

**Palestinian Authority  
Palestinian Water Authority  
Jenin Municipality**

**THE PREPARATORY SURVEY  
ON  
THE PROJECT  
FOR  
THE IMPROVEMENT OF  
WATER SUPPLY SYSTEM IN JENIN  
  
FINAL REPORT**

**October 2023**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)**

**TEC INTERNATIONAL CO., LTD.  
YACHIYO ENGINEERING CO., LTD.  
PADECO CO., LTD.**

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## PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the Joint Venture consist of TEC International Co., Ltd., YACHIYO Engineering Co., Ltd. and PADECO Co., Ltd.

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

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

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Palestine for their close cooperation extended to the survey team.

October, 2023

Morita Takahiro  
Director General,  
Global Environment Department  
Japan International Cooperation Agency



## SUMMARY

### (1) Overview of Palestine

The Palestinian Territories are located in the Middle East and have been governed by the Palestinian Authority since 1995 based on the Declaration of Principles on Interim Self-Government Agreement (hereinafter referred to as “Oslo Accords”) in 1993. The territories consist of the West Bank, which borders Jordan, including the Palestinian territories in East Jerusalem, and borders Egypt, and the Gaza Strip. The total land area is 6,020 km<sup>2</sup> (comprising 5,655 km<sup>2</sup> in the West Bank and 365 km<sup>2</sup> in the Gaza Strip), with a population of approximately 5.35 million people (approximately 3.19 million in the West Bank and about 2.17 million in the Gaza Strip).

The annual precipitation averages 468mm, which is approximately half of the world average of 880mm. Furthermore, there is significant variation in precipitation between seasons, with winter rainfall accounting for the majority of the annual total. As a result, securing a water source, especially during the summer season, has become more challenging.

Under Israel's occupation of the West Bank and Gaza Strip since 1967, Israel controlled the borders of these territories. As a consequence, conducting trade with other countries became exceedingly challenging, resulting in heavy dependence of the Palestinian economy on the Israeli economy. This led to a lack of development in Palestinian economic and financial institutions. Parallel to the peace process, economic support from donor countries and international organization to Palestine has increased since 1993. However, economic development has been impeded by the conflicts between Israel and Palestine that began in late September 2000, resulting in blockades, restrictions on movement, etc. The real economic growth rates remained consistently in the double digits until 2011 but experienced a sharp decline to 2.8% in 2013. In 2014, due to the Gaza conflict and economic blockades, it experienced negative growth (-0.4%) for the first time since 2006. Furthermore, economic activities decreased significantly due to the outbreak of the COVID-19 pandemic and the subsequent lockdown measures implemented in 2020, leading to a negative growth rate of -13.1%. While economic growth is expected to rebound with the relaxation of COVID-related restrictions and increased consumption, per capita GDP remains stagnant due to high population growth. Additionally, the economy is struggling to generate sufficient employment opportunities. Notably, unemployment in the Gaza Strip remains persistently high, exceeding 45%, leading to considerable dissatisfaction among the population. The per capita GDP is \$3,517 (2022, IMF estimate).

Regarding the water and sanitation sector, the overall achievement of SDG6 in Palestine indicates approximately 40% access to safe water and nearly 98% access to adequate sanitation facilities (2019, Palestinian Central Bureau of Statistics, <https://pcbs.gov.ps/SDGs.aspx?pageId=6>). Continuing efforts to achieve these goals, especially in the water supply sector, are still necessary.

### (2) Background and Overview of the Project

Jenin Municipality, the capital of Jenin Governorate, is located in the northern part of West Bank in Palestine, with a population of 64,036 people in 2020. The population of Jenin served with water supply is estimated at 51,680 people (rate of population served: 81%). Jenin faces water supply problems, such as water shortages due to leakage from aging water pipes and inadequate water pressure. Most of the water supply areas have limited access to water, receiving water for only 12-32 hours per 10 days. Consequently, the per capita water consumption is only 82 liters/person/day.

The water sources of Jenin consist of (i) the municipality owned three wells, (ii) bulk water supply from the West Bank Water Department (WBWD), and (iii) private wells. Among these, the water supply from WBWD to Jenin comprises two sources: purchased water from Israel and the WBWD's own groundwater. As Palestine is a semi-arid region with low annual precipitation, securing water sources is challenging due to its hydrogeological conditions. Furthermore, the development of new water sources is strictly controlled by Israel, in accordance with the Interim Agreement on the West Bank and the Gaza Strip (Oslo Accords II). Therefore, the development of new water sources becomes extremely difficult. Hence, the priority lies in reducing the non-revenue water (NRW) ratio to effectively utilize the limited water resources. Additionally, there is a need to reconstruct the water transmission and distribution system to ensure a fair and stable water supply through appropriate water management.

The NRW ratio in Jenin is 60% (2020), which is the highest among major cities in Palestine. To address

this issue, JICA implemented the Technical Assistance Project, "The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality (2017-2022)". The main aim of this project was to strengthen capacity in reducing NRW, improving water bill collection, and developing business operation plans to enhance waterworks management capacities. As a result of this project, a manual for NRW reduction was developed, and dedicated personnel were recruited specifically for NRW reduction. These initiatives led to notable improvements in the capacities related to NRW reduction and bill collection.

