The Hashemite Kingdom of Jordan
Jordan Customs Department

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR THE ENHANCEMENT OF CUSTOMS SECURITY AT AQABA
IN
THE HASHEMITE KINGDOM OF JORDAN

April 2019

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)
INGEROSEC CORPORATION

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for the Enhancement of Customs Security at Aqaba and entrust to INGEROSEC CORPORATION.

The survey team held a series of discussions with the officials concerned of the Government of the Hashemite Kingdom of Jordan, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion 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 the Hashemite Kingdom of Jordan for their close cooperation extended to the survey team.

April 2019

NAKAMURA Toshiyuki
Director General,
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Japan International Cooperation Agency

Summary

1. Overview of Jordan

The Hashemite Kingdom of Jordan (hereinafter referred to as “Jordan”)—which is bordered on the north by Syria, on the east by Iraq, on the south by Saudi Arabia, on the west by Palestine, and Israel, and the Kingdom of Saudi Arabia—has its own negotiating channel not only the Arab countries but also with the West and Israel, and is one of the states which plays a constructive role towards peace process in the Middle East. It is also a country that is relatively stable in the Middle East region, and plays an important role such as consistently accepting inflows of refugees from neighboring countries (mainly from Syria). For this reason, while maintaining and developing the political and social stability of Jordan itself as well as strengthening ties with neighboring countries, it is expected for Jordan to play a role to further contribute to the stabilization of the region.

2. Background and Overview of the Project

The Government of Jordan has formulated the “Border Security Program” and has worked on the development of legislation and countermeasures for strengthening public security measures at the border, as well as strengthening the monitoring of inflows of narcotics, firearms and explosives at border, airport and sea port. However, in addition to the rapid deterioration of the security situation in the surrounding countries like Iraq and Syrian crisis, logistics from Europe and Turkey to the Gulf countries and Jordan domestic market is shifting to the sea route from the Mediterranean to the Suez Canal and landing at the Aqaba Bay, and the amount of import cargoes landed at Aqaba Port has been increasing. In addition to the changes in the marine logistics routes, the reopening of the borders with Iraq in August 2017 and then with Syria in northern Jordan in 18th October 2018 also increases risk of the inflow of contraband which threatens the maintenance of social security.

The target area of this project is the Aqaba Special Economic Zone (hereinafter referred to as “ASEZ”) facing the Red Sea in the south of Jordan. Aqaba Port, located in ASEZ, is the only outer port in Jordan. It consists of Main Port, Middle Port, and the South Port (also known as Southern Industrial Port) within 20km north and south along the Aqaba Bay.

About 80% (Statistical Year of Jordan 2017) of the total imported cargo is landed at Aqaba Port, and the customs inspection including the security aspects for these imported cargoes is carried out by Aqaba Customs House, a local organization under Jordan Customs Department (hereinafter referred to as “JCD”). In addition to the role of blocking the inflow of drugs, firearms, explosives, etc., into Jordan via the port, the Aqaba Customs also has the function of detecting unauthorized import / export

/ false declaration and optimizing tariffs to improve the trade and investment environment of the country through strengthening the national financial base and shortening the number of days required for customs clearance (Jordan Customs Department Yearbook 2017). However, problems and solutions of imported cargo inspection system in ASEZ, as of October 2018, X-ray inspection systems are introduced only to the Yard-4 where manual inspection is carried out and to the X-1 inspection site near the cargo discharge gate of Aqaba Container Terminal (hereinafter referred to as “ACT”). On the other hand, an X-ray inspection system is not installed at General Cargo Terminal (hereinafter referred to as “GCT”) where bulk cargo such as general cargo, grain, fertilizer and the like and automobiles is landed and at Wadi Yetim Customs Center which is the entrance of ASEZ. As a result, these items, like bulk cargo, which do not undergo X-ray examination are inevitably forced to do screen inspections, requiring much longer time for inspection. Since the existing inspection system is insufficient to prevent the risk of inflow of contraband hidden in the above-mentioned imported cargoes, therefore, strengthening the inspection function of the Aqaba Customs is an urgent issue.

With the above-mentioned background, the Government of Jordan made the strengthening of the security measures function of Aqaba Customs an important issue and requested Japanese Grant Aid for the improvement of X-ray inspection systems at Aqaba Customs.

3. Summary of the Survey Results and Outline of the Project

In this survey, the current status of the import cargo inspection systems in ASEZ was investigated. The appropriateness of the contents of the Jordanian Government’s request was also verified and then the outline design of the cooperation target project was made.

ASEZ is composed of four major areas including port area (Main Port, ACT, X-1 inspection site, ALV, GCT, etc.), South Industrial area, city / commercial area, and residential area. All of these areas are designated as bonded areas. The distance from this harbor district to Wadi Yetim Customs Center, which is the gateway to ASEZ, is about 40 km.

Aqaba Customs has set up two “Customs Lines” for customs and security inspections on imported cargoes in ASEZ and is conducting smuggling control of undeclared items, contraband such as drugs, firearms and explosives, and counterfeit products. The boundary line between the port facility (port of harbor and terminal yard) where imported cargo is unloaded, carried in and stored, and the rest of the ASEZ is “Customs Line (1)”, where ‘first line of prevention’ is conducted by Aqaba Customs for controlling smuggled goods. In addition, the boundary line beyond “Customs Line (1)” is “Customs Line (2)” (set near Wadi Yetim Customs Center). It is an enforcement area functioning as a “final line of prevention” for all cargoes transpoted within and out of ASEZ.

There are 2 existing X-ray inspection systems deployed at the X-1 inspection site, one of which is a portal-type X-ray inspection system and the other is a mobile-type X-ray inspection system. These

devices were provided by the EU between 2012 and 2013. Among them, the portal-type X-ray inspection system has the following operational and performance problems.

- Deterioration of the inspection systems is noticeable and mechanical failure frequently occurs.
- Accurate image acquisition / analysis cannot be performed due to insufficient performance of the inspection system (for example, transmission ability, image sharpness, etc.).
- The existing devices will exceed the legal service life of seven years in 2020. If the systems are not renewed, it is at risk of obstructing the inspection of container cargo.

GCT should function as “Customs Line (1)” where “first line of prevention” of crackdown on smuggled goods should be done; however, X-ray inspection systems are not deployed at GCT. Visual inspection is randomly carried out by Aqaba Customs Inspectors at the same terminal. In other words, cargoes landed at GCT are passing through the Customs Line (1) and the Customs Line (2) of ASEZ without having any X-ray inspection.

The distance from the port area to Wadi Yetim Customs Center is about 40 km. It is necessary to drop contraband concealed in cargo and reload duty-free goods etc. during the same distance. There is a possibility that contraband can be extracted from or duty-free goods can be loaded onto cargo along the way. Insufficient enforcement in X-ray inspection at the X-1, Yard-4 and Wadi Yetim Customs Center exposes these facilities to such risks.

As mentioned above, as a result of analyzing and examining the present conditions and problems of the import cargo inspection mechanism in ASEZ, the following equipment plan shall be proposed for strengthening the control and cracking down the influx of the contrabands as well as fake goods and smuggling of duty-free goods outside ASEZA.

- Two units of portal-type X-ray inspection systems shall be deployed at the X-1 inspection site, which is within the area of above mentioned “Customs Line (1)”. Meanwhile, one unit of mobile-type X-ray inspection system shall be deloyed at GCT since no inspection equipment has been deployed as of March 2019.
- X-3 inspection site, located in 3 km before Wadi Yetim Customs Center and within the “Cusoms Line (2)”, shall be functioned as a “final line of prevention” to crack down on the all import cargos transported outside ASEZ by developing the X-ray inspection side and deploying two units of portal-type X-ray inspection systems.
- The deployment of these equipment is expected to lead to the establishment of an inspection system that can maximize the double countermasure function through the Customs Line (1) and the Customs Line (2) set by Aqaba Customs. It is expected that this will overcome the

vulnerability of the cargo inspection system in the current ASEZ and strengthen the security inspection function for imported cargo.

Table 1 shows the deployment plan for the equipment to be procured in this project.

Table 1 Deployment plan for procured systems

System Type	Requested Equipment		Deployment Plan	
	Destination for deployment	Units	Destination for deployment	Units
Portal-type X-ray inspection system	ACT	2	X-1inspection site (ACT)	2
	Wadi Yetim Customs Center	2	X-3 inspection site (In front of Wadi Yetim Customs Center)	2
Mobile-type X-ray inspection system Machine	Main Port	1	GCT	1

4. Project Implementation Schedule and Cost Estimation

If this project is implemented by Japanese Grant Aid, the detailed designing of implementation period is assumed to be 5 months and the equipment procurement period to be 13.67 months. The cost of this project to be borne by the Jordanian side is estimated approximately 138.2 million yen.

5. Project Evaluation

5.1 Relevance

- Through improvement of X-ray inspection systems to customs facilities in ASEZ by this project, the quality of inspection by X-ray images will improve, the number of inspections will increase, and the import cargo inspection system within ASEZ will be strengthening.
- This will lead to the improvement of security measures at the country's borders and ports undertaken by the Government of Jordan, as well as the prevention of inflow of goods harmful to the society, such as weapons and illegal drugs, and contribute to strengthening of security and stabilization in Jordan and the surrounding area.
- In addition, in 2009, the Government of Japan announced the “New strategy to counter the threat of terrorism”, and in 2013 the national security strategy was decided by the Cabinet, which clarifies the attitude of active pacifism based on international cooperation. Furthermore, in Japan's Country Assistance Policy for Jordan (2017), the basic policy of Japanese ODA is the “Enhancement of Region stability and Development of Industrial Infrastructure for Economic Growth”, and the “Stabilization of the region” is one of the priority areas. This project, which

contributes not only to the economic development of Jordan but also to the stabilization of the Middle East region, is consistent with Japan's cooperation policy.

- As mentioned above, this project will contribute to improvement of counter-terrorism and security maintenance by strengthening the inspection system of import container cargo and bulk cargo within ASEZ, and will benefit Jordanian citizens and neighboring countries.

Thus, the Project is highly relevant.

5.2 Effectiveness

5.2.1 Quantitative effects

Implementation of this project will improve the inspection rate of imported cargo by X-ray inspection systems equipped with high output and substance discrimination capacity under JCD management as shown in Table 2.

Table 2 Quantitative Effects

Indicator（*2）	Baseline 【2017 Status quo】	Target (2023) 【3 years after project completion】 (*1)
Inspection ratio of Imported container loaded vehicle subjected to X-ray inspection (per year)	X-1： 96% (*3)	X-1： 100%
Inspection ratio of Imported bulk cargo loaded vehicle subjected to X-ray inspection (per year)	GCT： 0%	GCT： 100%
Inspection ratio of Imported container cargo, bulk cargo and fuel loaded vehicle subjected to X-ray inspection (per year)	X-3： 0% (*4)	X-3： 100%

*1：The systems to be procured by this project are assumed to be delivered on November 2020. In this project, two portal-type X-ray inspection systems will be installed in the X-1 inspection site, one mobile-type X-ray inspection system will be installed in the GCT inspection site, and two portal-type X-ray inspection systems will be installed in the X-3 inspection site (3 km before the Wadi Yetim Customs Center).

*2：The target of this index covers only cargo whose shape and size can be inspected by X-ray inspection systems (special cargo that cannot be subjected to X-ray inspection is not covered by this evaluation index).

*3：The inspection ratio at X-1(96%) shows the ratio of the number of X-ray inspection results (247,274) to the number of imported container cargoes (257,572: total of 20 feet and 40 feet containers). As for the forecasts of the future number of container cargo estimated by Aqaba Development Corporation (ADC), which aims to plan and implement the development of Aqaba Special Economic Zone, the number of annual imported container cargo in 2023 is estimated to be 371,613 cargos (1,018 per day), that in 2026 is estimated to be 455,964 cargos (1,249 per day). The inspection processing capacity of existing inspection systems is 1,200 cargos per day.

*4：At the GCT inspection site, as of October 2018, no X-ray inspection system has been installed. Also, at

the X-3 inspection site, a new X-ray inspection site is planned to be constructed in this project.

*5 : Container cargo subject to inspection by the X-ray inspection systems under the control of the General Intelligence Department (GID) planned to be installed at the X-1 inspection site is not covered by this evaluation index.

*6 : Since the X-ray inspection system installed at the Wadi Yetim Customs Center is not a JCD property, cargo to be inspected by this system is excluded from this evaluation index.

*7 : With regard to imported cargo which is consumed within the Aqaba Special Economic Zone, it shall be inspected only at the X-1 and GCT Inspection sites.

5.2.2 Qualitative effects

The qualitative effects of the Project are described below.

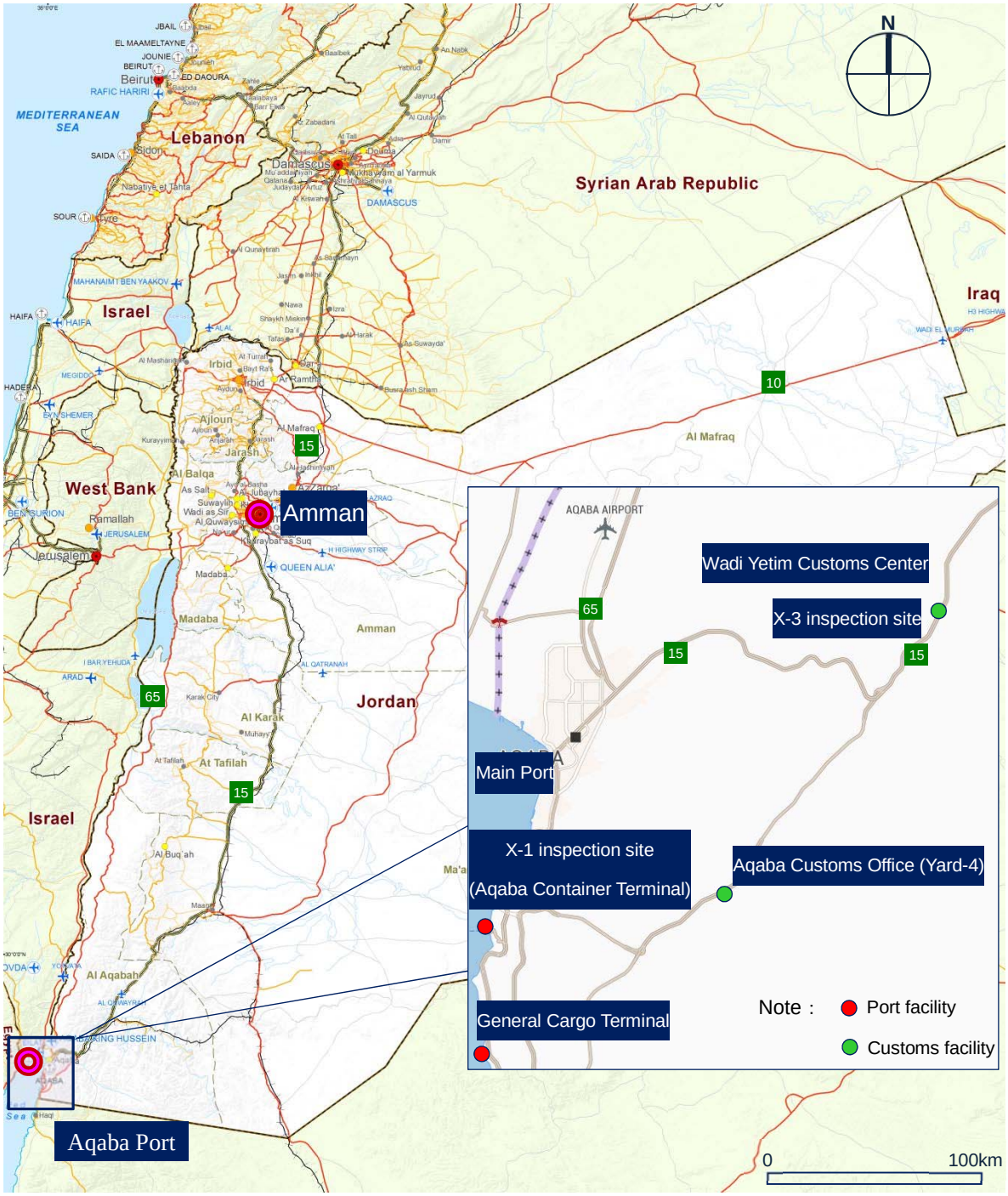
- Introduction of X-ray inspection systems with high output and substance discrimination capacity will improve the accuracy of exposure of high risk cargo, such as drugs and weapons.
- Installation of a plurality of X-ray inspection systems will make possible to conduct inspection 24 hours a day, 365 days a year without breaks even during the failure / maintenance period of inspection systems, and facilitate the inspection process within the ASEZ.
- Enforcement of cracking down on fraudulent declaration items of imported cargos will be strengthened

Contents

[Appendices]

1. Member List of the Study Team
2. Preparatory Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions (M/D) and Technical Note (T/N)

Country name	:	Hashemite Kingdom of Jordan
Capital	:	Amman
Official language	:	Arabic
National land area	:	89,000 km^2
Population	:	Approx. 9,455,000

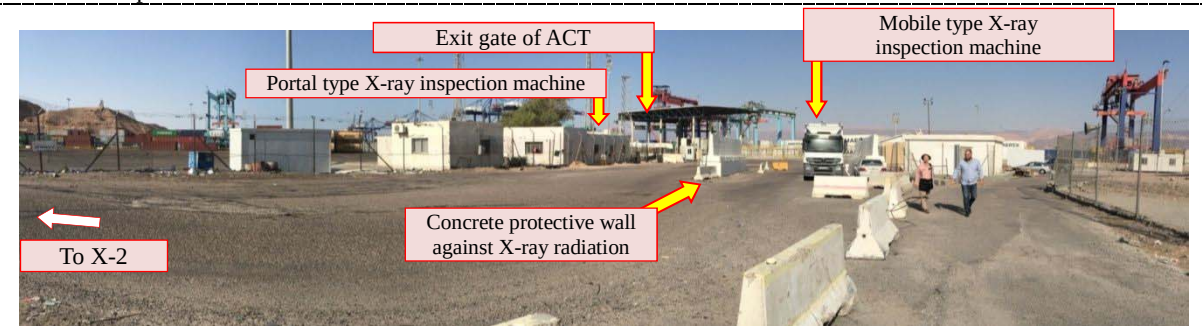


Source：World Food Program (WFP)

Survey Site Locations

1.1 Location of X-1 inspection site (nearby the exit gate of Aqaba Container Terminal (ACT))

1.2 X-1 inspection site



1.3 Portal type X-ray inspection machine deployed at X-1 inspection site (donated by the EU in 2013)

Portal type X-ray inspection machine

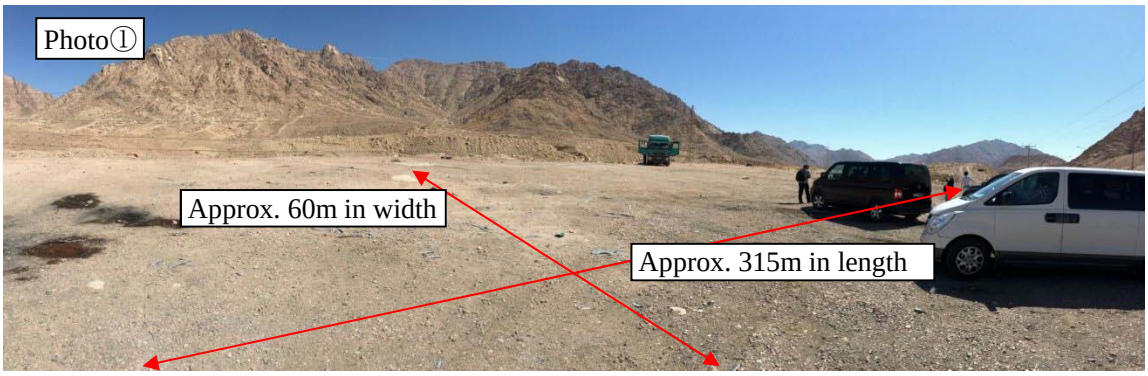
Damaged part (contacted by a cargo during X-ray inspection)

