should be carried out

accordingly:

1) National Electrical Code (NEC).

2) International Electrical and Electronics Engineers Association Regulations (IEEE).

3) National Fire Protection Code (NFPA).

4) The requirements of Jordan Civil Defence Department.

5) The Jordan telecommunication corporation requirements.

Any other standards and/or regulations and/or codes of practice and norms issued by institutes and/or authorities of other countries such as Japan and Europe provided they are found applicable and acceptable to perform the job.

4.3.2. Planning and Design Criteria

(1) Structure

1) Safety

Safety is defined according to the requirements of the National Building Code and the British Standards.

2) Economy

Economy is achieved through the use of the most practicable structural system permitted by the architectural design.

3) Features of Building

- Codes of Practice

The following Codes of Practice are complied with in the design:

a) British Standard for the Structural use of Concrete (BS 8110) is employed for reinforced concrete structural analysis and design.

b) Jordan Code for Loads and Forces is employed for the definition of Dead, Live, Wind and Seismic Loading.

c) The British Standard for Foundations (BS 8004) is employed for the design of foundations and substructures.

d) The British Standard Specification for bending dimensions and scheduling of reinforcement for concrete (BS4466) is employed for reinforcement details.

e) The German Standard DIN 1025/6/7 is employed for structural steel sections.

- Materials

a) Concrete

The characteristic strength of the concrete employed, as defined by a standard 150mm cube at 28 days, is:

20 Mpa for plain concrete.

30 Mpa for reinforced concrete columns

25Mpa for reinforced concrete members.

b) Reinforcement

All reinforcing bars of a diameter larger than 8 millimetres shall be deformed high strength steel bars of Characteristic Strength equal to :

fy = 420Mpa

Bars of 6 and 8 millimetres diameter shall be mild steel of Characteristic Strength equal to :

fy =280Mpa

c) Structural Steel

The structural steel shall be of Grade St 52-3 according to DIN standards, with a yield strength equal to 360 Mpa.

d) Aggregates

Maximum aggregate size is 20mm for all concrete.

e) Concrete Cover

Clear concrete cover for reinforcement shall be:

50mm for concrete surfaces in contact with ground.

25mm for interior concrete surfaces above grade.

30mm for exposed fair faced concrete surfaces

f) Underground concrete and all concrete in contact with the ground is protected by a bituminous waterproofing membrane.

- Loads

a) Dead Loads

Weight of Reinforced Concrete	=	24.00 kN/m^3
Weight of Water	=	10.00 kN/m^3
Weight of Roof Finishes	=	2.2 kN/m^2
False Ceiling & Ducting	=	0.50

b) Live Loading

Roof : 2.00 kN/m^2

c) Wind Loading

Basic wind speed - 35 m/sec

d) Earthquake Loading

Zone A according to the Jordanian Forces Code.

- Structural System

a) General

The cafe building of the Lower Observation Point is designed as a single story building. The layout is of rectangular shape. The spans of the cafe are 4.7 and 7.5 meters. Concrete construction is economical for this case.

b) Floor Slab Framing Systems

One ways ribbed slab system with removable moulds is appropriate in this situation.

c) Vertical Load Bearing Members

The external wall of the building is to be composed of reinforced concrete and stone cladding. This provides the major part of the vertical load bearing system.

d) Lateral Load Resisting System

The peripheral walls should act as an excellent lateral load resisting system.

e) Foundation System

The soil condition of the site is that of a limestone rock. This is based on visual inspection. For the one story building under design, the expected foundations for the walls and the few columns are quite small and no settlement problems are expected.

(2) Mechanical

1) Water Supply

The following criteria should be applied for the study of demand of water supply:

Staff	100 litres
Visitors	10 litres

The pipes for the water supply should be of galvanised steel for both cold and hot water supply.

2) Ventilation systems

Individual extract air system should be provided to serve toilets.

(3) Sewerage

Volume of soiled water

The following criteria shall be applied for the estimate of the volume of soiled water, which is 80% of water supply demand criteria.

Staff	80 litres/person
Visitors	8 litres/person

For the upper observation point, there is no city water main line available near the site. Drainage system for the building should be connected to the underground impervious cesspool.

(4) Solid Waste disposal

Volume of solid waste should be estimated with the following criteria:

Office	0.75 kg/person
Visitors	0.25 kg/person
Restaurant:	0.50 kg/person

(5) Electrical

External lighting

Lux at ground:	30-70 lux
Height:	5 m
Spacing:	25 m intervals

4.4. Planning and Design Policy

The planning and design policy for the observation point(s) aims to locate the point(s) in places that are easily accessible to visitors and overlooks the surrounding areas in such a manner that provides visitors with views and panorama outlooks that are both educational and exciting. They must be least imposing on the site and characterised with a simple design.

- To obtain the best view of the Karak Castle and Karak Old City with the possibility of viewing a laser show on the castle wall.
- To be easily accessible from the main road leading to Karak from the Dead Sea and the desert highway.

4.4.1. Site Layout

(1) Upper Observation Point

The site overlooks the Castle and the Old City in a nice panoramic view; the design layout aims at maximising this potential and overcoming the site limitations of steep slopes and accessibility, by locating the different components of the project at the higher part of the site adjacent to the street and orienting them in the direction of the best view.

(2) Lower Observation Point

The design layout focused on providing two observation platforms. The main one is open to the panoramic view of the castle and the other one is open to the valley view. The layout of the building is formulated by adopting the centre point which provides a direct view to the Castle.

4.4.2. Landscape Design

(1) Upper Observation Point

The landscape design aims at obtaining the best view of the Karak Castle and Karak City, providing indoor and outdoor facilities to accommodate a maximum number of 200 visitors at one time. The following policies are adopted in the detailed design of both outdoor and indoor facilities:

- Integrating the best view lines with the site topography and orientation through a radial arrangement of elements focusing on the best view direction.
- Creating simple closures that are sensitive to the local traditional environment by using traditional building materials and techniques while providing modern facilities.
- Maximizing the use of the project to elongate the stay of the visitor by providing components like the amphitheatre and the restaurant which can accommodate day and night activities.
- Using native traditional plant species that are growing naturally in the area for framing

and softening the views, shading, wind protection and enhancing different parts of the project.

- Providing parking spaces only for 12 cars and 1 bus due to site limitations, additional parking space is to be provided near the site.

(2) Lower Observation Point

The following ideas are adopted in the landscape design:

- Integrating the best view line with the site topography through a rotational dynamic mode.
- Creating simple closures that are sensitive to the local traditional environment by introducing modern lines and intersections and using traditional stone courses, rubble and rough stone cuts for the various design elements in modern combinations and cutting.
- Framing and softening the views with a plantation design that uses native traditional species.

4.4.3. Architectural Design

(1) Upper Observation Point

The project consists of two main elements, an amphitheatre and a small tourists centre.

- The amphitheatre can accommodate a maximum number of 200 visitors; it is oriented towards the view of the Castle and provided with a store and a projection room, and it is accessible by handicapped people.
- The visitor centre consists of a small restaurant with kitchen and store, two kiosks, information booth and toilets.
- The roof terrace is on top of the visitor centre, directly accessible from the street and the parking space; it has the best view towards Karak City and the Castle.

(2) Lower Observation Point

Two small connected stone buildings are forming a back screen for the observation platforms, one is housing a small cafeteria and an information kiosk and the other is housing the toilets.

The design provided parking spaces for 2 buses and 10 cars. The 20 m reservation area along the road can be used as additional parking space at peak times.

4.4.4. Design Concept

(1) Layout Plan

1) Upper Observation Point

- The audience space is located on the axis to the Castle.
- The location of the parking area is determined taking into consideration levels of the access road.
- The cafeteria is located in the area where the castle can be well observed.

2) Lower Observation Point

- The front road is scheduled to be expanded in width, the layout of the facility has

been made in the area set back from the road.

- The facility layout is considered to get views of the Castle in the eastern direction and the Dead Sea in western.
- The development size of the Lower Observation Point is rather smaller than the Upper Observation Point.

(2) Pavement and Retaining Wall Design

The pavement is to be with stone tiles. The area to be paved for the lower observation point is approximately 1,200m^2 and for the upper observation point is 1,450 m^2.

The retaining wall height is designed not to exceed 2 meters. The length of required retaining walls is 95 linear meters. It is recommended that they should be of reinforced concrete with stone facing.

(3) Sign and Symbols / Outdoor Furniture

Outdoor furniture and signage system is designed according to traditional prototypes in form and material. The following items are to be used:

1) Light fixtures
2) Benches
3) Waste baskets
4) Signs

(4) Outdoor Lighting / Electrical Plan

1) Lighting

Landscape will be lit using lighting poles with 70W high-pressure lamps, 1 meter height Bollards and suitable fittings.

Control of lighting will be carried out through photocell.

2) Power Distribution

Each shop and store will have its own DB, the whole plant will have main distribution panel to which all DB's will be connected.

Each shop will be fitted with suitable numbers of power outlets and lighting points.

Each shop and store will be fitted with a telephone outlet.

(5) Structure Plan

This is a very small building, which is to be constructed on the scenic observation point. The total area of the Lower Observation Point is 97.56 m^2 and the total area of Upper Observation Point is 207.18m2. The roof of Upper Observation Point is to be used as a terrace.

(6) Mechanical System

1) Design Standards

- BSS (British Standards Specification)

- General and specific requirements of local authorities.

2) Potable Water

Roof water reservoir tank will be provided and installed. The roof water reservoir tank will be supplied with potable water connected to the city water's main line. The water supply services will comprise the following:

- Roof water tank
- Pipe work

(7) Drainage System

Upper Observation point

The drainage services shall comprise waste and soil. The pipe work used for all drainage services will be UPVC drainage pipes. Inspection manholes will be provided where necessary for maintenance purposes. Waste and soil drainage will be collected by gravity and connected to the impervious cesspool located at site.

Lower Observation point

The drainage services shall comprise waste and soil. The pipe work used for all drainage services will be UPVC drainage pipes. Inspection manholes will be provided where necessary for maintenance purposes. Waste and soil drainage will be collected by gravity to the main sewer line running along the East side road.

4.4.5. Design Drawings

The following general drawings for the Upper and Lower Observation Points are shown at the end of this Report.

Upper Observation Point

(1) Architectural Drawings

1)	Site Plan	(1:200)
2)	Basement Floor Plan (General)	(1:100)
3)	Ground Floor Plan	(1:100)
4)	Elevations	(1:50)
5)	Elevations	(1:50)
6)	Sections	(1:50)

(2) Electrical Drawings

1)	Distribution Boards	N.T.S.

(3) Mechanical Drawings

1)	Water & Drainage Distribution Layout	N.T.S.

Lower Observation Point

(1) Architectural Drawings

1)	Site Plan	(1:100)
2)	Ground Floor Plan	(1:50)
3)	Elevations	(1:50)
4)	Sections	(1:50)

(2) Electrical Drawings

1)	Power, Telephone and Electrical Panels	N.T.S.

(3) Mechanical Drawings

1)	Mechanical Works	(1:200, 1:100)

Chapter 5 Visitor Centre

5.1. Existing Conditions

5.1.1. Location

The location of the visitor centre is situated along the north side of Al Mujamma Street adjacent to the Plaza Castle which is being developed by the World Bank and the Karak Castle in the higher part of the Karak City.