However, despite these achievements, high rates of water leakage persist due to several factors. These issues include inadequate water distribution management to regulate water pressure based on elevation differences, a lack of separation between water transmission and distribution pipes according to their function, and pipe deterioration. Furthermore, in light of the need for preventive measures against infectious diseases such as COVID-19, it is necessary to expand the water supply network to areas currently without water supply service.

Under these circumstances, improvement of water supply system in Jenin was requested by the Palestinian Authority assuming that the Japanese Grant aid would be utilized.

### (3) Summary of Survey Results and Project Details

#### 1) Summary of Survey Results

In light of the background mentioned above, JICA dispatched the Preparatory Survey Team to Palestine as follows. It is noted that the First Survey was conducted remotely from March to June 2021.

The Second Survey (Field Survey 1): From September 1 to December 17, 2021

The Second Survey (Field Survey 2): From May 26 to August 7, 2022

The Third Survey (Draft Outline Design Survey): From July 7 to July 21, 2023

The Preparatory Survey was conducted for the several purposes, including confirming the request from the Palestinian Authority, identifying the background, objectives, and contents of the Project, examine the effects and assess the technical and economic feasibility. It also aimed to conduct the outline design for the project components necessary to achieve the outcomes of the cooperation, estimate the project cost, and provide recommendations regarding the obligation of the Palestinian Authority, an implementation plan, as well as considerations for operation and maintenance required to achieve the Project objectives.

As a result of the Survey, the implementation of the grant aid project has been agreed with the Palestinian side. This includes the rehabilitation and new construction of the transmission and distribution facilities, as well as the rehabilitation of the intake facility. The Project will contribute to improving the living environment of the residents.

#### 2) Project Components

The components the Grant are as follows:

Item	Contents
Construction of facility	<ul style="list-style-type: none"> <li>➤ Rehabilitation of Al Saadeh Municipality Well</li> <li>➤ Rehabilitation of pumping facilities at Al Saadeh water pumping station</li> <li>➤ Rehabilitation of site piping within the existing water reservoirs (Al Marah and Al Jabreyat reservoirs)</li> <li>➤ Construction of new water distribution mains (pipe length: 8.3 km)</li> <li>➤ Replacement and new installation of water distribution networks (pipe length: 55 km)</li> <li>➤ Construction of District Metered Areas (DMAs) (15 DMAs)</li> <li>➤ Installation of pressure reducing equipment (pressure reducing tanks: 2 tanks, pressure reducing valves: 6 valves)</li> <li>➤ Reconnection of the existing water supply connection to the newly installed pipes</li> <li>➤ Introduction of Supervisory Control and Data Acquisition (SCADA) system</li> </ul>
Soft components	The following technical assistance is provided to ensure the smooth commencement of the operational use and sustainable operation and maintenance of the facilities constructed under the Grant project.

Item	Contents
	<ul style="list-style-type: none"> <li>➤ Technical assistance to implement proper water distribution management and water operations</li> <li>➤ Technical assistance to facilitate new water supply connections and promote efficient NRW measures</li> </ul>

#### (4) Implementation Schedule and Project Cost Estimation

##### 1) Implementation Schedule

The implementation of the Project will require 12 months for the detailed design and bidding process, followed by 25 months for construction works after the contract with the contractor is signed, totaling 37 months.

##### 2) Project Cost Estimation

The costs borne by the Japanese Grant will not be disclosed until the approval of the construction contract.

The estimated costs borne by the Palestinian Authority are as follows:

Costs for site securing and clearing for temporary and material stock yards	NIS 383,000 (Approx. JPY 15 million)
Initial cost of new electricity supply	NIS 51,000 (Approx. JPY 2 million)
Bank commission (expenses related to B/A and A/P)	NIS 76,000 (Approx. JPY 3 million)
Costs for provision of equipment, furniture, facilities necessary for the implementation of the Project	NIS 5,000 (Approx. JPY 0.2 million)
Total	NIS 515,000 (Approx. JPY 20.2 million)

#### (5) Project Evaluation

The Project is considered highly justified and effective for the following reasons:

##### 1) Relevance

###### (i) Project Beneficiaries

The implementation of the Project will benefit a total of 77,080 residents (by 2030) in the Project area of Jenin municipality, including the refugee camp. It will improve water supply services for the current population of 56,680 people and provide water supply services to an additional 25,400 people.

###### (ii) Urgency

As the water supply in Jenin municipality is persistently insufficient, most residents in the service area experience restricted water supply, receiving water only for 1 to 3 days in a 10-day period. To manage the limited water resources effectively, it is urgently required to address water leakage reduction and ensure equitable and stable water supply through the reconstruction of water distribution system.

###### (iii) Consistency with National Policy and Strategy

The Palestinian "National Policy Agenda (2017-2022)" aims to develop the water supply infrastructure and ensure universal access to safe water as key strategies. "The National Water Policy (2013-2032)" also highlights sustainable water resources management and access to water supply services as key policy objectives in the water sector. The Project is consistent with the Palestinian development plans, as it aims to reduce water leakage through the reconstruction of water distribution system and improve water supply coverage.

##### 2) Effectiveness

The effectiveness of the Project is expected in terms of both the following quantitative and qualitative effects.

(i) Quantitative Effects

For the evaluation of the water supply situation in Jenin Municipality, the estimated values in 2020 are employed as the baseline. The quantitative effects expected in the target year (2030) as a result of the implementation of the Project are shown in Table below.