1.4 Mobile type X-ray inspection machine at X-1 inspection site (donated by the EU in 2012)

Mobile type X-ray inspection machine at ACT

X-ray images shown on the analysis monitor

2.1 X-3 inspection site (to be constructed)

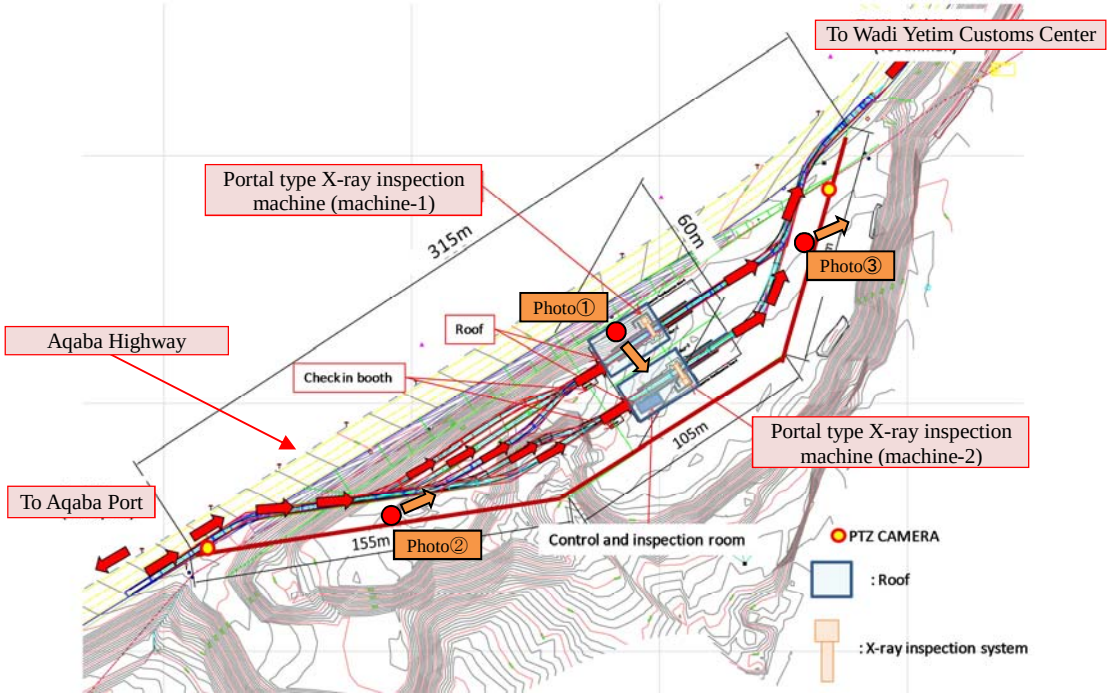


X-3 inspection site is a vacant lot (as of Mar. 2019)

X-3 is located in the area along the Aqaba Highway linking Aqaba Port and Wadi Yetim Customs Center

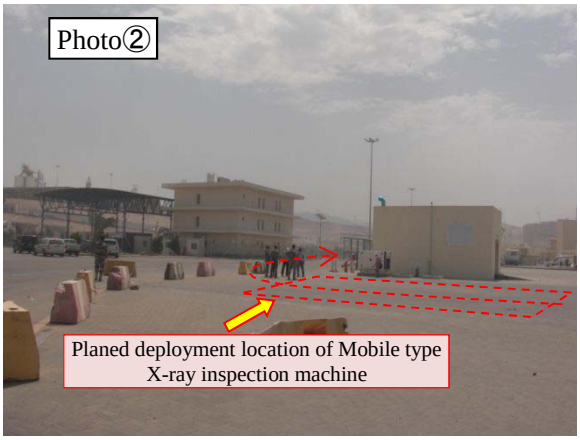
Power supply facility is extended to X-3 inspection site

2.2 Location of photographed points at X-3 and Equipment Deployment Plan



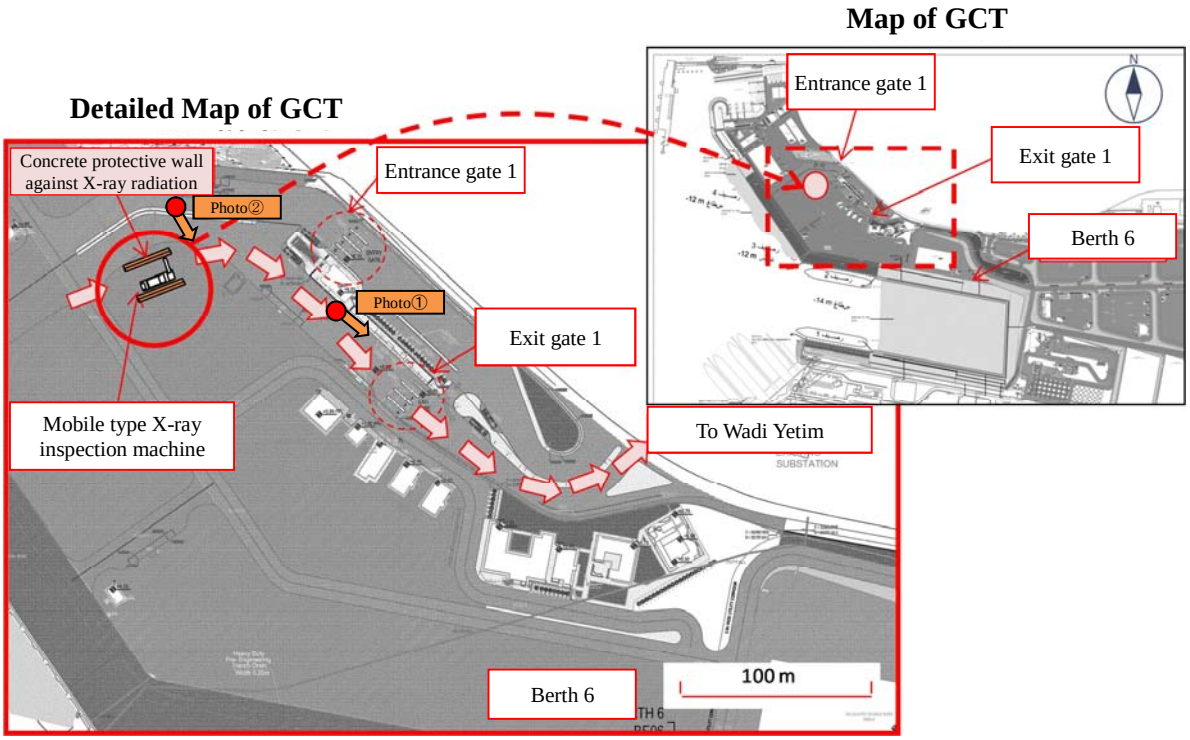
3.1 General Cargo Terminal (GCT)

Entrance gate of GCT

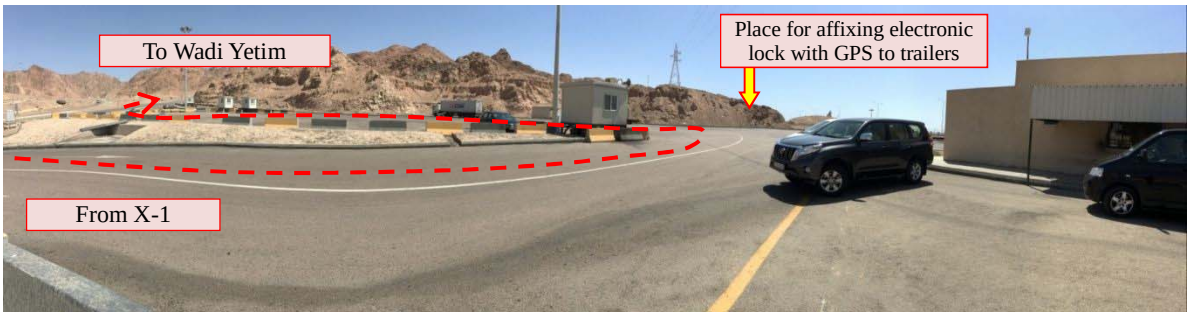


Planed deployment location of Mobile type X-ray inspection machine

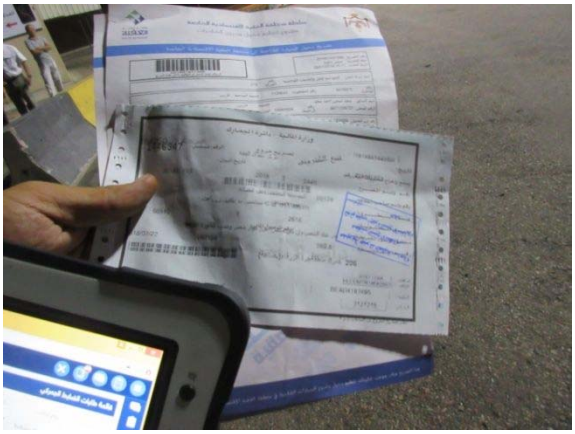
3.2 Location of photographed points at GCT and Equipment Deployment Plan



4.1 X-2 (Waiting station for X-ray inspection results & delivery of pass permit)



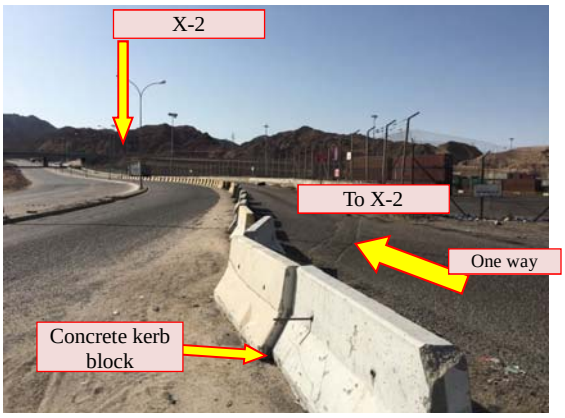
Panoramic view of X-2
Container-loaded trailers which passed X-1 inspection site receive result of X-ray inspection.
Electronic lock with GPS is affixed to those trailers loaded with bonded cargos



Shipping documents and registered information are cross checked by customs officer with tablet.

After the verification, electronic lock with GPS is affixed to the trailers

Container affixed with electronic lock with GPS



Concrete kerb blocks are installed along the roadsides from X-1 to X-2, preventing trailers from accessing to other roads.

5. Others

Portal type X-ray inspection machine
deployed at Yard-4

Manual inspection site at Yard-4
(more than 80 inspection booths)

Manual inspection scene at Yard-4

Check-in gate at Wadi Yetim Customs Center

Manual inspection yard at
Wadi Yetim Customs Center
(4 inspection booths)

Training room for X-ray image analysis
(Customs Training Center in Amman)

Rendering image: X-1 inspection site with Portal type X-ray inspection machines

Rendering image: X-3 inspection site with Portal type X-ray inspection machines

Rendering image: Mobile type X-ray inspection machine at General Cargo Terminal

Lists of Figures and Tables

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Abbreviations

Abbreviation	Denotation
International Organization / State Organ / Donor Organizations / development Plan / Legislation	
ACPOM	Aqaba Company for Ports Operation & Management
–	Aqaba Container Terminal Pvt Co.
ACH	Aqaba Customs House
ACT	Aqaba Container Terminal
ADC	Aqaba Development Corporation
ALV	Aqaba Logistics Village
APA	Aqaba Port Authority
–	Aqaba Main Port
ASEZA	Aqaba Special Economic Zone Authority
–	Aqaba Special Economic Zone Master Plan 2001-2020
–	Jordan National Vision and Strategy 2025
CTC	Customs Training Center
DAC	Development Assistance Committee
DLS	Department of Lands and Surveys
EDCO	Electricity Distribution Company
EU	European Union
GID	General Intelligence Department
–	Jordan National Police
–	Implementation Committee
ICRP	International Commission on Radiological Protection
JICA	Japan International Cooperation Agency
JCD	Jordan Customs Department
JAEC	Jordan Atomic Energy Commission
JNRC	Jordan Nuclear Regulatory Commission
MoPIC	Ministry of Planning and International Cooperation
MoPWH	Ministry of Public Works and Housing
NCFTT	National Committee for Trade and Transport Facilitation
NEPCO	National Electric Power Company
OECD	Organisation for Economic Co-operation and Development
PSD	Public Security Directorate, Ministry of Interior
RTC-MENA	Regional Training Centre for the Middle East and North Africa
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNODC	UN Office on Drugs and Crime
USAID	United States Agency for International Development
–	Wadi Yetim Customs Center
WCO	World Customs Organization
Units Symbol	
MeV	Million(mega) electron Volts
Ton	Tonne

Abbreviation	Denotation
Geographical / Facility names	
ACT	Aqaba Container Terminal
ASEZ	Aqaba Special Economic Zone
GCT	General Cargo Terminal
−	Main Port
−	Middle Port
−	South Port (Southern Industrial Port)
−	Yard-4
Others	
A/P	Authorization to Pay
ASYCUDA	Automated SYStem for CUstoms DAta
BOT	Build, Operate and Ttransfer
CCTV	Closed Circuit Television
−	Customs Line
C/P	Counter Part
E/N	Exchange of Note
FTA	Free Trade Agreement
G/A	Grant Agreement
IEC	International Electrotechnical Commission
IED	Improvised Explosive Device
IP Code	International Protection Marking
JD	Jordanian Dinar
LINAC	Linear Accelerator
M/D	Minute of Discussion
−	Mobile type X-ray inspection machine
NACCS	Nippon Automated Cargo and Port Consolidated System
−	Portal type X-ray inspection machine
PPP	Public-Private-Partnership
P2P	Point-to-Point
P2MP	Point-to-Multiplepoint
TEU	Twenty-foot Equivalent Unit
TTF	Trade and Transport Facilitation Programme
−	Harmonized Commodity Description and Coding System
SPD	Surge Protection Test
UPS	Uniterrupted Power Supply
WMD	Weapons of Mass Destruction

1. Background of the Project

1. Background of the Project

1.1 Background of the Request and Summary

The Hashemite Kingdom of Jordan (hereinafter referred to as “Jordan”), located in the Middle East where political situation and security are unstable, has a negotiating channel not only with the Arab countries but also with the West and Israel, and is one of the countries which plays a constructive role towards peace in the Middle East. It is also a country that is relatively stable in the Middle East region, and plays an important role, such as consistently accepting inflows of refugees from neighboring countries. For this reason, it is expected that Jordan will maintain its stability and develop soundly, strengthen the relationship between the neighboring countries, and further contribute to the stabilization of the region.

The Government of Jordan has formulated the “Border Security Program” and has worked on the development of legislation and countermeasures for strengthening public security measures at the border, as well as strengthening the monitoring of inflows of narcotics, firearms and explosives at border, airport and sea port. However, in addition to the rapid deterioration of the security situation in the surrounding countries’ crisis like Iraq and Syria, logistics from Europe and Turkey to the Gulf countries and Jordan domestic market is shifting to the sea route from the Mediterranean to the Suez Canal and landing at the Aqaba Bay, and the amount of import cargoes landed at the Aqaba Port has been increasing. In addition to the changes in the marine logistics routes, the reopening of the borders with Iraq in August 2017 and then with Syria in northern Jordan in 18th October 2018 also increases risk of the inflow of contraband which threatens the maintenance of social security.

The target area of this project is the Aqaba Special Economic Zone (hereinafter referred to as “ASEZ”) facing the Red Sea in the south of Jordan. Aqaba Port, located in ASEZ, is the only outer port in Jordan. It consists of Main Port, Middle Port, and the South Port (also known as Southern Industrial Port) within 20km north and south along the Aqaba Bay.

About 80%of the total imported cargo is landed at Aqaba Port (Statistical Year of Jordan 2017), and the customs inspection including the security aspects for these imported cargoes is carried out by Aqaba Customs House, a local organization under Jordan Customs Department (hereinafter referred to as “JCD”). In addition to the role of blocking the inflow of drugs, firearms, explosives, etc., into Jordan via the port, the Aqaba Customs also has the function of detecting unauthorized import / export / false declaration and optimizing tariffs to improve the trade and investment environment of the country through strengthening the national financial base and shortening the number of days required for customs clearance (Jordan Customs Department Yearbook 2017). However, as described in “1.3 Current status, problems and solutions of imported cargo inspection system in Aqaba Special Economic Zone”, as of October 2018, X-ray inspection systems are introduced only to the Yard-4 where manual inspection is carried out and to the X-1 inspection site near the cargo discharge gate of Aqaba Container Terminal

(hereinafter referred to as “ACT”). On the other hand, an X-ray inspection system is not installed at General Cargo Terminal (hereinafter referred to as “GCT”) where bulk cargo such as general cargo, grain, fertilizer and the like and automobiles is landed and at Wadi Yetim Customs Center which is the entrance of ASEZ. As a result, these items, like bulk cargo, which do not undergo X-ray examination are inevitably forced to do manual inspections, requiring much longer time for inspection. Since the existing inspection system is insufficient to prevent the risk of inflow of contraband hidden in the above-mentioned imported cargoes, therefore, strengthening the inspection function of the customs is an urgent issue.

With the above-mentioned background, the Government of Jordan made the strengthening of the security measures function of Aqaba Customs an important issue and requested Japanese Grant Aid for the improvement of X-ray inspection systems at Aqaba Customs.

Based on the above circumstances, overall goals, project objectives, expected effects of this project, systems to be provided by the Japanese side subject to the Japanese government approval are shown below.

Table 1-1 Overall Goal and Project Objectives

Overall Goal	The stability of security in Jordan is maintained, and autonomous and sustainable growth by Jordanian citizens is expected. Furthermore, stability of the country will contribute to stability of neighboring countries.
Project Objectives	Entry of drugs, firearms and explosives, that affect public security, is prevented by improving the X-ray inspection systems at Aqaba Customs and strengthening the Customs security measures
Expected Effects	X-ray inspection systems for security measures are equipped at Aqaba Customs, which is in charge of security inspections of about 80% of the total cargo imported to Jordan.
System to be provided by the Japanese side (Subject to the Japanese government approval)	① X-1 Inspection Site (Aqaba Container Terminal): Portal-type X-ray inspection systems, 2 units ② X-3 Inspection Site (3km in front of Wadi Yetim Customs Center): Portal-type X-ray inspection systems, 2 units ③ General Cargo Terminal (GCT): Mobile-type X-ray inspection system, 1 unit

1.2 Overview of the Project

This project aims to strengthen the security measures of Aqaba Customs by improving their X-ray inspection systems for large cargo imports. The cargo inspection system of Aqaba Customs will be strengthened, and it will be possible to carry out the inspections more quickly and accurately and deal with the increasing imported cargo landed at Aqaba Port, while at the same time preventing the inflow of drugs, firearms, explosives and contributing to maintaining and stabilizing the security of Jordan and its surrounding areas.

This survey is carried out to confirm the necessity and validity of the contents of the request from Jordan, to make an appropriate outline design as a grant aid project, to make a procurement plan (number of procured systems, specifications, deployment locations etc.) as well as the operation and maintenance plan, and to make an estimate of the project cost.

1.3 Current Conditions, Challenges and Solutions of the Imported Cargo Inspection System in ASEZ

1.3.1 Locations of Harbors and Customs Facilities and Issues of Current Cargo Inspection System

The locations of the port facilities and the main customs facilities in ASEZ which are the target areas of this project is shown in Figure 1-1. Table 1-2 also shows the roles of each facility, the status of deployment of existing inspection systems and the plan for deploying requested systems.

ASEZ is composed of four major areas including port area (main port, ACT, X-1 inspection site, ALV, GCT, etc.), South Industrial area, city / commercial area, and residential area. All of these areas are designated as bonded areas. The distance from this harbor district to Wadi Yetim Customs Center, which is the gateway to ASEZ, is about 40 km.

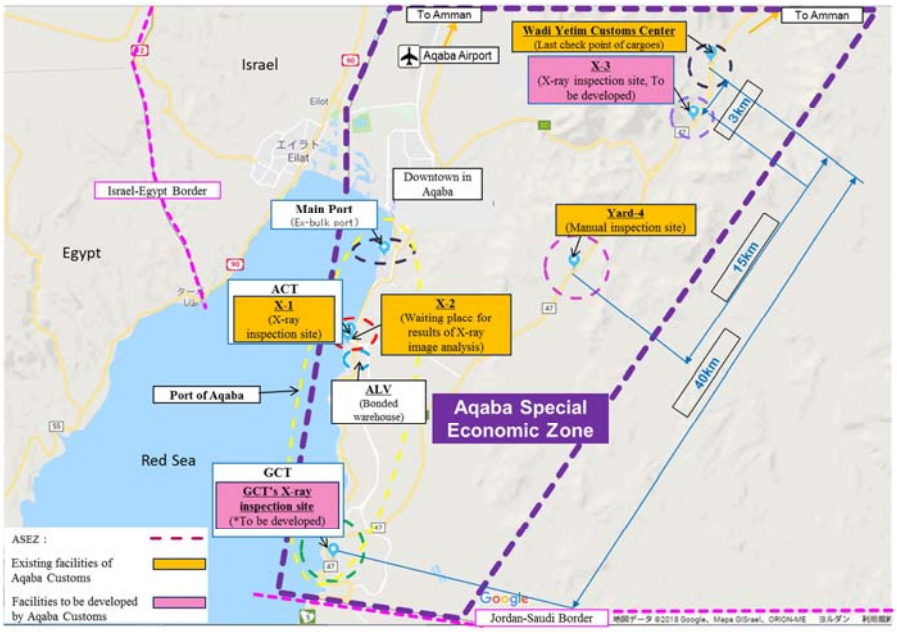


Figure 1-1 Locations of port facilities and major custom facilities in ASEZ

Table 1-2 Ports and customs facilities in ASEZ, Deployment locations of existing and requested inspection systems

Name of facility	Role	Availability of existing inspection systems	Number of systems deployment	
			Initial request	Deployment plan
Main Port	・ Former bulk port where general cargo, car, fertilizer, cereals etc. are handled ・ The function will be transferred to General Cargo Terminal (GCT) in South Port in 2018; while the former bulk port will be redeveloped as a resort center	―	Mobile-type X-ray inspection system (1 unit)	―
X-1 Inspection Site (Aqaba Container Terminal : ACT)	・ X-ray inspection site of import container unloaded at ACT ・ Located near the cargo export gate of ACT	・ Portal-type X-ray inspection system (1 unit) ・ Mobile-type X-ray inspection system (1 unit)	Portal-type X-ray inspection systems (2 units)	Portal-type X-ray inspection systems (2 units)
X-2	・ Waiting station for the inspection result of the container loading trailer which was subjected to X-ray inspection at X-1 (Located about 200 m from X-1) ・ Containers that were scanned at X-1 wait at this station until they get results of the inspection ・ Delivery of pass permit issued by customs ・ Place for mounting electronic lock with GPS for border transit cargo to be transported bonded	―	―	―
Aqaba Logistic Village (ALV)	・ Public bonded warehouse (located about 500 m southeast of ACT) ・ Sorting out container cargoes landed at ACT (already inspected at X-1 & X-2), and then transport them out from ALV by designated carrier	―	―	―
General Cargo Terminal (GCT)	・ General cargo, car, fertilizer, cereals etc. are handled ・ Succeeded the functions of the Main Port	―	――	Mobile-type X-ray inspection system (1 unit)
Opening Inspection Site (Yard-4)	・ Inspection site for imported cargo (Mainly for containers) ・ Function as the headquarter of Aqaba Customs (Located approximately 15 km inland from ACT)	Portal-type X-ray inspection system (1 unit)	―	―
X-3 Inspection Site	・ X-ray inspection site to be newly established (3km in front of Wadi Yetim Customs Center)		Portal-type X-ray inspection systems (2 units)	Portal-type X-ray inspection systems (2 units)
Wadi Yetim Customs Center	・ Land gateway of ASEZ (Located approximately 40 km inland from Aqaba city) ・ Final check point of cargo taken out of ASEZ	Mobile-type X-ray inspection systems (2 units) (Note 1)	―	―

Note 1 : The mobile-type X-ray inspection system was provided by the US government, and the management and operation thereof is carried out by Public Security Department (PSD) of the Ministry of Home Affairs. Approximately five years have elapsed since the manufacturing year for this inspection system. In addition to aged deterioration such as deterioration of function due to half-life of gamma rays, they have problems such as insufficient ability to transmit through thick steel plates, low image storage capacity, and unclear images. Also, unlike X-ray inspection systems, this inspection system always radiates gamma rays, so there are concerns about its influence on the health of inspectors and examiners, and it is not used as a daily safety inspection system .