This Al Mujamma Street is part of the tourist street and a bus parking area will be provided in front of the visitor centre.

In this regard, the visitor centre is strategically located in conjunction with the tourist flow between the commercial district and Karak Castle.

Location of the visitor centre is shown in Figure 1.1.

5.1.2. Existing Situation

(1) Location and Historic Background

The visitor centre is located on Al Mujamma Street; it has been developed and renovated in 1996 by the Karak Municipality and the Ministry of Tourism and Antiquities. The building was previously used as the Municipality Building of Karak City; the visitor centre requires the supply of additional furniture and equipment as well as display materials.

(2) Size of Space

The visitor centre consists of a traditional building that is to be used for its current function. It comprises two floors and a basement. Only the first floor is used to serve as a visitor centre and has an internal area of 240 m^2.

(3) Structure of Operation and Management and Number of Staff

The visitor centre is managed by a general manager and eight employees. Table 5.1 shows the positions of the employees and their numbers.

Table 5.1 Structure of Operation and Management

Employees	Number of Staff
1. Manager	1
2. Assistant Manager	1
3. Public relations	1
4. Archives	1
5. Typist	1
6. Tourist Surveyor	1
7. Tourist Information	1
8. Store Keeper	1
9. Janitor	1

Source: JICA Study Team

(4) Existing Furniture and Equipment

The existing furniture and equipment is simple. It includes a reception counter (built in and to be retained), one desk and two or three chairs in each office space.

5.1.3. Major Issues of the Visitor Centre

The existing visitor centre was renovated in 1996 by the Karak Municipality and MOTA, however further improvement is necessary in order to upgrade the facility to international standard.

(1) Facility Services

1) Toilet Facility

Although a toilet facility is available in the existing visitor centre, the foreign tourists are obliged to use a local style.

2) Kitchen Facility

The existing kitchen is located by the reception and the access to the kitchen is visible to tourists. Because the area of the kitchen is very narrow and small, it is not functional for arranging teas and coffees.

3) Air-conditioning

The room temperature of the existing visitor centre rises very high in the summer time due to the lack of ceiling and air-conditioning system in this building.

4) Telecommunications

The existing visitor centre has only two telephone lines available for staff use. In order to facilitate a computer network for tourists to search information on their destination in the future, increase of the number of lines is necessary.

(2) Multi-purpose Hall

According to MOTA, the area for the existing multi-purpose room is limited, and needs to be expanded in order for a certain number of tourists to obtain proper guidance and orientation of tourism in Karak and Jordan in general.

(3) Safety Measures

1) Access and escape route

Because the visitor centre is situated on the first floor of the building, the access is limited to only one narrow staircase. For the emergency case, this staircase is the only escape route.

2) Handrail at Terrace

The base structure of the existing handrail is weathered and deteriorated, and needs to be repaired for safety.

(4) Exterior Condition

Because the building was renovated in 1996, the exterior condition of the building is reasonably good. However, the waterproofing of the roof of the building is not well maintained and needs to be reapplied to avoiding further damage to the roof surface which may lead to a serious structural problem.

(5) Condition of Media

Some simple pamphlets are the only medium available for tourists to understand the tourism of Karak and Jordan in general. Therefore, it is necessary to introduce more visually

attractive and legible media for the promotion of tourism.

5.2. Review of Scope of Work

Based on a series of discussions with the Technical Committee representing Karak Municipality, Karak Development Cooperation and PMU, MOTA, as well as various site investigations, the scope of the Visitor Centre work-component was reviewed and confirmed with the Jordan side.

5.2.1. Comparison in Scope

The comparison of the proposed facility component and scope with the SAPROF Study is shown in Table 5.2.

Table 5.2 Comparison of Scope between SAPROF and This Study

SAPROF Study	JICA D/D Study
1) Full restoration of the Old Municipality Building 2) Equipment and material at the 1ST FL of Old Municipality Building	1) Improvement of interior and service facilities of the 1ST FL of the Old Municipality Building 2) Improvement of the exterior of the Building 3) Equipment for the visitor centre

Source: JICA Study Team

As shown in the above table, the major changes in the scope of the work-component are as follows:

5.2.2. Major Changes from SAPROF Study

(1) Scope of Area

Originally, the subject area of the visitor centre was included with the full restoration of the Old Municipality Building based on JICA's Master Plan Report, Feb. 1996.

As a result of the site investigation and the discussions with the Technical Committee, it was found that the renovation works of the Old Municipality Building were already done by the Karak Municipality and MOTA. In this regard, the renovation works is changed from the whole building to the improvement of the existing visitor centre at the 1ST FL of the Old Municipality Building including subsequently related works.

(2) Improvement of the Exterior of the Building

The improvement of the exterior of the Building was requested from the Technical Committee in the places where relevant to and enhancing the operation of the visitor centre. As a result of the site investigation and a series of discussions with the Technical Committee, the improvement of the waterproofing of the roof and the handrail of the terrace were included in the scope of work.

5.2.3. Work Items

The followings are the work items included in this Component according to the study results on the existing conditions and the review of the SAPROF Study as well as discussions with the responsible agency(ies).

(1) The improvement of the interior of the existing visitor centre of 240m^2 on the 1st floor of the Building:

- Partial change of room layout

- Provision of additional furniture and equipment
- Installation of air conditioning system
- Improvement of toilet and kitchen facilities
- Partial improvement of ceiling

(2) The improvement of the exterior of the Building

- Provision of new water-proofing works on the roof
- Repair of the handrail and provision of water drainage on the terrace

5.3. Design Premises

5.3.1. Design Standard

(1) General

1) Jordanian codes and standards
2) BSS/BSI: British Standards and code of practice

(2) Mechanical

The design of the mechanical work shall be generally in accordance with the following standards, codes, and regulations where applicable:

1) ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.
2) LPC: Loss Prevention Council.
3) CIBSE: The Chartered Institution of Building Services Engineers-U.K.

General and specific requirements of the local water and drainage authority, local public health officer, and the regulations of the local Civil Defence Department.

(3) Electrical

Design shall be mainly based on the following standards and should be carried out accordingly:

1) National Electrical Code (NEC).
2) International Electrical and Electronics Engineers Association Regulations (IEEE).
3) National Fire Protection Code (NFPA).
4) The requirements of Jordan Civil Defence Department.
5) The Jordan telecommunication corporation requirements.

Any other standards and/or regulations and/or codes of practice and norms issued by institutes and/or authorities of other countries such as Japan and Europe, provided they are found applicable and acceptable to perform the job.

5.3.2. Planning and Design Criteria

(1) Mechanical

Water Supply

The following assumptions should be applied for the study of demand of water:

Staff	100 litres/day
Visitors	10 litres/day

The pipes for the water supply should be of galvanised steel pipe for both cold and hot water supply.

(2) Heating, Ventilation and Air conditioning (HVAC) systems

The Heating, Ventilation and Air conditioning (HVAC) systems are planned and designed in accordance with design parameters below and in Table 5.3 – 5.5:

Latitude : 32 N

Altitude : 101.0 above sea level

Prevailing wind direction : North

Average wind speed : 2.5 m/s

Average daily temperature range : 14°C

Table 5.3 Outside Design Temperature

Season	Dry bulb (C)	Relative humidity (%)
Summer	38	40
Winter	10	60

Source: JICA Study Team (Calculation Data by Local Public Health Officer)

(3) Solid Waste disposal

Volume of solid waste should be estimated with the following criteria:

Office	0.75 kg/person
Visitors	0.25 kg/person

(4) Electrical

Electrical Design is developed under the following conditions.

Low voltage: 0.4 kV, 3 ph., 5 wire, 50 Hz.

Design illumination level

Table 5.4 shows the design illumination level of the major rooms to be applied to the design.

Table 5.4 Illumination levels for room

Room	Illumination level (Unit: lx)
Multi purpose Hall	500
Offices	500
Reception	300

Source: JICA Study Team

Telecommunications

Telephone outlet(s) are provided at receptionist desk, multi purpose hall, and in each office. The minimum requirement of city-office line is listed in Table 5.5:

Table 5.5 Minimum number of telephone lines

Room	City-office line
Reception Desk	Telephone x 1
Multi purpose hall	Telephone x 1
Offices	Telephone x 2, facsimile x 1
Total	5 lines

Source: JICA Study Team

5.3.3. Remarks to be considered in Design

(1) Structure of the Building

The structure of the existing Building can not be altered since the improvement works of the visitor centre is concentrated on the first floor of the Building. However, the Building was constructed in an irregular shape and the columns were located in odd places with various shapes. In particular, the narrow and tilted staircase can not be changed since this staircase is forming part of the major structure to support the Building.

5.4. Detailed Design

5.4.1. Planning and Design Policy

Because the scope of work for this work-component was reduced from the full restoration works of the Building to the minor improvement of the visitor centre and its related works, the planning policy aims to enhance the ambience and operation functions of the existing visitor centre, in order to provide better orientation and educational information on the Karak region and its historical significance in a comfortable environment for both tourists and local people including children.

The following are the design policy for the improvement of the visitor centre:

- Maintain and respect the existing architectural structure and finishing of the Building which is historically significant.
- Minimise the intrusion onto the Building caused by any utility installation and improvement works.
- Utilise and enhance the existing special allocation in the visitor centre.
- Improve the safety and comfortable of people in the visitor centre.
- Improve accessibility to the relevant information on tourism and historical education by introducing alternative media.

- Repairing architectural, mechanical and electrical problems which may cause serious damage to the Building in the future.

5.4.2. Architectural Plan and Design

In order to enhance the activities and operation functions of the visitor centre, the creation of a new atmosphere and display method of the visitor centre is the key design issue. Thus, information display inside the visitor centre aims to create interest and excitement and encourage people to learn more about the Karak region and its historical significance. This is achieved by the creation of spatial changes and lighting effect in such a way that encourages visitors to spend more time for learning inside the Building. Effort is made to make information displays informative and sufficient to help the visitor to plan his/her visit to the Karak region in an efficient and satisfactory manner.

(1) General Layout

The existing room layout is slightly changed by creating a new multipurpose hall, which can accommodate 60 persons at once, in the east wing of the building. Consequently, the existing offices and reception are relocated to the west wing, which has better facilities and wider span.

The narrow kitchen is relocated next to the toilet to create more space for it, and the existing kitchen is restored as a new storage.

The change of areas is shown in Table 5.6.

Table 5.6 Change in Floor Areas and Layout

Function	Floor Areas		Location	
	Existing	Designed	Existing	Designed
Reception	55.71	47.99	East Wing	West Wing
Manager Office	18.00	22.55	East Wing	West Wing
Staff Office	35.03	23.14	Both Wings	West Wing
Police Office	7.82	Combined w/ Staff office	West Wing	
Multi Purpose Room (MP room)	23.19	85.23	West Wing	East Wing
Toilet	15.16	15.33	West Wing	West Wing
Kitchen	5.42	7.60	Centre	West Wing
Storage	-	5.42		Centre
Meeting Room	33.92	Combined w/ MP room	West Wing	
Corridor	13.01	-	West Wing	
Total Floor Area	207.26	207.26		

Source: JICA Study Team

(2) Display Design

The display design accommodates exhibits according to the affordability of space in which things are displayed. Particular attention is paid to the sequence of exhibits and the provision of quality lighting.