Indicator	Baseline [2020 actual value]	Target (2030) [4 years after completion of the Project] <sup>#3</sup>
Rate of population served (%)	81	98
Population served (people)	51,680	77,080 <sup>#1</sup>
Average daily water distribution (m <sup>3</sup> /day)	10,134	13,155 <sup>#2</sup>

Note:

#1: The population forecast is estimated based on a census data and the annual population growth rate of 2.08%, with reference to the projections by PCBS.

#2: Average daily water distribution = Population served of 77,080 people × Average daily water demand of 128 liters per person per day + Leakage volume of 3,289 m<sup>3</sup> per day.

#3: This target year is set for the intermediate phase of the Jenin Water and Sewerage Master Plan, four years after project completion.

Source: Preparatory Survey Team

(ii) Qualitative Effects

The qualitative effects expected from the implementation of the Project are as follows:

- Improvement of the living environment for residents (improvement of water supply hours, reduction of NRW ratio, and convenience by reducing areas with inadequate water pressure)
- Improvement of the health and hygiene of the population (reduction of waterborne diseases)



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(1) IEE Report

(2) Environmental Checklist

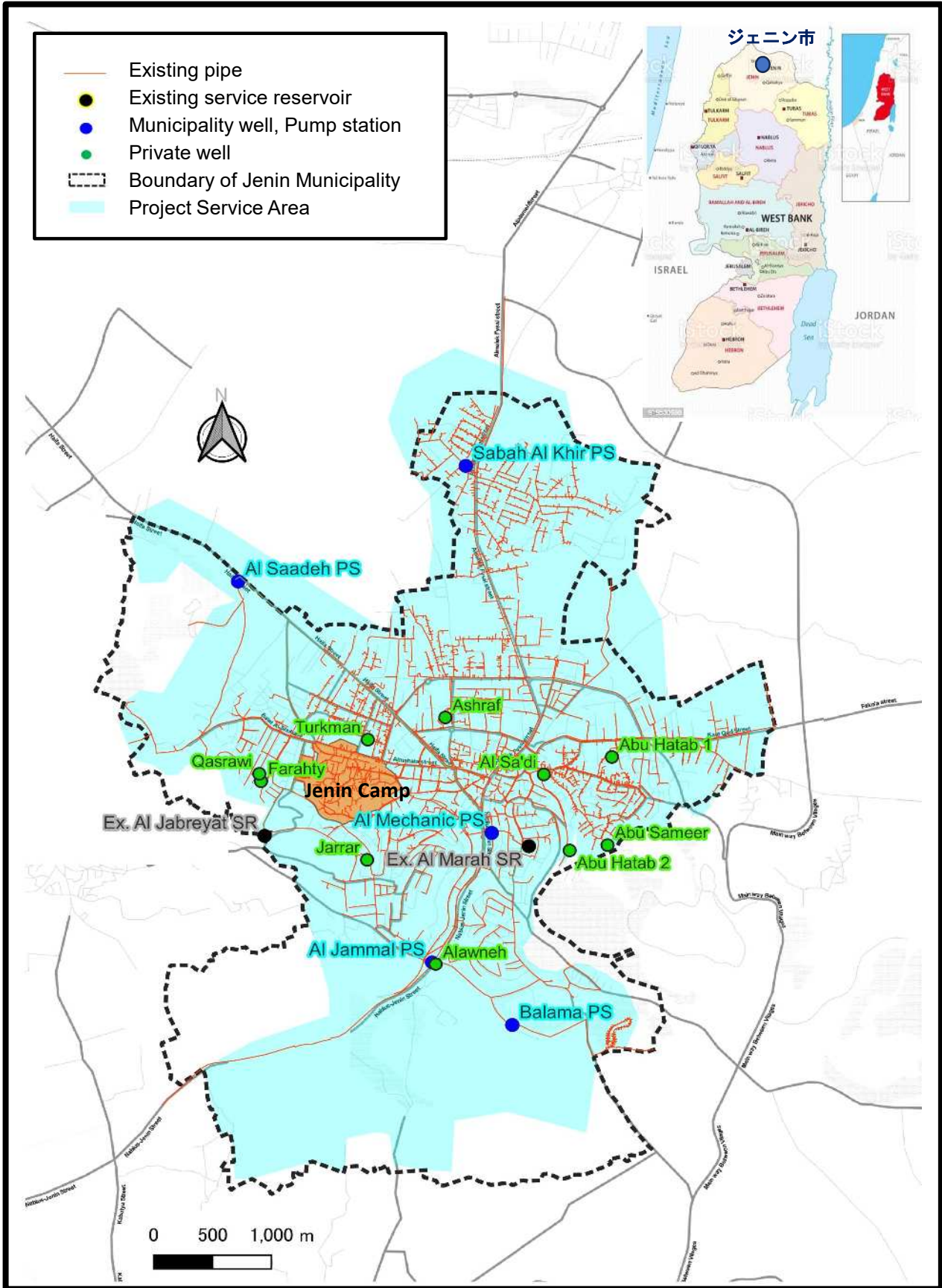
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**Abbreviations**

