

添付資料



## 資料1 調査団員・氏名

氏名	担当分野	所属	派遣期間
大村 良樹	総括/上水	独立行政法人 国際協力機構 国際協力専門員	2019/7/7-2019/7/18
藤田 暁子	協力計画	独立行政法人 国際協力機構 地球環境部 水環境グループ 水資源第一チーム 主任調査役	2019/7/7-2019/7/18
窪崎 喜方	業務主任/上水道計画	株式会社 TEC インターナショナル	2019/7/7-2019/9/2
本間 真	副業務主任/上水道計画 2	〃	2019/7/7-2019/8/3 2019/8/21-2019/9/2
木下 治郎	揚水施設計画・設計/運転維持管理計画	〃	2019/7/7-2019/8/3
鈴木 辰造	浄水施設計画・設計/運転維持管理計画	〃	2019/7/7-2019/8/8
宇田川 弘勝	環境社会配慮調査 /水質	国際航業株式会社	2019/7/14-2019/9/2
山田 紹子	財務・経営	株式会社 TEC インターナショナル	2019/7/17-2019/8/8
長谷川 英一	電気設備	〃	2019/7/7-2019/8/3
小林 博	施工調達/積算	〃	2019/8/6-2019/9/2
尾形 興一	業務調整/施工調達 2/ 積算 2 (自社負担)	〃	2019/7/18-2019/9/2
宗吉 俊吾	業務調整 2 (自社負担)	〃	2019/7/7-2019/8/3



資料2 調査行程

	総括/上水	協力計画	業務主任/上水道計画	副業務主任/上水道計画2	揚水施設計画・設計/運転維持管理計画	浄水施設計画・設計/運転維持管理計画	環境社会配慮調査/水質	財務・経営	電気設備	施工調達/積算	業務調整/施工調達2(自社負担)	業務調整2(自社負担)
	大村 良樹	藤田 晴子	窪崎 喜方	本間 真	木下 治郎	鈴木 辰彦	宇田川 弘勝	山田 紹子	長谷川 英一	小林 博	尾形 興一	宗吉 俊香
2019/7/6	土	成田発	成田発	成田発	成田発	成田発	成田発		成田発			成田発
2019/7/7	日	安マン着 ・打合せ(JICA事務所)	安マン着 ・打合せ(JICA事務所)	安マン着 ・打合せ(JICA事務所)	安マン着 ・打合せ(JICA事務所)	安マン着 ・打合せ(JICA事務所)	安マン着 ・打合せ(JICA事務所)		安マン着 ・打合せ(JICA事務所)			安マン着 ・打合せ(JICA事務所)
2019/7/8	月	・打合せ(WAJ) ・キックオフミーティング	・打合せ(WAJ) ・キックオフミーティング	・打合せ(WAJ) ・キックオフミーティング	・打合せ(WAJ) ・キックオフミーティング	・打合せ(WAJ) ・キックオフミーティング	・打合せ(WAJ) ・キックオフミーティング		・打合せ(WAJ) ・キックオフミーティング			・打合せ(WAJ) ・キックオフミーティング
2019/7/9	火	・CDMとの合同調査	・CDMとの合同調査	・CDMとの合同調査	・CDMとの合同調査	・CDMとの合同調査	・CDMとの合同調査		・CDMとの合同調査			・打合せ(JICA事務所)
2019/7/10	水	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ		関係各所と打合せ			関係各所と打合せ
2019/7/11	木	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ		関係各所と打合せ			関係各所と打合せ
2019/7/12	金	資料整理	資料整理	資料整理	資料整理	資料整理	資料整理		資料整理			資料整理
2019/7/13	土							成田発				
2019/7/14	日	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	関係各所と打合せ	安マン着				
2019/7/15	月	M/M締結	M/M締結	M/M締結	M/M締結	M/M締結	M/M締結					
2019/7/16	火	・実施中の類似案件 関連案件把握	・実施中の類似案件 関連案件把握	・過去および実施中の 類似案件・関連案件把握	・パブリックコメント ・維持管理調査 ・受領データ分析	・ポンプ効率測定 ・ポンプ分解調査	・WTP天日乾燥床設備 調査 ・沈砂池調査	・WAJ, MIYAHUNA 訪問 ・調査準備 ・個人選定	・WTP, SCADA調査 ・WTP電気設備、制 御設備調査			・業務調整
2019/7/17	水							成田発				成田発
2019/7/18	木	安マン発	安マン発					安マン着				安マン着
2019/7/19	金	成田着	成田着	資料整理	資料整理	資料整理	資料整理	資料整理	資料整理			資料整理
2019/7/20	土											
2019/7/21	日											
2019/7/22	月			・上位計画(都市開 発計画、政策等)、 上下水道開発計画 調査	・税金関係調査 ・維持管理調査	・ポンプ効率測定 ・ポンプ分解調査	・WTP天日乾燥床設備 調査 ・沈砂池調査	・関連法規、組織体制 調査 ・浄水場現況調査	・現地視察 ・種々/財団にかかる データ依頼、データ既 認・協議 ・受領データ分析			・業務調整
2019/7/23	火								・各ポンプ場電気設 備、制御設備調査			・業務調整
2019/7/24	水											
2019/7/25	木											
2019/7/26	金			資料整理	資料整理	資料整理	資料整理	資料整理	資料整理			資料整理
2019/7/27	土											
2019/7/28	日			・現場調査とリまとめ								
2019/7/29	月			・他の開発パート ナー(JICA、世界 銀行、KFW等)によ る活動状況調査	安マン発	・管厚測定	・二酸化塩素設備調 査 ・浄水処理設備調査	・ギャップ分析 ・スコーピング ・水源地水質調査	・受領データ分析 ・不足データ依頼 ・維持管理費に係る 協議	・各ポンプ場電動機 診断		・業務調整 ・管厚測定
2019/7/30	火				成田着							
2019/7/31	水											
2019/8/1	木											
2019/8/2	金			資料整理		資料整理	資料整理	資料整理	資料整理			資料整理
2019/8/3	土				安マン発				安マン発			安マン発
2019/8/4	日				成田着				成田着			成田着
2019/8/5	月									成田発		
2019/8/6	火			・評価指標の検討・ 関連情報の収集								・業務調整
2019/8/7	水									安マン着 ・現地状況調査		
2019/8/8	木					安マン発			安マン発			
2019/8/9	金			資料整理		成田着		資料整理	成田着		資料整理	資料整理
2019/8/10	土											
2019/8/11	日											
2019/8/12	月			資料整理 (祝日)				資料整理 (祝日)		資料整理 (祝日)		資料整理 (祝日)
2019/8/13	火											
2019/8/14	水											
2019/8/15	木			・シリア難民状況調 査			・GHG削減試算 ・JICA FIT試算 ・モニタリング計画の 策定			・労務単価、資材単 価等調査		・業務調整 ・積算補助
2019/8/16	金			資料整理			資料整理			資料整理		資料整理
2019/8/17	土											
2019/8/18	日											
2019/8/19	月			・自立発電性の確保 方策検討	成田発		・カテゴリーB報告書 ドRAFT作成 ・水質管理対策のま とめ					
2019/8/20	火			・先方負担事項検討	安マン着					・労務単価、資材単 価等調査		・業務調整 ・積算補助
2019/8/21	水			・事業リスク検討								
2019/8/22	木				・ソフト開発 ・キックオフミーティング							
2019/8/23	金			資料整理	資料整理			資料整理		資料整理		資料整理
2019/8/24	土											
2019/8/25	日											
2019/8/26	月			・テクニカルノート作 成 ・現地調査結果のとり まとめ	・ソフコン計画 ・テクニカルノート作成							
2019/8/27	火							・テクニカルノート作成 ・現地調査結果のとり まとめ		・労務単価、資材単 価等調査		・業務調整 ・積算補助
2019/8/28	水											
2019/8/29	木											
2019/8/30	金			資料整理	資料整理			資料整理		資料整理		資料整理
2019/8/31	土											
2019/9/1	日			・現地調査結果のとり まとめ	・現地調査結果のとり まとめ					・現地調査結果のとり まとめ		・現地調査結果のとり まとめ
2019/9/2	月			安マン発	安マン発			安マン発		安マン発		安マン発
2019/9/3	火			成田着	成田着			成田着		成田着		成田着



## 資料3 関係者（面会者）リスト

## &lt;ヨルダン側&gt;

所属	氏名	担当
水・灌漑省ヨルダン水道庁	Eng. Iyad Dahiyat	総裁
	Eng. Salameh Mahasne	プロジェクトダイレクター兼アドバイザー
	Mr. Hussein Alsourkhi	商業会計部門ダイレクター
	Eng. Samaher AL-Akhrass	水道業務部門 副事務局長
Miyahuna 水道公社	Eng. Ghazi Khaleel	総裁
	Eng. Haitham Al-kilani	生産部門長
	Eng. Hani Dradkeh	効率改善・エネルギー削減部門
	Eng. Mohamed Hamdan	ザイ浄水場 上長
	Eng. Ashraf Abu Alsondous	ザイ浄水場 維持管理部門長
	Eng. Ehab Awad	ザイ浄水場 維持管理部門 電気担当
	Eng. Ghassan Alsalhi	ザイ浄水場 取水部門長
	Eng. Rayyan Abdullh	ザイ浄水場 運転管理部門
	Eng. Mohamedo Aburuman	ザイ浄水場 運転管理部門
	Eng. Bahaa Baghdadi	会計部門ダイレクター
	Eng. Mohammad Ouran	顧客サービス部門ダイレクター
	Mr. Mohammad Zakaria Talafha	人材開発部門ダイレクター
	Mr. Adbullah al Jarrah	無収水対策部門ダイレクター
	Ms. Malak S. Al-Ma' aita	技術サポート部門長
計画国際協力省	Ms. Wafa Al-Saket	アジア関連部門コンサルタント
財務省関税局	Dr. Abdelmajid A. Al-Rahamneh	事務局長
財務省税務局	Ms. Majeda QuiAbdelmajid	売上税免税部門専門家