Note 2 : Pink color highlights refer to facilities that are installed and operated within the "Customs Line (1)" area which will be described later. The role of Customs Line (1), which is the "first line of prevention", is to reduce the risk of inflow of contraband etc. via ACT and GCT. On the other hand, the light blue highlight refers to facilities within the "Customs Line (2)" area. It is functioning as a "final line of prevention" to crack down on missing cargo at security and customs inspections within the "Customs Line (1)" area and smuggling of duty-free items outside ASEZ.

The current status and issues of the current inspection system has been elaborated as follows in relation to the locations of port facilities and transport route.

Cargo landed at Aqaba Port is automatically classified into three colors (green, yellow, red) according to the risk degree of imported cargo, by the function of Risk Management System (RMS) installed in Automated SYstem for CUstoms DAta (Electronic customs clearance system, hereinafter referred to as "ASYCUDA") (Table1-3). It is automatically sorted based on the risk parameters such as shipper, port of shipment, carrier, type of declared cargo and destination. Selection criteria are modified as necessary based on additional information fed back from the site based on the results of daily inspection.

Table 1-3 Risk Management of Cargo by ASYCUDA

Classification of declaration form	Standards for cargo inspection	X-ray inspection	Manual Inspection
Green	Inspection unnecessary (In principle document examination and screening inspection are omitted) [Note 1]	Required	Performed at random or according to the result of X-ray examination
Yellow	Detailed screening of the customs document is required	Required	
Red	Manual inspection is required	Required	Manual inspection is required

Note 1: The container cargos of the import cargo classified as Green are currently subject to X-ray scanning by the existing X-ray inspection systems operating at the out gate of ACT. The scanned container cargos will be manually inspected when any potentially suspicious goods are identified in the X-ray image analysis.

For cargoes that have been judged red by ASYCUDA, manual inspection at Yard-4 is obligatory. On the other hand, even if the judgment result of the cargo is green or yellow, customs staff in charge can randomly select or specify cargoes for manual inspection at Yard-4, according to criteria such as type of declared cargo, shipper, shipping port (cargo loaded or transshipped at a port/country which is

considered as a narcotics or weapons trading port/country), final destination, etc.

Aqaba Customs has set up two “Customs Lines” for customs and security inspections on imported cargoes in ASEZ and is conducting smuggling control of undeclared items, contraband such as drugs, firearms and explosives, and counterfeit products etc. As shown in Figure 1-2, the boundary line between the port facility (port of harbor and terminal yard) where imported cargo is unloaded, carried in and stored, and the rest of the ASEZ is “Customs Line (1)”, where ‘first line of prevention’ is conducted by Aqaba customs for controlling smuggled goods. In addition, the boundary line beyond “Customs Line (1)” is “Customs Line (2)” (set near Wadi Yetim Customs Center). It is an enforcement area functioning as a “final line of prevention” for all cargoes transported within and out of ASEZ.

Imported goods are landed at several terminals such as ACT and GCT, located along 20km coast of Aqaba. For this reason, Aqaba Customs has adopted a policy to set up X-ray inspection stations as “border control” for each landed port facility instead of consolidating cargo inspection sites in one place. However, as shown in Table 1-2, the X-ray inspection site under Aqaba Customs is only X-1 inspection site (located near ACT cargo transfer gate). No X-ray is provided at GCT where bulk cargo are unloaded.

There are 2 existing X-ray inspection systems deployed at the X-1 inspection site, one of which is a portal-type X-ray inspection system and the other is a mobile-type X-ray inspection system. These devices were provided by the EU between 2012 and 2013. Among them, the portal-type X-ray inspection system has the following operational and performance problems.

- Deterioration of the inspection systems is noticeable and mechanical failure frequently occurs.
- Accurate image acquisition / analysis cannot be performed due to insufficient performance of the inspection system (for example, transmission ability, image sharpness, etc.).
- The existing devices will exceed the legal service life of seven years in 2020. If the systems are not renewed, it is at risk of obstructing the inspection of container cargo.

GCT should function as “Customs Line (1)” where “first line of prevention” of crackdown on smuggled goods should be done; however, X-ray inspection systems are not deployed at GCT. Visual inspection is randomly carried out by Aqaba Customs Inspectors at the same terminal. In other words, cargoes landed at GCT are passing through the Customs Line (1) and the Customs Line (2) of ASEZ without having any X-ray inspection.

The distance from the port area to Wadi Yetim Customs Center is about 40 km. It is necessary to drop contraband concealed in cargo and reload duty-free goods etc. during the same distance. There is a possibility that contraband can be extracted from or duty-free goods can be loaded onto cargo along the way. Insufficient enforcement in X-ray inspection at the X-1, Yard-4 and Wadi Yetim Customs Center exposes these facilities to such risks.

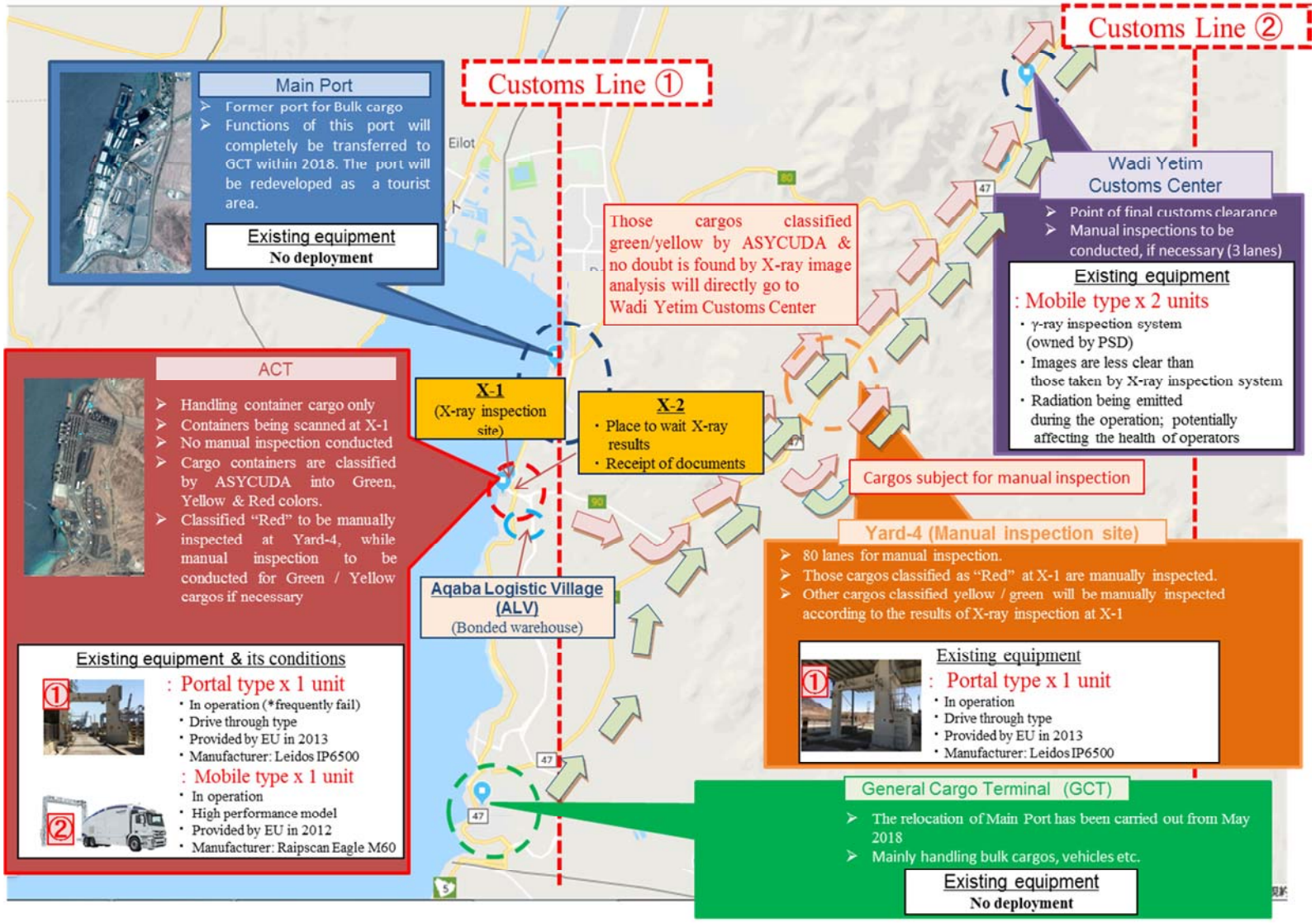


Figure 1-2 Current situation of imported cargo inspection line and existing systems deployment in ASEZ

1.3.2 Enhancement of Safety Inspection System by Installing / Updating X-ray Inspection Systems

Based on the problems and vulnerabilities of the current cargo inspection system in the ASEZ set forth in the preceding paragraph, and based on the results of careful scrutiny of requests of the Government of Jordan, the deployment plan of the X-ray inspections systems can be effective to strength the security inspection function of Aqaba Customs. The overview of the study is given below and the details are described in Chapter 2.

As shown in Figure 1-3, the customs facilities subject to this project are: ① X-1 inspection site, ② X-2, ③ GCT, ④ Yard-4, ⑤ X-3 inspection site, ⑥ Wadi Yetim Customs Center and ⑦ JCD headquarters Central control room under the control of the Telecommunications and Electronic Control Directorate. Among these seven facilities, the facilities on which X-ray inspection systems are planned to be deployed are X-1 inspection site (portal-type X-ray inspection systems, 2 units), GCT (mobile-type X-ray inspection system, 1 unit), and X-3 inspection site (portal-type X-ray inspection systems, 2 units). Meanwhile, X-2, Yard-4, Wadi Yetim Customs Center, Central Control Room of Communications and Electronic Supervision Department of JCD Headquarters are connected with X-ray inspection sites by data communication system. Terminals for viewing, storing and analyzing image data and diagnostic results acquired by the X-ray inspection systems are proposed to be deployed to X-2, Yard-4 and Wadi Yetim Customs Center.

With this project, the deployment of X-ray inspection systems in ACT and GCT will strengthen the control system for smuggled goods (“border control”) within the port facility shown in Figure 1-3, that is, in the Customs Clearance (1) area. In addition, it will be possible to carry out a quicker and more accurate X-ray examination, which will lead to more efficient and accurate inspection of cargoes suspected of smuggling etc. at Yard-4. Furthermore, by installing 2 portal-type X-ray inspection systems at the X-3 inspection site which will be newly constructed, it is expected to have the inspection function as “final line of prevention” just before the cargo is unloaded outside ASEZ. The deployment of these systems are expected to lead to the establishment of an inspection system that can maximize the double countermeasure function through the Customs Line (1) and the Customs Line (2) set by Aqaba Customs. It is expected that this will overcome the vulnerability of the cargo inspection system in the current ASEZ and strengthen the security inspection function for imported cargo.

The current imported cargo inspection flow is shown in Figure 1-4, and the inspection flow after new systems deployment is shown in Figure 1-5.

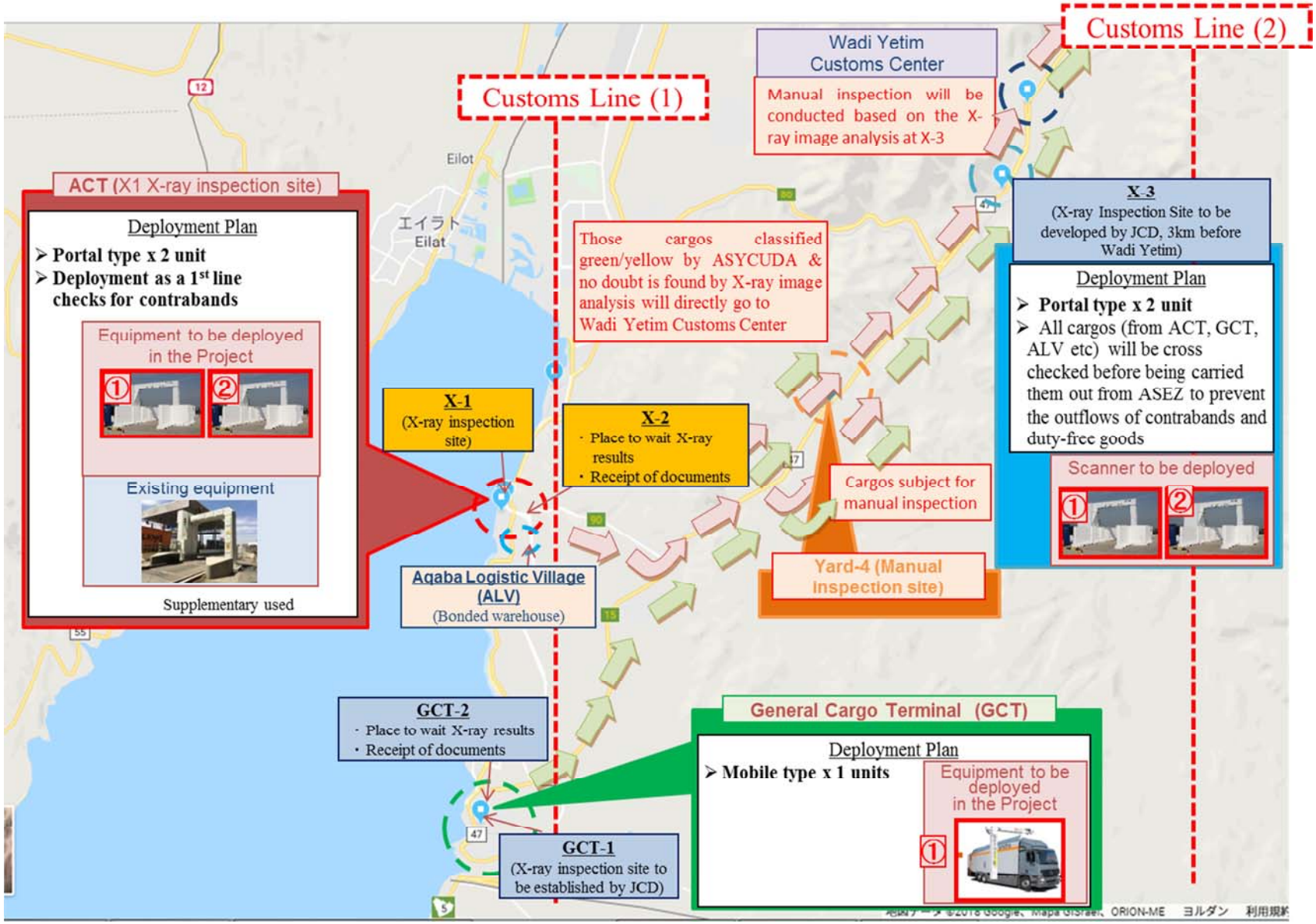


Figure 1-3 Imported cargo inspection flow line after new systems deployment by this project

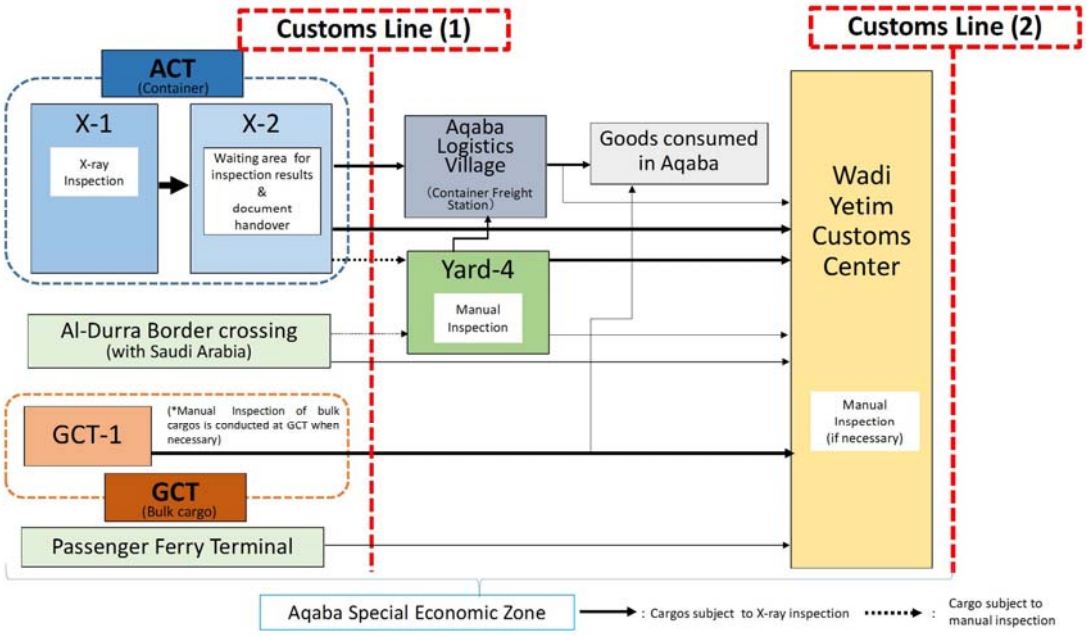


Figure 1-4 Current imported cargo inspection flow in ASEZ

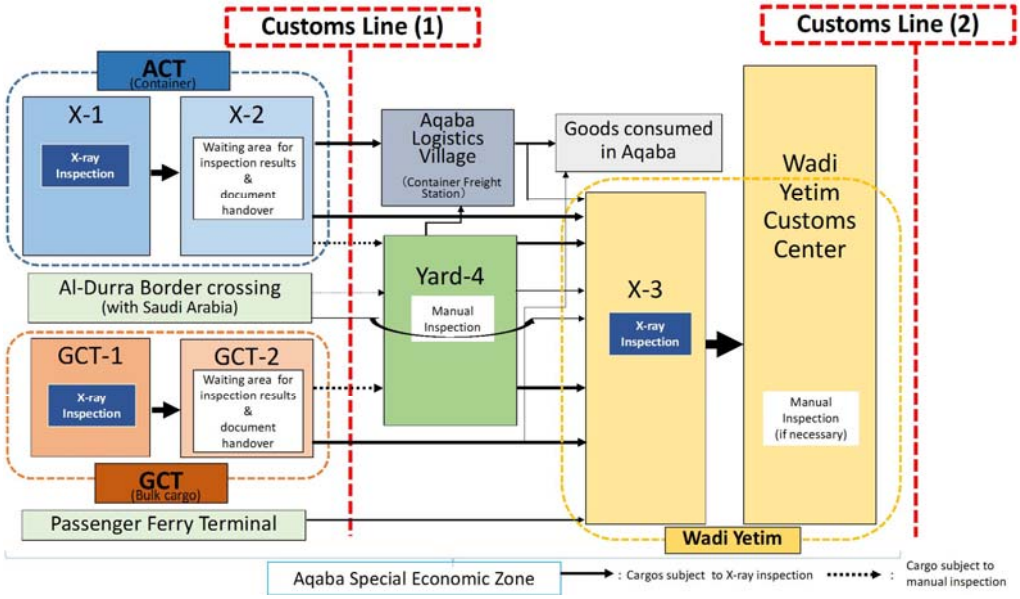


Figure 1-5 Imported cargo inspection flow after new systems deployment

1.4 Environmental and Social Considerations

In this project, there are no private property such as houses and farm land around the related facilities where the deployment of the systems is planned; therefore the influence on the social environment is not assumed. This project is classified as a Category C project based on “Japan International Cooperation Agency (JICA) Guidelines for Environmental and Social Considerations” (April, 2010). In other words, it is considered that there are minimal or little undesirable effects on the environment and society. Therefore, there are no particular impacts on the surrounding environment and society in implementation.