ADSL	Asymmetric Digital Subscriber Line
AFD	Agence Francaise de Developpement
A/P	Authorization to Pay
B/A	Banking Arrangement
COGAT	Coordinator of Government Activities in the Territories
C-P	Connection Point
DIP	Ductile Iron Pipe
DMA	District Metered Area
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EQA	Environmental Quality Authority
E/N	Exchange of Notes
G/A	Grant Agreement
GDP	Gross Domestic Product
GPRS	General Packet Radio Service
HDPE	High Density Polyethylene
IEC	Israel Electric Company
IEE	Initial Environmental Examination
IMF	International Monetary Fund
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
JM	Jenin Municipality
KfW	Kreditanstalt für Wiederaufbau (German Reconstruction Finance Corporation)
M/D	Minutes of Discussions
Mekorot	MEKOROT Israel National Water Co.
MOF	Ministry of Finance
MOLG	Ministry of Local Government
MOSD	Ministry of Social Development
NDP	National Development Plan
NEDCO	Northern Electric Distribution Company
NIS	New Israeli Shekel
NPA	Palestine's National Policy Agenda
ODA	Official Development Assistance
PCBS	Palestinian Central Bureau of Statistics
PETL	Palestine Electricity Transmission Company
PLC	Programmable Logic Controller
PPGC	Palestine Power Generation Company
PPWM	Prepaid Water Meter
PRT	Pressure Reducing Tank
PRV	Pressure Reducing Valve
PWA	Palestinian Water Authority
SCADA	Supervisory Control and Data Acquisition
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UPS	Uninterruptible Power Supply
USAID	United States Agency for International Development
WBWD	West Bank Water Department
WDPA	World Database on Protected Area
WSRC	Water Sector Regulating Council
WWD	Water and Wastewater Department



# Chapter 1 Background of the Project

## 1-1 Background and Outline of the Grant

Jenin Municipality, the capital of Jenin Governorate, is located in the northern part of West Bank in Palestine, with a population of 64,036 people in 2020.<sup>1</sup> The population of Jenin served with water supply is estimated at 51,680 people (rate of population served: 81%).<sup>2</sup> Jenin faces water supply problems, such as water shortages due to leakage from aging water pipes and inadequate water pressure. Most of the water supply areas have limited access to water, receiving water for only 12-32 hours per 10 days. Consequently, the per capita water consumption is only 82 liters/person/day.<sup>3</sup>

The water sources of Jenin consist of (i) the municipality owned three wells, (ii) bulk water supply from the West Bank Water Department (WBWD) of Palestinian Water Authority (PWA), and (iii) private wells. Among these, the water supply from WBWD to Jenin comprises two sources: purchased water from Israel and the WBWD's own groundwater. As Palestine is a semi-arid region with low annual precipitation, securing water sources is challenging due to its hydrogeological conditions. Furthermore, the development of new water sources is strictly controlled by Israel, in accordance with the Oslo Accords. Therefore, the development of new water sources becomes extremely difficult. Hence, the priority lies in reducing the non-revenue water (NRW) ratio to effectively utilize the limited water resources. Additionally, there is a need to reconstruct the water transmission and distribution system to ensure a fair and stable water supply through appropriate water management.

The NRW ratio in Jenin is approximately 60% (2020 actual)<sup>4</sup>, which is the highest among major cities in Palestine. To address this issue, JICA implemented the Technical Assistance Project, "The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality (2017-2022)". The main aim of this project was to strengthen capacity in reducing NRW, improving water bill collection, and developing business operation plans to enhance waterworks management capacities. As a result of this project, a manual for NRW reduction was developed, and dedicated personnel were recruited specifically for NRW reduction. These initiatives led to notable improvements in the capacities related to NRW reduction and bill collection.

However, despite these achievements, high rates of water leakage persist due to several factors. These issues include inadequate water distribution management to regulate water pressure based on elevation differences, a lack of separation between water transmission and distribution pipes according to their function, and pipe deterioration. Furthermore, in light of the need for preventive measures against infectious diseases such as COVID-19, it is necessary to expand the water supply network to areas currently without water supply service.

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<sup>1</sup> Estimation by the Preparatory Survey Team based on PCBS (2019) "Census Final Results 2017"

<sup>2</sup> Estimated by the survey team. According to the "Annual Report on Water Supply in Jenin Municipality for the Year 2020, Table 4-1" prepared by Jenin Municipality, the population served is 63,000 (in 2020). However, the reliability of the published figure is considered low due to the fact that there are areas within the municipality that are not yet served and the large difference between the population served and the population estimated from the number of customers.

<sup>3</sup> Survey team estimate.

<sup>4</sup> Data provided by the City of Jenin (total water distribution: 3,692,561 m<sup>3</sup>/year; NRW: 2,205,512 m<sup>3</sup>/year)

Under these circumstances, JICA has been conducting the "Preparatory Survey on the Project for Improvement of Water Supply System in Jenin" since March 2021 with the aim of implementing a water supply improvement project in Jenin Municipality, assuming that the Japanese Grant Aid would be utilized. The requests made by the Palestinian side confirmed during the field survey are summarized in Table 1-1.