## &lt;ドナー&gt;

ドイツ復興金融公庫(KfW)	Dr. Dareq A. Zabarah	シニアプロジェクトマネージャー
	Eng. Nisreen Haddadin	シニアプログラムコーディネーター
欧州投資銀行(EIB)	Mr. Sander Van Kooten	欧州投資銀行代表者
USAID	Eng. Akram AlQehaiwi	プロジェクトマネジメントシニア専門家
CDM Smith	Eng. Richard Minkwitz	プロジェクトマネージャー

## &lt;日本側&gt;

JICA ヨルダン事務所	宮原 千絵	所長
	馬杉 学治	次長
	緒方 隆二	専門家
	藤井 菜津子	所員



**Minutes of Discussions  
on the Preparatory Survey for the Project for  
Improvement of the Zai Water Supply System**

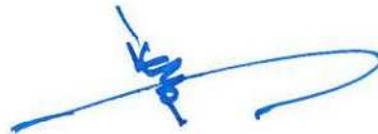
In response to the request from the Government of the Hashemite Kingdom of Jordan (hereinafter referred to as the “Jordanian Government”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Improvement of the Zai Water Supply System (hereinafter referred to as “the Project”) to the Hashemite Kingdom of Jordan. The Team held a series of discussions with the authorities concerned and conducted field surveys. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Amman, 15<sup>th</sup> July 2019



Yoshiki Omura

Leader,  
Preparatory Survey Team,  
Japan International Cooperation Agency,  
Japan



Iyad Dahiyat  
Secretary General,  
Water Authority of Jordan,  
Ministry of Water and Irrigation,  
The Hashemite Kingdom of Jordan



Ghazi Khaleel  
CEO,  
Jordan Water Company/ Miyahuna,  
The Hashemite Kingdom of Jordan

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to enhance the water security of Amman, the capital of Jordan, through renewal of pumping equipment and water treatment plant (WTP) facilities of the Zai Water Supply System.

### 2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of the Zai Water Supply System”.

### 3. Project site

Both sides confirmed that the Project sites are in Amman Governorate and Balqa Governorate, which are shown in Annex 1.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

- 4-1. The Water Authority of Jordan (hereinafter referred to as “WAJ”), Ministry of Water and Irrigation will be the executing agency of the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time.
- 4-2. Jordan Water Company/Miyahuna (hereinafter referred to as “Miyahuna”) is in charge of operation and maintenance of the Zai Water Supply System according to the assignment agreement with WAJ.

### 5. Items requested by the Jordanian Government

The items requested by the Jordanian Government are as follows:

- Renewal of travelling screen
- Renewal of 18 pumps and 13 motors at intake, raw water and transmission pump stations
- Renewal of chemical feeding facilities at Zai WTP
- Repair of raw water main (header pipe etc.) in raw water pump station
- Replacement of grit settling basins
- Sludge drying bed



- consulting services and soft component

JICA will assess the necessity and feasibility of the above requested items through the survey and will report the findings to the Japanese Government. The final scope of the Project will be decided by the Japanese Government.

## 6. Procedures and Basic Principles of Japanese Grant

6-1. The Jordanian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 2 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires the Jordanian side to submit the Project Monitoring Report, of which form is attached as Annex 3.

6-2. The Jordanian side agreed to take the necessary measures, as described in Annex 4, for smooth implementation of the Project. The contents of the Annex 4 will be revised as necessary and refined during the Preparatory Survey and be agreed during the next mission for presentation of the Draft Preparatory Survey Report to be fielded around April 2020.

The revised contents of Annex 4 will be attached to the Grant Agreement to be made between WAJ and JICA.

## 7. Schedule of the Survey

7-1. The Team will proceed with further survey in Jordan until 3<sup>rd</sup> September 2019.

7-2. JICA will prepare a draft Preparatory Survey Report and field a mission to Jordan in order to explain its contents around April 2020.

7-3. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Jordanian side, JICA will finalize the Preparatory Survey Report and submit it to Jordanian Government around May 2020.

7-4. The above schedule is tentative and subject to change.

## 8. Environmental and Social Considerations

8-1. The Jordanian side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations:



The project is neither located in an environmentally sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA Guidelines for Environmental and Social Considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

The Jordanian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by the end of March 2020.

8-3. There is no resettlement in the Project site.

## 9. Other Relevant Issues

### 9-1. The current sludge disposal process at the Zai WTP

During the site visit, the Team observed part of sedimentation sludge was directly discharged to outside of the plant despite at least eight vacant sludge drying beds remaining unused. According to the draft report by USAID dated on 14<sup>th</sup> November 2018, WTP staff estimated that 50%-60% of the sludge is directly discharged to a nearby wadi without drying process. The Team considers that such a practice provides significant load on environment and make a serious concern in environmental assessment. Therefore, the Jordanian Government is committed to immediately review the current practice of sludge disposal and to dispose of dried sludge at an environmentally safe site. Although WAJ requested providing additional drying beds or mechanical sludge dewatering facilities, the Team does not find any document to justify increasing drying beds or necessity of such machine under circumstances described above.

From the viewpoint of environmental protection regardless of implementation of the Project, the Jordanian Government is agreed to submit a feasible plan of the environmentally safe sludge disposal to JICA Jordan Office in writing by the end of October 2019 and implement the plan by the end of March 2020.

### 9-2. Tax Exemption

The Jordanian side agreed to arrange an issue of the Cabinet letter immediately after the Exchange of Note signed, which authorize the exemption of taxes and duties to be imposed by the government such as customs duties and other expenses related to customs clearance, work permit fees and stay permit fees, to related organizations such as Ministry of Finance and Ministry of Municipalities.



### 9-3. Sustainable Use

The Team observed that the facilities of Zai Water Supply System is well maintained with great efforts by Miyahuna and WAJ. But there is lack of the budget for the major renovation/rehabilitation which needs once in 20-30 years. For sustainable use of the facilities, Miyahuna and WAJ are required to prepare funds for the next major renovation/rehabilitation.

#### List of Annexes

Annex 1 Project Site

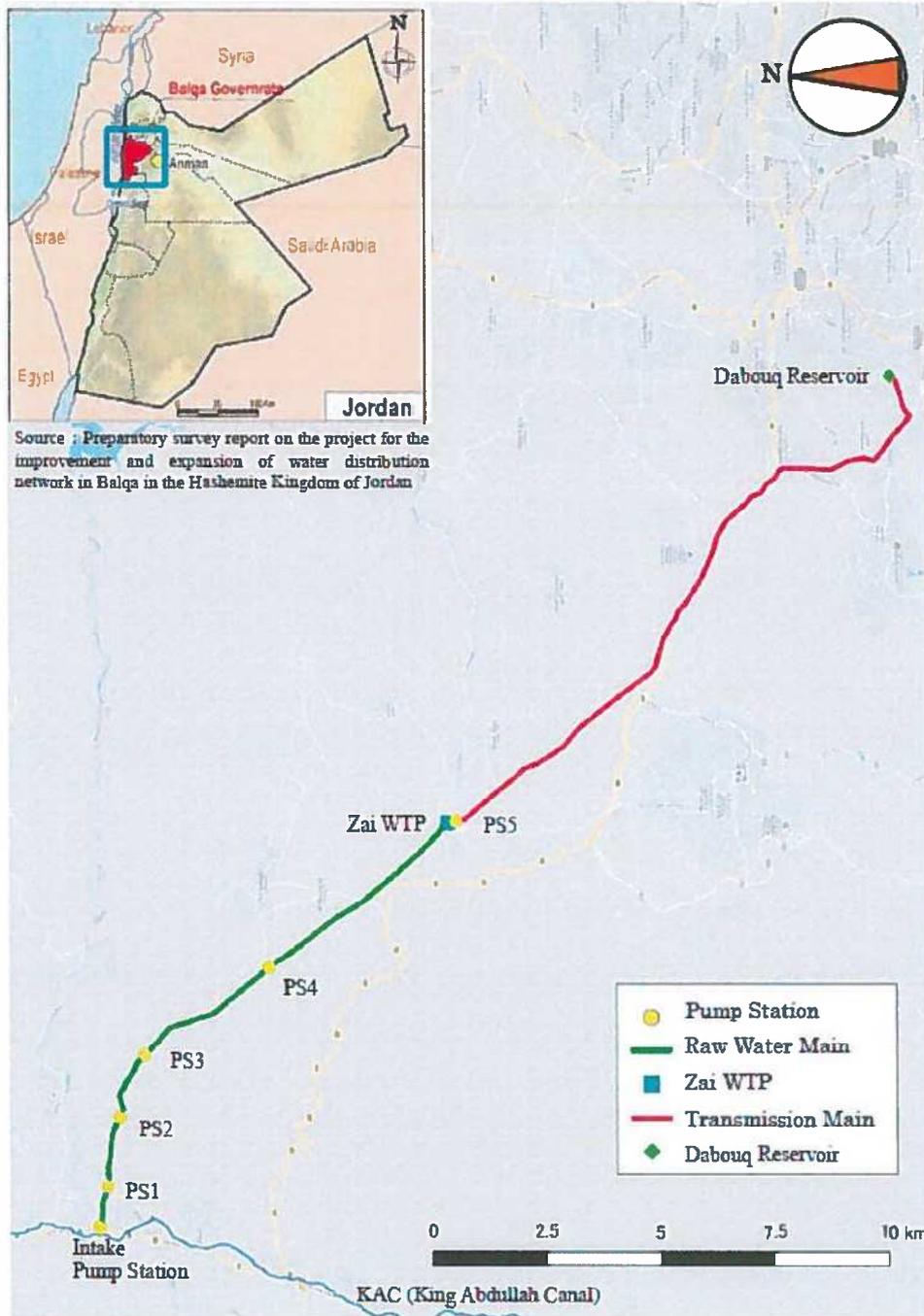
Annex 2 Japanese Grant

Annex 3 Project Monitoring Report (template)

Annex 4 Major Undertakings by the Jordanian Government



**PROJECT SITE**



**LOCATION MAP**

## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.