(3) Utilities and Building Facilities

One of the utilities needed in the visitor centre is to provide a heating and cooling system as well as toilets for foreign tourists. This is expected to encourage people to spend more time inside the building and as a result learn more about its content, both during the summer and

winter seasons.

5.4.3. Furniture / Equipment (for improvement)

The condition and image of the present furniture in the building is moderate. Therefore, it is recommended to replace all furniture items which do not have a first class image, particularly those items within spaces where visitors will visit, watch audio visual presentations, or just relax while browsing through a book or brochure.

In addition, there is an urgent need to provide audio-visual equipment/systems that will market not only the Karak region, but also many other sites of historical, religious and folklore significance in Jordan.

Equipment required by KDC

- Personal Computer and Printer
- Private Automatic Branch Exchange (PABX)
- Video Cassette Recorder (VCR) and TV monitor with a size not less than 30 inches to present at least three languages

(1) Inventory of Furniture / Equipment

There are about 20 chairs inside the building, which cannot meet visitors and staff needs, and about eight desks that requires replacement with desks of a better quality. No equipment, that can be used to market the tourism industry in Karak, is now present.

(2) Design of Furniture / Equipment

The design of existing furniture is moderate in image, as previously explained, and is not sufficiently comfortable for use by the various age groups of visitors.

The design of new furniture should be attractive and simple while providing for comfort.

Table 5.7 List of Additional Equipment & Furniture for the Visitor Centre

Contents	Quantity	Size
Counter	1 set	
Computer	1 set	
Video Booth	1 set	
Low Case	2 sets	W2mxH1mxD1m
Graphic Panel	4 sets	W1mxH2m
Chair, Table, Book sheet	1 set	
Exhibition Case	1 set	

Source: JICA Study Team

5.4.4. Mechanical

(1) Heating, Ventilation and Air conditioning (HVAC) Systems

Packaged heat pump air handling units and split-heat pump units are proposed for the HVAC of this project. Heating will be accomplished by heat pump version. Packaged air handing units are selected to match internal design conditions for each zone.

For the multi purpose hall conditioned air will be distributed through spaces by ducts. Location of packaged air handling units, duct routes and air outlets are coordinated with the architects.

Individual extract air system is provided to serve toilets.

5.4.5. Electrical

The electrical works of this sub-project are designed basically in a self-contained and easily maintainable system for operation and maintenance generally practiced in Jordan.

(1) Power Distribution

Main Power Distribution

The Project shall be fed through a Main Distribution Board (MDB). The final distribution boards are connected to MDB by wires drawn in conduits.

(2) Lighting

The project shall be equipped with lamps suitable for the purpose of use.

Lighting fixtures and Control

Multi purpose Hall: Ceiling tracks close to museum walls are to be installed. Floodlights are to be installed on these tracks directed to wall mounted items.

Offices and reception: 60 x 60cm parabolic fluorescent lighting fixtures. Lighting shall be controlled from local switching.

Design illumination level

Table 5.8 shows the design illumination level of the major rooms to be applied to the preliminary design.

Table 5.8 Illumination levels for room

Room	Illumination level (Unit: lx)
Multi purpose Hall	500
Offices	500
Reception	300

Source: JICA Study Team

(3) Power Outlets

General-purpose single and duplex receptacles are installed throughout the building. General-purpose receptacles in the multipurpose hall, offices, reception and kitchen. Outlets for video equipment projector and screens are also provided, where needed.

(4) Telephone System

Offices and hall are fitted with 12 number of telephone outlets. Main telephone box is installed and a telephone cable is branched off the building main cable.

(5) Fire Alarm System:

Complete analogue addressable fire alarm system is provided for the building. The main fire alarm control panel is located at the Reception.

Control Panel:

2 zone fire alarm control panel is installed in the reception. The control panel is furnished with batteries and charger.

System:

Smoke Detectors shall be installed in reception, offices and multi purpose hall. Heat detectors are to be installed in the kitchen.

5.4.6. Safety Measures

Because a large number of people (60 persons) stay at one time in the multipurpose hall, it is necessary to provide other escape route rather than the staircase in the middle of the Building for safety in an emergency case. In order to avoid major structural change in the historical building, escaping from the terrace is an alternative. In this regard, the following measures are taken into consideration:

1) Opening of the windows in the reception and the multipurpose hall is changed from the inward to out swinging.
2) The handrail on the terrace is repaired and reinforced..
3) Corridor is removed and reducing converge of flow.

5.4.7. General Drawings

The following general drawings for the Visitor Centre are shown at the end of this Report.

(1) Architectural Drawings

1)	Site Plan	(1:100)
2)	Existing Plan, Elevations & Sections	(1:100)
3)	Proposed Plan	(1:50)
4)	Proposed Internal Elevations (Sections)	(1:50)

(2) Electrical Drawings

1)	Electrical Works	(1:100)

(3) Mechanical Drawings

1)	Mechanical Works	(1:100)

Chapter 6 Construction Planning

6.1. Project Site

The project sites of this sub-project are dispersed throughout Karak Tourism Development and currently used by local people every day. Therefore, prior to the commencement of the construction, a notification to the local residents is mandatory. The project site should be handed over to the contractor for the construction period, during which the contractor shall have all responsibility for the site. However, the accessibility of the street should be maintained for local use.

6.2. Temporary Work

All temporary works are the responsibility of the contractor. Program and plan of all temporary works should be submitted to and approved by MPWH and/or relevant agencies prior to the commencement of actual implementation of the temporary works on site.

6.2.1. Temporary Facilities

(1) Construction access road:

The tourist street, composed of Al Malik Hussein Street, Al Mujamma Street and Al Sarayah Street, can be utilised as the construction access.

Each of the observation points has its own access road which can be used for construction access.

For the works related to Karak Castle, Al Qal'a Street is to be the construction access road, but measures not to disturb the visitors to the Castle shall be taken.

(2) Contractor's office, workshop, material storage, parking, etc.

As for the tourist street and the observation points, the Karak municipality will not provide sites for the temporary facilities other than the construction site; therefore, the contractor is responsible for finding a suitable location.

For the components in Karak Castle, DOA will provide some space for the temporary facilities, although the specific location is not confirmed yet.

(3) Utility Services for the construction works

1) Water supply

It is confirmed by Karak Municipality that the contractor can obtain water supply from the existing main pipe which runs along the nearest road to the site, but subject to permission from Karak Water Authority.

2) Electrical supply

It is also confirmed by Karak Municipality that the contractor can obtain electrical supply from the existing transmission line running along the nearest road to the site under the co-ordination with Jordan Electrical Power Company.

3) Telecommunications

For the telephone lines, it may be practical to utilise mobile telephones. However, cable lines are required for the facsimile line and also internet/e-mail lines. It is confirmed

that the lines can be obtained at the main telephone line along the nearest road the site under the co-ordination with Jordan Electrical Power Company.

4) Sewerage

There is no sewerage facility available to the contractor. However, if the contractor wants to provide toilets near the site, the contractor should provide a new septic tank(s) to purify soil water to meet the Jordanian standards and regulations. The discharge point of the treated water should be coordinated with Karak Water Authority.

5) Normal solid waste disposal from the contractor's office

Karak Municipality will collect the normal solid waste and dispose of it according to their own system. If not, the contractor should apply an appropriate system and measures by his own responsibility.

6) Disposal of excess soil and debris

The excess soil and debris shall be disposed to an area(s) which should be designated under co-ordination with the Karak Municipality. The necessary measures to mitigate environmental impacts should be taken by the contractor.

Removal of any stones along the visitor pathways should be executed only after the approval of DOA.

Removal of debris along the visitor pathways and where necessary in the Karak Castle need to be approved by DOA.

The final solutions of the utility services accepted by the relevant agencies should be submitted to MPWH in written form prior to the construction on site.

6.2.2. Traffic Control Measures

In general, the contractor should not hinder the existing traffic flows both vehicles and pedestrians by the construction activities, without introducing any alternative flow lines. Plans of alternative traffic flow lines should be submitted to and coordinated with the Traffic Department of Karak Municipality.

(1) Tourist Street

As for the tourist streets, the municipality will plan how to maintain the traffic directly related to the daily life of the residents and shops along the street.

(2) Castle Observation Points

The Upper Observation Point should take measures for traffic control of the construction vehicles because the site is located at the sharply curved corner of the road. As for the Lower Observation Point, because the site is situated along the sloping road with curve, entering and exiting the site should be controlled.

(3) Karak Castle Presentation

For the components in the Karak Castle, the contractor should take measures to maintain traffic flow of visitors into and out of the Castle.

6.2.3. Safety and Security Measures

In general, the contractor shall be responsible for safety of the people living in the adjacent areas and of passing vehicles and pedestrians surrounding the site throughout the construction period.

(1) Safety measures at access point(s)

The contractor should determine an access point(s) for construction vehicles to the construction site and submit to MPWH for its acceptance. At the access point, the contractor should provide safety measures for the vehicles and pedestrians passing the existing road(s) on which the access point will be located.

(2) Security measures

Provision of a temporary fence or the like surrounding the construction site is recommended in order to avoid unnecessary entry of people and vehicles as well as to protect construction materials and equipment from theft.

The temporary fence or the like for the tourist street shall be provided part by part according to the sequential location of construction works.

6.2.4. Environmental Considerations

The work components of this sub-project consists: 1) Karak Castle Presentation, 2) improvement of the tourist streets, 3) construction of castle observation points and 4) renovation of the existing visitor centre. The project sites are located in the urban area of Karak City where houses and shops are concentrated.

As a result of on-site survey it is confirmed that natural environment cannot be seen around the sites and the impacts caused by the projects are limited to the human environment and are minor. In addition, most negative impacts are minor because the project-scale of each component is small.

The table below summarises the key adverse impacts and the proposed mitigation measures at both stages of construction and operation. The proposed mitigation measures are different according to their nature, the identified information is classified into that which should be described in the tender documents and others. The detail is described in the Supporting Report (Volume S6-3).

Table 6.1.1 Potential Impacts and Proposed Mitigation Measures

	Actions	Impacts	Mitigation measures
mitigation measures which are clarified in the tender document	**[construction stage]** - renovation works of the tourist streets	**Air Pollution:** - cause nuisance to the neighbouring residents by dust - disturb economic activities	- provide sheets for dust control - watering for dust control
	[construction stage] - renovation works of the visitor centre and the tourist streets	**Noise & Vibration Pollution:** - cause nuisance to the neighbouring residents	- provide noise protection sheets - restrict working hours
	[construction stage] - renovation works of the visitor centre and the tourist streets	**Existing Infrastructure:** - affect the existing signage, sewage and electric lines etc.	- alleviate effects on the existing infrastructure by clarifying the existing conditions and scope of works
	[construction stage] - renovation works of the visitor centre, the Castle and the tourist streets	**Traffic&Safety:** - increase conflict between vehicles and visitors	- conduct traffic control - secure detour (if necessary) - avoid rush hours
	[construction stage] - renovation works of the visitor centre, the Castle and the tourist streets	**Waste Pollution:** - generate a large volume of construction wastes	- secure transport and disposal sites - enhance recycling of the wastes

Source: JICA Study Team

6.3. Construction Method and Construction Schedule

The contractor should plan the most appropriate construction method and construction schedule, to be in CPM. They should be submitted to MPWH for its approval prior to the commencement of the work on site.