Table 1-1 Items Requested by PA

Item	Contents
Project Description	<p>(1) Facilities</p> <ul style="list-style-type: none"> <li>- Rehabilitation of existing municipality wells</li> <li>- Rehabilitation and construction of pumping stations</li> <li>- Repair of the intake pumps (replacement of pumps, pipes and fittings) for the above wells</li> <li>- Rehabilitation of existing reservoirs and construction of new reservoir</li> <li>- Construction and rehabilitation of the transmission pipes</li> <li>- Replacement of distribution mains and distribution network pipes</li> <li>- Construction of DMAs (District Metered Areas)</li> <li>- Introduction of distribution monitoring system</li> </ul> <p>(2) Soft (Non-physical) components</p> <ul style="list-style-type: none"> <li>- O&amp;M of constructed facilities</li> <li>- Water distribution management</li> <li>- Customer adaptation to improved water supply, such as 24/7 water supply</li> </ul> <p>(3) Consulting Services</p> <ul style="list-style-type: none"> <li>- Detailed design, tendering support, and construction supervision</li> </ul>

Source: 2nd Survey M/D (July 2022)

## 1-2 Past Japanese Assistance

Japan's past assistance to Palestine in the field of water sector are summarized in Table 1-2.

Table 1-2 Japanese Assistance in Water Sector

Type	Implementation period	Title	Summary
Grant Aid	December 1999 - December 2001	The Project for Improvement of Water Distribution Facilities in the Northern Districts of the West Bank (Phase I)	The project implemented the construction and expansion of water transmission and distribution networks in 13 municipalities in the northern part of the West Bank, the construction of distribution reservoirs in 4 municipalities, and the procurement of materials to promote house connections.
Grant Aid	February 2011 - June 2014	The Jericho Wastewater collection, Treatment System and Reuse Project	In the Jericho-Jordan Valley area, where sewage retention was a serious environmental problem due to its topography, the project was implemented to construct a resource-recycling wastewater treatment facility and to effectively use the treated water as a water source for irrigation and other purposes.

Type	Implementation period	Title	Summary
Technical Assistance Project	December 2012 - March 2018	Technical Assistance and Capacity Building Project for the Jericho Sanitation	The project supported the development of implementing organization and capacity development for operation and maintenance of the sewerage facilities constructed under the Japanese grant.
Technical Assistance Project	September 2017 - October 2022	The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality	The project assisted in the formulation of a mid-term water service management plan and in the capacity development of the NRW reduction and revenue collection.
Grant Aid (in cooperation with UNRWA)	Fiscal Year 2017	Sewerage Network Project in Aqbad Jabr Refugee Camp	Improved living conditions and sanitation in the Aqbad Jabr refugee camp, which is home to approximately 9,000 people, by constructing a sewerage network.
Technical Assistance Project	July 2021 - June 2023	Capacity Development for Sustainable Wastewater Management of Jericho Municipality	The project assisted in the capacity development of wastewater management of Jericho with the goal of establishing a sustainable wastewater management structure and providing sustainable sewerage services in Jericho Municipality.
Advisor	Year 2022 - Ongoing	Advisory for Water Service Management in Jenin Municipality	The project is currently being implemented to assist institutionalization of the capacity to reduce NRW, collect revenue, and formulate water service management plans, that was previously supported through the JICA's Technical Assistant Project. It also supports for integrating water utilities management in the norther region.

Source: The Preparatory Survey Team

### 1-3 Other Donors' Assistance

#### (1) Connection Point (C-P) Project

With the support of USAID, the project was planned to provide regional water supply to the Jenin municipality and the surrounding villages, including water supply from Israel and the construction of ongoing well. Subsequently, the French AFD took over the project to update and design. The construction of the facilities will be financed by the World Bank. The summary of the C-P project is presented in Table 1-3.

In this grant Project, approximately 73% of the water source for the Jenin municipality depends on the bulk water supply from the C-P project. Therefore, the implementation of the C-P project is considered as a critical prerequisite for the grant Project. It is important to assess the probability and process of the C-P project in order to execute the Project in a systematic manner.

Table 1-3 Summary of the C-P Project

Item	Contents
Project area	Jenin Municipality, 12 surrounding cities and villages
Population	182,904 (projection for 2040) Population of Jenin Municipality (and camps): 93,381 (out of the total)
Production	25,229 m <sup>3</sup> /day (daily average)

Item	Contents
capacity	
Water source plan	Total: 31,320 m <sup>3</sup> /day (breakdown below) [C-P Project component] Bulk water supply from Israel Salem Point: 9,600 m <sup>3</sup> /day (400 m <sup>3</sup> /hour) Bulk water supply from Israel Al Jalameh point (high pressure): 2,640 m <sup>3</sup> /day (110 m <sup>3</sup> /hour) Bulk water supply from Israel Al Jalameh point (low pressure): 9,360 m <sup>3</sup> /day (390 m <sup>3</sup> /hour) [Well construction under assistance by AFD and Netherland] Janzour well (under construction): 3,600 m <sup>3</sup> /day (150 m <sup>3</sup> /hour) [Existing facility] Existing wells in Jenin: 3,480 m <sup>3</sup> /day (145 m <sup>3</sup> /hour) Qabatiya city existing wells: 2,640 m <sup>3</sup> /day (110 m <sup>3</sup> /hour)
Project components	Installation of water transmission and distribution pipes Construction of pumping stations and water distribution reservoirs and installation of SCADA Procurement and installation of equipment and pipes for Janzour well
Estimated project cost	Approx. EUR 30-35 million (World Bank grant)
Implementation schedule	September 2022 Completion of basic design December 2022 Completion of detailed design March 2023 Completion of draft bid documents November 2023 – January 2024 Construction Contract May – August 2025 Completion

Source: Preparatory Survey Team based on Connection Point Project report .<sup>5</sup>

## (2) Jenin Eastern and Southwestern Villages Water Supply Project

With the assistance of the World Bank, project has been formulated to provide water supply to villages in the eastern and southwestern parts of Jenin, using the bulk water supply from the C-P Project. After receiving financing approval from the World Bank for the C-P Project, it was decided to implement this project as one of its components. Currently, the bidding process is underway. The summary of the project is shown in Table 1-4.