Annex 2-1



- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

### 3. Basic Principles of Project Grants

#### (1) Implementation Stage

##### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

##### 2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of



Annex 2-2



the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

### 3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

### 4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

### 5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

### 6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

### 7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

### 8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

### 9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of



Annex 2-3



construction.

- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.



Annex 2-4



**PROJECT MONITORING REPORT (template)**

Date:  
Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY  
JICA ~~XXX~~ OFFICE

[Address specified in the Article 5 of the Grant Agreement]

Attention: Chief Representative

Ladies and Gentlemen:

**NOTICE CONCERNING PROGRESS OF PROJECT**

Reference : Grant Agreement, dated (signed date of the G/A), for (name of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]

- Preparation of bidding documents - result of detailed design
- Completion of final works under construction/procurement contract

[Construction]

- Monthly progress [Month/Year]

[Procurement of Equipment]

- Shipping/delivery, hand-over (take over) of equipment
- Installation works
- Operational training

- Other \_\_\_\_\_

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

[Signature]

[Name of the signer]

[Title of the signer]

[Name of the executing agency]

cc:



Annex 3-1



Director General  
Financial Cooperation Implementation Department  
Japan International Cooperation Agency  
*[Address specified in the Article 5 of the Grant Agreement]*



Annex 3-2



**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
 20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	Person in Charge <u>(Designation)</u> _____ Contacts _____ <u>Address:</u> <u>Phone/FAX:</u> <u>Email:</u>
<b>Executing Agency</b>	Person in Charge <u>(Designation)</u> _____ Contacts _____ <u>Address:</u> <u>Phone/FAX:</u> <u>Email:</u>
<b>Line Ministry</b>	Person in Charge <u>(Designation)</u> _____ Contacts _____ <u>Address:</u> <u>Phone/FAX:</u> <u>Email:</u>

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____




**1: Project Description**

**1-1 Project Objective**

--

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------




**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			
	Total			

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			

- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

**Original** (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

**Actual** (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

**Original** (at the time of outline design)

**Actual** (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.



Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)



Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
					Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●	●	●	●
Item 2	●●t	●	●	●		
Item 3						
Item 4						
Item 5						



2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1	●	●	●			
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

.



Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

## MAJOR UNDERTAKINGS BY THE JORDANIAN GOVERNMENT

Specific obligations of the Jordanian Government which will not be funded with the Grant

### (1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	CBJ WAJ		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	CBJ WAJ		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		WAJ		
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	MOE		
5	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding documents	WAJ		
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	WAJ		
7	To secure and clear the following lands 1) project sites 2) temporary construction yard and stock yard near the Project area 3) disposal site near the Project area	before notice of the bidding documents	WAJ		
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	WAJ		
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	WAJ		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, CBJ: Central Bank of Jordan, WAJ: Water Authority of Jordan)

Annex4-1

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	WAJ		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	WAJ		
	2) Payment commission for A/P	every payment	WAJ		
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	WAJ		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOPIC MOI WAJ		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services [be exempted by its designated authority without using the Grant];	during the Project	MOPIC MOF WAJ		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	WAJ		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	WAJ		
8	1) To submit Project Monitoring Report	every month	WAJ		
	2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	WAJ		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	WAJ		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		WAJ		
	1) Electricity The distributing line to the site	before start of the construction			
	2) Water Supply The city water distribution main to the site	before start of the construction			
	3) Drainage The city drainage main ( for storm, sewer and others ) to the site	6 months before completion of the construction			

Annex4-2

11	To take measure necessary for security and safety of the Project - maintaining the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - traffic control around the site(s) and on transportation routes of construction materials -	during the construction	WAJ		
12	To implement EMP and EMoP	during the construction	WAJ		
13	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	WAJ		
14	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report, if necessary	- for 2 years after land acquisition and resettlement complete	WAJ		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, MOPIC: Ministry of Planning and International Cooperation, MOI: Ministry of Interior, MOF: Ministry of Finance, WAJ: Water Authority of Jordan)

### (3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	WAJ		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between WAJ and JICA.	for 3 years after the Project	WAJ		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	WAJ		

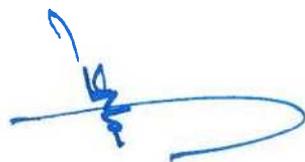
### Other obligations of the Jordanian Government funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To construct water supply facilities and provide equipment 1) To conduct the following transportation a) Marine(Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site		

Annex4-3

	2) To construct access roads a) Within the site		
	3) To construct the temporary building		
	4) To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities a) Electricity - The drop wiring and internal wiring within the site - The main circuit breaker and transformer b) Water Supply - The supply system within the site (receiving and/or elevated tanks) c) Drainage - The drainage system (for toilet sewer, ordinary waster, storm drainage and others) within the site d) Furniture and Equipment - Project equipment		
	5) To provide equipment with installation and commissioning		
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		XXX

\*The Amount is provisional. This is subject to the approval of the Government of Japan.



Annex4-4





**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Improvement of the Zai Water Supply System**  
**(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed among Water Authority of Jordan (Hereinafter referred to as “WAJ”), Ministry of Water and Irrigation, Jordan Water Company /Miyahuna (hereinafter referred to as “Miyahuna”), and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 15 July 2019, and in response to the request from the Government of Hashemite Kingdom of Jordan (hereinafter referred to as "Jordan"), JICA held the on-line meeting for the explanation of Draft Preparatory Survey Report (hereinafter referred to as “the Draft Report”) for the Project for Improvement of the Zai Water Supply System (hereinafter referred to as “the Project”).

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Amman, 28th July 2020

MIYAHARA Chie  
Chief Representative  
Japan International Cooperation Agency  
Jordan Office

Ali Subah  
Secretary General,  
Water Authority of Jordan,  
Ministry of Water and Irrigation,  
The Hashemite Kingdom of Jordan

Mohammed Ouran  
Acting CEO,  
Jordan Water Company/ Miyahuna,  
The Hashemite Kingdom of Jordan

## ATTACHEMENT

### 1. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the JICA side, the Jordanian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Jordanian side around October 2020.

### 2. Cost estimate

Both sides confirmed that the cost estimate including the contingency explained by JICA is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

### 3. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

### 4. Timeline for the project implementation

JICA explained to the Jordanian side that the expected timeline for the project implementation is as attached in Annex 1.

### 5. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Jordanian side will be responsible for the achievement of agreed key indicators targeted in year 2026 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Name of index	Baseline value (2019)	Target value (2026)
Electricity consumption per m <sup>3</sup> of water supplied by the Zai Water Supply System (kWh/m <sup>3</sup> )	5.10	4.91
GHG emission/year (Mt-CO <sub>2</sub> /year)	191.97	Less than 185

(Source: JICA Survey Team)

[Qualitative indicators]

Ensure a stable water supply to Amman in future.

6. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, and Sustainability). The result of the evaluation will be publicized. The Jordanian side is required to provide necessary support for the data collection.

7. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 2. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2)-5 of Annex 2, both sides confirmed that such customs duties, internal taxes and other fiscal levies, shall be clarified in the bid documents by WAJ during the implementation stage of the Project. For the exemption of customs duties, internal taxes and other fiscal levies to proceed progressively and without fault, the “Cabinet Letter”, which is issued by the Cabinet, shall describe the items to be exempted (or zero taxed) specifically and clearly. Especially, the levies of work permit fee and stay permit fee shall be exempted.

The Jordanian side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 2 will be used as an attachment of G/A.

8. Monitoring during the implementation

The Project will be monitored by the WAJ and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 3. The timing of submission of the PMR is described in Annex 2.

9. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA by WAJ promptly, but in any event not later than six months

after completion of the Project.

## 10. Environmental and Social Considerations

### 10-1 General Issues

#### 10-1-1 Environmental Guidelines and Environmental Category

JICA explained that ‘JICA Guidelines for Environmental and Social Considerations (April 2010)’ (hereinafter referred to as “the Guidelines”) is applicable to the Project. The Project is categorized as B because the project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

#### 10-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex4. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Jordanian side shall submit the modified version to JICA in a timely manner.

### 10-2 Environmental Issues

#### 10-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report is not required for the Project in Jordan’s legal system.

#### 10-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project are as Annex5, respectively. Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

#### 10-2-3 Other specific environmental issues which need to be confirmed/agreed between the parties.

Jordanian side will start removing the dry sludge from Zai after the government reduce the restrictions, which is expected in September 2020.

Both sides also confirmed that there is no social impact at present by the discharged sludge in Zai National Park.

## 10-3 Social Issues

### 10-3-1 Environmental Monitoring

Both sides agreed that the Jordanian side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex6. The timing of submission of the monitoring form is described in Annex 2. .

### 10-3-2 Information Disclosure of Monitoring Results

Both sides confirmed that the Jordanian side will disclose results of environmental and social monitoring to local stakeholders through their websites / in their field offices. .

The Jordanian side agreed to JICA's policy to disclose results of environmental and social monitoring submitted by the Jordanian side as the monitoring forms attached as Annex 6 on its website. .