2. Outline Design of the Japanese Assistance

2. Outline Design of the Japanese Assistance

2.1 Design Policy

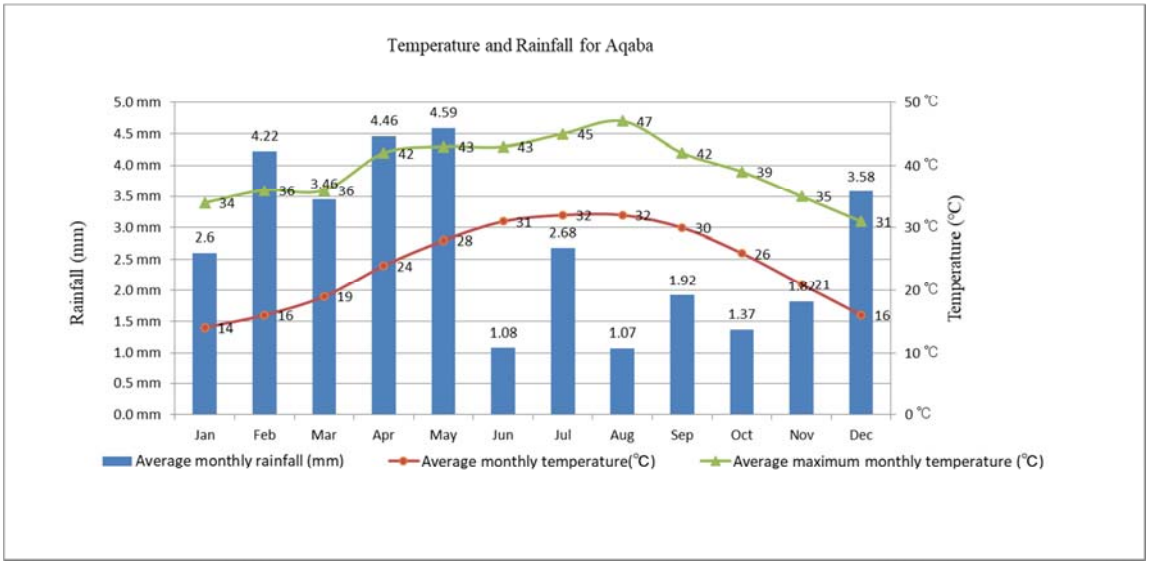
2.1.1 Basic Policy

As mentioned above, this project plans to improve the X-ray inspection systems in the X-1, X-3 and GCT inspection facilities controlled by Aqaba Customs in ASEZ in order to strengthen the inspection systems for imported goods. The plan for the basic approach, shown below, is based on the request from the Government of Jordan, and the results of field surveys and consultations.

2.1.2 Policy on Natural Environmental Conditions

(1) Climate

The climate of Aqaba is hot, arid and mostly sunny in summer. In winter, it is cool, dry and mostly clear. The average rainfall is low with about 1 to 5 mm a year. The average temperature ranges from 14°C to 32°C, and the maximum temperature ranges from 31°C to 47°C.



Source： Climate Change Knowledge Portal

Figure 2-1 Average monthly temperature and precipitation in Aqaba

The average wind speed in Aqaba hardly changes throughout the year, and the highest average wind speed from 2016 data was 15.8 km/h in June. The wind direction is mostly from the Aqaba Bay to the north, which is a sea breeze.

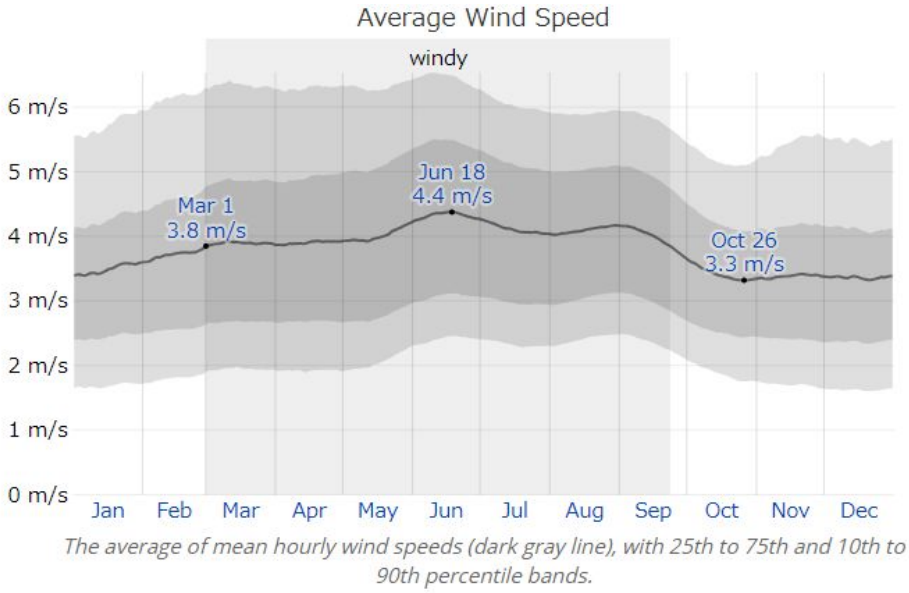


Figure 2-2　Average monthly wind speed in Aqaba

Source：Weather Spark

(2)　Environmental conditions

Aqaba, as the target area of the project, is “located in the coastal area, susceptible to salt damage” and has “strong sunshine, high temperatures” and a “desert climate”; therefore, specifications will be chosen so that problems will not arise even in these severe conditions. Conditions of the environment are as shown below.

1) Response to the high-temperature environment

The site has strong sunshine and the maximum temperature can reach between 31°C and 47°C, so systems that can operate in a high-temperature environment will be selected. The measures are as follows.

- ✓ Select systems that can operate even in high temperatures
- ✓ Install a roof to shield the systems from direct sunlight and prevent the temperature increases

2) Corresponding to desert conditions

This project site is in a “desert climate” and sand dust with small particle sizes will accumulate, so it is necessary to protect against dust intruding into the X-ray inspection systems, particularly moving parts, as they are precision systems. The following measure is necessary to protect systems against dust intrusion.

- ✓ Adopt IP 6X, which is the highest rank of the International Protection (IP) waterproof / dustproof standards prescribed by the International Electrotechnical Commission (hereinafter referred to as “IEC”)

3) Corresponding to outdoor installation

This project plans to install a roof that covers the portal-type X-ray inspection machine that will be procured. This roof will be designed to protect the systems against direct sunlight and is not intended for protection against rain.

Therefore, the inspection systems shall have waterproofing that prevents water from entering from any direction due to rain, similar to specifications for an outdoor installation, and the systems shall be able to operate without malfunction even if they get wet.

- ✓ Adopt IP X5, which is a rank of the IP waterproof / dustproof standards prescribed by the IEC that regulates the waterproof performance of systems and stipulates specifications that enables operation by outdoor installations

4) Corresponding to coastal installation

As the X-1 and GCT inspection sites are located in coastal areas, they are exposed to salty air and so the systems are at risk from rust and corrosion. In order to prevent corrosion, it is necessary to select systems that have been treated for salt resistance in accordance with the relevant specifications.

Salt-resistance is a standard specification for outdoor installations of X-ray inspection systems.

2.1.3 Policy on Systems' Grading and Specifications

The grade of procured systems shall be the same grade as systems introduced to similar facilities in other countries. This specification is to prevent the inflow of illicit goods and illegal cargo into Jordan by using standard systems in accordance with international standards and to avoid manufacturer-specific specifications. Furthermore, since weapons such as firearms and explosives are often concealed in vehicles and luggage, the first priority is to discover these weapons during examinations and thus determine which systems have detection capabilities that can distinguish these items by using X-ray images.

(1) Existing portal-type X-ray inspection system

Regarding the existing portal-type X-ray inspection system, the image quality is unclear, because the performance of the X-ray irradiation machine is inadequate, and it is not easy to distinguish potential target items, so it is necessary to perform thorough inspections at Yard-4. Therefore, the portal-type X-ray inspection machine to be procured shall be a model with higher X-ray transmission capability that is capable of outputting clearer images than existing systems.

For other specifications, the specifications of existing systems shall be considered.

(2) Current mobile-type X-ray inspection system

Regarding the existing mobile-type X-ray inspection system which can generate clear enough X-ray

images with good steel penetration and resolution, the Project shall adopt systems with the same specification as the existing systems, so that Aqaba Customs can operate without affecting the model deployed in the X-1 examination site.

2.1.4 Policy on Operation and Maintenance

For the operation of each X-ray inspection system planned to be procured through this project, a minimum of two persons are required: one operator to operate the system and one analyst to analyze the acquired images. With regard to the necessary inspection personnel, this project shall consider the examination capability of the portal-type X-ray inspection system and the mobile-type X-ray inspection system, the target quantity of cargo for X-ray inspection and the operation of a 24-hour system.

Regarding the maintenance and management of procured systems, it would be difficult to exchange parts or carry out repairs of the X-ray inspection systems by the user. It is desirable for a local agent to replace parts through periodic inspections or to carry out repairs when breakdowns occur, or for the manufacturer to implement quick maintenance services so as not to interfere with daily operations. Therefore, when selecting the systems, it is a prerequisite that authorized distributors have a base in Jordan that can properly maintain and manage the systems.

2.1.5 Policy on Replacement and Consumables Procurement

Since deterioration or aging of X-ray inspection systems are proportional to the number of irradiations (and not operating time), it is possible to plan for procurement of replacement parts / consumables by properly managing the systems based on the number of irradiations. In addition, manufacturers can prepare annual plans for parts replacement depending on the number of irradiations. (The plans vary by manufacturer). A fee for parts replacement plan for one year shall be included in the Grant Aid fee at the time of bidding.

In accordance with the JICA's Grand Aid policy, as a rule, one year spare-parts plan is included in the project cost. JCD needs to discuss with the manufacturer as for the spare-parts and consumables for the second year onwards.

2.1.6 Policy on Procurement Method

Consideration of Divided Contracts (procurement by lot division)

This project plans to procure two kinds of systems, portal- and mobile-type X-ray inspection systems, and it is essential that a system is established so that maintenance services will be smoothly implemented by authorized distributors for the systems after delivery. It is assumed that it will be difficult to quickly maintain and manage the systems if the portal and the mobile systems were divided into two lots for the bidding. It would mean that inspection systems from different manufacturers would be delivered and that

maintenance services would be carried out by two different authorized distribution companies. Therefore, a policy for this project should be not to divide the procurement into lots.

2.1.7 Policy on Country of Origin

The country of origin of major manufacturers that can supply X-ray inspection systems to Jordan include the United States, France, the United Kingdom and China. Among these countries, manufacturers with bases in the United States, France and the United Kingdom already have experience of delivering X-ray inspection systems to Jordan's market and of providing long-term maintenance services. Manufacturers from these countries have authorized distributors in Jordan, so there is no problem in providing maintenance services. Therefore, this project will designate the United States, France and the United Kingdom as the country of origin for the procurement plan.

2.1.8 Policy Concerning the Handling of Existing Systems

The handling of existing systems after deployment of new systems by this project is as follows.

(1) Portal-type X-ray inspection system in Yard 4（manufactured by Leidos）

The portal-type X-ray inspection system installed in Yard 4 (manufactured by Leidos) is in relatively good condition because it is used less frequently; however, as described in Section 2.1.3, the main issue is that clear enough X-ray images are not generated because of the low capability of the X-ray machine (Betatron system). JCD is considering how this system should be operated in the future.

(2) Portal-type X-ray inspection system in X-1 inspection site（manufactured by Leidos）

The portal-type X-ray inspection system installed in the X-1 inspection site (ACT) (manufactured by Leidos) is used on a 24-hour basis. The volume of cargo inspected there is the largest and so the workload of the systems is high. It is the same model as the X-ray inspection system in Yard 4, and has the same problem that the image quality is unclear because the capability of the X-ray machine is low. JCD will decommission the inspection system in 2020 or use it as a supplementary system.

(3) Mobile-type X-ray inspection system deployed to ACT（manufactured by Rapiscan）

This project plans to relocate the mobile-type X-ray inspection system deployed at the X-1 inspection site (ACT) (manufactured by Rapiscan) to the customs facilities in ASEZ, such as the GCT or the Al-Durra border customs office, in order to reduce the work load on the mobile-type X-ray inspection system that will be provided to the GCT under this project.

2.2 Basic Plan (Equipment Plan)

2.2.1 Overall Plan

As shown in 1.1, two customs clearance lines are provided in ASEZ, and policies are adopted to establish an X-ray inspection system in each customs line. In accordance with the policy of JCD, this project plans to upgrade the X-ray inspection system in the X-1 inspection site for imported container cargo and in the GCT inspection site for imported bulk cargo and located in front of Customs Line (1).

For Customs Line (2), this project plans to deploy X-ray inspection systems to a vacant lot that is located 3 km south of the Wadi Yetim Customs Center of ASEZ, which shall be called X-3 inspection site, because it is difficult to secure a site on the premises of Wadi Yetim Customs Center.

It shall be mentioned that civil works and ancillary works for the proposed X-3 inspection site is necessary because the site is currently a vacant lot.

2.2.2 Equipment Plan

(1) Assessment of equipment quantity

1) Measurement of inspection time of existing systems

On 23 July, 2018, the inspection time required by the existing inspection system was measured at the X-1 inspection site. As shown in Fig. 2-3, the average inspection time, “E”, was estimated for cargo from its arrival at the inspection reception until the completion of the X-ray inspection. As shown in Table 2-1, the result of the cumulative time of inspection for nine containers was 8 minutes 35 seconds.

2) Review of inspection ability

In the following paragraph, “E” is calculated focusing on “C” (inspection by X-ray inspection system), as shown in Figure. 2-3.

The inspection time, “C”, for the existing system of the X-1 inspection site is 120 units/hour (equivalent to 30 seconds/unit), whereas the planned specification for procurement systems is 80 vehicles/hour (equivalent to 45 seconds/unit). (This system specification of 80 vehicles/hour is described in “Basic specifications of systems” in Section 2.2.2. (2), 2)) Difference between the existing and the planned inspection times (45 - 30 = 15 seconds/unit) shall be added to the measured inspection time to calculate the planned systems’ specification.

Therefore, the inspection processing capacity of the systems to be procured, “E”, shall be 10 minutes 50 seconds per 9 units, which was derived using the measured inspection time plus the difference between the existing and planned processing rate per unit (8 minutes 35 seconds + 15 seconds × 9 units = 10 minutes 50 seconds), and thus the inspection processing capacity per day is estimated to be approximately 1,200 units.

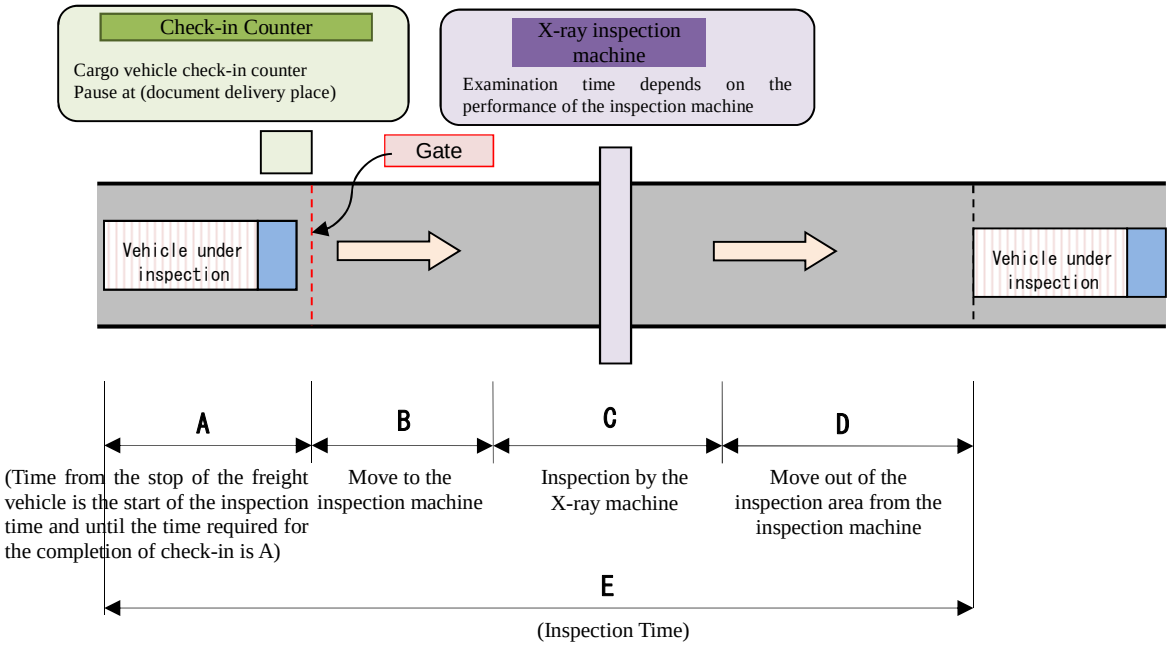


Figure 2-3 Measurement of inspection time at X-1 inspection site

Table 2-1 Inspection times (E) for X-1 inspection site

Number of vehicles	Cumulative time	Process time
1	0 min 35 sec	0 min 35 sec
2	1 min 30 sec	0 min 55 sec
3	2 min 15 sec	0 min 45 sec
4	3 min 25 sec	1 min 10 sec
5	4 min 00 sec	0 min 35 sec
6	5 min 03 sec	1 min 03 sec
7	6 min 10 sec	1 min 07 sec
8	8 min 00 sec	1 min 50 sec
9	8 min 35 sec	0 min 35 sec

3) Number of system installations required for X-1 inspection site

a) Amount of cargo processing by X-1 inspection site

The necessary number of X-ray inspection systems was estimated based on the above calculation for inspection ability of the planned systems and forecast of cargo quantities up to 2028. The type of cargo to be inspected at the X-1 inspection site shall be container cargo only, because this is the only type of cargo that is imported through ACT.

Cargo quantity for X-1 inspection site = number of containers

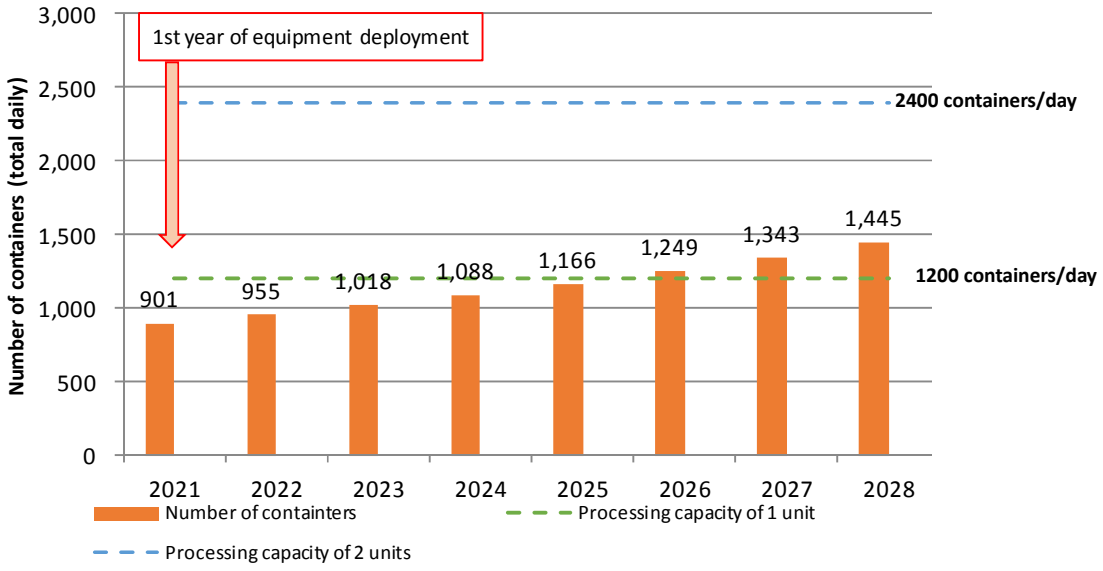
b) Required number of inspection systems for X-1 inspection site

Figure 2-4 shows the number of containers that can be inspected per day, which was calculated by converting the predicted annual container handling volume of ACT from 2021 to 2028 obtained from the Aqaba Development Corporation (hereinafter referred to as “ADC”) into the daily container handling volume.

As shown in this figure, the forecast shows that the demand for inspection processing will exceed the capacity of one unit by 2026, which is 5 years after installation of the systems, and that demand will exceed the capacity by more 1.2 times by 2028, 10 years after installation.

The X-ray inspection systems require periodic maintenance at least biannually, which can take several days (3 to 4 days), and operation of X-ray inspection systems will be interrupted during these periodic inspections. (This interruption of operation excludes days when the systems cannot be operated due to unexpected breakdown.)

The provision of two units is the minimum requirement in order to meet the JCD's targets for the total number of X-ray inspection and to carry out inspections without periods of interrupted operations. Given a deployment of three X-ray inspection systems is highly likely to be excessive, therefore, two X-ray inspection systems shall be installed in the X-1 inspection site.