Table 1-4 Summary of Village Water Supply Project in Eastern and Southwestern Jenin

Item	Contents
Project area	4 villages in the eastern part of Jenin and 1 village in the southwestern part (approximately 3,304 ha)
Target year	Year 2047
Population	17,554 (in 2022) 21,426 (in 2030) 32,604 (in 2047)
Water distribution capacity	Daily average 2,387 m <sup>3</sup> /day (2022) Daily average 6,810 m <sup>3</sup> /day (2047)
Water sources plan	Total: 2,388 m <sup>3</sup> /day (2022) Water supply from C-P project: 2,143 m <sup>3</sup> /day Al Attara well: 245 m <sup>3</sup> /day
Project Components	Installation of water transmission and distribution pipes Construction of pumping stations (3), distribution ponds and elevated water tanks (4: total 2,500 m <sup>3</sup> )

<sup>5</sup> PWA, "Preliminary Design, Detailed Design, Preparation of Tender Documents and Construction Supervision Services for Connection Points Ramallah and Jenin Water Supply Project, Jenin Preliminary Design Report Vol. 1: Report" September 2022


Item	Contents
	Installation of prepaid water meters
Estimated project cost	Approx. 16.4 million USD (World Bank loan)
Implementation Schedule	August 2022 Completion of detailed design March 2023 Completion of draft bid documents

Source: Prepared by the Preparatory Survey Team based on the detailed design report of the village water supply project in eastern and southwestern Jenin

### (3) Jenin Industrial Free Zone Project

With the support of KfW (Kreditanstalt für Wiederaufbau, Germany), the construction of a 93ha industrial park in the northern part of Jenin Municipality (south of Jalameh Point) is currently underway. Since the industrial park is located outside of the JICA Project Area, the water demand for the industrial park is not included in the JICA's water demand forecast. However, the C-P Project plans to supply 2,000 m<sup>3</sup>/day of water to this industrial park.

Table 1-5 Summary of Jenin Industrial Park Project

Item	Description	
Implementing agency	Palestinian Industrial Estates & Industry Free Zones Authority (PIEFZA)	
Main components	Substation (45 MVA) Sewage treatment plant (2,000 m <sup>3</sup> /day) Internal water supply pipes (6,455 m) Firefighting equipment Water distribution reservoir (6,500 m <sup>3</sup> ) Pumping station Internal roads Stormwater drainage system Internal site lighting Power supply	 <p>General layout</p>
Implementation schedule	Ongoing (Construction period: 18 months)	

Source: Preparatory Survey Team based on prequalification documents (2017) and other available public information.

### (4) Nexus North Project

In line with the policy of integrating water utilities in the West Bank into three regional water and wastewater utilities, the PWA implemented the Nexus North project with the support of the French AFD as a regionalization support project, which was completed in September 2021. The project aimed to improve water services by integrating the water utility of Jenin Municipality with three other utilities (Joint Service Council Jenin Western Villages: JSC-JWC, Marj Ibn Amer, and Burqui) into the North Jenin group. While the integration of the three entities, excluding Jenin Municipality, was agreed upon, Jenin Municipality decided to operate its water service independently without merging into the North Jenin.

Subsequently, from March 2023, JSC-JWC has been transitioning from the Joint Service Council status to

an independent water utility named the North Jenin Water Utility. The current organization plan for the Jenin region, created by PWA, aims to establish a regional water utility that includes the North Jenin Water Utility, Jenin Municipality, and the northeastern villages of Jenin. JICA is currently providing technical support for the regionalization of Jenin Municipality through the Advisory for Water Service Management in Jenin Municipality.

Starting in March 2023, JSC-JWV is in the process of transitioning from the Joint Service Council to an independent water utility known as the Jenin West Water Utility (JWWU). In this connection, PWA aims to establish the North Jenin Regional Water Utility, which consolidates Jenin Municipality, East North Villages, and JWWU. Through JICA's "Advisory for Water Service Management in Jenin Municipality", the corporatization of the Water and Wastewater Department of Jenin Municipality is being facilitated with the aim of eventual consolidation into a regional water utility.

#### (5) Janzour Well Construction

The Janzour well, funded jointly by AFD and the Netherlands, has been under construction. Initially, drilling was conducted up to the planned depth of 500 meters. However, the expected aquifer was not encountered. As a result, drilling was continued to a depth of 800 meters (by June 2021), yet the aquifer remained unlocated. Therefore, it was decided to proceed with drilling to a depth of 1,000 to 1,200 meters. However, during the drilling works for enlargement, an accident occurred where the drilling bit accidentally dropped, resulting in damage to the casing and the subsequent suspension of the work. As of June 2023, discussions are underway between the PWA engineering department and AFD to determine whether to retrieve the fallen drilling bit and continue drilling deeper or explore alternative locations for a new well. At present, there is no clear timeline for resuming the construction.