6.3.1. Construction Method

The construction method should include utilisation plan of construction machines as well as labour force.

The followings are the items to be taken into consideration regarding the construction method:

(1) Karak Castle museum

It is decided by DOA that the museum space will not be operated during the construction, therefore, no specific remark is noted.

(2) Visitor pathway

DOA decide that the pathway should be kept open to visitors even during construction, therefore construction in phasing should be planned to maintain visitor flow.

(3) Tourist street

The construction method is considered by the contractor upon the traffic control plan, which will be prepared by the municipality.

(4) Castle Observation points

No specific remark is noted, but a fence or the like should be provided along the perimeter of the site. In particular, for the upper observation site, the construction activities on a steep slope should be taken into consideration.

6.3.2. Construction Schedule

A construction schedule, recommended by the Study Team, is shown in Figure 6.1. The total construction period is estimated at 16 months with the defect liability (guarantee) period of one year.

The actual construction schedule should be prepared in CPM by the contractor taking into consideration temporary works and construction methods as well as other conditions of the site, material and labour supply plan on their work program. The construction schedule should be submitted to MPWH for its approval prior to the commencement of the work.

The rainy season (from December to February) should be taken into consideration for the preparation of the construction schedule.

6.3.3. Remarks on Construction Plan

(1) Foundation of retaining wall

The design of foundations and retaining walls of the castle observation points may be modified according to results of confirmation excavations conducted by the contractor prior to the construction of retaining walls.

(2) Museum wall

The removal of the heaped soil with debris and consolidation of the original museum wall after the removal of the soil are included as part of the scope of the contractor. However, the construction works must be closely co-ordinated by DOA. The cost estimates should be reviewed and clarified during the construction according to the co-ordination with DOA.

(3) Soundings and Excavations

In relation to the Visitor Pathways

1) DOA need to allow excavations to define the appropriate finish levels in the following locations:
   - Northern Suq Entrance
   - Northern Gate Area
   - Pathway of the Gallery Area
   - Pathway in the eastern area (Prison area)
   - Final design pathway levels to be determined after DOA excavations, otherwise to be implemented as drawings.
2) Concerning the castle exit which was opened recently, DOA shall continue the excavations works in order to properly connect the exit with the Gallery in relation to original levels.

In relation to the museum, the follow aspects are considered:

1) Several soundings and excavations were conducted to determine appropriate and original levels at the plaza, rooftop and adjacent hall. Archaeological excavation, undertaken in

front of the museum by DOA, has clarified that the original floor level of the plaza is approximately the same as the level of the museum hall.

2) After execution of soundings and excavations inside the new museum hall, removal of a later constructed wall that connected the main museum hall and the new hall was approved. The original ground level of the new hall, in relation to findings from the sounding was determined accordingly to about 60 cm from main hall. It was also noted that an original entrance from the adjacent hall is under the external existing stairs leading to the frontal court Plaza (refer to drawings). DOA clarified that the reduction of external stairs width, removal of the present water channel, and removal of the retaining wall in the near future are possible options and lie within the responsibility of DOA.

3) The findings of the sounding on top of the roof adjacent hall allowed for the removal of the debris from the roof in preparation for the proper drainage of the roof and adjacent external stairs.

(4) Site Management and Construction Guidelines

1) Guidelines and instructions for construction and consolidation works at Karak Castle;

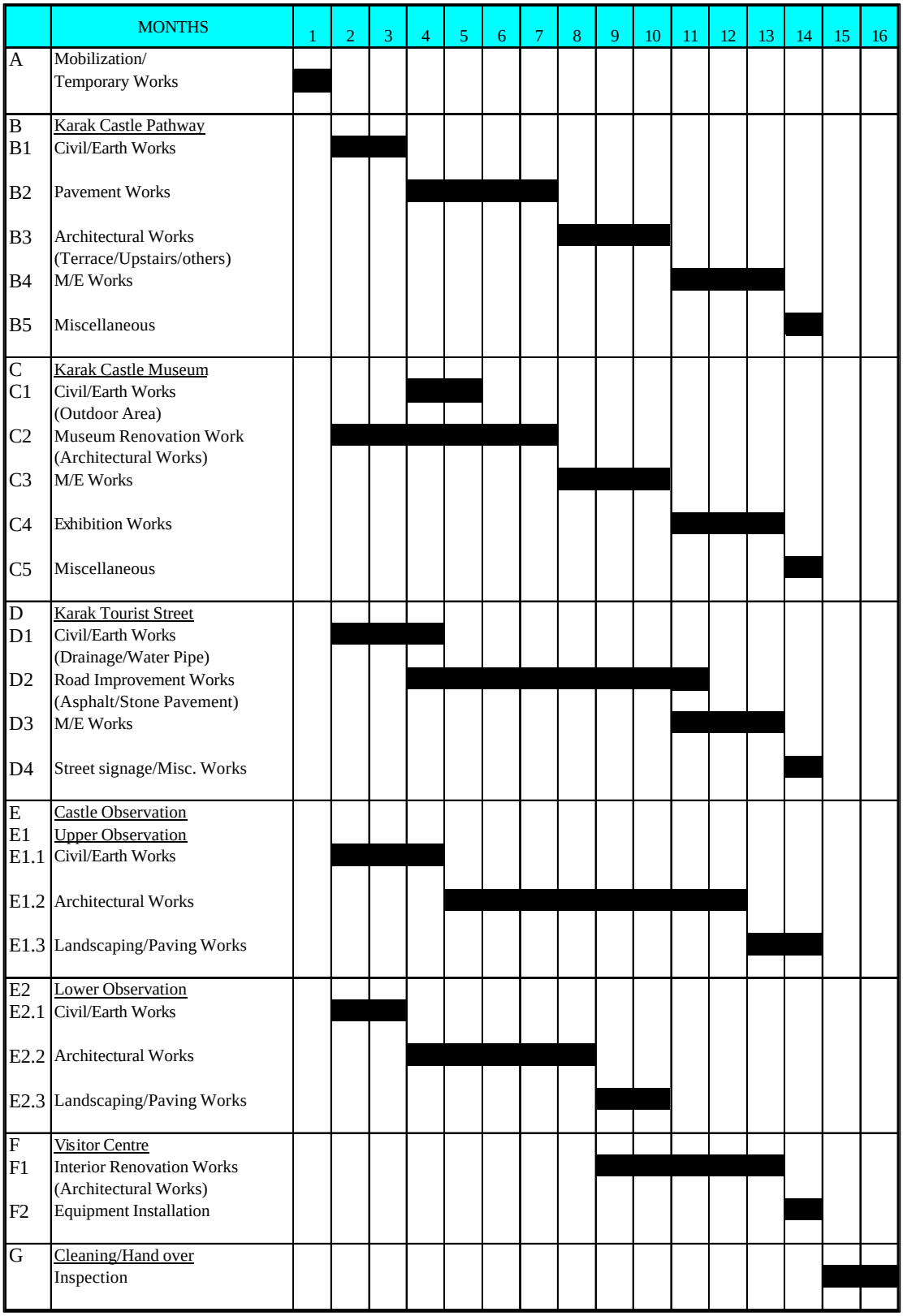
- Contractor shall employ professional technical staff who have relevant experience in conservation of such archaeological sites after the approval of DOA.
- The study of the rerouting of the visitors paths, while construction should be considered by the contractor in conjunction with the supervisor, consultant and DOA to minimize any disruption.
- Transportation of materials inside the castle site should be manual. DOA approval should be obtained for using any equipment.
- Vibration equipment should not be used. Use manual tools such as pick axe, shovel, etc.
- Concrete and material mixing in the castle site will not be allowed without using special containers.
- Removal of existing pointing should be only executed manually. Removed pointing to be tested in order to design matching mortar for repointing works.
- Stone should be always cleaned immediately after intervention.
- Polyethylene sheet layer should be used under new layers of construction.
- New stone for construction works shall be from Jordan Valley quarries and colour where specified, since no matching quarries of the existing castle stone are available.
- Contractor shall photograph all locations before, during and after execution of works.

2) Operation and site management during construction shall address the need to accommodate the role of DOA and/or their specialists to be appointed within the supervision or contracting team in addition to the consultant/supervisor team and the main contractor.

3) The relocation of the existing museum during the implementation of the proposed works, was considered. One suggestion is the temporary relocation of the exhibits to the Naseria Hall, after the approval of DOA.

Dumping and removal of waste materials resulting from the works are considered. Planning and implementation of removal of materials by the contractor needs to be approved by DOA.

Figure 6.1 Construction Schedule



Note) The following four(4) parties for the construction are considered;
1st party for B and C, 2nd party for D, 3rd party for E1 and 4th party for E2 and F

Source : JICA StudyTeam

Chapter 7 Tender and Contract Documents

7.1. Tender Package

This tender is conducted in one package including the following components:

1) Improvement of Karak Castle Presentation
2) Improvement of Tourist Street
3) Development of Castle Observation Points (2 places)
4) Improvement of Visitor Centre

7.2. Tender Administration

In order to manage the tender process, the follow aspects are considered.

7.2.1. Procurement Method

According to the Procurement Guidelines of JBIC, this sub-project should adopt Local Bidding (LB), since the construction cost is estimated a less than 400,000,000 Japanese Yen (approximately 2.7 million JD). In the case of LB, pre-qualification procedure is not necessary before the tender procedure.

Regarding the procedures of LB, specific requirements are as follows:

1) Unless the award of contract is to be made to the lowest tenderer among all the tenders received, review and concurrence are required by JBIC on the "Analysis of the Tenders and Proposal for Award" with a Summary Sheet as per the Form stipulated, before such award is made.
2) After executing a contract, review and concurrence are required by JBIC on the "Contract" with a duly certified copy of the contract.

7.2.2. Agency Responsible for this Tender

This LB for the Karak Tourism Development will be conducted under the responsibility of the Ministry of Public Works and Housing. (MPWH). The Government Tenders Directorate of in MPWH will organise a Tender Committee composed of staff of the Directorate, staff of MPWH, etc. The various works related to the tender will be assisted by a Project Management Consultant (PMC) assigned for the implementation of the sub-project.

The signer (the Employer) of the contract with the Contractor will be the Minister of MPWH.

7.3. Tender Documents

The tender documents are prepared by the JICA Study Team under the contract with JICA as a technical assistance scheme of the Japanese Government. The documents will be granted to the Jordanian Government after the completion of appraisal by JICA, and the Jordanian Government should legalize and formalize the documents for use in the implementation of the Project.