## 11. Other Relevant Issues

### 11-1 Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

### 11-2 Financial Management

JICA side explained the results of financial evaluation of Miyahuna and WAJ. The results show that both Miyahuna and WAJ cannot secure the fund for future rehabilitation (20 years after the Project completion) nor even future O&M cost without increase of water tariff. JICA recommended the staged increase of water tariff, coordination and making consensus among the concerned organizations to accumulate the surplus of Miyahuna and operating surplus of WAJ for future O&M cost and investment.

In addition, JICA also recommended to modify the audit financial statements of WAJ and Miyahuna to clearly show the items such as expenditures and assets by water supply and sewerage services separately.

The Jordanian Side agreed to carefully consider the recommendations of JICA.

### 11-3 Grit settling basin

Both sides confirmed that the Grit settling basin is out of scope of this Project.

The Jordanian side agreed to maintain and repair the concrete in case of reinforcing bar expansion in the two Grit settling basin.

#### 11-4 Replacement Plan of Pump and Motor

The new pump and new motor is recommended to installed and used by pair as the pump manufacture can guarantee the operation totally. To make the pair as many as possible, both sides confirmed the Replacement Plan of Pump and Motor of the Project is as Annex 7.

Annex 1 Project Implementation Schedule

Annex 2 Major Undertakings to be taken by the Government of Jordan

Annex 3 Project Monitoring Report (template)

Annex 4 Environmental Check List

Annex 5 Environmental Management Plan/Environmental Monitoring Plan

Annex 6 Environmental and Social Monitoring Form

Annex 7 Replacement Plan of Pump and Motor



## MAJOR UNDERTAKINGS BY THE JORDANIAN GOVERNMENT

Specific obligations of the Jordanian Government which will not be funded with the Grant

### (1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	CBJ WAJ		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	CBJ WAJ		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A		WAJ		
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	MOE		
5	To secure the necessary budget and implement land acquisition and resettlement (including preparation of resettlement sites), and compensation with full replacement cost in accordance with RAP	before notice of the bidding documents	WAJ		
6	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	until land acquisition and resettlement complete	WAJ		
7	To secure and clear the following lands 1) project sites 2) temporary construction yard and stock yard near the Project area 3) disposal site near the Project area	before notice of the bidding documents	WAJ		
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	WAJ		
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	WAJ		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, CBJ: Central Bank of Jordan, WAJ: Water Authority of Jordan)

( 2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	WAJ		
2	To bear the following commissions to the Agent Bank for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	WAJ		
	2) Payment commission for A/P	every payment	WAJ		
3	to ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	WAJ		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOPIC MOI WAJ		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services [be exempted by its designated authority without using the Grant];	during the Project	MOPIC MOF WAJ		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	WAJ		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	WAJ		
8	1) To submit Project Monitoring Report	every month	WAJ		
	2) To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	WAJ		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	WAJ		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)		WAJ		
	1) Electricity The distributing line to the site	before start of the construction			
	2) Water Supply The city water distribution main to the site	before start of the construction			
	3) Drainage The city drainage main ( for storm, sewer and others ) to the site	6 months before completion of the construction			

11	To take measure necessary for security and safety of the Project - maintaining the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - traffic control around the site(s) and on transportation routes of construction materials	during the construction	WAJ		
12	To implement EMP and EMoP	during the construction	WAJ		
13	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	WAJ		
14	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report, if necessary	- for 2 years after land acquisition and resettlement complete	WAJ		
15	To relocate 4 existing motors	before equipment installation	WAJ	60 thousand JOD	
16	To supply electric power	during test operation of pumps	WAJ	100 thousand JOD	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, MOPIC: Ministry of Planning and International Cooperation, MOI:

Ministry of Interior, MOF: Ministry of Finance, WAJ: Water Authority of Jordan)

### (3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	WAJ		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between WAJ and JICA.	for 3 years after the Project	WAJ		
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	WAJ		

### Other obligations of the Jordanian Government funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*

1	To construct water supply facilities and provide equipment 1) To conduct the following transportation a) Marine(Air) transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site	by the project completion	
	2) To construct access roads a) Within the site		
	3) To construct the temporary building		
	4) To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities a) Electricity - The drop wiring and internal wiring within the site - The main circuit breaker and transformer b) Water Supply - The supply system within the site (receiving and/or elevated tanks) c) Drainage - The drainage system (for toilet sewer, ordinary waster, storm drainage and others) within the site d) Furniture and Equipment - Project equipment		
	5) To provide equipment with installation and commissioning		
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
3	Contingencies		
	Total		XXX

\*The Amount is provisional. This is subject to the approval of the Government of Japan.

**PROJECT MONITORING REPORT (template)**

Date:

Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA XXX OFFICE*[Address specified in the Article 5 of the Grant Agreement]*

Attention: Chief Representative

Ladies and Gentlemen:

## NOTICE CONCERNING PROGRESS OF PROJECT

Reference : Grant Agreement, dated (signed date of the G/A), for (name of the Project)

In accordance to the Article 6 (3) of the Grant Agreement, we would like to report on the progress of the Project up to the following stages:

[Common]

- Preparation of bidding documents - result of detailed design
- Completion of final works under construction/procurement contract

[Construction]

- Monthly progress [Month/Year]

[Procurement of Equipment]

- Shipping/delivery, hand-over (take over) of equipment
- Installation works
- Operational training

- Other \_\_\_\_\_

Please see the details as per attached Project Monitoring Report (PMR).

Very truly yours,

**[Signature]**

[Name of the signer]

[Title of the signer]

[Name of the executing agency]

cc:

Director General  
Financial Cooperation Implementation Department  
Japan International Cooperation Agency  
*[Address specified in the Article 5 of the Grant Agreement]*

**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXX**  
 20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____  Contacts _____ <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____  Contacts _____ <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____  Contacts _____ <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

<b>1: Project Description</b>	
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**1-1 Project Objective**

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**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

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**1-3 Indicators for measurement of “Effectiveness”**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

<b>2: Details of the Project</b>
----------------------------------

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

<i>(PMR)</i>
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**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

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**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				
Total				

Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
1.				

- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

## 2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

**Original** (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

**Actual** (PMR)

## 2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

## 3: Operation and Maintenance (O&M)

### 3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

**Original** (at the time of outline design)

**Actual** (PMR)

### 3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

Actual (PMR)

#### 4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

##### Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

## **5: Evaluation and Monitoring Plan (after the work completion)**

### **5-1 Overall evaluation**

Please describe your overall evaluation on the project.

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### **5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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### **5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
  - Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C-D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●			
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1	Item 1	●	●	●			
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-  
-  
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

## The Project for Improvement of the Zai Water Supply System, Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) Since the Project does not fall under "Projects requiring Comprehensive/Preliminary EIA Report" as defined in Annex 2 and 3 of the Jordan Environmental Impact Assessment Regulations (EIA Regulations, 2005), no EIA report will be prepared by the executing agency (WAU). (b) Not applicable (c) Not applicable (d) No environmental permission required
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) N (b) N	(a) It is not necessary to explain to local stakeholders because the Project replaces equipment and facilities only in the existing site. (b) Not applicable
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) N	(a) Prioritization studies of the proposed coponents has already conduct instead of considering alternative plans. The impacts on the natural and social environment are minimal because all the components are implemented in the existing facilities.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken? (b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	(a) N (b) Y	(a) No air pollution due to chlorine is expected. (b) Occupational safety standards of Jordan are adhered including the storage and injection facilities of chlorine.
	(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards?	(a) Y	(a) SS, BOD, COD, pH, etc. in the Wastewater meet the national environmental standards. Besides, organic pollution is evaluated by total organic carbon (TOC) instead of BOD and COD.
	(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	(a) Y	(a) Sludge generated in the water treatment process in Zai WTP will be planned to dispose by MIYAHUNA.
	(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	(a) Y	(a) Noise and vibration levels will be matched with the national environmental standards by mitigation measures.
	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N	(a) Not applicable. The Project does not utilize any groundwater.
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) Forest stands designated as Zai National Parks are scattered in the vicinity, but their impact is not foreseen.

The Project for Improvement of the Zai Water Supply System, Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(2) Ecosystem	<p>(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?</p> <p>(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?</p> <p>(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>(d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?</p> <p>(e) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect surface water and groundwater flows?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p>	<p>(a) Not applicable</p> <p>(b) Not applicable</p> <p>(c) Not applicable</p> <p>(d) Not applicable</p>
	(3) Hydrology	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Is the compensation going to be paid prior to the resettlement?</p> <p>(e) Is the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) N</p> <p>(f) N</p> <p>(g) N</p> <p>(h) N</p> <p>(i) N</p> <p>(j) N</p>	<p>(a) Since there is no change in water intake volume, any adversely affect on hydrology will not be foreseen.</p> <p>(a) No resettlement will occur in the Project.</p> <p>(b) Not applicable</p> <p>(c) Not applicable</p> <p>(d) Not applicable</p> <p>(e) Not applicable</p> <p>(f) Not applicable</p> <p>(g) Not applicable</p> <p>(h) Not applicable</p> <p>(i) Not applicable</p> <p>(j) Not applicable</p>
4 Social Environment	(1) Resettlement			