Source: Consultant made based on the ADC data

※Legal service life of seven years (7 years) after the deployment of the equipment is used.

Figure 2-4 Comparison of the forecast demand for cargo inspection at the X-1 inspection site and the inspection processing capacity of the systems

4) Number of system installations required for X-3 inspection site

a) Amount of cargo processing by X-3 inspection site

The amount of cargo to be inspected at the X-3 inspection site is the total amount of the X-1 container cargo and the GCT bulk cargo.

cargo quantity for X-3 inspection site = number of containers from X-1 + quantity of bulk cargo

b) Arrangement of bulk cargo volume passing through X-3

As shown in Table 2-2, since the total of bulk cargo of GCT is calculated by weight, this data is converted into the equivalent amount of container cargo, based on the following conversion.

20.5 tonne = one 40-foot container

The calculation above is adopted from the JICA calculation manual.

Table 2-2 Trends in imported bulk cargo weight (2014 to 2017)

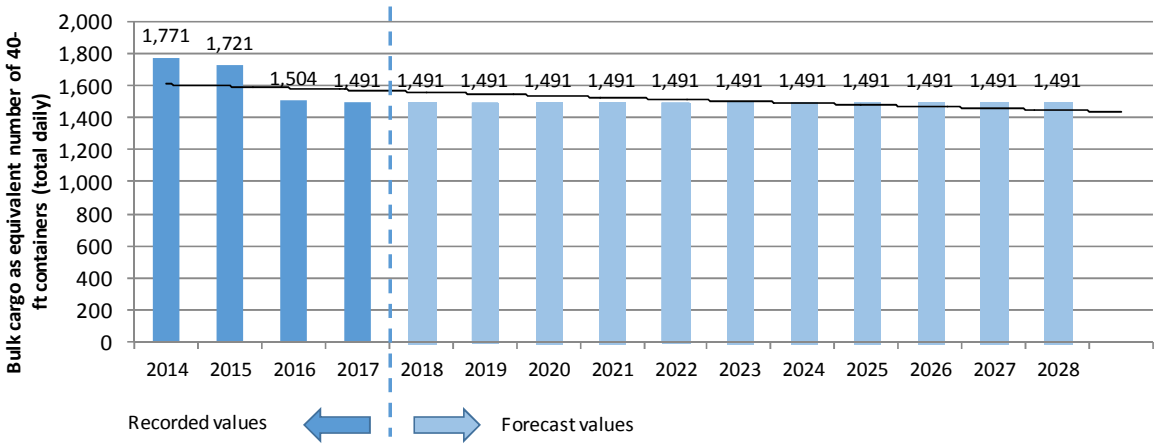
Units：tonne

	2014	2015	2016	2017
steel&iron	457,597	913,885	966,399	467,802
Timber	81,410	59,456	23,224	52,040
Construction materials	47,462	38,414	22,083	59,900
other general cargo	209,510	538,468	402,467	250,676
fuel/oil	7,708,487	6,886,124	5,165,486	5,435,778
fertilizer	1,609,775	1,679,128	1,179,060	1,534,860
grain	3,095,309	2,701,408	3,427,783	3,299,241
livestock	38,943	56,184	67,949	51,429
sulfur	554,946	865,361	746,525	791,451
Total(ton)	13,250,506	12,875,082	11,256,467	11,153,742
Total as equivalent number of 40-ft contrainers	646,366	628,053	549,096	544,085

Source: Consultant made based on the ADC data

c) Conversion of bulk cargo weight into container cargo volume

The equivalent volumes of container cargo shown in Figure 2-5 are based on the above records of bulk cargo weights. Despite recent trends between 2014 and 2017 which show that annual bulk cargo has been decreasing, it is inconceivable to assume further downward trend considering Jordan's economic growth rate of 2% (World Bank data, 2017); therefore, the annual bulk cargo after 2018 was set equal to the recorded total weight in 2017.



Source: Consultant made based on the ADC data
※Conversion of the annual number of containers from Table 2-2 into daily number of containers
※Legal service life of seven years (7 years) after the deployment of the equipment is used.

Figure 2-5 Forecast volume of container cargo based on conversion of bulk cargo weight (Converted to 40-foot containers)

d) Required number of inspection systems for X-3 inspection site

A forecast for the total number of the container cargos passing through the X-3 inspection site is the sum of the container cargos of X-1 and the bulk cargos from GCT converted to the number of 40-foot container cargo.

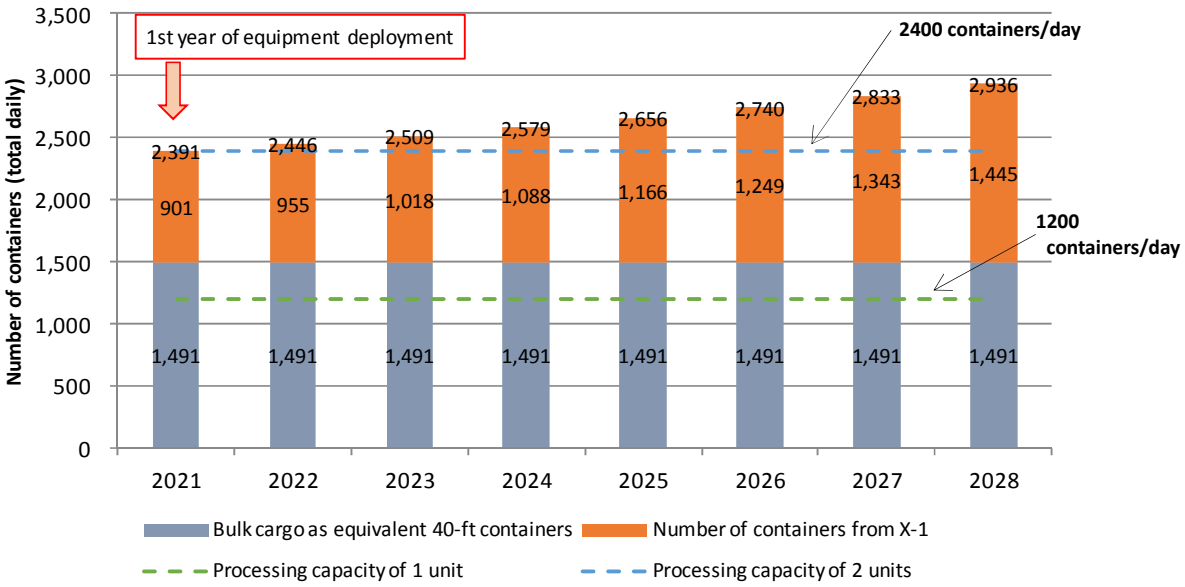
First, a scenario which a deployment of three X-ray inspection systems at the X-3 inspection site is studied. In this scenario, it is assumed that three units will have an inspection handling capacity of 3,600 containers/day, and the necessary handling capacity will be significantly exceeded in seven years after the installation of the systems. On the other hand, if two systems are deployed, the handling capacity is 2,400 containers/day; it will exceed the handling capacities of the system approximately 2% after 2 years, 15% after 5 years and 25% after 7 years of the deployment. However, the number of vehicles (containers) subject to X-ray examination varies from month to month; it is assumed that the number of vehicles (containers) can still properly be x-rayed during the ordinary period without queuing up.

The above calculation is based on the assumption of peak inspection time / period such as the cargos which need to be inspected are queuing up during the time after Ramadan.

In order to prevent this peak season (Ramadan), it would be desirable to deploy three X-ray inspection systems. However, since the inspection peak season occurring after Ramadan is limited period of time a year and it is excessive to deploy three inspection systems. It is therefore to conclude that the deployment of two inspection systems are appropriate enough to conduct X-ray inspection on cargos except for during the peak season.

Number of cargo containers passing through the X-3 inspection site

= Number of cargo containers from X-1 inspection site + Bulk cargo converted to equivalent number of 40-foot containers



Source: Consultant made based on the ADC data

※Legal service life of seven years (7 years) after the deployment of the equipment is used

Figure 2-6 Comparison of the forecast demand for cargo inspection at the X-3 inspection site and the inspection processing capacity of the systems

5) Number of system installations required for GCT inspection site

a) Amount of cargo processing by GCT

A conversion of bulk cargo weight (forecasted value) to container cargo volume will be used for consideration of X-3 inspection site, because GCT does not handle container cargo. However, fuel and oil are excluded from cargo volume, because they are not unloaded at GCT. Instead, fuel and oil will be subjected to X-ray examination at the X-3 inspection site.

Cargo weight for GCT Inspection site = bulk cargo converted to equivalent number of 40-foot containers (excluding fuel and oil)

b) Arrangement of bulk cargo passing through the GCT

Table 2-3 shows volume of bulk cargo excluding fuel and oil.

Table 2-3 Summary of imported bulk cargo weight, excluding fuel / oil, from 2014 to 2017

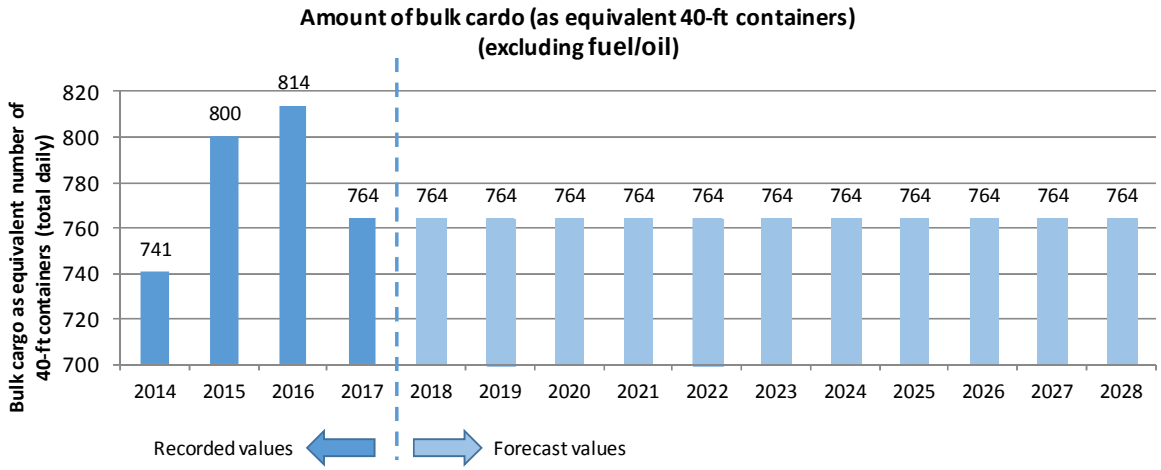
Units: tonne

Cargo	2014	2015	2016	2017
Steel & iron	457,597	913,885	966,399	467,802
Timber	81,410	59,456	23,224	52,040
Construction materials	47,462	38,414	22,083	59,900
Other general cargo	209,510	538,468	402,467	250,676
Fuel / oil	excluded	excluded	excluded	excluded
Fertilizer	1,609,775	1,679,128	1,179,060	1,534,860
Grain	3,095,309	2,701,408	3,427,783	3,299,241
Livestock	38,943	56,184	67,949	51,429
Sulfur	554,946	865,361	746,525	791,451
Total of bulk cargo (tonne)	5,542,020	5,988,958	6,090,981	5,717,965
Total as equivalent number of 40-ft contrainers	270,342	292,144	297,121	278,925

Source: Consultant made based on the ADC data

c) Conversion of bulk cargo weight to freight container volume, excluding fuel and oil

The forecast of the bulk cargo weight, excluding fuel and oil, is based on the figures in Table 2-3. As shown in Figure 2-7, the volume of bulk cargo was converted to equivalent freight containers, and forecast volume after 2018 were set equal to the record of 2017.



Source: Consultant made based on the ADC data

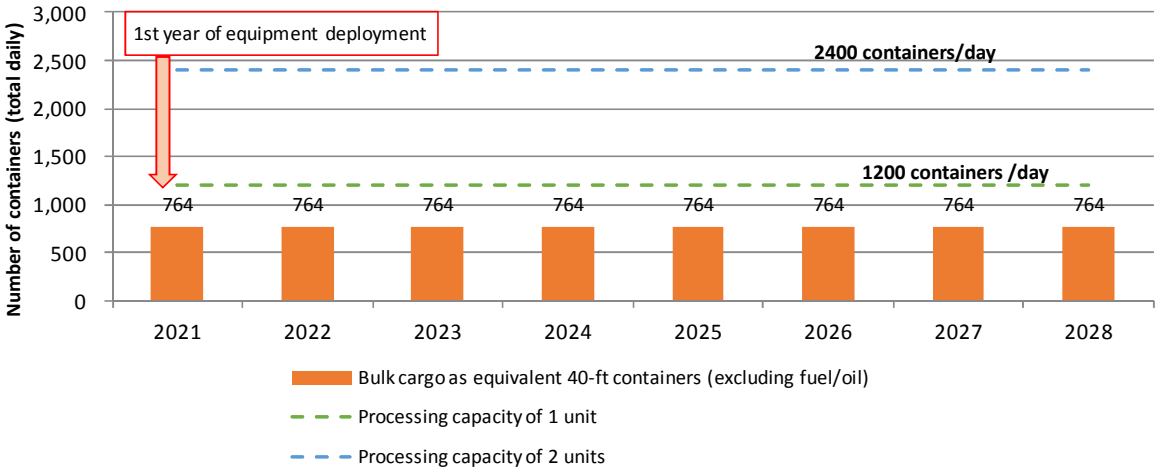
※Legal service life of seven years (7 years) after the deployment of the equipment is used.

Figure 2-7 Forecast of container freight volume conversion of bulk cargo weight (excluding fuel and oil) (Converted to 40-foot containers)

d) Number of X-ray inspection systems required for GCT inspection site

As shown in Figure 2-8, one X-ray inspection system should be sufficient because the demand for

inspection of bulk cargo passing through the GCT inspection site, as an equivalent number of containers (excluding fuel and oil), will be lower than the capacity of the inspection system.



Source: Consultant made based on the ADC data
※Legal service life of seven years (7 years) after the deployment of the equipment is used

Figure 2-8 Estimated demand for bulk cargo inspections (excluding fuel and oil) compared to system capacity (Converted to 40-foot containers)

(2) Equipment specification

1) Selection of portal- and mobile-type X-ray inspection systems

There are two types of X-ray inspection system: portal type and mobile type (see the photos in Table 2-4). Since the mobile type is an in-vehicle type of X-ray inspection system, it can respond flexibly to inspections without being restricted by the inspection site or the position of vehicles. Furthermore, the cost of mobile system procurement and maintenance is much less than portal system. However, the mobile type cannot have more than two personnel for the image analysis, because the operating space in the vehicle is limited, only enabling to locate minimal quantity of facilities such as computers.

The portal-type X-ray system can expand its operating space by utilizing a container or other housing structure as an operations room, and so multiple personnel for image analysis can be arranged by increasing the number of computers and, by doing so, it is possible to inspect cargo at a higher rate compared with mobile types.

In this project, the amount of inspections is large (see Figure 2-4 and Figure 2-6) and so the portal type will be selected for the X-1 and X-3 inspection sites where processing speed is a priority. On the other hand, the GCT has a comparatively small amount of inspections (see Figure 2-8) compared to the X-1 and X-3 inspection sites, and although the place of operations is as shown in Figure 2-13, JCD may use the system at a different location within the terminal as necessary. In addition, mobile-type X-ray inspection system shall be selected for its advantage of being able to change inspection site, such as

potentially being used to supplement inspections of cargo at other inspection sites of ASEZ and at border areas with Saudi Arabia.

Table 2-4 Features of portal- and mobile-type X-ray inspection machines

<table>
<tr><th>Location</th><th>System type</th><th>Reference photo</th><th>Features</th></tr>
<tr><td>X-1 Inspection Site

X-3 Inspection Site</td><td>Portal-type X-ray inspection machine</td><td> 
Photo: portal-type X-ray inspection machine in operation by JCD (Yard-4)</td><td>This type must be installed in cases where the inspection volume is large and a certain processing capacity is required.</td></tr>
<tr><td>GCT</td><td>Mobile-type X-ray inspection machine</td><td> 
Photo: mobile-type X-ray inspection machine in operation by JCD (X-1 Inspection Site)</td><td>This type must be installed in cases where the inspection volume is relatively small and the inspection site is in flux.</td></tr>
</table>

2) Basic specifications for systems

a) Portal-type X-ray inspection system

As stated in Section 2.1.4, the issue with the existing X-ray inspection systems operated by JCD is that the image quality is unclear due to the low capability of X-ray irradiation machine. Therefore, a model of X-ray inspection system that has an excellent ability shall be selected for procurement.

As a measure against unclear imagery, this project shall adopt systems with linear accelerator (LINAC) method for particle acceleration, instead of the BETATRON method in the existing systems, because the image quality of LINAC is clearer.

Other than the above, the basic specifications of the systems to be procured under this project are as shown in Table 2-5 with comparison to the basic specifications of the existing systems. There are three or more manufacturers that can meet these specifications and can supply systems to Jordan.

Table 2-5 Systems specifications for portal-type X-ray inspection machine

System type	Specification		Changes with existing systems
Portal-type X-ray inspection machine	Inspection method	: Drive through	No change
	Accelerator	: LINAC method	Method changed (image quality improvement)
	Output	: 6 MeV or more	Output increased (image quality improvement)
	Penetration level	: 300 mm (iron plate) or more	No change
	Processing rate	: 80 units / hour or more	Approximately 40% reduced
	Dustproofing and waterproofing	: IP6 & IP5 or more	No change
	Maximum safe operating temperature	: Suitable for high temperature area（～+50℃）	No change
	Data communication	: data transfer by dedicated line	No change
	Compatibility with electronic customs clearance system	: Compatible with Jordan's ASYCUDA electronic customs clearance system	No change
	Container serial number recognition function	: Included	No change
	Vehicle registration number recognition function	: Included	No change

b) Mobile-type X-ray inspection system

Currently, the mobile-type X-ray inspection system manufactured by Rapiscan, which JCD operates, is a model that has a LINAC for the particle accelerator, so there is no issue regarding the basic specifications and the image quality.

Therefore, the basic specifications are the same as those of the mobile-type X-ray inspection machine currently operated by JCD, as shown in Table 2-6. There are three or more manufacturers that can meet these specifications and can supply systems to Jordan.

Table 2-6 Systems specifications for mobile-type X-ray inspection machine

System type	Specification		Changes with existing systems
Mobile-type X-ray inspection machine	Inspection method	: Drive through	No change
	Accelerator	: LINAC method	No change
	Output	: 6 MeV or more	No change
	Penetration level	: 300 mm (iron plate) or more	No change
	Processing rate	: 80 units / hour or more	No change
	Dustproofing and waterproofing	: IP6 & IP5 or more	No change
	Maximum safe operating temperature	: Suitable for high temperature area（～+50℃）	No change
	Data communication	: data transfer by dedicated line	No change
	Compatibility with electronic customs clearance system	: Compatible with Jordan's ASYCUDA electronic customs clearance system	No change
	Container serial number recognition function	: Included	No change
	Vehicle registration number recognition function	: Included	No change

(3) Deployment plan for procured systems

Table 2-7 shows the layout plans for procured systems based on the above study results.

The Main Port was a candidate for system deployment at the time of the initial request by the Government of Jordan, but since its function has already been transferred to GCT, the deployment of systems was changed to GCT.

Table 2-7 Deployment plan for procured systems

System Type	Requested Equipment		Deployment Plan	
	Destination for deployment	Units	Destination for deployment	Units
Portal-type X-ray inspection system	ACT	2	X-1inspection site (ACT)	2
	Wadi Yetim Customs Center	2	X-3 inspection site (In front of Wadi Yetim Customs Center)	2
Mobile-type X-ray inspection	Main Port	1	GCT	1

(4) X-ray protective wall made of reinforced concrete

1) Portal-type X-ray inspection machine

There is no protective wall around the existing portal-type X-ray inspection machine, because the X-ray emissions are lower than the systems that shall be procured under this project.

In this project, LINAC method, which has a larger emission of X-rays, shall be adopted in order to solve the performance and operational issues of the existing systems. Consequently, there will be more peripheral scattering of radiation. Therefore, protective walls made of reinforced concrete shall be installed to ensure safety to prevent radiation contamination around the systems.

Because the dimensions of the protective wall that are necessary for safe operation regarding radiation varies depending on the manufacturer of the X-ray inspection system, the design of the protective wall shall be subjected to a safety review by the Jordan Nuclear Regulatory Commission at the time of delivery of the systems .

For reference, Figure 2-9 shows an example of a portal-type X-ray inspection systems and the reinforced concrete protective wall is highlighted with a red line.