7.3.1. Composition of the Documents

The tender documents are composed of the following volumes and parts:

(1) Invitation to Tenderers

(2) Volume -I: Instructions to Tenderers

Form of Tender

1) Appendices

Appendix A:	Schedule of Time, Rates and Conditions
Appendix B:	Form of Agreement
Appendix C:	Form of Tender Guarantee
Appendix D:	Form of Performance Guarantee
Appendix E:	Form of Advance Payment Guarantee
Appendix F:	Drawing List
Appendix G:	General Construction Schedule
Appendix H:	Temporary Facility Location Map
Appendix I:	Query Form
Appendix J:	Tender Acknowledgement
Appendix K:	List of Eligible Countries

2) Enclosures

Enclosure No.1:	Power of Attorney
Enclosure No.2:	Certification of Submission of Tender Guarantee
Enclosure No.3:	Joint Operation Agreement
Enclosure No.4:	Letter of Association
Enclosure No.5:	Affidavit of Site Inspection
Enclosure No.6:	Basic Program of the Work
Enclosure No.7:	Contractor's Organization Chart
Enclosure No.8:	Outline Construction Plan and Proposed Layout Plan for Temporary Works
Enclosure No.9:	List of Contractor's Equipment to be used on the Works
Enclosure No.10:	List of Major Materials and Plant for the Works
Enclosure No.11:	List of Sub-Contractors/ Suppliers
Enclosure No.12:	List of Intended Import Materials and Plant
Enclosure No.13:	Detailed Monthly Cash Flow of Anticipated Contract Payments
Enclosure No.14:	Breakdown of Major Rates

(3) Volume -II: Specifications

PART-1: General Requirements
PART-2: Technical Specifications

(4) Volume -III: Bill of Quantities

(5) Volume -IV: Drawings

(6) Volume -V: Conditions of Contract

PART-1: General Conditions of Contract
PART-2: Special Conditions of Contract

7.3.2. Order of Contract Documents

The priority among the documents is as follows:

1) Contract Agreement
2) Letter of Acceptance
3) Tender and Notice to Tenderer/Appendix
4) Conditions of Contract Part (II)-Special Conditions
5) Conditions of Contract Part (I)-General Conditions
6) Specifications
7) Drawings
8) Priced Bill of Quantities

7.4. Type of Tendering

In principle, a type of "Unit Price Base Contract" tender shall be adopted for the contract of this sub-project with the arrangement of a provisional sum for limited work items.

(1) Provisional Sum

The Provisional Sum means a sum included in the Contract and so designated in the Bill of Quantities for the execution of any part of the construction works or for the supply of goods, materials, plant or services, or for contingencies which sum may be used, in whole or in part, or not at all on the instructions of the Engineer represented by the implementing agency of this sub-project.

The Contractor shall be entitled to only such amounts in respect of the work, supply or contingencies to which such Provisional Sums relate as the Engineer shall determine in accordance with the contract.

Chapter 8 Cost Estimates and Implementation Plan

8.1. Conditions of Cost Estimates

(1) Estimation Time

The unit prices for the construction works are adopted for the sub-project at the time of the cost estimation in March 2000.

(2) Base Cost for Estimation

The prices for construction materials, rental fees for construction equipment and labour unit rates obtained from the Ministry of Public Works and Housing (Issued in 1998) are adopted as the base cost for the sub-project.

(3) Jordanian Dinar (JD) is used for the cost estimation currency, since the basis of the construction budget for the Project has been referred from the SAPROF Report, prepared in March 1997 by OECF (currently called JBIC).

(4) Exchange Rate

The exchange rate between Jordanian Dinar and US dollar is 0.708 JD, and the exchange rate between Japanese yen and US dollar is 106.08 at the time of March 2000. The following exchange rates are applied:

- US$1 = 0.708 JD
- 1 JD = ¥150

(5) Price Increase

According to the information on construction costs from the Ministry of Public Works and Housing, the Government of Jordan, the unit prices for construction costs in Jordan have not changed for the last three years, since the construction sector is not active and new construction projects are decreasing, thus competitiveness of contractors is increasing. Therefore, the price increase for the Project is not considered for this cost estimation.

(6) Cost items to be excluded

Land acquisition costs and relocation costs for existing residents and shop owners are not included in accordance with the SAPROF budget. Contingency costs are also not added to the estimation in this study.

(7) Tax Conditions

Custom duties and service tax are excluded for some specific materials and equipment, which are expected to be imported. Custom duties and service tax are included in the unit price for construction materials and equipment.

(8) Measurement System

The Bills of Quantities are prepared in accordance with the standard prepared by the American Institute of Architects (AIA), which is commonly used in Jordan.

The construction work items are divided into the following divisions:

Divisions	Work Items
Division –1	General Requirement
Division –2	Site Work
Division –3	Concrete Work
Division –4	Masonry Work
Division –5	Metal Work
Division –6	Wood and Plastic
Division –7	Thermal and Moisture Protection
Division –8	Doors, Windows and Glazing
Division –9	Finishes
Division –10	Specialities
Division –11	Equipment
Division –12	Furnishing
Division –13	Special Construction
Division –14	Convey System
Division –15	Mechanical
Division –16	Electrical

8.2. Project Cost

8.2.1. Direct Cost

An official standard for quantity surveying for buildings is not available in Jordan. At the time of estimation, JST prepared compound costs for main construction works with reference to the information obtained from the Ministry of Public Works and Housing, other large projects currently being executed and the standard rates of Japan.

(1) Compound Cost

1) Working Hours

The working hours of people in the construction field is assumed from 8 o'clock in the morning to 6 o'clock in the afternoon including 2 hours for lunchtime. Therefore, for the calculation of the compound cost, 8 hours is adopted as the working hours for the sub-project.

2) Efficiency of Local Labour

The work efficiency for the project, as a coefficient, has been computed by utilising the information collected in Jordan with the comparison of the standard efficiency of Japan.

3) Machine Rental Price

The rental prices for construction machines obtained from the Ministry of Public Works and Housing is adopted for the calculation.

8.2.2. Indirect Cost

Rate of indirect costs (Preliminaries and Profit) are analysed and referenced based on the actual sample of prime projects currently being executed in Jordan.

(1) Preliminaries

Temporary and Preparation Works

Temporary and Preparation Works include temporary access roads, working yard, temporary buildings, working facilities, safety expenses, power and water, cleaning, laboratory testing, etc.

For the calculation of the cost of Preliminaries for each Sub-Project, the ratio of 2.5% of the direct cost is adopted.

Site Administration

The site administration cost includes direct personnel cost, site expenses, insurance, etc. Based on the analysis of the actual prime projects currently executed in Jordan with the comparison of rates applied in Japan, the rate of the site administration is assumed to be 11.5% of the direct cost.

For the sub-project, appropriate a sum of 14.0% of the direct construction cost as the Preliminaries include the cost of Temporary and Preparation Works as well as Site Administration.

(2) Profit

Based on the analysis of the actual prime projects currently executed in Jordan with the comparison of rates applied in Japan, the rate of the profit is assumed to be 10.0% of the direct cost.

For the sub-project, appropriate a sum of 10.0% of the direct construction cost as the profit.

8.2.3. Construction Costs

The construction cost of this sub-project is not specified in this report primarily due to the public availability of this report and the confidentiality of the construction cost prior to the tender. The detailed information on the construction cost, however, has been described in a separate edition, which has been supplied only to the Agencies and Ministries concerned.

8.3. Project Implementation Plan

8.3.1. Execution of the Sub-project

Items to be fulfilled for the overall implementation period of this sub-project, which is categorised as a LB type of procurement method, are as shown below:

(1) Completion of the JICA Study

JICA plans to complete the Final Report and Tender Documents by the end of August and they may be transferred to the Jordanian Government as soon as possible after finalising the internal procedures of the Government of Japan.

(2) Procurement of Project Management Consultant (PMC)

A Project Management Consultant (PMC) should be procured before the tender documents are transferred to the Jordanian side by JICA in order to maintain a smooth transition to the implementation stage under the JBIC Loan from the JICA D/D Stage.

(3) Review and confirmation of the tender documents

The tender documents should be reviewed and updated if any changes are made by the Jordanian side to the tender packaging, scope of works, employer address and so on.

(4) Tender period

This is categorised in the sub-projects for which the procurement method is LB. The procurement procedures for LB sub-projects are stipulated in the JBIC Guidelines as follows:

1) Announcement of Tender
2) Pre-tendering conference and distribution of Tender Documents
3) Preparation of tenders by the tenderers
4) Tender opening
5) Evaluation of Tenders
6) Unless the award of contract is to be made to the lowest tenderer among all the tenders received, review and concurrence are required by JBIC on the "Analysis of the Tenders and Proposal for Award" with a Summary Sheet as per the Form stipulated, before such award is made
7) Sending the notice of award to the successful tenderer
8) Negotiation
9) Signing the contract
10) After executing a contract, review and concurrence are required by JBIC on the "Contract" with a duly certified copy of the contract.

(5) Construction and As-built drawings

As shown in Figure 6.1, the construction period for this sub-project is estimated at 16 months. The contractor should prepare and submit a set of as-built drawings to MPWH within one month after the completion of the construction works (issuance of the completion certificate).

(6) Defect liability (Guarantee) period

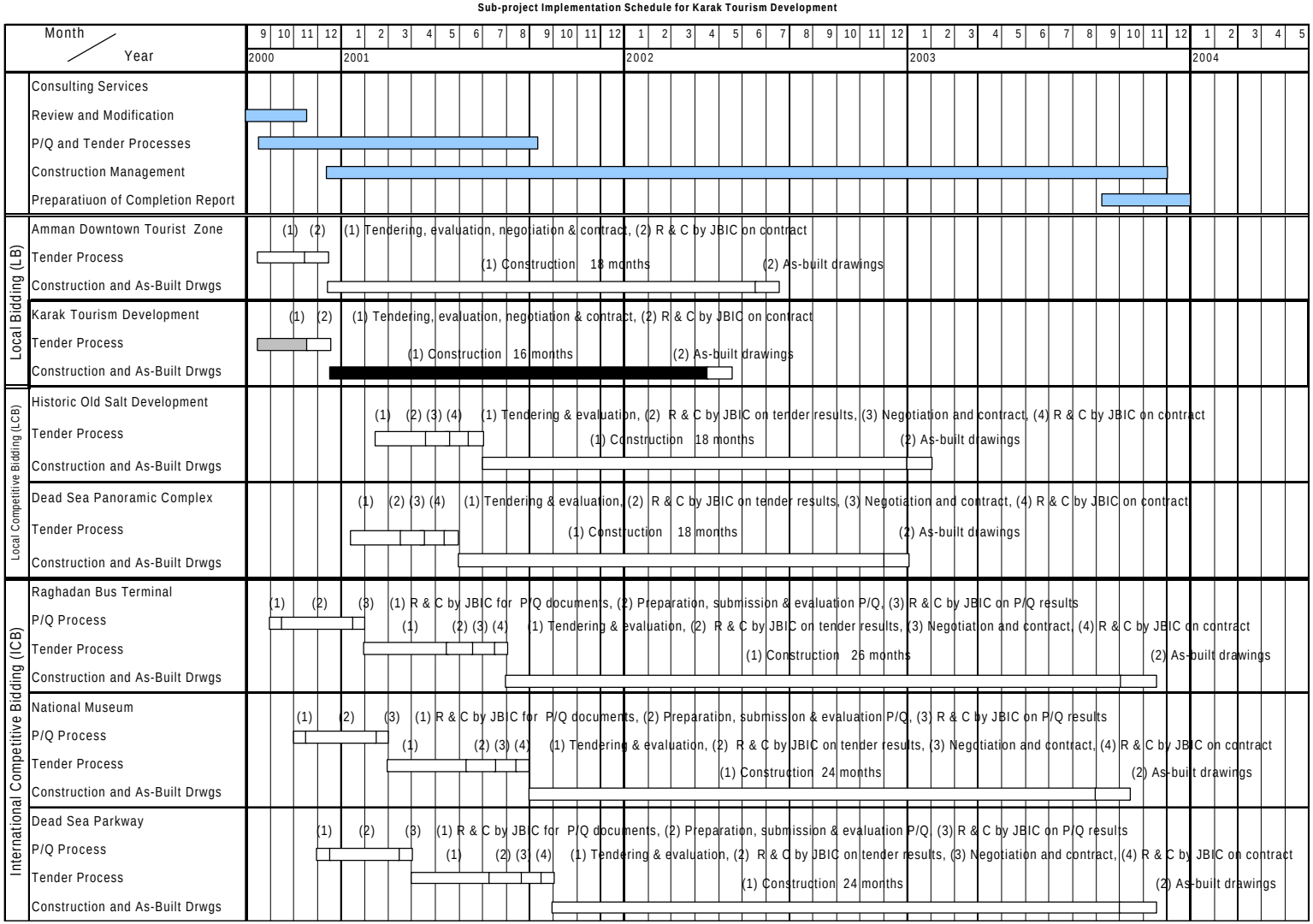
The period for defect liability is 365 days (one year).