The Project for Improvement of the Zai Water Supply System, Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?	(a) N (b) N	(a) There will be no adverse impact on residents' lives. (b) The current water intake volume will not be changed. Besides, no new chemical injection or civil engineering work will be planned on the water source. So there is no impact on existing water use and water area use.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) There are no UNESCO-designated World Heritage sites inside or outside the project site. Also, there are no historical, culturally or religiously valuable heritages or historic sites designated by Jordanian law. In addition, there is also no heritage based on local customs or culture.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) There are no landscapes to consider at the project site. In addition, since this project will be carried out on the existing site, it is not expected
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) Not applicable (b) Not applicable
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) Jordan's domestic laws on working conditions will be respected and health and safety will be prioritized. (b) Hard and soft safety considerations related to occupational accident prevention are thoroughly implemented. (c) Training courses on safety education are kept implementing by MIYAHUNA. (d) Safety measures are thoroughly enforced by MIYAHUNA. Furthermore, security guards are stationed.
	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? (d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	(a) Y (b) N (c) Y (d) Y	(a) Mitigation measures for air pollution, vibration and noise will be prepared by MIYAHUNA (b) No adverse effects on the ecosystem due to construction are expected. (c) There is a slight possibility that an accident will occur due to traffic of construction vehicles. Mitigation measures will be prepared by MIYAHUNA as necessary. (d) As traffic congestion is a little expected due to traffic of construction vehicles in the town area. Mitigation measures will be prepared by MIYAHUNA
5 Others				

The Project for Improvement of the Zai Water Supply System, Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) — (c) Y (d) Y	(a) During construction, environmental monitoring for air quality and generation of noise and vibration will be conducted by the constructor. (b) The monitoring method and frequency will be described in the monitoring form by the constructor. (c) Under the supervision of MIYAHUNA, the monitoring system will be established. (d) The constructor shall report the monitoring results to WAJ and MIYAHUNA periodically.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	(a) N	(a) Not applicable. Any civil works will not be conducted on the intake source.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) GHG emission is expected to reduce by 7.06 Mt-CO <sub>2</sub> per year after the Project implementation.

- 1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.  
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience)
- 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

### Environmental management plan

#### (1) Pre-/Construction phase

##### 1) Air Quality

Sources of Potential Impact	Relevant Standard	Objectives	Management Effort	Management Institution
<ul style="list-style-type: none"> <li>Dust generated from construction activities</li> <li>Pollutant emissions from heavy machinery and trucks (e.g. Sox, Nox etc.)</li> </ul>	<ul style="list-style-type: none"> <li>National Ambient Air Quality Standards (Jordanian Standard 1140/2006)</li> </ul>	<ul style="list-style-type: none"> <li>Protection of social and biological environment from adverse impacts of dust and emissions.</li> <li>Ensuring compliance with emission limit values.</li> </ul>	<ul style="list-style-type: none"> <li>Water spraying will be applied in work sites for dust suppression.</li> <li>Speed limits will be applied for vehicles.</li> <li>Well maintained vehicles will be used.</li> </ul>	<ul style="list-style-type: none"> <li>Supervision: Miyahuna</li> <li>Implementation: Contractor</li> </ul>

##### 2) Noise and Vibration

Sources of Potential Impact	Relevant Standard	Objectives	Management Effort	Management Institution
<ul style="list-style-type: none"> <li>Heavy machinery and trucks</li> <li>Work personnel transportation vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Noise Level Control Regulation (year 2003).</li> </ul>	<ul style="list-style-type: none"> <li>Elimination of anxiety and inconvenience to the local population.</li> <li>Ensuring occupational health and safety.</li> <li>Protection of environment.</li> </ul>	<ul style="list-style-type: none"> <li>Works will be undertaken during the daytime.</li> <li>Noise control measures will be implemented.</li> <li>Health and safety management for workers will be implemented as necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Supervision: Miyahuna</li> <li>Implementation: Contractor</li> </ul>

##### 3) Waste

Sources of Potential Impact	Relevant Standard	Objectives	Management Effort	Management Institution
<ul style="list-style-type: none"> <li>Domestic waste</li> <li>Industrial and hazardous waste</li> </ul>	<ul style="list-style-type: none"> <li>Regulation concerning Solid Waste Management, No. 27 of 2005.</li> <li>Regulation of Harmful and Hazardous Waste Management, Transfer and Handling, No. 54 of 2002 and No.47 of 2008.</li> </ul>	<ul style="list-style-type: none"> <li>Protection of environment from adverse impacts of solid and hazardous waste.</li> </ul>	<ul style="list-style-type: none"> <li>Different types of waste (e.g. hazardous waste, domestic waste) will be collected and disposed of separately.</li> <li>Efforts will be made to have a contract with waste disposers licensed by MOE to collect and treat household wastes.</li> </ul>	<ul style="list-style-type: none"> <li>Supervision: Miyahuna</li> <li>Implementation: Contractor</li> </ul>

#### (2) Operation phase

##### 1) Waste

Sources of Potential Impact	Relevant Standard	Objectives	Management Effort	Management Institution
<ul style="list-style-type: none"> <li>Domestic waste</li> <li>Industrial and hazardous waste</li> </ul>	<ul style="list-style-type: none"> <li>Regulation concerning Solid Waste Management, No. 27 of 2005.</li> <li>Regulation of Harmful and Hazardous Waste Management, Transfer and Handling, No. 54</li> </ul>	<ul style="list-style-type: none"> <li>Protection of environment from adverse impacts of solid and hazardous waste.</li> </ul>	<ul style="list-style-type: none"> <li>Different types of waste (e.g. hazardous waste, domestic waste) will be collected and disposed of separately.</li> <li>Efforts will be made to have a contract with waste disposers licensed</li> </ul>	<ul style="list-style-type: none"> <li>Supervision: Miyahuna</li> <li>Implementation: Contractor</li> </ul>

	of 2002 and No.47 of 2008.		by MOE to collect and treat household wastes.	
--	-------------------------------	--	---	--

(Source: JICA Survey Team)

### Environmental monitoring plan

#### (1) Pre-/Construction phase

Significant Impact to be Monitored		Air Quality	Noise and Vibration
Monitoring parameter		(1) PM10, (2) SO <sub>2</sub> , (3) NO <sub>2</sub>	Noise level
Monitoring method	Method of collecting and analyzing data	(1) Gravimetric method (2) UV-Fluorescence method (3) Colorimetric method	On-site by Sound-level meter (on-site measurement)
	Location	Deir Alla IPS, 4 Pumping Stations and the Zai WTP (total 6 sites)	
	Duration and frequency	Upon complaint	
Implementing organization		Contractor	
Responsible organization		Miyahuna	
Approx. cost (included in the construction fee)		USD1,200/time (USD200×6 sites)	USD1,200/time (USD200×6 sites)

Significant Impact to be Monitored		Waste	Odor
Monitoring parameter		Discharge amount	Offensive odor
Monitoring method	Method of collecting and analyzing data	(1) Recording of discharge amount (2) Visual investigation	On-site confirmation
	Location	Deir Alla IPS, 4 Pumping Stations and the Zai WTP (total 6 sites)	
	Duration and frequency	Monthly	
Implementing organization		Contractor	
Responsible organization		Miyahuna	
Approx. cost (included in the construction fee)		USD600/time (USD100×6 sites, waste and odor package deal)	

Significant Impact to be Monitored		Machinery Maintenance	Work Environment
Monitoring parameter		Content of maintenance	Workers' health and safety
Monitoring method	Method of collecting and analyzing data	Recording of the maintenance	Observation and inspection
	Location	Contractor's office	
	Duration and frequency	Continuous records (Monthly/Daily)	
Implementing organization		Contractor	
Responsible organization		Miyahuna	
Approx. cost (included in the construction fee)		(Expenses to be included in contract cost by Contractor)	

Significant Impact to be Monitored		Traffic Volume	Accidents
Monitoring parameter		Vehicles and other equipment used for the transportation and construction work	(1) Number of traffic accidents (2) Number of accidents (human and fire cases)
Monitoring	Method of collecting and	Record of numbers of cars being	Record of accidents

method	analyzing data	used	
	Location	Principal roads around Project site	Contractor's office
	Duration and frequency	Continuous records (Monthly/Daily)	
Implementing organization		Contractor	
Responsible organization		Miyahuna	
Approx. cost (included in the construction fee)		(Expenses to be included in contract cost by Contractor)	

## (2) Operation phase

Significant Impact to be Monitored		Waste
Monitoring parameter		(1) Sludge generation amount, (2) Sludge collection amount
Monitoring method	Method of collecting and analyzing data	(1) Recording of sludge generation amount from the Zai WTP (2) Recording of sludge collection amount by the licensed waste disposers
	Location	The Zai WTP
	Duration and frequency	Continuous records (Monthly/Daily)
Implementing organization		Miyahuna
Responsible organization		Miyahuna
Approx. cost		(Expenses are to be included in the cost of personnel in charge of Miyahuna)

(Source: JICA Survey Team)

### Monitoring form

#### I. Construction phase

##### i. Air Quality

##### (a) SO<sub>2</sub>

Location	Date	24 hours average	National standard	WHO Guideline
	/ /	ppm	0.14 ppm (24 hours average)	20 µg m <sup>-3</sup> (Interim-Target -3, 24 hours average)
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		

##### (b) NO<sub>2</sub>

Location	Date	1 hour average	National standard	WHO Guideline
	/ /	ppm	0.21 ppm (1 hour average)	200 µg m <sup>-3</sup> (1 hour average)
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		

##### (c) PM<sub>10</sub>

Location	Date	24 hours average	National standard	WHO Guideline
	/ /	ppm	150 ppm (24 hours average)	120 µg m <sup>-3</sup> (Interim-Target -1, 24 hours average)
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		

##### (d) PM<sub>2.5</sub>

Location	Date	24 hours average	National standard	WHO Guideline
	/ /	ppm	65 ppm (24 hours average)	75 µg m <sup>-3</sup> (Interim-Target -1, 24 hours average)
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		
	/ /	ppm		

**ii. Ambient Noise Level**

Time		Location
From	To	

**Reference Value: National Standards of Ambient Noise\***

Category of Area	Limits in dB (A) Leq	
	Day time (6 AM - 8 PM)	Night time (8 PM - 6 AM)
Residential Area (urban area)	60	50
Residential Area (suburb area)	55	45
Residential Area (rural area)	50	40

\* Article (4) of the Standards for the Prevention and Elimination of Noise (2003)

**iii. Waste with Odor**

Date.....