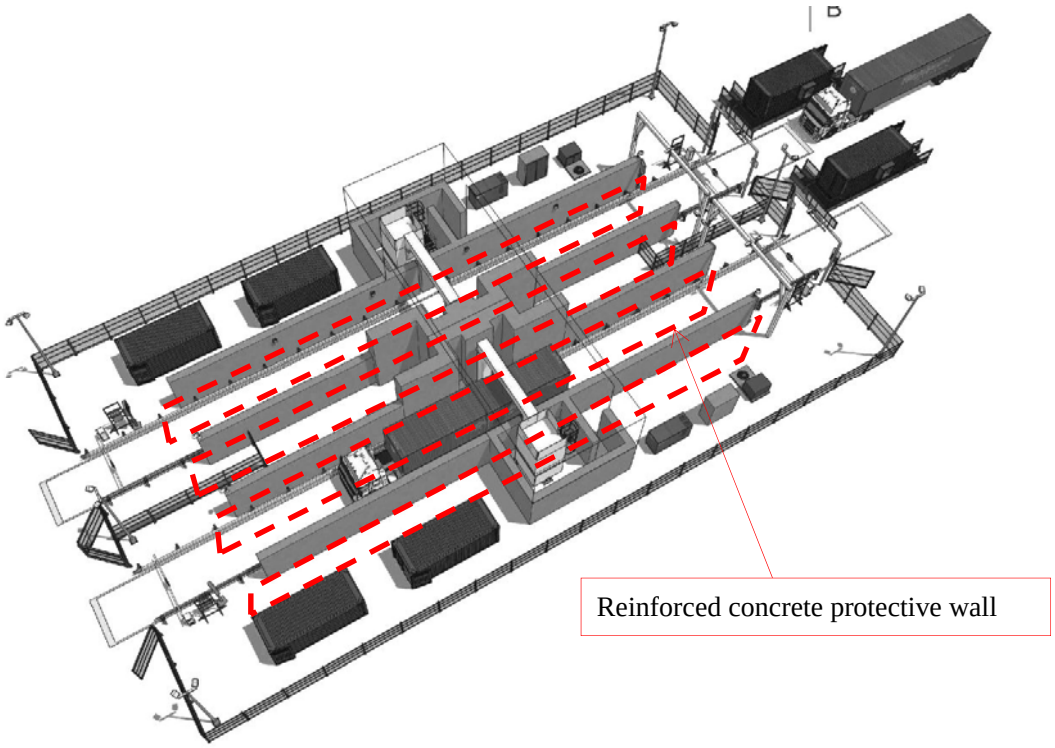


Figure 2-9 Example of a protective wall for portal-type X-ray inspection systems Source: consultant

2）Mobile-type X-ray inspection machine

The existing mobile-type X-ray inspection machine utilizes the LINAC method. It is equipped with the same particle acceleration method as the systems planned for procurement under this project. A protective wall made of reinforced concrete that can be moved by a transport machine, such as a crane truck, shall be located in the vicinity of the mobile-type X-ray inspection system. In order to secure the mobility of the mobile-type X-ray inspection systems, a fixed protective wall shall not be used.

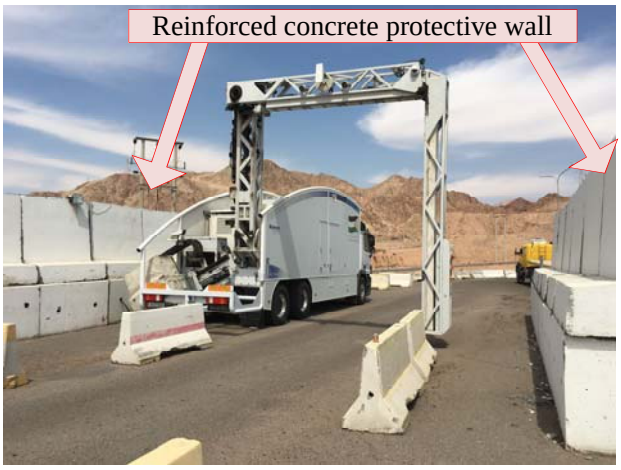


Photo 2-1 Reinforced concrete protective wall and X-ray inspection machine

Like the portal-type X-ray inspection machine, the necessary dimensions of the protective wall required for safe operation regarding radiation will vary depending on the manufacturer of the X-ray inspection system, and the design of the protective wall will be subject to a safety review by the Jordan Nuclear Regulatory Commission when the system is delivered.

Photo 2-1 shows the reinforced concrete protective walls for the existing mobile-type X-ray inspection machine in the X-1 inspection site.

(5) Network of X-ray inspection systems

Existing X-ray inspection systems are connected to a network by a dedicated line in JCD (shown in Figure 2-10), and it is also possible to access, store and analyze data. With regard to the planned systems for procurement under this project, computers for accessing, storing and analyzing data shall be deployed and the same dedicated line shall be used to network the X-1, X-3 and GCT inspection sites and the JCD headquarters, Yard 4 and Wadi Yetim Customs Center.

Also, several tablet computers shall be provided for X-2, Yard 4, Wadi Yetim Customs Center in order to allow inspectors to check the inspected cargo and X-ray images for efficiency.

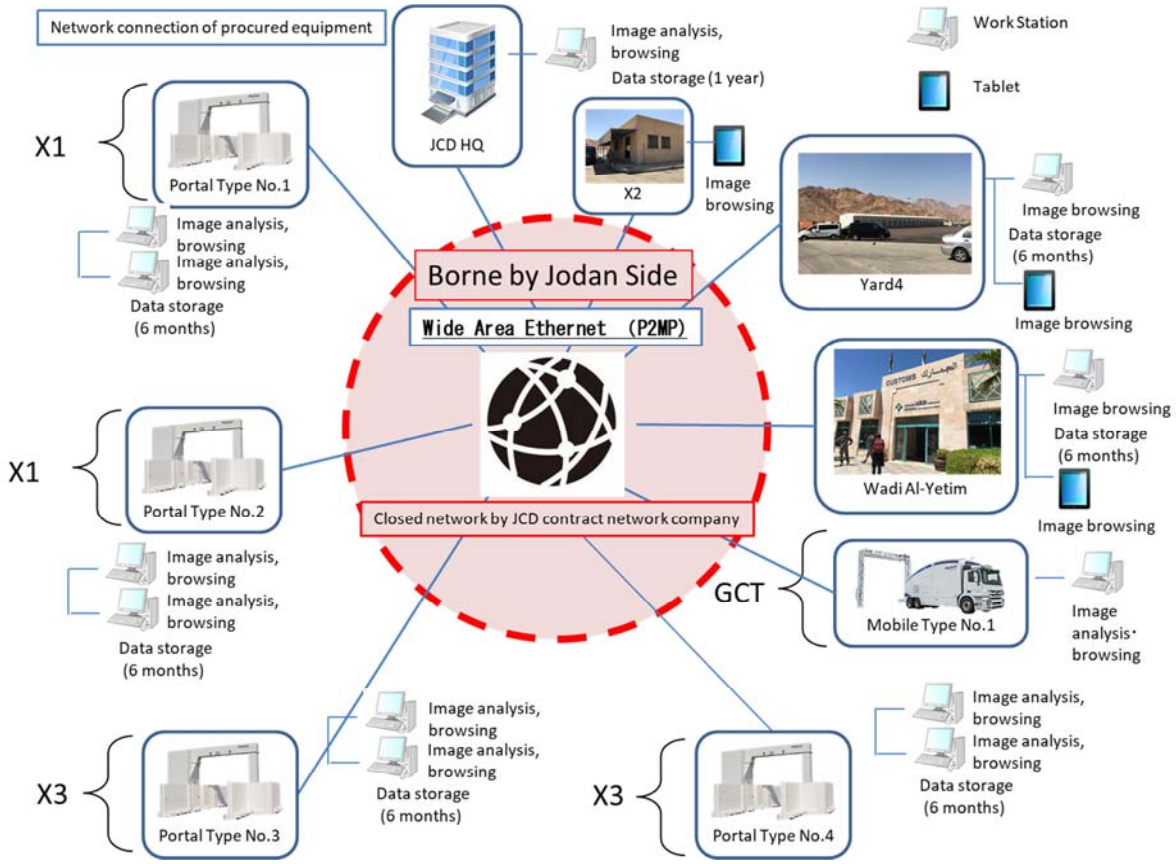


Figure 2-10　Network connection of procured systems

(6)　Deployment plan for X-ray inspection systems

The position of portal-type X-ray inspection systems at the X-1 and X-3 inspection sites shall be placed in parallel rows, as shown in Figure 2-11 and Figure 2-12 respectively.

The mobile-type X-ray inspection systems at the GCT inspection site shall be placed as shown in Figure 2-13.

1) X-1 Inspection Site

The main criterion of the layout plan is that two X-ray inspection systems shall be arranged in parallel rows for container-loaded vehicles passing through the two gates, namely Lanes 2 & 3. The seaward side gate (Lane 1) is currently a allotted lane for entering the X-ray inspection site managed by the General Intelligence Department (hereinafter referred to as “GID”). In addition, cargo that has a non-standard height or shape, such as open-top containers, does not pass through the gate leading to the X-1 inspection site, but instead passes through the ACT gate.

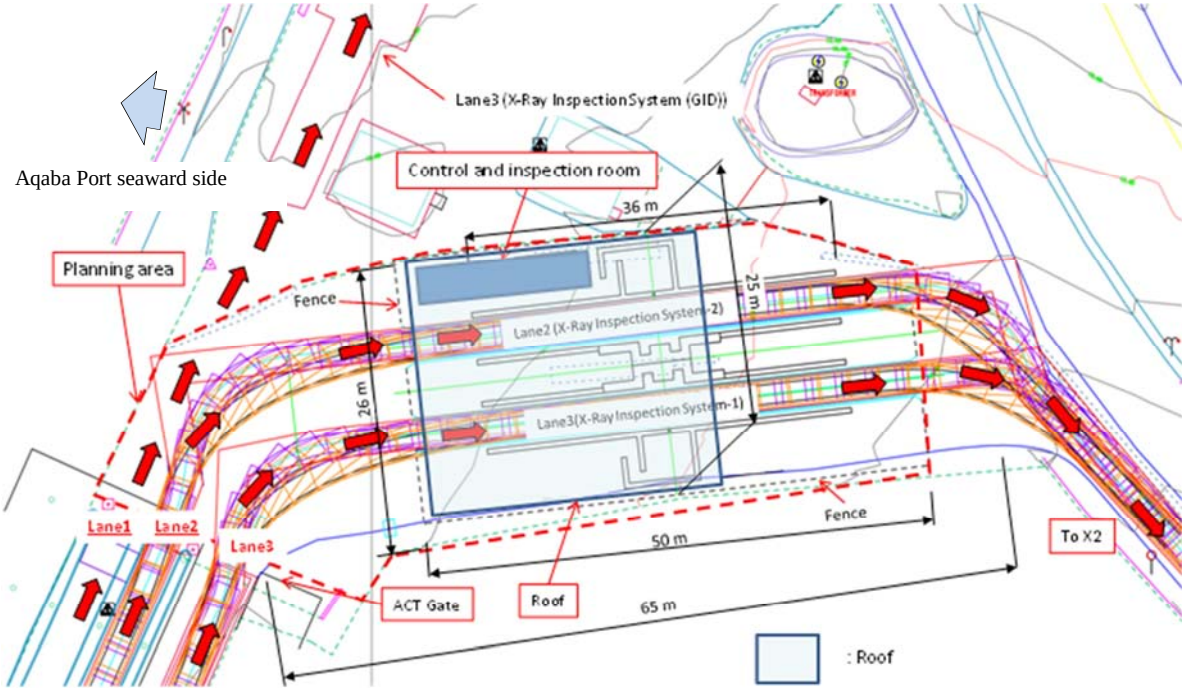


Figure 2-11 Systems layout plan for X-1 inspection site

2) X-3 Inspection Site

The planned construction of the X-3 inspection site shall be the vacant lot of land (as of March 2019) along the Aqaba Highway, located about 3 km south of the Wadi Yetim Customs Center. In the planned area, the Government of Jordan shall be responsible for the necessary preparation of the site for installation of systems, including creation of the land, civil engineering works, electric power facilities, water supply and sewerage facilities, and traffic safety facilities. The cargo to be inspected will enter the premises of the X-3 inspection site from the Aqaba Highway, will undergo an inspection and then return to the Aqaba Highway.

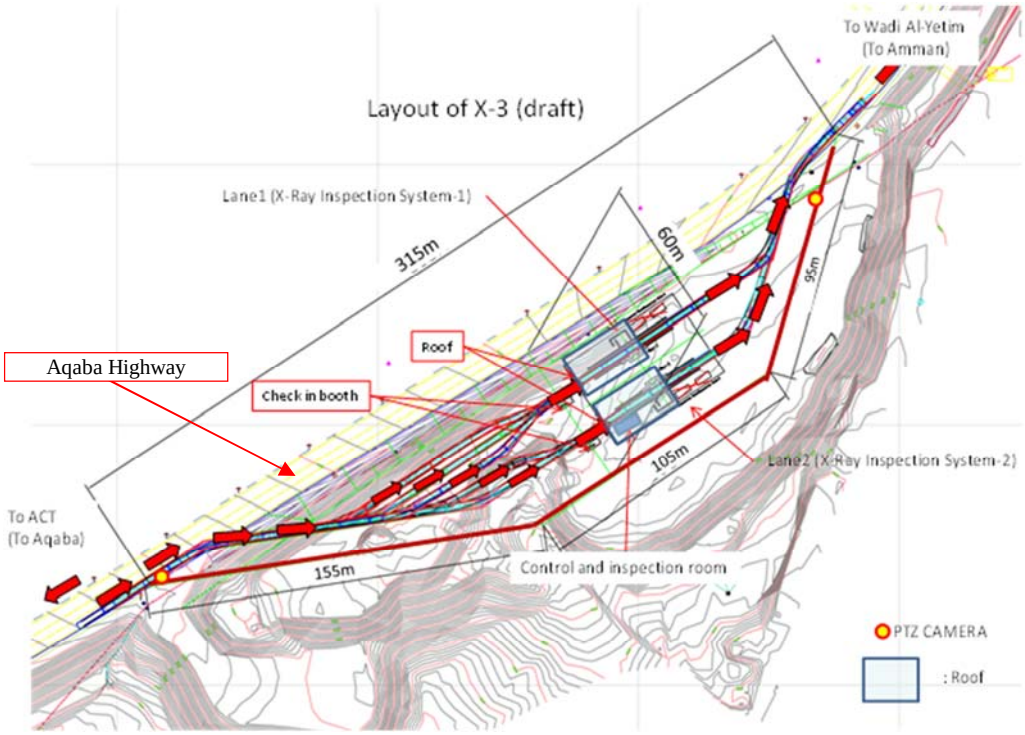


Figure 2-12 Systems layout plan for X-3 inspection site

3) GCT

The mobile-type X-ray inspection system in the GCT should be arranged in close proximity to the exit gate, as shown in Figure 2-13, while taking into consideration the traffic line of the freight cars of GCT and the passage to the exit.

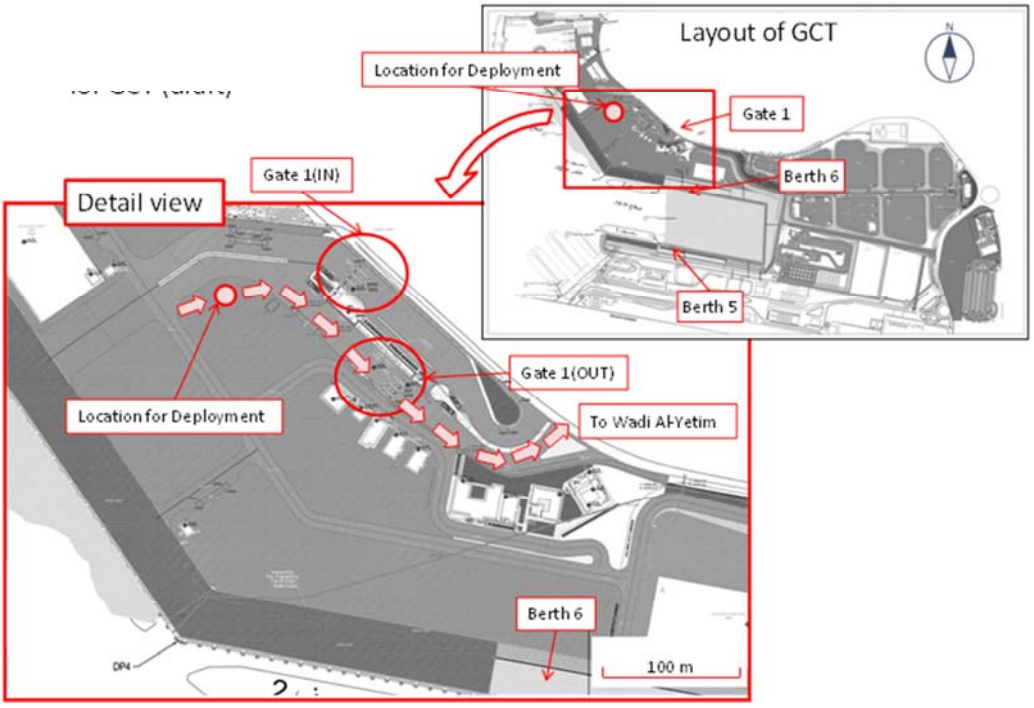


Figure 2-13 System layout plan for GCT inspection site

(7) Procurement plan for replacement and consumable parts

Replacement and consumable parts of the X-ray inspection system procured by this project will vary depending on the manufacturer, so the specific part names and quantities cannot be specified at the time of bidding. Therefore, the condition that one year's supply of the necessary replacement parts as designated by each manufacturer shall be specified in the tender document.

(8) Operation and maintenance plan of equipment

1) Operator and Image Analyst

In order to operate the equipment procured by this project, it is necessary to assign at least one operator, who operates the equipment. In addition, at least one analyst who analyzes the acquired images should be assigned.

It is planned that two image analysts shall be assigned in order to increase the cargo processing capacity and to improve inspection analysis accuracy. In the X-1 and X-3 inspection sites, one operator and one image analyst shall be assigned for each unit of Portal-type X-ray inspection system.

The cargo volume in the GCT inspection site is about 60% of the processing capacity of the mobile type X-ray inspection machine, so it seems that there is leeway for image analysis, and so one operator and one image analysis officer shall be assigned as shown in Figure 2-8.

In total, 15 teams and 42 personnel are required for the operation of X-ray inspection equipment, as shown in Table 2-8.

However, this study has estimated the minimum number of people required for 24-hour operation in 8-hour shifts. It will be necessary to allocate more personnel than the number shown in Table 2-8 considering the need for holidays and rest days.

Table 2-8 Personnel necessary for operation of X-ray inspection machine

Inspection Site			Team														Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
X1	Portal Type No.1	Operator	1	1	1													3
		Image Analyst	2	2	2													6
	Portal Type No.2	Operator				1	1	1										3
		Image Analyst				2	2	2										6
X3	Portal Type No.3	Operator							1	1	1							3
		Image Analyst							2	2	2							6
	Portal Type No.4	Operator										1	1	1				3
		Image Analyst										2	2	2				6
GCT	Mobile Type	Operator													1	1	1	3
		Image Analyst													1	1	1	3
															Total			42
															Breakdown	Operator		15
																Image Analyst		27

2) Maintenance

Equipment that is scheduled to be procured under this project cannot be maintained by the user, such as exchange of parts replacement or repair. Therefore, spare parts included in the equipment procurement will be used for one year in conjunction with support from a local authorized dealer under the manufacturer's warranty.

Basically, in accordance with the policy of JICA grant aid, for the second and subsequent years, it is necessary for JCD to conclude an equipment maintenance contract with local authorized dealer by the JCD’s budget.

2.3 Procurement Plan

2.3.1 Procurement Policy

(1) Equipment procurement policy

Since the portal-type X-ray inspection systems and mobile-type X-ray inspection systems to be procured in this project are not manufactured in either Jordan or Japan, they will be procured from a third country. Since high levels of function, accuracy and durability are required for the X-ray inspection systems, the systems including the main parts are designated to USA, France and U.K.

In terms of procurement, the systems will be selected from manufacturers whose products have specifications that satisfy those stipulated in the bidding documents, are easy to maintain and manage, have an established after-sales service system and, when troubles occur, can provide support and spare parts promptly.

System installation work, adjustment / commissioning and instruction need to be done by the manufacturer’s engineers. The hand work of the installation work shall be performed by the workers of the site construction company under the supervision of the manufacturer’s engineers.

(2) Project implementation entity

Figure 2-14 shows the structure and interrelations of the bilateral agencies concerned when this project is implemented under Japanese grant aid.