(7) Completion Report

Within 3 months after the completion of the construction works a completion report should be prepared and submitted by the Consultant to MPWH.

An overall project implementation schedule prepared by JST is shown in Figure 8.1.

Figure 8.1 Overall Project Implementation Plan



Source: JICA Study Team

Chapter 9 Operation and Maintenance Plan

9.1. General

The goal of the sub-project is to achieve the objectives described below:

1) To improve tourism access to Karak Castle in relation with the development in front of the Castle under the assistance of World Bank.
2) To enforce pedestrian linkage among the tourism assets in the zone.
3) To improve tourism activities along Tourist Street.
4) To serve for:
   - providing convenience to the tourists to make them stay longer in Karak; and
   - encouraging the existing and new commercial activities.

The maintenance and operation system of Karak Tourism Development Sub-project should be established by components as shown below:

Table 9.1 Component and Agency Responsible for Operation and Maintenance

Functional Group	Component	Responsible Agency
Karak Castle Presentation	Karak Castle Pathway	DOA. MOTA
	Karak Castle Museum	
Tourist Street		Municipal Work Department, Karak Municipality
Observation Point	Upper Observation Point	Karak Municipality, Karak Development Corporation
	Lower Observation Point	
Visitor Centre		MOTA

Source: JICA Study Team

The following are the descriptions of the operation and maintenance system by the component:

9.2. Karak Castle Presentation

Karak Castle Museum is the regional/site museum. The operation and maintenance (O/M) body of Karak Castle Presentation is DOA, MOTA according to the Law of Antiquity, Jordan. Therefore, the existing O/M system for the Karak Museum by DOA including Karak Castle Museum can be continuously applied after the completion of the sub-project, although the exhibition space has been expanded.

9.2.1. Existing Management System

The existing management system of Karak Castle is briefly described as follows:

Staff Organization

The existing management system of the Castle is divided into two organisations for Castle Museum and the Castle as shown in Table 9.2.

Operation Hour

- Operation Hours: AM 8:00 ~ PM 5:00
- Operation days: 365 days

Admission fee

The admission fee is collected at the entrance of Karak Castle and no additional fee is required for museum space.

- Domestic, independent: 0.15 JD for Adult, 0.10 JD for Students
- Domestic, group: no charge for all
- International, all: 2.00 JD for all

Table 9.2 Existing Staff Organisation of Castle Management

Title	Number of Staff
Castle Museum Management	
1. General Manager	1
2. Curator	2
3. Cleaning	1
Sub-total	**4**
Castle Management	
4. Inspector	1
5. Accountant	1
6. Ticket Selling	4
7. Control Activity	1
8. Driver	1
9. Cleaning	2
Sub-total	**10**
Total	**14**

Source: DOA

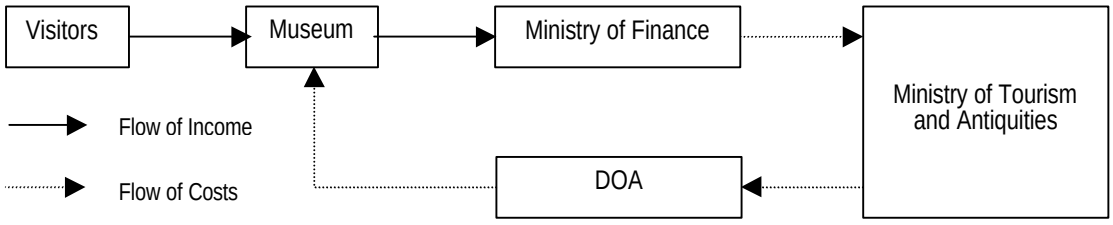
9.2.2. Flow of Admission Fee and Budget

The flow of admission fee and budget is as shown in Figure 9.1. The admission fee collected from visitors is directly transmitted to the Ministry Finance just through the accountant section. Castle Museum and the Castle have the annual budget from the Ministry of Finance through DOA of MOTA.

9.2.3. Examination on the Existing System

The operation of the Museum is stable since they can get operation budget annually from the Ministry of Finance without relation to making income (admission fee) higher or lower. Therefore it seems that conation of the staff to improve/renew for making the exhibition more attractive is spoiled, and that the system may be a reason to loose attractiveness of Castle Museum as well as other existing museums.

Figure 9.1 Flow of Admission Fee and Budget



Source: DOA

9.2.4. Proposed System

Although it may be necessary to amend the Law of Antiquities for the drastic change of the management system of the museums in Jordan, it is proposed for the operation system of Castle Museum as follows:

- To introduce self sustainable system although some governmental subsidy will be necessary,

- To give incentives against efforts of staff to increase profit, and
- To keep attractiveness with improvement and renewal of the exhibition, etc.

The Museum is categorised as a site museum and may not require such Research, Education, Library sections, etc., which should be handled by the DOA head quarter. The management structure of the Castle even after renovation would be conducted with the current structure. However, it is proposed to increase the number of common staff for cleaning, facility maintenance, etc. The proposed organisation is shown in Table 9.3.

Table 9.3 Proposed Organisation Structure and Number of Staff

Section	Manager	Section Head	Service staff	Total	Function and role
Director	**1**			**1**	
Castle Department	1			1	
General affair section					
• Inspector		1		1	
• Accountant		1		1	
• Ticket selling			4	4	
• Control activity		1		1	
• Driver			1	1	
Facilities section		1		1	
• Maintenance, cleaning, etc.			4	4	• Maintenance, Cleaning management, etc.
Sub-total	**1**	**4**	**9**	**14**	
Museum Department	1			1	
• Curator		1		1	
• Museum Shop Management			1	1	
Sub-total	**1**	**1**	**1**	**3**	
Total	**3**	**5**	**10**	**18**	

Source: JICA Study Team

9.2.5. Training for Museum Staff

An important aspect along with managerial aspects such as the business income of a museum is the problem of staff who support museum undertakings and its activities. If each and every museum staff has the consciousness and readiness to operate the museum towards a more desirable direction, his/her daily routine should prove to be readily productive. It is a matter, which cannot be realised merely from the consequences of one's work and endeavours. For a museum to be better managed and operated, all concerned, from the curator and those engaged in art down to service staff, are required to be in joint possession of a fundamental philosophy regarding museum administration, such as its social role. It is essential to realise such a goal, training museum staff to improve on their temperament by having them acquire knowledge and experience as well as an opportunity to get to know better their occupation.

(1) Training programme arrangements

1) Confirming job details of principal posts.
2) Examining required backgrounds, qualifications, etc. of candidates for principal posts.
3) Recruiting for principal posts by special committee including representatives of the preparatory committee.

(2) Home training

The overseas training may not be required for the staff of Museum basically. Some staff of the Museum would have home training in the training course of National Museum which will be

conducted by the managing staff as well as curators, who will be trained overseas and acquire know-how concerning museum activities such as data and material control, exhibit planning, public relations.

9.2.6. Responsibility of Actions at Pre-operation Stage

The actions required in the pre-opening stage should be taken by various agencies or persons concerned. Every agency or person should fulfil his responsibility properly and in time, otherwise the opening of the Museum will not be in success. The demarcation of responsibility for each action is shown in Table 9.4.

Table 9.4 Demarcation of Responsibility at Pre-opening Stage

Activities	Responsible body				
	DOA	Staff of Museum	PMU Consultants	Contractor	Others
A. Operational activities					
A-1 Preparation museum operation plan	o		o		
A-2 Preparation of training program	o		o		
A-3 Home training					o
A-4 Preparation of list of artefacts to be collected		o			
A-5 Plan, design, text writing, editing, printing literatures		o			
A-6 Preparation of operation manual and simulation		o			
A-7 Preparation of opening ceremony		o			
A-8 Promotion and advertisement		o			
B. Study and design activities					
B-1 Procurement of Contractor (P/Q, Tender, Contract)			o		o
B-2 Collection of data and information for panels and models	o				
B-3 Writing text for panels and explanation boards		o			
B-4 Final design of panels, models, etc.			o		
B-5 Negotiation with current owners for authentic artefacts	o				
C. Construction activities					
C-1 Construction of building, outdoor works, etc.				o	
C-2 Production of exhibition materials (panels, models, etc.)				o	
C-3 Seasoning the building				o	
C-4 Installation of exhibition equipment				o	
C-5 Processing existing film/slides, etc. for AV presentation			o	o	
C-6 Transport and shipping in the authentic artefacts	o				

Source: JICA Study Team

9.3. Tourist Street

The agency responsible for the maintenance of tourist street is Karak Municipality.

It is proposed that the current maintenance system of Karak Municipality should be basically applied for the tourist street. However, considering the objectives of the Project to promote the tourism of the Karak area, the maintenance of the tourist street should be taken with more care and frequency as shown below, although the street composed of the tourist street is ranked in the highest priority road in Karak city.

(1) Inspection System

Inspections are performed so that repairs can be made and pavements maintained and no hindrance to pedestrians will occur.

Pavements inspections are one of the most important maintenance activities in this sub-project to determine the convenience of the tourists as well as local people's walking conditions.

The types of inspections to be conducted are divided into three categories as routine inspection,

periodic inspection and special inspection.

1) Routine Inspection and Cleaning: inspecting any deteriorations and damages while cleaning streets, trails, stairs and facilities according to the criteria of the current program of Karak Municipality.

2) Periodic Inspection: the investigation of structures such as stone and concrete tile pavements, drainages, vegetations and slopes.

3) Special Inspection: the supplementary inspection conducted in addition to the routine and periodic inspection described above when necessary due to possible damaged caused by storms, heavy rain, earthquake, or other unusual conditions.

The frequencies of cleaning and inspection mentioned above are as follows:

- Routine cleaning Once a week/Once a month
- Periodic Inspection Once a year
- Special Inspection As necessary

The proposed contents of inspections are shown in Table 9.5.