Location	Discharge amount		Rate of recycle/Reuse	
	Industrial (ton)	Domestic (kg)	Industrial (%)	Domestic (%)
Odor	<input type="checkbox"/> Acceptable		<input type="checkbox"/> Not-acceptable	

**iv. Record of machinery maintenance**

Date	Machinery name	ID No.	Content of maintenance

**v. Disturbance to Existing Social Infrastructure and Services**

Traffic volume (vehicles and others used for the transportation and construction work)

Date	Location	Start time	End time	Weather
/ /		:	:	

Traffic	Tally	Traffic	Tally
Bicycle		Articulated lorry	
Motorcycle		Bus/Coach	

Car	Construction vehicle
Van/Pick-up	Farm vehicle
Small lorry	Other

**vi. Work Environment (daily and monthly)**  
 Monitor record of trainings on health and safety, observation and inspection on site, workers' health condition and medical check-ups' record, number of accidents and their working hours

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**vii. Accidents Record**

**(a) Number of traffic accidents**

\_\_\_\_\_

**(b) No. of accidents (human and fire cases)**

\_\_\_\_\_

**(c) Record of accidents**

- Date & Time: \_\_\_\_\_
- Location: \_\_\_\_\_
- Accident details: \_\_\_\_\_

\_\_\_\_\_

**II. Operation stage**

**i. Work Environment and Accidents**

**(a) Check of cautionary signs placed on required points on site**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**(b) Record of accidents**

- Date & Time: \_\_\_\_\_
- Location: \_\_\_\_\_
- Accident details: \_\_\_\_\_

\_\_\_\_\_

**Replacement Plan of Pump and Motor for Zai Water Supply System**

○ : Equipment to be replaced  
 □ : Equipment not to be replaced

**1) Replacement equipment based on survey results**

PS	IPS				PS1				PS2				PS3				PS4				PS5				Total No. of Sets		
	No	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3		4	
Pump	○	○	○	□	○	□	○	○	○	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	18
Motor	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	16	

**Comment of the above replacement plan**

The new pump and new motor are recommended to installed and used by pair as the pump manufacturer can guarantee the operation totally.

**2) Examination of motor replacement method**

PS	IPS				PS1				PS2				PS3				PS4				PS5				Total No. of Sets	
	No	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3		4
Pump	○	○	○	□	○	□	○	○	○	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Motor	○	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	4	

(1)                      (2)                      (3)    (4)

**Preparation Work by Jordanian Side**

- (1) Interchange IPS No. 4 Motor and IPS No. 3 Motor.
- (2) Interchange PS1 No. 2 Motor and PS3 No. 3 Motor.
- (3) Interchange PS2 No. 2 Motor and PS3 No. 4 Motor.
- (4) Replace PS5 No. 4 motor with spare motor owned by Miyahuna.

**3) Final replacement plan**

PS	IPS				PS1				PS2				PS3				PS4				PS5				Total No. of Sets	
	No	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3		4
Pump	○	○	○	□	○	□	○	○	○	□	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	18
Motor	○	○	○	□	○	□	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	15	

**Replacement Work by Japanese Side**

- (1) Replacement of 3 sets of intake pump and motor
- (2) Replacement of 9 sets of raw water pump and motor with new ones
- (3) Replacement of 3 raw water pumps (PS4) with new ones
- (4) Replacement of 3 sets of transmission pump and motor with new ones

**TECHNICAL NOTES  
ON  
THE PREPARATORY SURVEY  
FOR  
THE PROJECT FOR THE IMPROVEMENT OF THE ZAI WATER  
SUPPLY SYSTEM**

Based on the Minutes of Discussions (hereinafter referred to as “M/D”) on the Preparatory Survey for the Project for the Improvement of the Zai Water Supply System (hereinafter referred to as “the Project”) signed on 15<sup>th</sup> July, 2019 between the Preparatory Survey Team (hereinafter referred to as “the Team”) of Japan International Cooperation Agency (hereinafter referred to as “JICA”) and the Government of the Hashemite Kingdom of Jordan (hereinafter referred to as the “Jordanian Government”), the consultant members of the Team had a series of discussions and conducted field surveys from 7<sup>th</sup> July to 2<sup>nd</sup> September, 2019.

As a result of the discussions and the surveys, both sides confirmed the technical conditions described as per attached.

Amman, 28<sup>th</sup> August, 2019



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Yoshikata Kubosaki  
Chief Consultant,  
Preparatory Survey Team,  
Japan



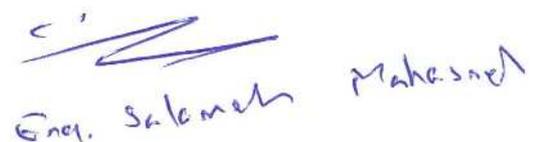
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Iyad Dahiyat  
Secretary General,  
Water Authority of Jordan,  
Ministry of Water and Irrigation,  
The Hashemite Kingdom of Jordan



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Ghazi Khaleel  
CEO,  
Jordan Water Company/ Miyahuna,  
The Hashemite Kingdom of Jordan



Engr. Saleemah Mahasneh

## ATTACHMENT

Both parties agreed on and confirmed the following items:

### 1. Requested components by Jordanian Government

The requested components by Jordanian Government are as follows:

- Renewal of 18 pumps and 16 motors at the intake Pump Station (IPS), raw water PS (PS1-4) and transmission PS (PS5)
- Renewal of chemical feeding facilities
- Repair of raw water main pipe etc. at raw water pump stations
- Renewal of travelling screens
- Rehabilitation of grit settling basins
- Enhancement of Sludge dewatering system
- Soft component

### 2. Results of the survey and proposal for replacement and/or repair on the items requested by Jordanian Government

#### 2.1 Renewal of 18 pumps and 16 motors at the intake PS (IPS), raw water PS (PS1-4) and transmission PS (PS5)

[Results of the survey]

6 of the 24 pumps and 8 of the 24 motors have been replaced by Miyahuna. The remaining 18 pumps and 16 motors are deteriorated. In addition to replacement of the pumps, measures to protect pump material from chemicals are required since the raw water with high chloride ions is injected with chlorine dioxide and potassium permanganate after the intake pump. 3 control valves and 4 check valves are deteriorated in PS5.

[Proposal]

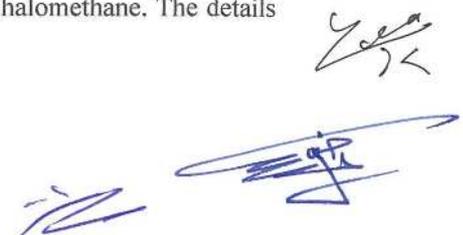
Three intake pumps are required to be upgraded with cast stainless steel (SCS13) for impellers, and all 12 booster pumps are required to be upgraded with duplex stainless steel. All 16 motors are required to be replaced with those of the existing specifications. Three transmission pumps will be evaluated by experts, including the actual usage, and will be considered as to what kind of plans can be considered under the condition that they are installed in the current pump house. Some of these pumps and motors were installed more than 20 years ago, and their renewal is long over due. 3 control valves and 4 check valves are required to be replaced in PS5.

Such renewal is expected to reduce energy consumption equivalent to approximately 3.2 million JOD per year.

#### 2.2 Renewal of chemical feeding facilities

Various chemicals are applied in Zai water supply system. (Deir Alla intake pump station and Zai water treatment plant). Regarding all chemicals used in this system, the dosing order is well considered, and dosing rate is determined by regular water analysis.

2.2.1 In Deir Alla intake station, chlorine dioxide and potassium permanganate are dosed into lifting pipeline. They are both strong oxidant with properties of no generating Trihalomethane. The details are given in Appendix-1.



2.2.2 In Zai WTP, the powdered activated carbon (PAC) is dosing at the inlet regulating basin, and ferrous sulfate and polymer, ferric sulfate with polymer are dosing at a rapid mixing. The details are given in Appendix-1.

### 2.2.3 Chlorine dioxide generators

[Results of the survey]

Chlorine dioxide is manually injected due to the ageing of devices and malfunction of self-adjustable valves. Since one of the three generators is now out of order, the chlorine dioxide generation is being done with the remaining two generators without any standby. The injection rate reaches maximum in the case of high turbidity.

[Proposal]

All the three generators are required to be replaced as they are aged but they are essential for water treatment processing. The generators are required to be replaced by the ones with higher injection rate than existing since the injection rate has reached the maximum level and it is impossible to cope with further worsening of raw water quality by the generators of present injection rate. It is required to be replaced immediately.

### 2.2.4 Sodium chlorite solution device

[Results of the survey]

The sodium chlorite solution device is aged. Sodium chlorite powder of 80% concentration is dissolved into water to form 25% solution. As powder sodium chlorite has a risk of explosion when it comes into contact with reducing agent or organic substance, careful handling is required for this chemical during transportation, stock and dissolving. Considering the request from Miyahuna, use of sodium chlorite liquid is required.

[Proposal]

The existing equipment could be used, but replacement of piping will be required for sodium chlorite liquid. It is required to be replaced with Chlorine Dioxide Generators at the same time.

### 2.2.5 Powdered activated carbon injection facility

[Results of the survey]

The existing powdered activated carbon injection facility is deteriorated. Two facilities are working without any standby. The activated carbon is sent and injected into the inlet of the raw water regulating basin located at 30m away from the powdered activated carbon injection facility building. As the injection pipes (HDPE) often gets clogged with activated carbon, it is required to replace the injection pipes every 2 or 3 weeks.