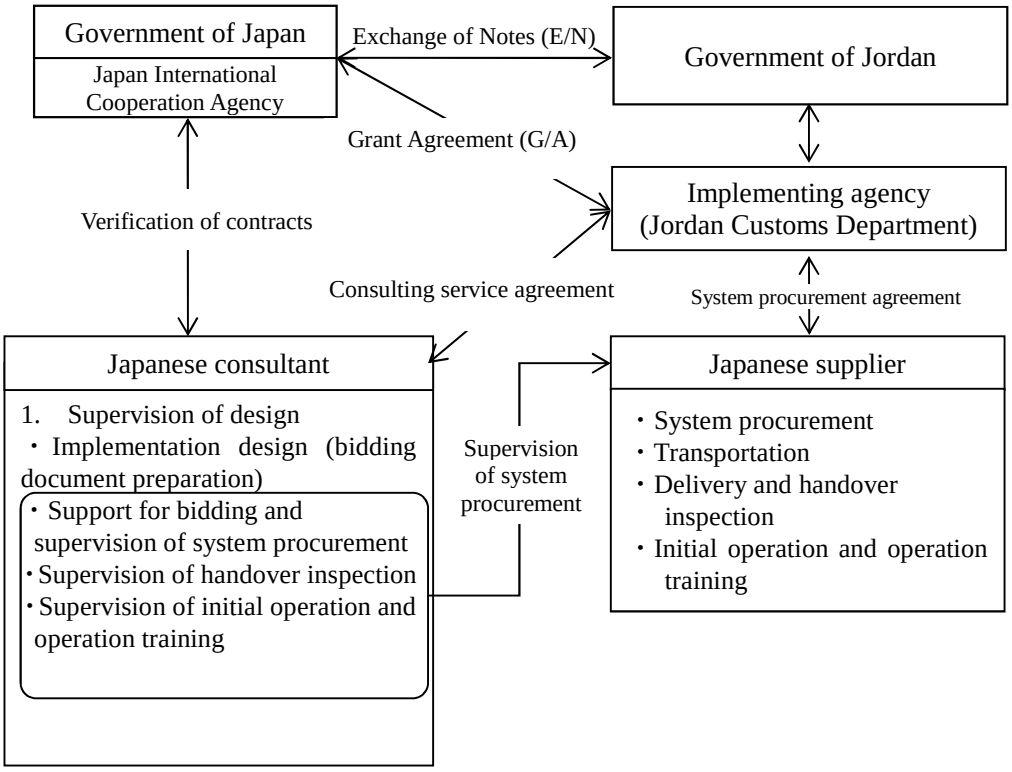


Figure 2-14 Organizational Chart of Project Implementation

(3) Government of recipient country

Basically, JCD, the deployment place of the systems, is in charge of the operation and maintenance of the systems. From the second year after delivery, JCD needs to secure the necessary maintenance contract cost with the manufacturer.

(4) Consultant

JCD shall conclude a service agreement (consulting service agreement) with a Japanese consultant promptly after concluding the E/N and G/A. The consultant is responsible for the detailed design, bidding document preparation, bidding support, supervision of system procurement and provision of engineering services until handover of the systems.

(5) System supplier

The supplier shall be decided in an open bidding.

A single-stage two-envelope bidding will be chosen. The technical envelope is opened first, whereupon the consultant conducts technical screening of quality, specifications and quantity. Later, the price envelope of the bidders having passed the technical screening is opened by the consultant to assess and decide the final bid winner. The bid winner will conclude an agreement with the Jordanian representative as the system supplier.

2.3.2 Considerations on Procurement

(1) Grant-aid scheme

JCD, the implementing agency, has experienced grant-aid system procurement in the Project for the Enhancement of Border Security at Al-Karamah Border Crossing in Jordan and understands the implementation procedures. However, sufficient explanations must be provided, and discussions should be included at each implementation stage to avoid delay or defaults.

(2) Defect liability during transportation

Planned systems will be transported by sea from procurement country (third country: France, UK, USA) and will be unloaded at Aqaba Port. After customs clearance, systems will be transported inland to each site.

Responsibility for loss or damage, etc., of the systems during this transportation period will be borne by the supplier using transportation insurance.

(3) About the responsibility of breakage and loss of systems in installation work, initial operation / operation training

After arriving at the site, responsibility for loss or damage, etc., of systems during installation work, initial operation / operation training will be borne by the supplier using construction insurance.

After that, ownership will be handed over to the Jordan side after the delivery / inspection.

2.3.3 Procurement Classification

The transportation cost to the designated system storage and all the cost of system procurement, including assembly at unloading, are borne by the Japanese side.

On the other hand, the maintenance of the site for installing systems (including electricity, communication, water and sewage) shall be borne by the Jordanian side.

Table 2-9 Cost Bearing of Both Governments

Item		Division of Cost Bearing		Note
		Japan	Jordan	
Procurement, loading, installation of systems	System procurement	○		
	Sea transportation	○		
	Unloading	○		
	Customs clearance procedures		○	
	Securing installation site		○	
	Leveling, paving of installation site		○	
	Securing supply network such as electricity, water supply and drainage for installation site		○	
	Roof for sunshade (portal type only)	○		
	Cost for installation and initial operation	○	○	Personnel expenses of participants for initial operation training, electricity bills, fuel costs, and communication costs associated with data communications are borne by the Government of Jordan
	Approval application to relevant organizations		○	Including automobile registration of mobile-type X-ray inspection system
	Payment of commission to bank for banking arrangement		○	
After system procurement	Maintenance and operation expenses of systems, personnel expenses (Electricity bill, water bill, data communication fee, fuel cost, etc.)		○	
	Contract and cost for data communication with communication company		○	
	Maintenance contract cost with system manufacturer		○	Basically, in accordance with the policy of JICA grant aid, for the second and subsequent years, it is necessary to conclude an equipment maintenance contract with local authorized dealer according to the JCD's budget.
	Mobile X-ray protection wall for mobile-type X-ray inspection machine	○		

2.3.4 Procurement Supervision

(1) Basic policy

On conclusion of E/N and G/A, the Japanese consultant shall conclude a consulting service agreement with the Government of Jordan, develop the detailed design and supervise procurement within the scope of duties stipulated in E/N and based on the grant-aid framework. It is important for the consultant to perform their duties while being fully aware of the background to the project implementation and development and the aim of the outline design to formulate the cooperation project.

Since this is a system procurement project including civil engineering works such as foundation work and protective wall installation, procurement supervisors specialized in civil engineering (for facilities) and procurement supervisors specialized in systems (for X-ray inspection systems) will be assigned.

(2) Detailed Design

The consultant will make detailed design as indicated in the consultant contract based on the preparatory survey, the Exchange of Note (E/N) and the Grant Agreement (G/A). Based on the result of the detailed design, the project cost estimate will be examined and bidding documents including specification sheet/drawing necessary for the bidding will be prepared.

The detailed design mainly comprises the following.

- Discussions on the launch of the Project and site confirmation
- Review of system specifications
- Bidding document preparation
- An explanation of the bidding documents and obtaining approval for the same
- Support for bidding procedures (announcement of bid, distribution of bidding documents, bid and result review)
- Support for concluding of the contract (negotiations on contract, witness of contract and verification procedures of contract)

(3) Procurement supervision

Procurement supervision mainly comprises the following.

- Confirmation of issuance of the system order form
- Confirmation of production drawings, shop inspection and pre-shipment inspection
- Arrangement of pre-shipment inspection (outsourced to a third party) and issuance of an inspection report
- On-site preparation meeting (delivery schedule, confirmation of tax exemption and gist of initial operation and operation training)

- Assembly, initial operation, operation training and witness
- handover inspection and witness of handover
- Preparation of the completion report

2.3.5 Quality Control Plan

Product quality is managed by each manufacturer. And the handover of the systems will be conducted after site acceptance test, installation and commissioning.

The following inspections will be performed by the consultant in each stage of procurement to confirm that the systems to be procured meet the quality and specifications provided in the contract.

- Confirmation of the contents of the system order form issued by the Supplier
- Confirmation of production drawings, shop inspection at the factory where the systems are manufactured and pre-shipment inspection
- Pre-shipment inspection
- Inspection at system handover

2.3.6 Procurement Plan

(1) Procurement Sources

Following the basic policy of the country of origin, the division of the sources of systems are shown in Table 2-10.

X-ray inspection systems that meet the specifications required for this project are not manufactured in Japan.

Table 2-10 Division of Source of Systems

System	Country of Origin			Reason
	Japan	Jordan	Third country	
Portal-type X-ray inspection system	---	---	● (USA, France, UK)	meets the required specifications; not manufactured in Japan
Mobile-type X-ray inspection system	---	---	● (USA, France, UK)	meets the required specifications; not manufactured in Japan

(2) Transportation plan

1) Transport overview

The systems to be procured in this project will be systems manufactured in a third country (assuming

USA, France or UK) and will be unloaded to ACT or GCT by sea transport from country of origin. After unloading, it will be transported to the final destination X-1 inspection site, X-3 inspection site and GCT by trailer.

The transportation period is assumed to be about 1.5 months.

2) About shipping lot

As for installation of systems at the X-1 inspection site, since installation will be carried out while conducting ordinary customs operations within a narrow yard, it is necessary to pay attention so as not to disturb the normal work; therefore one lane will be constructed at a time. As for system installation at the X-3 inspection site, two systems will be installed simultaneously.

In accordance with the timing of the above-mentioned system installation work, shipment will be divided into two parts.

In the first shipment, one of the 2 portal-type X-ray inspection systems for ACT will be shipped and all the remaining systems will be shipped in the second shipment.

2.3.7 Installation Plan

Installation work will be carried out by a local contractor under the direction of the manufacturer's designated technician. The construction work includes installation of reinforced concrete protective walls around the systems, laying power lines, laying communication lines, concrete paving, asphalt pavement, foundation work in the operation room, installation of X-ray inspection systems, and roof construction for covering the systems.

The construction period necessary for the installation work per system is as shown in Table 2-11.

Table 2-11 Installation Plan (per unit)

System type	Construction period necessary for installation work (per unit)
Portal-type X-ray inspection system	About 4.5 months
Mobile-type X-ray inspection system	No construction work required

2.3.8 Adjustment and Commissioning Plan

The manufacturer's designated engineers will perform commissioning and adjustment of the procured systems.

After the installation work, the manufacturer's designated engineers will perform commissioning and adjustment of the procured systems, under the management of the supplier. Meanwhile, the consultant will also supervise at the site and ensure the safety of work. The consultant will confirm whether any

trouble will occur during the setting and adjustment and if any points to be improved should be found, it will request the supplier for readjustment or repair.

After adjustment/commissioning is completed, the systems will be handed over to JCD and initial operation/operation training will be carried out.

The period necessary for adjustment /commissioning per system is as shown in Table 2-12.

Table 2-12 Adjustment and commissioning plan of X-ray inspection systems (per unit)

System type	Time required for Adjustment and commissioning (per unit)
Portal-type X-ray inspection system	About 0.5 months
Mobile-type X-ray inspection system	About 0.5 months

2.3.9 Initial Operation /Operation Training Plan

The initial operation and operation training planned by the consultant based on the initial operation guidance curriculum obtained from the manufacturer of the X-ray inspection systems is as shown in Table 2-13.

Table 2-13 Initial Operation Training Plan for X-ray Inspection Systems

Date	Lecture content	Protal	Mobile
Day 1 (Sun.)	1-1 Introduction	●	●
	1-2 Safety consciousness, radiation and general safety matters	●	●
	1-3 Outline of system and equipment (portal type)	●	
	1-3 Outline of system and equipment (mobile type)		●
	1-4 Safety of equipment and systems	●	●
	1-5 Review and questions	●	●
Day 2 (Mon.)	2-1 Overview of system operation procedure (portal type)	●	
	2-1 Overview of system operation procedure (mobile type)		●
	2-2 Introduction of system software (portal type)	●	
	2-2 Introduction of system software(mobile type)		●
	2-2 Review and questions		●
Day 3 (Tue.)	2-2 Outline of each device (portal type)	●	
	2-2 Outline of each device (mobile type)		●
	2-3 Basics of Image Analysis	●	●
	2-4 Review and questions	●	●
Day 4 (Wed.)	3-1 Outline of X-ray machine (portal type)	●	
	3-2 Outline of X-ray machine (mobile type)		●
	3-3 Preparation before system startup, demonstration at startup and implementation training (portal type)	●	
	3-3 Preparation before system startup, demonstration at startup and implementation training (mobile type)		●
	3-9 Demonstration of scanning and implementation training 1	●	●
	3-4 Review and questions	●	●
Day 5 (Thu.)	3-5 Development of the scanner section, demonstration of each inspection mode and implementation training		●
	3-9 Demonstration of scanning and implementation training 2	●	●
	3-4 Review and questions	●	●
Holiday			
Day 8 (Sun.)	3-6 Demonstration and implementation training of emergency stop and system recovery	●	●
	3-7 Demonstration of system termination and implementation training	●	
	3-8 Storage, demonstration of system termination and implementation training		●
	3-9 Demonstration of scanning and implementation training 3	●	●
	3-9 Review and questions	●	●
Day 9 (Mon.)	3-5 Training for equipment inspection before starting	●	
	3-6 Training of equipment inspection before starting and scanner deployment		●
	3-9 Demonstration of scanning and practice training 4	●	●
	3-6 Review and questions	●	●
Day 10 (Tue.)	3-5 Basic troubleshooting and proper management of X-ray scanner	●	●
	3-6 Daily inspection of vehicle chassis		●
	3-6 Daily inspection	●	●
	3-6 Demonstration of scanning and implementation training 5		●
	3-9 Review and questions	●	●
Day 11 (Wed.)	4-1 Implementation training of the whole process	●	●
	4-7 Review and questions	●	●
Day 12 (Thu.)	4-1 Simulated scanning competition (practice, lecture)	●	●
	4-6 General review	●	●
	4-7 Award of certificate	●	●

2.3.10 Inspection Plan

In order to confirm that the systems to be procured meet the quality and specifications stipulated by the contract, the following inspections are carried out at each stage of procurement work.

- Confirmation of drawings before manufacturing
- Pre-shipment inspection at the factory (only to check the inspection report)
- Pre-shipment inspection by a third party
- Inspection at the time of delivery

(1) Confirmation of drawing

X-ray inspection system is a system with different specifications under different cases. In order to prevent trouble after completion, specifications will be confirmed before making drawings for manufacturing. Also, upon completion of these drawings, discussion and confirmation of the contents of the drawing will be carried out between the manufacturer, supplier and consultant.

Table 2-14 shows the number of consultations on system production drawings.

Table 2-14 Number of consultation days before the manufacture of systems and place of consultation

Place	System name	Contents	Number of consultations	Note
Domestic	X-ray Inspection System	consultation before the manufacture of systems	1	-

(2) Pre-shipment inspection

Before each system is shipped from the factory, inspection of the systems will be carried out in the presence of supplier to check whether there is damage or the like, whether the required specifications are satisfied, and the quantity. Furthermore, manufacturers are obliged to submit an inspection sheet specified by the manufacturer and confirm whether the predetermined quality is assured.

The consultant shall supervise the entire process of these inspections and confirm the documents (however, participation in the inspections will not be necessary).

Table 2-15 shows the number of pre-shipment inspections and inspection locations.

Table 2-15 Number of pre-shipment inspections and inspection place

Shipment	System Type	Number of Inspections	Place
1st shipment	Portal-type X-ray inspection system (1st unit)	1	Country of Origin (third country)
2nd shipment	Mobile-type X-ray inspection system (1 unit) Portal-type X-ray inspection systems (2nd to 4th units)	1	Country of Origin (third country)
Total		2	―

(3) Arrangement for pre-shipment inspection by third party inspection agency

When each system is shipped from the factory and brought to the port in the country of origin, pre-shipment inspection by a third-party inspection agency shall be carried out in the presence of the supplier. Inspection includes the confirmation of shipment documents such as packing list, and the examination of systems. If there is no difference in contents, a certificate and report will be issued.

The number of inspections is as shown in Table 2-16.

Table 2-16 Number of pre-shipment inspections and inspection place

Shipment	System Type	Number of Inspections	Place
1st shipment	Portal-type X-ray inspection system (1st unit)	1	Country of Origin (third country)
2nd shipment	Mobile-type X-ray inspection system (1unit) Portal-type X-ray inspection systems (2nd to 4th units)	1	Country of Origin (third country)
Total		2	―

In addition, the consultant will discuss with the inspection agency about the contents of the pre-shipment inspection, have preliminary meetings with related organizations and provide information, etc.

(4) Delivery and inspection

After the systems arrive at the site, inspection of the systems will be conducted in the presence of the supplier and the consultant.

The inspection includes the confirmation of quantity, appearance, operation, accessories and spare parts for all systems.

2.3.11 Maintenance Contract

Systems to be procured are special systems that require maintenance and management by a manufacturer-designated engineer and basically it is difficult to properly and continuously operate the systems without maintenance service by a local agency.

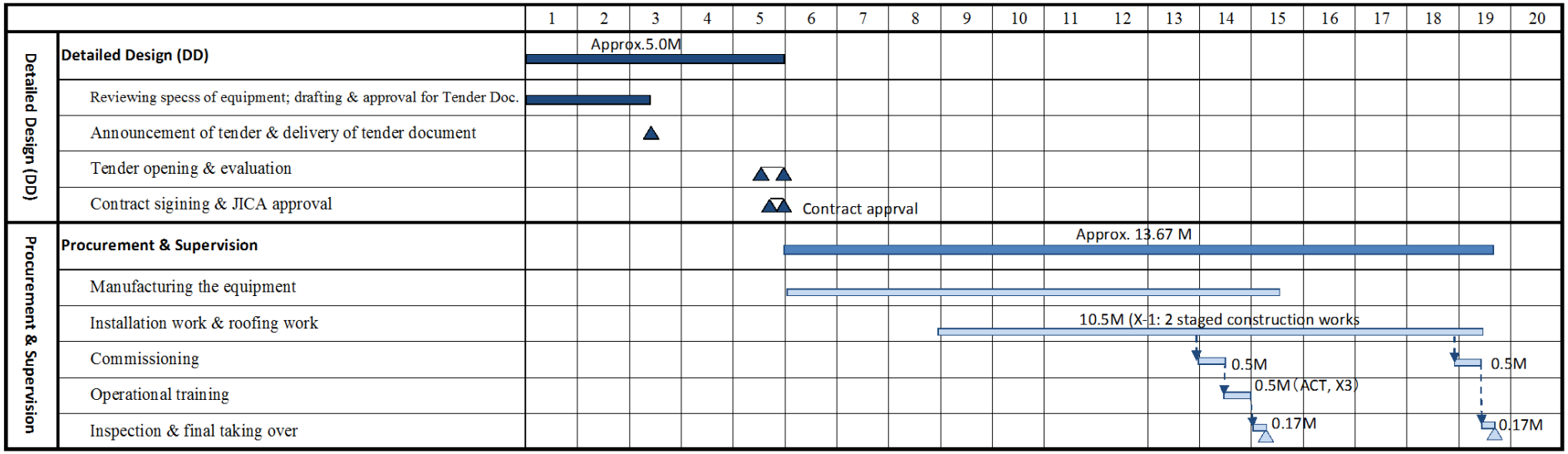
Therefore, before the defect warranty period expires, the consultant shall confirm the status of the systems, necessary spare parts and defects in the presence of the JCD's representatives. The consultant shall also consult with JCD and the local agent of the manufacturer on future maintenance and management, and provide support to appropriately proceed with maintenance contract with a local

agent.

2.3.12 Implementation Schedule

This project shall be implemented based on the grant aid from Japan. The schedule is as shown in Table 2-17.

Table 2-17 Implementation Schedule (draft)



3. Obligations of Recipient Country

3. Obligations of Recipient Country

When the Project is implemented as a Grant Aid project of the Government of Japan, the obligations to be taken on by the Jordanian side are as described in Section 2.3.3 “Procurement Category”, and it was confirmed by both the survey team and the Jordanian side that the Jordanian side shall undertake the following measures. The schedule of implementation is as shown in Table 3-1.

Table 3-1 Obligations of Recipient Country

Schedule of Implementation (Deadline)	Obligations (Item)
1. At the start of Detailed Design	Assistance
	Banking Arrangement
	Signature of Consultant Contract
2. At the start of implementation of the main project	Signature of Supplier Contract
	Tax Exemption
3. Before starting system installation	Completion of improvement work of X-1 and X-3 inspection sites
	Application for receiving power to the distribution company (EDCO), payment of contributions
4. Before implementing guidance by the manufacturer	Securing personnel involved in the operation and maintenance of newly provided systems

3.1 Banking Arrangement and issuance of Authorization to Pay

The Jordanian side shall open an account in the name of Jordan with a bank in Japan and issue Authorization to Pay to the bank. It is also responsible for paying the notification charge of the Authorization to Pay and charges pursuant to the Banking Arrangement.

3.2 Assistance

The Jordanian side shall extend assistance to Japanese consultants engaged in the Project when they enter/stay in Jordan and visit relevant government agencies in order to perform their duties.

3.3 Tax Exemption

All taxes imposed in Jordan such as taxation, custom duties, value added tax, income tax, etc., shall be exempted for systems and materials procured by this project.

The tax exemption procedure for overseas aid projects confirmed by JCD, etc., is as follows.

a) When the E/N is concluded, a notice of tax exemption is issued to the Cabinet from the Ministry of Planning and International Cooperation (hereinafter referred to as “MOPIC”).
b) After the request is discussed at the Cabinet meeting, the Cabinet issues a notice of approval for tax exemption to the implementing agency.
c) In the notice of approval for tax exemption of above b), 0% tax exemption, etc., are not

specified. Therefore, after deciding the supplier, the implementing agency submits to the Cabinet a “request for amendment of the notice of approval for tax exemption of b)” in cooperation with MOPIC.

d) In response to the above request, the Cabinet consults and coordinates with relevant ministries and agencies such as the Ministry of Finance and obtains a response.

e) Based on the responses from each ministry, the Cabinet issues “Revised notice of approval for tax exemption” to the implementing agency.

f) MOPIC attaches “Revised notice of approval for tax exemption” stated in above e) and asks the National Taxation Bureau to issue an instruction letter relating to tax exemption measures.

g) In the case of imported systems and materials, the above e) “Revised notice of approval for tax exemption” is presented to the National Taxation Bureau and the JCD so that tax exemption measures are applied.

h) In the case of systems and materials procured in Jordan, it is possible to purchase goods, etc., tax-free within the Aqaba Special Economic Zone. Concerning other items procured in Jordan, it varies depending on suppliers and shops. Sometimes tax exemption purchase may be possible by presenting the “Revised notice of approval for tax exemption” stated in above e), sometimes the supplier may purchase with taxes, and later he needs to receive tax refund after filling out the form prescribed by the government of Jordan.