Upon the completion of the construction of the Janzour well, the provision and installation of submersible pumps, pipes and other equipment will be carried out under the C-P Project.

## 1-4 National Conditions

### 1-4-1 Weather Conditions

#### (1) Precipitation

Table 1-6 shows the precipitation data for the past 10 years from 2011 to 2020 in the city of Jenin, and Figure 1-1 illustrates the monthly average precipitation for the same 10-year period.

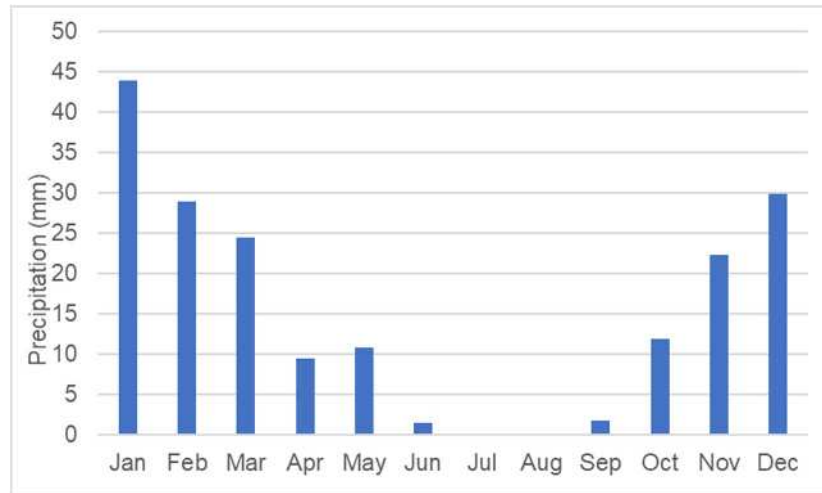
Table 1-6 Precipitation for the Past 10 Years (mm)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jan.	41.72	51.22	98.24	4.00	53.45	53.53	10.09	39.95	12.36	72.56
Feb.	49.53	46.35	28.93	20.91	31.92	16.06	19.76	28.61	23.88	23.98
Mar.	16.48	43.43	3.92	39.86	2.36	10.83	11.64	0.52	35.42	80.23
Apr.	18.65	4.64	12.67	1.34	11.43	3.82	6.28	25.74	5.36	5.45
May	10.50	1.85	13.40	59.42	2.27	2.68	0.41	11.64	2.98	3.18



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jun.	0.41	0.41	0.00	4.01	0.51	2.27	0.00	3.30	3.61	0.41
Jul.	0.00	0.00	0.40	0.93	0.00	0.00	0.00	0.00	0.00	0.00
Aug.	0.20	0.00	0.00	0.30	0.62	0.00	0.00	0.20	0.10	0.00
Sep.	6.38	0.41	4.12	1.14	3.71	0.00	0.00	1.54	0.31	0.00
Oct.	4.43	19.66	10.59	20.69	13.36	2.17	2.27	29.66	14.73	1.14
Nov.	42.22	50.66	38.42	22.97	6.91	1.54	6.99	21.92	2.37	29.77
Dec.	15.34	34.26	110.28	3.71	16.57	28.73	7.32	36.98	33.05	12.25
Total	205.86	252.89	320.97	179.28	143.11	121.63	64.76	200.06	134.17	231.67

Source: The Global Historical Weather and Climate Data



Source: The Global Historical Weather and Climate Date

Figure 1-1 Monthly Average Precipitation for the Past 10 Years

In Jenin, the annual precipitation varies from year to year, but the average annual precipitation for the past 10 years has been 185mm, which is lower than the average precipitation for the entire Palestinian region. The northern region of Palestine has a Mediterranean climate, and even in Jenin, there is precipitation during the winter months. Monthly average precipitation data shows that rainfall is concentrated from November to March, during the rainy season, with most of the annual rainfall occurring during this period. On the other hand, the period from June to September, corresponding to the summer months, is mostly dry with very little rainfall, constituting the dry season.

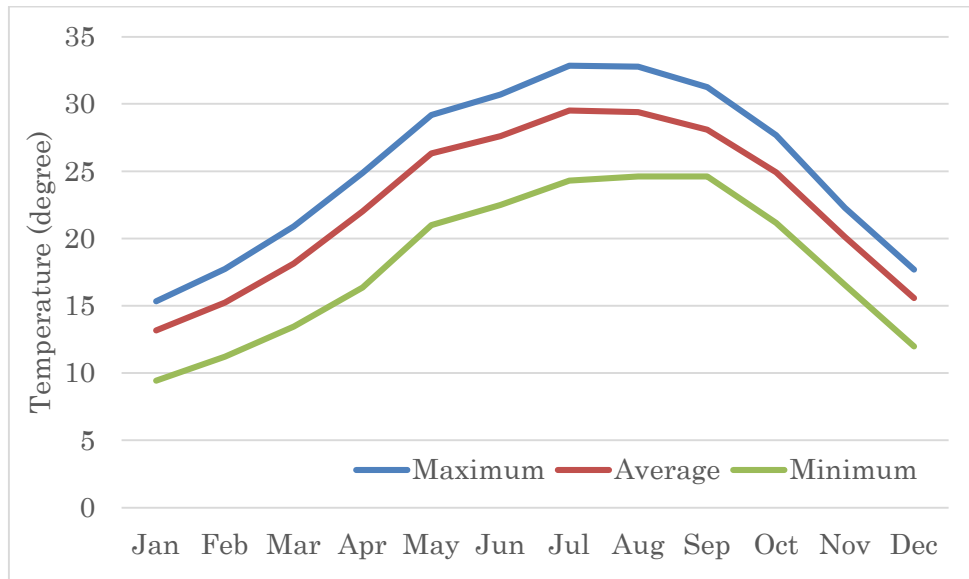
## (2) Temperature

Table 1-7 and Figure 1-2 present the average temperatures for the past 10 years from 2011 to 2020 in the city of Jenin.