[Proposal]

The existing three aged facilities including one standby are required to be replaced and a new building is required to be constructed nearby the inlet of the raw water regulating reservoir to install the three facilities. From this measure, reliable injection can be achieved by avoiding the clogging in the injection pipes. It is required to be replaced immediately.

### 2.2.6 Chlorine injection facility (1985)

[Results of the survey]

The facility is deteriorated, and two main equipment and one evaporator installed in 2000 have now malfunction. Thus, only the standby equipment is working.



[Proposal]

Three main equipment (including 1 standby) and one evaporator are required to be replaced as disinfection is an important water treatment process. It is required to be replaced immediately.

#### 2.2.7 Chlorine injection facility (1999)

[Results of the survey]

One of the two lines is out of use due to malfunction of the chlorine gas header pipe. Two evaporators in 2000 have now malfunction.

[Proposal]

The existing chlorine gas header pipe and two evaporators are required to be replaced, and spare parts are required to be supplied. Disinfection is an important water treatment process. It is required to be replaced immediately.

#### 2.2.8 Ferric sulfate injection facility

[Results of the survey]

There are no spare pumps.

[Proposal]

Spare pumps are required to be installed for injecting ferric sulfate into the injection point of each line. It is required to be replaced immediately.

#### 2.2.9 Potassium permanganate feeding system

[Results of the survey]

Over 20 years have passed, the facility is deteriorated.

[Proposal]

Two injection pumps (including one standby) and three dissolution tanks are required to be replaced with new ones of the same specification as existing. This facility complements the chlorine dioxide injection facility by reducing excessive injection of chlorine dioxide, which helps reduce generation of disinfection by-products of chlorous acid. This facility has function of reducing the unusual odor and tastes by oxidization of organic matters, and also suppresses the generation of disinfection by-products. It is required to be renewed within a few years.

#### 2.2.10 Ferrous sulfate injection facility

[Results of the survey]

Weighing and dissolving equipment have been working without problems due to regular inspection, but there are no spare parts. In addition, the injection pump is aging.

[Proposal]

Injection pumps are required to be replaced with new ones having same capacity as existing, and spare parts are required to be supplied.

#### 2.3 Repair of raw water main pipe etc. at raw water pump stations

[Results of the survey]

Currently, the end cap of the discharge header pipe is repaired by the Miyahuna. Regarding the end cap portion of discharge header pipe, the current repair seems to be insufficient for the water hammer pressure.

[Proposal]

By reinforcing or improving the end cap of the discharge header pipe, it is possible to prevent the booster and transmission pump station from stopping. It is required to be improved immediately.

#### 2.4 Renewal of travelling screens

[Results of the survey]

There are four traveling screens, but one is out of order and cannot be operated. The remaining three have become aged and trouble occurred frequently.

[Proposal]

Four aging screens are required to be replaced with new ones of the same specification as of existing.

#### 2.5 Rehabilitation of grit settling basins

[Results of the survey]

Two basins are out of use due to deterioration of reinforced concrete structures. At present, only two basins are in operation. However, turbidity reduction effect is confirmed even when two basins are in operation.

[Proposal]

There are two proposals. One is to construct two new basins at the same place after dismantling the two deteriorated basins. The other is to construct two new basins after intake and just before the intake pump station at a land lot to be acquired. The size of basins is estimated at 22m wide x 59m long x 5m deep for two basins capacity. Grid settling basin has effect to remove almost all sand or silt except for fine colloidal particles. If turbidity is defined as colloidal particle concentration, turbidity removal effect would not be expected so much.

#### 2.6 Sludge drying beds

[Results of the survey]

Twelve drying beds are working only in summer, but not in winter due to less drying effect in winter. Lack of enough drying beds forces sludge water to drain outside. It is desirable to process sludge inside the plant. The Team confirmed that sludge at the Zai WTP is no environmental and legal problem in Jordan.

[Proposal]

There are two plans for improvement of sludge drying process; one is construction of new sludge thickeners and additional drying beds, while the other is construction of new thickeners and new pressure dewatering equipment. The former requires construction of about 130 drying beds as the same size as exiting one and securing a large land lot within or near the plant. (The Team estimated about 130 drying beds based on the current sludge amount. It might be difficult to secure a large land lot.) The latter requires the installation of pressure dewatering equipment inside the plant.

#### 2.7 Soft component

The Team explained that it will examine the necessity and possibility of technical assistance such as a soft component and then will inform its results.

### 3. Results of the survey and necessary replacement and/or repair of the other relevant items

The Team also surveyed the other relevant items mentioned below. The details are given in Appendix-2.



- Water treatment plant
  - Rapid sand filter (1985)
  - Rapid sand filter (1999)
  - Sedimentation basin (1985)
  - Air scour blowers
  - Backwash water tank
  - Backwash water recovery pumps
- Electrical Facilities
  - Monitoring control equipment (PLC system) and Data logger system
  - Telemeter systems
- Laboratory equipment

#### 4. Priorities of the candidate items to be considered by the Government of Japan

The following criteria have been considered in prioritizing of the replacement/repair plans of items (Appendix-2).

- Renewal/repair effects (Benefits of facility renewal/repair)
- Risks of deteriorating raw water quality and decreasing water production due to malfunctioning of facilities, if unattended (Risks of system stopping and water quality degradation)
- Maintenance cost reduction (Improvement of financial conditions of Miyahuna)
- Energy consumption reduction effect (Reduction of power consumption)

The Team explained that the final scope of the Project will be decided by the Japanese Government with due consideration of benefit and budget. The Jordanian Government agreed to it.

#### 5. Other relevant survey results

##### 5.1 Examination on the cause of corrosion/erosion of raw water pumps (PS1 to PS4)

The casing interior seems being corroded and cavitation erosion is found on the impeller. In addition, the impeller ring and casing ring have been worn out possibly due to silt. For the detail of cause and measures, refer to the attached Appendix-3.

##### 5.2 Water Quality (Raw Water Quality of King Abdullah Canal)

Based on the monitoring data provided by Miyahuna, the Team has analyzed the data to grasp the current condition and recent trend of raw water quality of King Abdullah Canal (KAC). The summary refers to the attached Appendix-4 and 5.

The Team judged based on the above analytical results that it was necessary to continuously study the impact of the raw water quality on the water supply system, and requested Miyahuna to periodically monitor water qualities at the intake point at KAC, settling basin and WTP until January 2020. Miyahuna agreed to it.

#### 6. Operation and maintenance (O&M)

The O&M is executed in systematic and effective manner using a computer program such as CMMS (Computer Maintenance Management System). Therefore, the Project does not require the technical assistance for O&M. However, in the field of water treatment process such as a chemical injection, technical assistance may be required. The Team will examine its possibility in Japan and inform the

result later.

## **7. Environmental and Social Consideration**

In accordance with the JICA Guidelines for Environmental and Social Considerations (April 2010), the Team has developed the scoping draft (Appendix-6), and concluded tentatively that implementation of the Project would not have serious impacts on natural and social environment around the Project site because it is basically aiming at replacement/repair of water treatment facilities only in the existing properties. However, it is necessary to pay enough attention to preventions of air pollution, noise and vibration, discarded wastes and traffic/work related accidents. Based on the results of the study, the Team will prepare an initial environmental examination (IEE) level report for Category B project in accordance with JICA form at the end of October 2019 and send it to WAJ. WAJ will submit it with a specific application to Ministry of Environment to review and classify in categories by the Technical Committee. After that, the Jordanian Government will conduct the necessary procedure concerning the environmental assessment and make environmental impact assessment (EIA) or IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by the end of March 2020 as per Minutes of Discussion of 15 July 2019.

## **8. Tax exemption**

Both parties confirmed that all taxes, duties and levies applicable to goods and services to be rendered in relation with the Project are exempted, and the exemption process will be completed in advance. For tax exemption, it is needed that the Cabinet Letter is issued by Jordanian Government indicating that tax exemption is applicable to the Project.

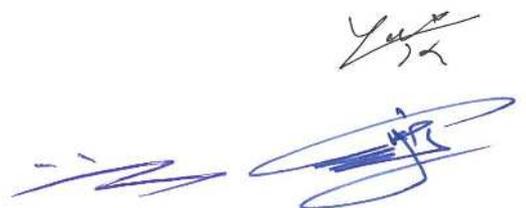
## **9. Third countries procurement**

The Team explained that some equipment may be procured from third countries. The Jordanian Government agreed to it.

## **10. Sustainable Use**

For sustainable use of the facilities, Miyahuna and WAJ are required to prepare funds for the next major renovation/rehabilitation.

**The contents of this Technical Notes might be changed subject to results of further analysis in Japan and discussions with JICA.**



## Appendix-1 Chemicals in Zai Water Supply System

Location	Chemical	Function	Dosing point	Dosing rate (mg/L)
Deir Alla IPS	Chlorine dioxide	Disinfectant Oxidant	Pipeline to PS1	1 to 3.0
	Potassium permanganate	oxidant	Pipeline to PS1	1.5 to 3.0 Not always
Zai WTP	PAC	absorbent	Inlet recovery basin	5.0 to 35
	Ferrous sulfate	Coagulant reductant	Rapid Mixing basin	1.0 to 10 Not always
	Ferric sulfate	Coagulant	Rapid Mixing basin	10 to 50
	Cationic polymer 1 Con. 4%	Coagulant aid	Rapid Mixing basin or Flocculation basin	0.5 to 5.0
	Cationic polymer 2 Conc. 2%	Filter aid	Filter inlet channel	0.2 to 3.0
	Chlorine	Disinfection	Filter inlet channel	0.5 to 2.5
Filter outlet basin			0.1 to 1.0	





### Appendix-3 Examination on the cause of corrosion/erosion of raw water pumps (PS1 to PS4)

From the observation, the casing interior seems being corroded by an oxidant like chloride. On the other hand, cavitation erosion is found on the impeller. In addition, the impeller ring and casing ring have been worn out possibly due to silt.