(2) Pavement Cleaning

Pavement cleaning involves removing dirt and trash from the street, trails, plazas and adjacent facilities to eliminate walking obstructions.

(3) Vegetation Management

Vegetation management consists of planting new growth, pruning and maintaining established vegetation, and removing old vegetation, so that grass, shrubs and trees can grow without any obstruction to provide a pleasing respite for pedestrians, help to conserve and enhance the environment.

Table 9.5 Contents of Inspection

Functional Category	Classification of Structure
Pavement Surface	Pavement (Lime stone, Basalt, Concrete tile)
	Curb
	Mortar Joint
Slope	Vegetation Slope
	Slope Protection Works
	Masonry
	Retaining Wall
Drainage Facilities	Street Surface
	Slope
	Catchment
Building Structure (Arch, Pergola, View Terraces)	Concrete Structure
	Concrete Sub-structure
	Steel Fastening
	Painting
	Wooden Structure
Culvert	Reinforced Concrete Box
	Reinforced Concrete Pipe
	Other
Traffic Safety Facilities	Traffic Barrier (Hand Rail, Boland)
Traffic Control Facilities	Signs (Direction sign, traffic sign)
	Markings
	Delineators (Guard Posts)

Source: JICA Study Team

(4) Repairs

Repairs include repairing the pavement surface, slope repair, and repainting traffic control facilities, stairs, structures, etc.

- Basalt pavement

  Basalt pavement repairs are required because of loosening cracking and rutting caused by heavy traffic, sudden stopping and tire chains. An evaluation method shall be established for the repairs required, based on a survey and analysis of the existing pavement roughness, cracking ratio and depth of rutting.

- Minor Repair
  - Replacement of broken pavement, crack sealing and patching of local damage and adjustment of pavement surface differences
  - Traffic safety and control facilities, guard-rails, signs and road markings
  - Slopes, embankment control, drainage and removal of fallen rock and debris
  - Minor repair and leakage of water pipes
- Maintenance of Street Fixtures, Fittings and Equipment

  This item includes the inspection, maintenance and repair of water devices, and lighting fixtures as well as electrical facilities, street furniture such as benches, etc.

(5) Restoration of Traffic Accident Damage

Typical damage caused by traffic accidents are the damage to signages, curbs, trees, light poles, pavement, and building walls, etc.

(6) Restoration Work for Damage Caused by Unforeseen Natural Disasters

Slope failures and retaining wall damage are caused by heavy rainfall and/or earthquakes. Slope failures are normally related to heavy rainfall and providing inadequate drainage of surface and seepage water.

9.3.2. Specific Considerations

Since it is important to confirm, by the shop owners along the street, who are the beneficiaries from the activation of the tourist street, that the tourist street is not only physical road but also formulated by the social elements, it is recommended to organise an association of the shop owners in order try to maintain and improve the attractiveness of the tourist street by themselves.

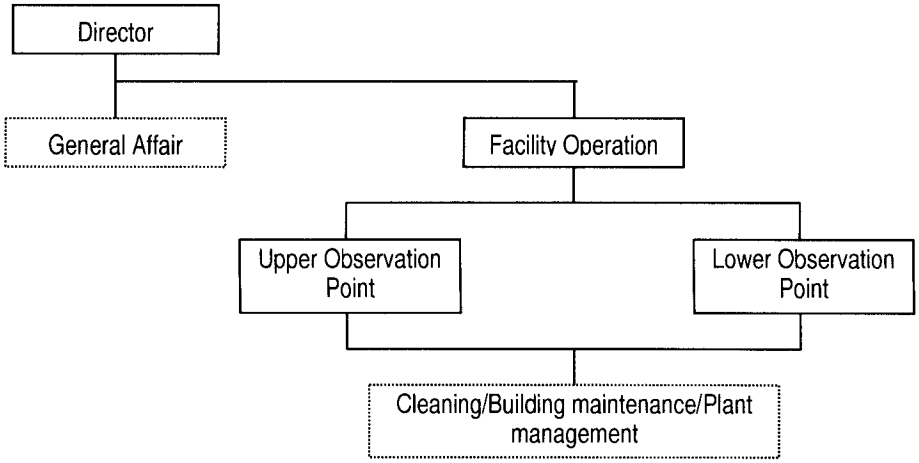
9.4. Observation Points

9.4.1. Structure of Operation and Maintenance

The agency responsible for operation and maintenance of the observation points is Karak Municipality. The main office of the operation body will be located in the Municipality and each observation point facility has only one manager, who is also the tourism information manager of each observation point. The proposed structure of the operation and maintenance is as shown in Figure 9.2.

The function of general affair and staff of cleaning, building maintenance and plant management would be covered by the existing system of Karak Municipality.

Figure 9.2 Structure of Operation and Maintenance



Source: JICA Study Team

9.5. Environmental considerations in Operation Stage

The project basically helps to improve the urban area of the Karak City in tourism promotion. Also it will bring enhancement of economic activities of the town due to increase of tourists. Some project sites locate in the residential areas or along the streets, and environmental impacts caused by the project are restricted to the human environment and socio-economic activities.

Based upon the on-site survey, it is confirmed that the residents and shops near the project sites may receive indirect or direct impacts at the stages of operation. Table 9.6 summarises the key adverse impacts and the proposed mitigation measures in the operation stage.

Table 9.6 Potential Impacts and Proposed Mitigation Measures

Actions	Impacts	Mitigation measures
[operational stage] - increase of tourists	Waste Pollution: - generate a large volume of construction waste	- place litter boxes for collecting general waste - improve the existing waste collection system
[operational stage] - increase of tourists and cars	Traffic & Safety: - increase conflict between vehicles and visitors	- raise awareness by environmental education - improve functions of the existing parking areas - plan/ implement new traffic system to reduce the number of cars in the city centre and to secure good traffic circulation with long-term perspectives

Source: JICA Study Team

9.6. Facility Operation and Maintenance Plan for Observation Points

9.6.1. Facility Operation and Maintenance System

Although the facilities are designed with the utmost emphasis on ease of operation and maintenance, it is advisable to establish a system for efficient maintenance of the facilities taking into consideration following.

1) Technical staff responsible for operation and maintenance of facilities in each field would be arranged by the Municipality in the current system.

2) Building Contractor shall give on-the-job training for the operation, maintenance and inspection of facilities to the above technical staff and at the same time provide instruction manuals on maintenance and operation, if any.

3) Weekly reports on maintenance and inspection of facilities shall be prepared by the technical staff to make it easy to have a clear grasp of the status of the facilities.

9.6.2. Operation and Maintenance Plan

The activities for operating and maintaining the facilities are as shown below.

O& M	Daily O& M	- cleaning, operation, daily inspection
	Periodical O& M	- periodical inspection/adjustment, minor repair
	Emergency O& M	- emergency inspection, repair, renovation

To establish an overall plan for operation and maintenance, especially for the periodical inspection/adjustment among the above activities, is essential to keep facilities operated in order as planned and to prolong the facilities life.

The inspection and maintenance system of the facility are shown in Section 9.6.3 below. In addition to them, special emphasis shall be placed on the following issues.

1) Roof

- Highly durable materials are selected for waterproofing of the roof. Periodical inspections and cleaning, however, are necessary to avoid water leaks.
- Gutters and drainpipes, especially, shall be cleared twice a year since they are likely to be filled with dust.

2) Finishing Materials

- When exterior materials have rusted, rust shall be removed and the metal shall be painted to prevent it's spread.
- Rooms shall be kept well ventilated and the finished surfaces of rooms shall be kept clean to prevent them from getting rusty and dirty.
- Since floors finished with stone or terrazzo tiles are difficult to repair once scratched, particular care shall be taken when moving heavy objects on such a floor.
- Ceiling finish materials shall be handled very carefully since they are affected by shocks,

3) Building Machines

- Building machines shall be operated and inspected by engineers with professional knowledge of electricity or machinery in accordance with the instructions listed in instruction manuals.
- When troubles are found in a piece of machine, operation of it shall immediately be stopped to find out the cause and remedial measures shall be taken to prevent the trouble form affecting other pieces of machines.

9.6.3. Inspection and Maintenance system

The main points of facility inspection and maintenance to be inspected and adjusted, and their suitable periods are shown in Table 9.7 for the building and Table 9.8 for the electrical and mechanical.

Table 9.7 Building Inspection and Maintenance System

Part of Building		Inspection Points	Inspection Period
Structure	Footing	1. Crack, deform, damage and settlement. 2. Settlement and floating of the building from the ground level.	3 years
	Column, Girder, Wall, Floor, Roof, Balcony, Stair	1. Crack, deformation, damage, rust, erosion, deterioration of painting, and loosening of connection.	
Finish	Floor	1. Crack, damage, fragmentation of surface, rust, erosion, abrasion, deterioration of paint, condensation in finishing materials. 2. Performance of waterproofing membrane. 3. Drainage of water exposed area.	1 year
	Stairs	1. Crack, damage, fragmentation of surface, rust, erosion, condensation, deterioration of paint, and rain leaking in finishing materials. 2. Deformation, damage or deterioration, and installation condition of non-slip.	1 year
	Wall	1. Crack, deformation, damage, fragmentation of surface, rust, erosion, condensation, deterioration of paint and rain leaking in finishing materials. 2. Crack, damage, and deterioration of sealant. 3. Deformation, rust, erosion or deterioration of paint and installation condition of metallic material.	Interior 3 years Exterior 1 year
	Door & Window	1. Deformation, damage, abrasion, rust, erosion or deterioration of paint, and condition of working & installation. 2. Crack, deformation, damage, abrasion and deterioration of sealant & airtight material.	1 year
	Ceiling	1. Crack, deformation, damage, fragmentation of surface, rust, erosion, condensation, deterioration of paint, rain leaking and installation condition of finish. 2. Deformation, damage, rust, erosion or deterioration of paint and installation condition of curtain box & ceiling maintenance hatch.	Interior 3 years Exterior 1 year
	Roof	1. Crack, damage, deterioration and surface fragmentation of finish & expansion joint 2. Crack, damage or fragmentation of surface, rust and installation condition of parapet & top rail. 3. Performance of waterproofing membrane.	3 years

Source: JICA Study Team

Table 9.8 Mechanical and Electrical Inspection and Maintenance System

Mechanical Equipment

Building utilities		Maintenance Item	Maintenance Period
Water supply, drainage system	Water supply and drainage	1. Check damage, rust, corrosion, noise and abnormal vibration.	1 year
		2. Check lubrication of bearings.	-ditto-
		3. Check operation of devices.	-ditto-
	Pipes and valves	1. Check damage, rust and corrosion.	1 year
		2. Check operation of valves.	-ditto-

Electrical Equipment

Building utilities		Maintenance Item	Maintenance Period
Lighting and motor control system	Lighting and motor control devices	1. Check damage inside of distribution board, rust, temp rising, noise and connection of cables.	1 year
		2. Operation test	-ditto-
		3. Operation test of protective devices.	-ditto-
		4. Check damage, connection of cables, rust, temp rising of outdoor lighting fixtures.	-ditto-
	Feeder	1. Check damage, rust and temp rising.	1 year
		2. Check condition of installation and damages or rust on supporting materials.	-ditto-
Wiring system for outdoor		1. Check crack, damage, corrosion, condition and connection of cables.	
		2. Check damage, corrosion of pipes and supporting materials.	6 months
		3. Check crack, damage, level of lid of hand hall and man hall.	-ditto-
		4. Check deformation, damage and condition of hand hall and man hall.	1 year -ditto-
		5. Operation test.	-ditto-

Source: JICA Study Team

Chapter 10 Financial Analysis

10.1. Methodology

The purpose of the museum management is both making museum activity well filled and making an offer of the good service to society. The key of good management is suitable arrangement of museum personnel and maintaining stability of finances.