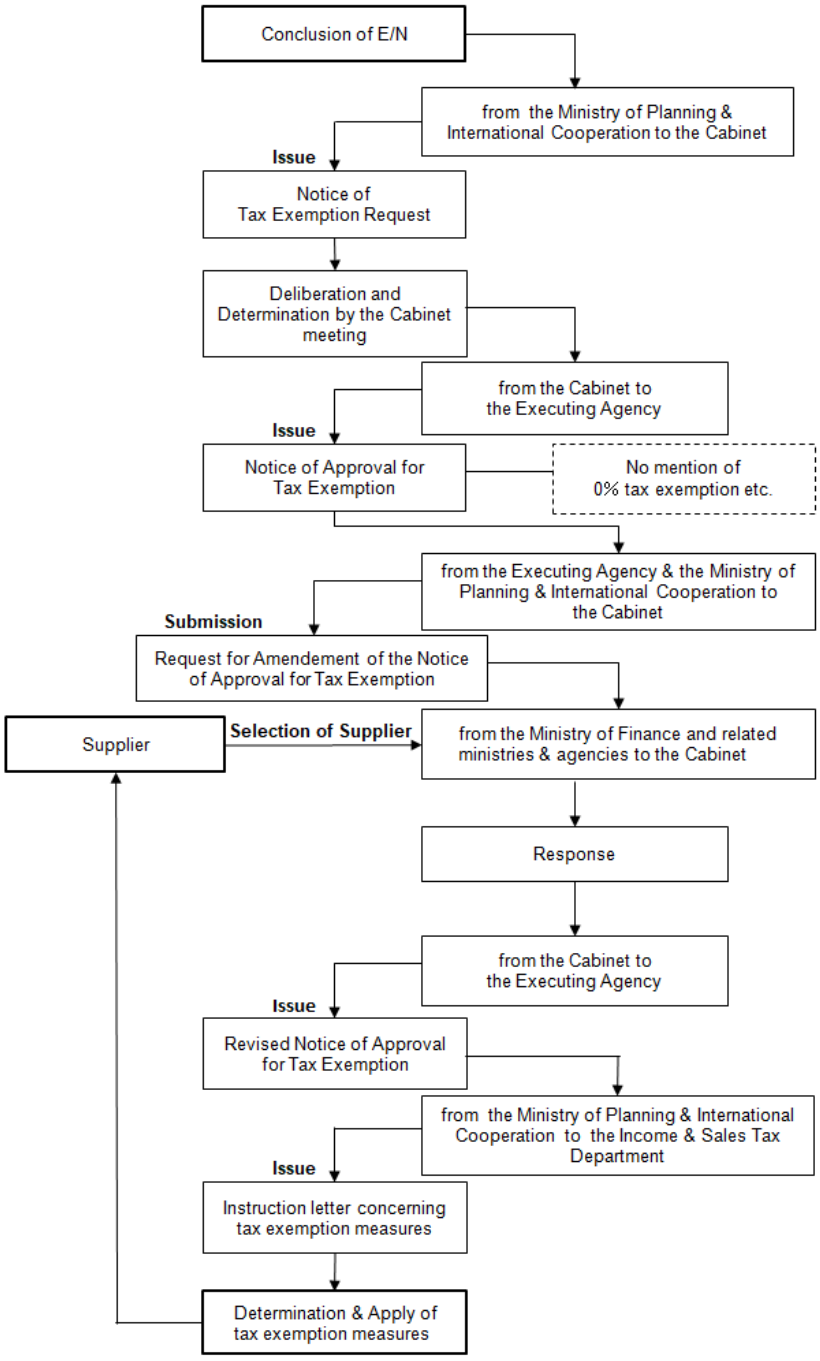


Figure 3-1 Flow of tax exemption procedure

3.4 Works to be borne by the Jordanian side

The matters to be borne by the Jordanian side identified in this survey in consultation with JCD are shown in Table 3-2. Regarding the costs for the preparation of the X-3 Inspection site, a cost for the civil engineering work was estimated at 800,000JD by the Ministry of Public Works and Housing (hereinafter referred to as "MoPWH"), while a cost for construction of the electrical power supply facility was estimated at 60,000 JD. JCD requested the Prime Minister the preparation of X-3 site to be undertaken by ASEZA in the letter issued on January 2019. JCD also confirmed JICA with the letter dated on 20th February 2019 that the budget for these matters will be undertaken by JCD themselves in

collaboration with MoPWH if ASEZA is unable to carry out the preparation of X-3 site. The Jordanian side needs to complete the preparation of the X-3 inspection site by December 2019. The consultant shall monitor the progress of budget request for the X-3 inspection site preparation and also to the development of it.

Table 3-2 Outline and clarification of matters to be borne by the Jordanian side

Facility name	Main items to be confirmed
X-1, X-3 and GCT Inspection site	✓ Securing operation and maintenance budget (budget measure, personnel assignment, training plan) ✓ Preparation of data communication facilities
X-1 Inspection site	✓ Preparation of power supply facility by December 2019
X-3 Inspection site	✓ Completion of civil engineering works (including asphalt pavement), and preparation of power supply facilities, data communication facilities, lighting and other auxiliary facilities by December 2019 ✓ Installation of traffic safety signs, etc., on the Aqaba Highway near the inspection site ✓ Transfer of electric facilities installed at the boundary between the Aqaba Highway and the inspection site and supply of electricity

3.5 Feasibility and relevance of matters to be borne by the Jordanian side

3.5.1 Preparation for X-3 inspection site

As shown in Section 3.4, regarding the X-3 inspection site, it is necessary to complete the leveling and pavement work by the end of December 2019 from the current vacant state. In order to secure the budget for site preparation of it, JCD issued an official letter addressing JICA on 20th February 2019, confirming to secure such budget in coordination with MoPWH if ASEZA becomes unable to finance the preparation of it. The consultant shall monitor the progress on the budgetary issue to ensure that the design and construction work for the site preparation will be carried out without any delay after the Cabinet approval is made. Therefore, the consultant needs to judge the possibility of bidding announcement around November 2019.

3.5.2 Payment of contribution to power distribution company

High voltage distribution lines and substations at each inspection site are operated and managed by a power distribution company called Electric Distribution Company (hereinafter referred to as “EDCO”). For this reason, EDCO implements expansion work of high voltage distribution lines and substation construction work, but the cost is borne by customers. The outline power demand of this project is expected to be 250 kVA or less. An approximate estimate of the contribution obtained from EDCO is about 19,414 JD (about 3 million yen). The Jordanian side also understands this mechanism and the amount is reasonable.

3.6 Precondition for Proper System Maintenance

The Jordanian side is responsible for maintaining X-ray inspection systems properly and securing the required budget for it. It is also responsible for securing human resources and technical capacity to ensure the X-ray inspection systems are used safely and properly.

3.7 Submission of a Project Monitoring Report

The Jordanian side is responsible for submitting the Project Monitoring Report on time (four times in total).

4. Project Operation and Maintenance Plan

4. Project Operation and Maintenance Plan

4.1 Securing human resources to ensure operation and maintenance of systems to be procured

The departments in charge of the project in JCD, the implementing agency, are the Telecommunications and Electronical Control Directorate at the head office and the Aqaba Customs House which is the branch office of the JCD in Aqaba.

Operating time of systems to be procured follows current time: 24 hours a day, 365 days a year. Human resources necessary for operation and maintenance of systems to be procured are 42 X-ray inspectors as shown in Table 4-1. Regarding the securing of necessary human resources, the Telecommunications and Electronic Control Directorate is already advancing to respond by changing the personnel placement within JCD.

Table 4-1 Human resources necessary for operation and maintenance of systems to be procured

System	Necessary human resources
X-1 Inspection site Portal-type X-ray inspection system	1 operator ×3 shifts ＝ 3 inspectors 2 image analysts ×3 shifts＝6 inspectors
X-1 Inspection site Portal-type X-ray inspection system	1 operator ×3 shifts＝3 inspectors 2 image analysts ×3 shifts＝6 inspectors
X-3 Inspection site Portal-type X-ray inspection system	1 operator ×3 shifts＝3 inspectors 2 image analysts ×3 shifts＝6 inspectors
X-3 Inspection site Portal-type X-ray inspection system	1 operator ×3 shifts＝3 inspectors 2 image analysts ×3 shifts＝6 inspectors
GCT Inspection site Mobile-type X-ray inspection system	1 operator ×3 shifts＝3 inspectors 1 image analysts ×3 shifts＝3 inspectors

※8-hour shifts

4.2 Education and Training of Human Resources

The project shall incorporate the appropriate combination of self-help efforts of Jordan (Customs training center) and the Japanese grant aid (training by system manufacturers).

5. Project Cost Estimation

5. Project Cost Estimation

5.1 Initial Cost Estimation

5.1.1 Costs to be borne by the Jordanian Side

Table 5-1 Costs to be borne by the Jordanian Side

Item	Amount (Unit: million yen)
Banking commission	1.6
Preparation and pavement work of the installation site, securing of supply network such as electricity, water supply and sewage and data communication network	136.5
Electricity charges on system operation at the time of initial operation / operation guidance, travel expenses of JCD staff, etc.	0.1
Total	138.2

5.1.2 Estimation Conditions

- Time of estimation : August 2018
- Exchange rate : US$ to JPY : US$ 1.00 = 111.38 yen
  Local Currency to JPY : JD1.00 =156.25 yen
- Procurement period : The period of implementation design and procurement is as provided in the implementation schedule.
- Others : The Project is to be implemented in accordance with the grant-aid scheme of the Government of Japan.

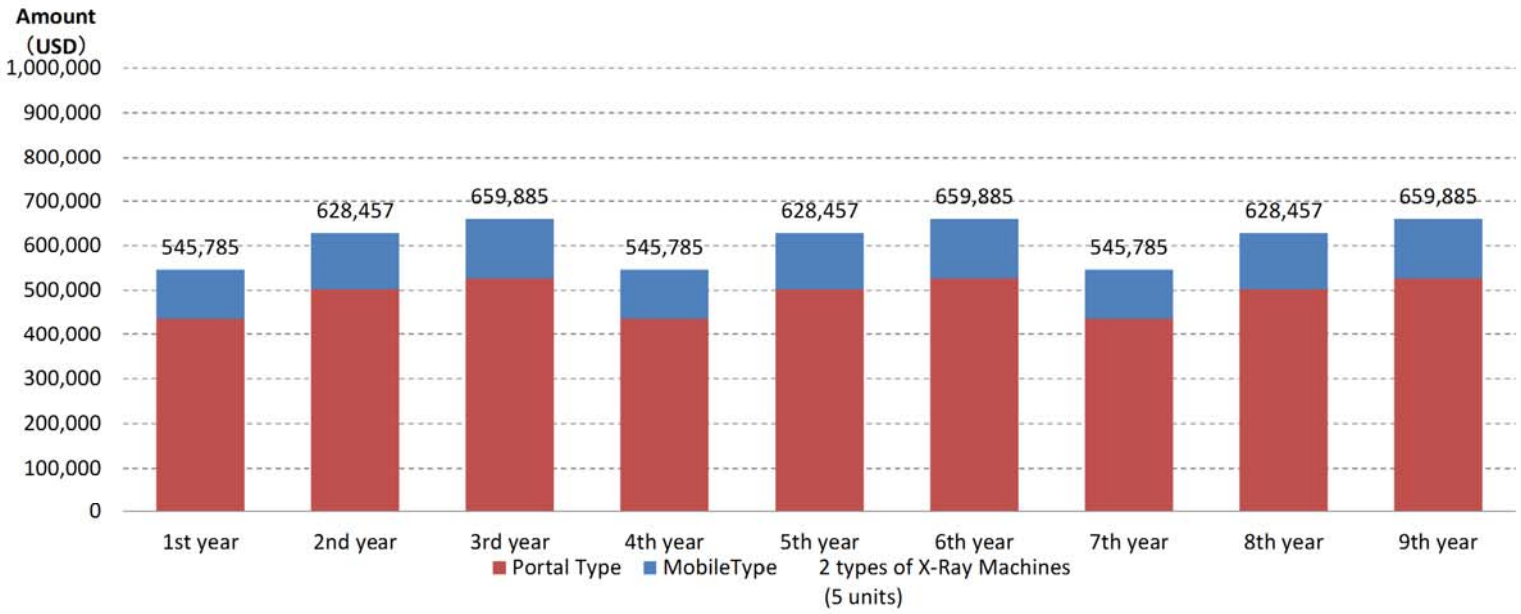
5.2 Operation and Maintenance Cost

Basically, maintenance by specialist agencies (engineers) of the manufacturer is required for the systems to be procured in this project.

Figure 5-1 shows the maintenance cost including technical fee and parts cost required for one mobile-type and four portal-type systems, prepared with reference to the quotation obtained from manufacturers.

The necessary cost required in one year is estimated at about 60-70 million yen.

It shall be noted that JCD's 2018 budget, 0.3% of it (approximately 33 million yen) is allocated for "Goods / Service Purchase / Facilities / Facilities Maintenance Costs"; it suggests that it seems difficult to cover all the maintenance costs of the X-ray inspection systems to be procured by this project. It is therefore JCD plans to request additional budget in 2020 in order to secure the operation and maintenance costs of these X-ray inspection systems.



Unit: USD

Type of Vehicle	Currency unit	Qty.	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year
Portal Type	USD	1	109,157	125,535	131,813	109,157	125,535	131,813	109,157	125,535	131,813
	USD	4	436,628	502,140	527,252	436,628	502,140	527,252	436,628	502,140	527,252
MobileType	USD	1	109,157	126,317	132,633	109,157	126,317	132,633	109,157	126,317	132,633
	USD	1	109,157	126,317	132,633	109,157	126,317	132,633	109,157	126,317	132,633
2 types of X-Ray Machines (5 units)	USD	5	545,785	628,457	659,885	545,785	628,457	659,885	545,785	628,457	659,885
	日本円(千円)	5	60,582	69,759	73,247	60,582	69,759	73,247	60,582	69,759	73,247

Figure 5-1 Necessary cost for system maintenance (technical fee and parts costs based on the quotation of agencies of manufacturers)

6. Project Evaluation

6. Project Evaluation

6.1 Preconditions

Preconditions for implementation of this project are as follows.

- Securing operation and maintenance budget and personnel allocation
- Implementation of image analysis training, etc., to personnel allocated
- Implementation of procedures related to bank arrangements, payment authorization, tax exemption and customs procedures
- Implementation of site preparation and pavement work, etc., of X-3 inspection site
- Preparation of power supply and data communication facilities (X-1, X-3 and GCT inspection sites)
- Securing the location of mobile-type X-ray inspection system in GCT premises
- Continuing policies related to border security and customs fields

6.2 Necessary Inputs by Recipient Country for successful implementation of the project as a whole

The recipient country needs to provide inputs listed as below for effective use of the systems to be procured and successful implementation of the project as a whole.

- Obtaining approval of each related organization to install and operate X-ray inspection sites at X-1, X-3 and GCT
- Securing the necessary budget for site preparation, pavement work, etc., of the X-3 inspection site and completion of the work by the deadline due to construction agreement
- Obtaining permission of Jordan Nuclear Regulatory Commission (JNRC) to install and operate X-ray inspection machine.
- Obtaining permission from relevant authorities or installation work of portal-type X-ray inspection systems at the X-1 and X-3 inspection sites and permission to build roofs, etc..
- Conducting a new customer procedure with the Electricity Distribution Company (EDCO) and payment for the contribution concerning transfer of power supply facilities and power connection work regarding the X-3 Inspection site.
- Site preparation and pavement work for the X-3 inspection site and installation of traffic safety signs, etc., on the Aqaba Highway along the X-3 inspection site.
- Preparation of data communication facilities to each inspection site.
- Election / placement of site administrators responsible for this project.
- Ensuring budgetary measures necessary to operate and maintain the systems to be procured (personnel expenses, electricity bills, data communication costs, fuel costs, etc.)
- Selection and dispatch of trainees for operation and maintenance training, and support of their daily living expenses and accommodation expenses.
- Implementing procedures concerning bank arrangements, payment authorization procedures, tax exemption procedures for import systems, customs procedures, etc..
- Car registration of the mobile-type X-ray inspection system.
- Securing operation and maintenance budget and continuing day-to-day operation and maintenance of X-ray inspection systems according to the above-mentioned preconditions.

6.3 External Conditions

The following can be considered external conditions for the effect development of the project. At the implementation stage of this project, installation work of systems to be procured will be implemented smoothly without deteriorating security and political situation in Jordan and neighboring countries. In addition, even after delivery, inspections will be continually conducted using the procured systems in support of the stable security and political situation of Jordan and neighboring countries.

6.4 Project Evaluation

6.4.1 Relevance

- Through improvement of X-ray inspection systems to customs facilities in ASEZ by this project, the quality of inspection by X-ray images will improve, the number of inspections will increase, and the import cargo inspection system within ASEZ will be strengthening.
- This will lead to the improvement of security measures at the country's borders and ports undertaken by the Government of Jordan, as well as the prevention of inflow of goods harmful to the society, such as weapons and illegal drugs, and contribute to strengthening of security and stabilization in Jordan and the surrounding area.
- In addition, in 2009, the Government of Japan announced the “New strategy to counter the threat of terrorism”, and in 2013 the national security strategy was decided by the Cabinet, which clarifies the attitude of active pacifism based on international cooperation. Furthermore, in Japan's Country Assistance Policy for Jordan (2017), the basic policy of Japanese ODA is the “Enhancement of Region stability and Development of Industrial Infrastructure for Economic Growth”, and the “Stabilization of the region” is one of the priority areas. This project, which contributes not only to the economic development of Jordan but also to the stabilization of the Middle East region, is consistent with Japan's cooperation policy.
- As mentioned above, this project will contribute to improvement of counter-terrorism and security maintenance by strengthening the inspection system of import container cargo and bulk cargo within ASEZ, and will benefit Jordanian citizens and neighboring countries.

Thus, the Project is highly relevant.

6.4.2 Effectiveness

(1) Quantitative effects

Implementation of this project will improve the inspection rate of imported cargo by X-ray inspection systems equipped with high output and substance discrimination capacity under JCD management as shown in Table 6-1.

Table 6-1 Quantitative Effects

Indicator（*2）	Baseline 【2017 Status quo】	Target (2023) 【3 years after project completion】 (*1)
Inspection ratio of Imported container loaded vehicle subjected to X-ray inspection (per year)	X-1： 96% (*3)	X-1： 100%
Inspection ratio of Imported bulk cargo loaded vehicle subjected to X-ray inspection (per year)	GCT： 0%	GCT： 100%
Inspection ratio of Imported container cargo, bulk cargo and fuel loaded vehicle subjected to X-ray inspection (per year)	X-3： 0% (*4)	X-3： 100%

*1：The systems to be procured by this project are assumed to be delivered on November 2020. In this project, two portal-type X-ray inspection systems will be installed in the X-1 inspection site, one mobile-type X-ray inspection system will be installed in the GCT inspection site, and two portal-type X-ray inspection systems will be installed in the X-3 inspection site (3 km before the Wadi Yetim Customs Center).

*2：The target of this index covers only cargo whose shape and size can be inspected by X-ray inspection systems (special cargo that cannot be subjected to X-ray inspection is not covered by this evaluation index).

*3：The inspection ratio at X-1(96%) shows the ratio of the number of X-ray inspection results (247,274) to the number of imported container cargoes (257,572: total of 20 feet and 40 feet containers). As for the forecasts of the future number of container cargo estimated by Aqaba Development Corporation (ADC), which aims to plan and implement the development of Aqaba Special Economic Zone, the number of annual imported container cargo in 2023 is estimated to be 371,613 cargos (1,018 per day), that in 2026 is estimated to be 455,964 cargos (1,249 per day). The inspection processing capacity of existing inspection systems is 1,200 cargos per day.

*4：At the GCT inspection site, as of October 2018, no X-ray inspection system has been installed. Also, at the X-3 inspection site, a new X-ray inspection site is planned to be constructed in this project.

*5：Container cargo subject to inspection by the X-ray inspection systems under the control of the General Intelligence Department (GID) planned to be installed at the X-1 inspection site is not covered by this evaluation index.

*6：Since the X-ray inspection system installed at the Wadi Yetim Customs Center is not a JCD property, cargo to be inspected by this system is excluded from this evaluation index.

*7：With regard to imported cargo which is consumed within the Aqaba Special Economic Zone, it shall be inspected only at the X-1 and GCT Inspection sites.

(2) Qualitative effects

The qualitative effects of the Project are described below.

- Introduction of X-ray inspection systems with high output and substance discrimination capacity will improve the accuracy of exposure of high risk cargo, such as drugs and weapons.
- Installation of a plurality of X-ray inspection systems will make possible to conduct inspection 24 hours a day, 365 days a year without breaks even during the failure / maintenance period of inspection systems, and facilitate the inspection process within the ASEZ.
- Enforcement of cracking down on fraudulent declaration items of imported cargos will be strengthened.