The cause of corrosion is strongly suspected to be corrosion by chlorine ions in the raw water, so it must be taken into account when selecting the pump material. In addition, the pumps are also affected by chlorine dioxide and potassium permanganate. To protect the main parts of the pumps from corrosion, pump materials is recommended to be changed to duplex stainless steel.

Handwritten signatures in blue ink, including a date '2012' and several illegible signatures.

## Appendix-4 Water Quality (Raw Water Quality of King Abdullah Canal)

Based on the monitoring data provided by Miyahuna, the Team has analyzed the data to grasp the current condition and recent trend of raw water quality of King Abdullah Canal (KAC). The summary is as follows:

### 1) Physical properties

In the past, turbidity of the raw water showed remarkably higher values in winter season. However, seasonal variations became subsequently smaller, and the lowest yearly values have been increasing gradually from around 2014 (Appendix-5). In order to reduce turbidity load on Zai WTP, it will be necessary to take measures to control turbidity in the future. Besides, since there is no clear relationship between algae count and turbidity, the increase in turbidity is mainly attributed to suspended inorganic materials such as silt and clay in the raw water (Fig.-a2).

### 2) Chemical properties

Electric conductivity, which indicates the total amount of dissolved materials, is extremely high even in the rainy season. This is the obvious feature of KAC raw water and the annual average is more than  $100 \text{ mS m}^{-1}$  in general. In recent years, chloride and sulfate tend to increase gradually (-b1) and contribute to the increase in electrical conductivity (-b2).

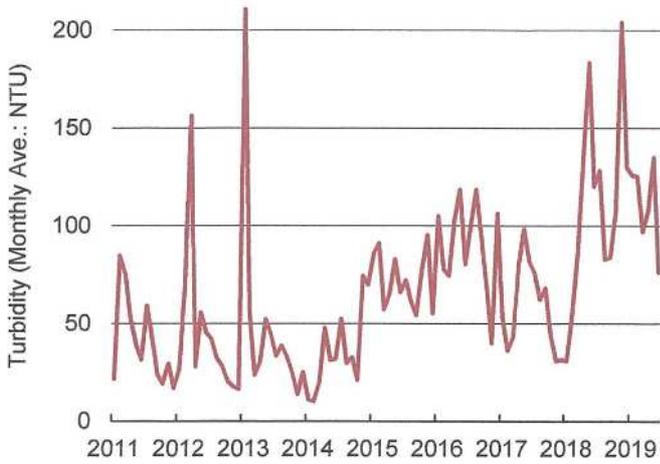
### 3) Microbiological properties

Algae tend to be abundant in summer season. Injecting potassium permanganate ( $\text{KMnO}_4$ ) and chlorine dioxide ( $\text{ClO}_2$ ) at the intake point reduce it to approximately 40% (-c1). On the other hand, a nutrient salts concentration, especially nitrate concentration in the water is also high annually and the number of fecal coliform shows a positive correlation with it (-c2).

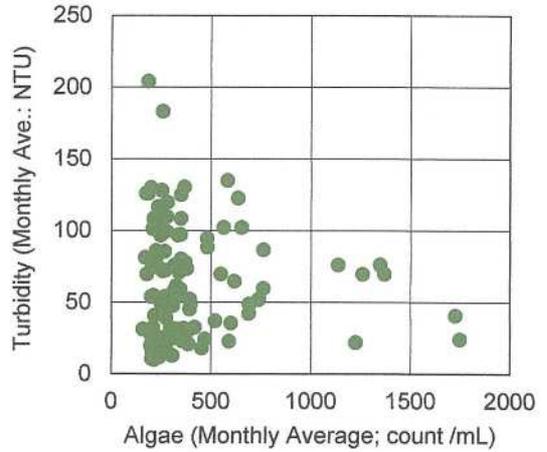
From the above, injection of oxidizers such as  $\text{KMnO}_4$  and  $\text{ClO}_2$  is essential for hygiene purpose, but excessively adding may cause corrosion and/or corrode steel products in the water supply system.



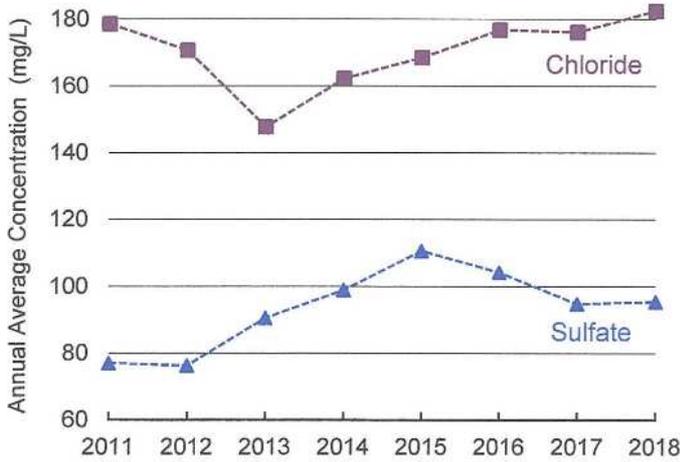
## Appendix-5 Recent Trend of Raw Water Quality of KAC



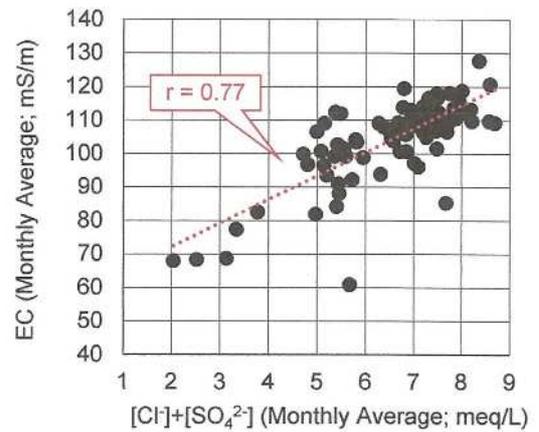
a1) Historical Change of Turbidity



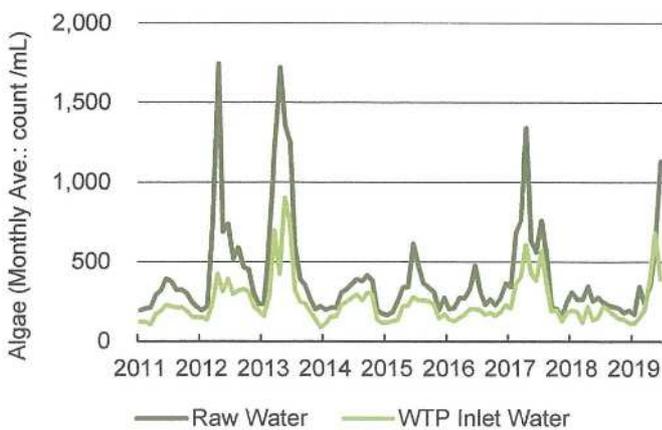
a2) Relationship between Algae & Turbidity



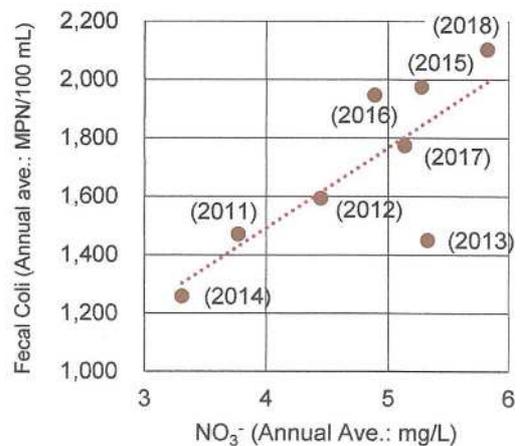
b1) Historical Change of Chloride & Sulfate ions



b2) Relationship between  $[Cl^-]+[SO_4^{2-}]$  & EC



c1) Comparison between Raw & WTP Inlet Water on Algae



c2) Relationship between Nitrate & Coliform

*[Handwritten signatures]*

Item	Impact	Rating		Results
		Pre-Construction Phase	Operation Phase	
				is implemented in the existing properties.
24	Gender	D	D	<b>Pre-/Construction and Operation phase:</b> No specific impacts to gender issues.
25	Children's Rights	D	D	<b>Pre-/Construction and Operation phase:</b> No specific impacts on children's rights.
26	Infectious Diseases such as HIV/AIDS	D	D/B+	<b>Pre-/Construction and Operation phase:</b> The Project does not need massive influx of construction workers and may not trigger any infectious disease epidemics. Conversely, positive impacts for disease prevention may be predicted due to stable water supply by the Project implementation in the future.
27	Work Environment (Including Work Safety)	B-	D	<b>Pre-/Construction phase:</b> Risks of accidents are high through the construction work. <b>Operation phase:</b> No major impact is anticipated.
Other	28	Accidents	B-	<b>Pre-/Construction phase:</b> Accidents may occur due to the construction work. Also traffic accidents may occur due to the increase of traffic volume. <b>Operation phase:</b> Accidents can occur during operation and maintenance work.
	29	Cross-boundary Impact and Climate Change	D	D

Source: JICA Study Team

Note:

A+/-: Significant positive/negative impact is expected,

B+/-: Positive/negative impact is expected to some extent,

C+/-: Extent of positive/negative impact is unknown (further examination is needed, and the impact may be clarified as the study progresses)

D: No impact is expected.