Appraised the income and expenditure is based on the budget allotment of the number of personnel, special exhibition, public relations, restoration of an exhibit and research in the representative museum in Japan and the circumstances in Jordan.

10.2. Expenditure and Income

Items to be considered for expenditure and income are assumed as shown in Table 10.1.

The basis of the calculation of income and expenditure for operation cost is financially stable plan, namely it estimates low income and high expenditure in the plan.

Accordingly it does a trail calculation of the income and expenditure for operating cost, referred to museums in Japan and advanced countries, and the circumstances in Jordan.

Table 10.1 Items of Expenditure and Revenue

Expenditure

Item		Application
Personnel Expenditure	Director	Monthly salary + bonus + allowance
	Assistant Director	
	Department Head	
	Chief of Section	
	General Staff	
	Service Staff	
Operation Expense	Special Exhibitions	Exhibition Expense
	Public Relations	Symposium and Lectures, meeting etc.
		Training programme
		Bulletin
		Guide book
		Poster and advertisement, etc.
	For Exhibit	Collection of exhibits
		Restoration of Exhibit
	Studies and Research	Academic society fee, Travelling expense
		Book Purchasing cost, Research report expense
Administrative Expenses	Utility costs	Electricity, Water, Sewage and Fuel cost
	Maintenance Cost	Inspection, Repair expenses
	General Cost	Communication, Supplies and Miscellaneous expenses

Revenue

Item		Application
Operation Revenue	Exhibition	Admission fee
	Educational spreading	Lecture and short course attendance fee
	Income by Publication	Sales of publications
Facilities Rent	Rental fee	Museum shops
		Restaurant

Source: JICA Study Team

10.2.1. Expenditure

(1) Cost for personnel

It is calculated based on present labour cost of museum in Jordan and the assumed number of personnel and service staff of the new museum.

Annual labour cost is calculated, referred the estimated monthly salary by SAPROF and estimated allowance (approximately 4 times of the monthly salary).

The estimated annual labour cost for museum are assumed as follows:

Director	24,000JD
Chief of section	12,800JD
General staff	8,000JD
Service staff	4,800JD

(2) Operating cost

Calculations have been made by the means quoted in the existing museums in Jordan for required items.

1) Items which can be referred to the existing museum in Jordan are estimated by converting the planed facilities or number of personnel.

2) Items which cannot be referred to the existing museum in Jordan are estimated by the ratio of the operating cost of the national museum in Japan as shown in Table 10.2.

Table 10.2 The ratio of the total expenditure in the operating cost

Items		Tokyo National Museum	Kyoto National Museum	Nara National Museum	Total
Operating Cost	Special Exhibition	4.8	13.6	13.9	8.3
	Public Relations	1.1	0.8	0.4	0.9
	Data and Materials Collection	0.3	0.1	0.2	0.3
	Restoration of Data	7.8	3.2	1.6	5.7
	Studies and Research	0.3	0.0	0.0	0.2
	Total	14.2	17.8	16.2	15.3

Source: Museums in Japan

The ratio shows on which items emphasis in museum activities is laid. For museums in Japan, it is clear that holding special exhibitions several times a year, which will generate publicity and attract large numbers of visitors, is the key to successful operation.

(3) Administrative cost

1) Heating and lighting expenses is estimated by maximum demand of facilities for Karak Castle Museum

Electricity and fuel	4,800 JD
Water and sewage	1,000 JD

Total	5,800 JD
Unit price/m^2	5,800 JD／485 ㎡＝12.00 JD

2) Maintenance cost is 20% of the Heating and lighting expense

3) General expense is 10% of the total expenditure

The expenditure does not include depreciation and taxes because of administration by government or local public body. Accordingly in case of administration by incorporated foundation or the third sector, it takes them into consideration.

10.2.2. Revenue

(1) Operating revenue

1) Admission fee is estimated by anticipatory visitors and the intended fee

Anticipator visitors under the planed facilities are higher than those of National Museum in Japan. To materialise the anticipator visitors, it holds attractive special exhibition as mentioned in 10.2.1 (2) "Operating Cost". It is impossible to materialise it without attractive special exhibition and various events in the news to make an appeal to the group which does not go to museum in usual life and tourists.

2) Education spreading income is 72% of the public relations cost

3) Publication income is 70% of public relation

Table 10.3 Ratio of Operation Revenue against Revenue of Public Relation

(%)

ITEM		Tokyo National Museum	Kyoto National Museum	Nara National Museum	Average
Operating Income	Education Spreading Income	61.4	68.6	186.9	71.7
	Publication Income	47.0	128.3	144.3	70.4

Source: Museums in Japan

(2) Other income

Other incomes such as subsidies, contributions are not assumed.

10.3 Considerations on Financial Status

10.3.1 Visitors and Admission Fees

A provisional calculation of expenditure and revenue was conducted based on the conditions below and the results of the calculation are shown in Table 10.4.

Visitors

According to data of the current number of visitors to the Castle, total visitors are 75,700 in 1998/99, of which 70 % or 53,000 and 30% or 22,700 are for foreign and local visitors respectively.

Admission Fees

The admission fee is set as 3.0 JD for foreign visitors and 0.15 JD for local ones, also the fees

may be determined in political considerations finally. The admission fee of 0.15 JD for the local visitors is keeping the current admission fee of the Castle, while 2.0 JD has been increased for the foreign visitors from the current fee of 1.0 JD in order to obtain keep certain level of the financial status.

10.3.2 Considerations on the Calculation Results

According to the calculation results shown in Table 10.4, the following are the considerations of the financial status of the Museum:

- The balance between the revenue and expenditure becomes 40,654 JD in red ink.
- In order to keep a break-even point between the expenditure and revenue, increasing the amount of admission fee is the only way, since other revenue is too small and not effective. Increasing the amount of admission fee has two ways; 1) increasing number of visitors and 2) increasing admission fees.
- For the break-even to the operation and maintenance costs, the former way above was taken because the admission fees will be determined with political considerations. As shown in Table 10.5, it is required to pay efforts to increase number of visitors to 94,700 in total (addition of 19,000) for keeping the break-even point.
- For return of the initial investment; pre-opening activities and construction costs, more efforts should be paid by the all agencies concerned in relation with the total tourism promotion of the Karak City and region.

Table 10.4 Provisional Calculation of Expenditure and Revenue based on Visitors in 1998/99

Expenditure

Item		Number/Personnel	Expenditure per Annum (JD)	Amount (JD)
Personnel Expenditure	Director	1	24,000	24,000
	Chief of Section	4	12,800	51,200
	General Staff	2	8,000	16,000
	Service Staff	10	4,800	48,000
	Sub Total			139,200
Operation Expenses	Special Exhibitions	Exhibition Expense		22,410
	Public Relations	Lectures, Short courses and Poster Production costs etc.		2,430
	Data and Materials Collection and restoration	Data and Materials Collection		810
		Restoration of Exhibit		15,390
	Studies and Research	Academic society fee, Book purchase cost, Report printing expense		540
	Sub Total			41,580
Administrative Expenses	Utility costs	Electricity, Water, Sewage and Fuel cost		5,800
	Maintenance Cost	Equipment maintenance and inspection, Repair expenses		1,160
	General Cost	Communication, supplies and misc. expenses		18,770
	Sub Total			25,730
Total				206,510

Revenue

Item		Admission fee	Number of Visitors	Amount (JD)
Operation Revenue	Admission Income	Tourist (3JD)	53,000	159,000
		Local Citizen (0.15JD)	22,700	3,405
		Sub Total	75,700	162,405
	Education Spreading Income	Lecture and short course attendance fee		1,750
	Income publication	Sales of Publications		1,701
	Sub Total			165,856
Total				165,856
Balance of Revenue and Expenditure				-40,654

Source: JICA Study Team

Table 10.5 Provisional Calculation for Break-even by adjusting Number of Visitors

Revenue

Item		Admission fee	Number of Visitors	Amount (JD)
Operation Revenue	Admission Income	Tourist (3.0 JD)	66,300 (+13,300)	198,900
		Local Citizen (0.15 JD)	28,400 (+ 5,700)	4,260
		Sub Total	94,700 (+19,000)	203,160
	Education Spreading Income	Lecture and short course attendance fee		1,750
	Income publication	Sales of Publications		1,701
	Sub Total			206,611
Total				260,611
Balance of Income and Expenditure (in Table 10.4)				+101

Source: JICA Study Team

Chapter 11. Issues to be solved in Further Stage

There are still many issues to be solved by the Jordanian side to proceed further in the implementation stage.

11.1. Particular Issues

(1) Review of Procurement Schedule

The procurement schedule should be confirmed prior to the commencement of the procurement procedures. The procurement procedure should be updated according to the actual situations of issues of each component.

(2) Coordination and agreement with tenants/shop owners

The construction of the new tourist streest in Karak cannot conduct without co-operation of the residents and shop owners for disturbance of their daily activities such as entry/exits, stopping the operation, etc

The Sub-project situated in town centre may cause socio-economic impacts to disturb or stop economic activities of the tenants/shop owners and disturb the daily life of residents as well as customer in/along/adjacent to the Sub-project site.

It is essential to provide adequate notice and information on the development, and to obtain their acceptance in order to achieve a smooth implementation of the sub-project.

It is also important to take it in consideration to co-ordinate with their daily activities and conveniences during the construction.

(3) Demarcation of Exhibition Works

The works related to the exhibition of new museums should be defined and clearly demarcated between the contractor and the Jordanian sides. The Jordanian side basically executes to follow up software supply and collection works before the opening of the Museum.

The following table is shown for basic understanding of the works between the Jordanian side and contractors:

Items	Done by the Jordanian Side	Done by Contractors
Show Cases/Stands	-	Fabrication
Audiovisual	Software Supply (Videos, Slides, and Films)	Installation of Equipment
Exhibition Panels	Software Supply (Maps, Photos, Drawings, and/or Descriptions)	Installation of Flames and Boards with supplied maps/photos/drawings/descriptions
Exhibition Plates and Signs	Software Supply (Interpretation texts, Drawings and/or Logos)	Installation of Plates and Lettering in accordance with supplied texts
Authentic Materials and Artefacts	Collection, Transportation and Installation	-

Software Supply means that necessary to facilitate original text and interpretation of collected artefacts, and to provide basic scenario of AV and explanation drawings by the Jordanian side with the support of a consultant employed under the JBIC scheme.

(4) Confirmation of removing debris by DOA

The removing of the heaped soil with debris and consolidation of the original museum wall after the removing of the soil are included as part of the scope of the contractor. However, the construction works must be closely co-ordinated by DOA. The cost estimates should be reviewed and clarified during the construction according to the co-ordination with DOA.