Table 1-7 Monthly Temperatures for the Past 10 Years (°C)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max.	15.4	17.7	20.9	24.9	29.2	30.7	32.9	32.8	31.3	27.7	22.3	17.7
Ave.	13.2	15.2	18.1	22.0	26.3	27.6	29.5	29.4	24.9	24.9	20.1	15.6
Min.	9.4	11.2	13.4	16.3	21.0	22.5	24.3	24.6	21.2	21.2	16.5	12.0

Source: The Global Historical Weather and Climate Data



Source: The Global Historical Weather and Climate Data

Figure 1-2 Average Temperature for the Past 10 years

The average temperature in Jenin throughout the year is 22.5°C, with a monthly average high temperature of 29.5°C in July and a monthly average low temperature of 13.2°C in January. Maximum temperatures, exceeding 30°C on average per month, occur during the summer months from June to September. Conversely, during the winter, temperatures can drop below freezing, resulting in a significant temperature difference due to the dry climate.

#### 1-4-2 Natural Conditions Survey

To use as foundational information for the outline design, the following surveys were carried out through subcontracting: topographic survey, geotechnical survey, underground utilities survey, and trial pit survey. The summaries of each survey are outlined below.

##### (1) Topographic Survey

###### 1) Objective

For the design and cost estimation of the proposed facilities, a topographic survey of the major water supply facilities of Jenin municipality, as well as the pipeline route, was conducted.

###### 2) Scope

Type	Site	Quantity
Profile and plane survey	Pipeline route	70 km
Plane survey	Al Saadeh Well	0.2 ha
Plane survey	Al Marah Service Reservoir	0.2 ha
Plane survey	Al Jabreyat Service Reservoir	0.2 ha
Plane survey	Al Mechanic Well	0.1 ha

###### 3) Results

The results of the survey were utilized in creating outline design drawings for the planned facilities and routes.

(2) Geotechnical Survey

1) Objective

A geotechnical survey was conducted to assess the geotechnical conditions of the proposed facility sites, in order to select the appropriate foundation types and reflect to the facility design.

2) Scope

Type	Site	Quantity
Boring survey	New service reservoir site	2 nos.

3) Results

The results of the geotechnical survey have not been utilized since it was concluded, as explained in the section 2-2-1-1 Basic Policy, that a new service reservoir will not be constructed.

(3) Underground Utilities Survey

1) Objective

The underground utilities survey was conducted along the proposed pipeline routes to verify the presence or absence of underground utilities and to incorporate this information into the pipeline design.

2) Scope

Methodology	Site	Quantity
Geophysical survey	Pipeline route	20 nos.

3) Results

The results of the underground utilities survey were utilized in the pipeline design for the proposed route.

(4) Trial Pit Survey

1) Objective

Jenin city includes flatland and hilly terrain with exposed bedrock in the hilly areas. For the design and cost estimation of the proposed facilities, a trial pit survey was conducted at selected points throughout the entire water supply area.

2) Scope

Methodology	Size	Quantity
Trial pit excavation	W1.0m x L1.0m x H2.0m	36 nos.

3) Results

The results of the trial pit survey were utilized in determining the excavation methods for pipeline construction and in calculating the construction duration.

### 1-4-3 Social Conditions

The social conditions survey was conducted through subcontracting with the aim of understanding the awareness, living conditions, and other social aspects of the residents in the project area. The results of the social conditions survey are summarized below.

#### 1-4-3-1 Overview

The following is an overview of the social conditions survey conducted as part of the preparatory survey.

Survey Target	Residents of the areas expected to benefit from this project
Survey Method	Individual household interviews conducted using questionnaires
Survey Period	August 9th to 16th, 2022
Conducted by	Local subcontractors
Sample Size	201 households (Water users: 170 households, Non-water users: 31 households)
Survey Items	Water usage status and household demographics Current water supply conditions and satisfaction Awareness regarding water meters Intentions regarding water bill payments Requests and preferences for water and sewage services

The social conditions surveys were also conducted in the JICA Technical Assistance Project. These results are compared with the results of the social conditions survey in this preparatory survey. The overview of the social conditions surveys (baseline and endline surveys) conducted in the Technical Assistance Project is provided below:

Survey	Contents
Baseline Survey	Target: Pilot Area 1 (PA1) Survey Period: October 22nd to October 28th, 2017 Sample Size: 124 households (Water users: 124 households)
	Target: Whole areas of the Jenin Municipality Survey Period: November 7th to 11th, 2017 Sample Size: 100 households (Water users: 91 households, Unserved household: 9 households)
Endline Survey	Target: Pilot Areas 1/2/3 (PA1/PA2/PA3) Survey Period: June 14th to July 13th, 2021 Sample Size: 108 households (Water users: 108 households)
	Target: Outside of the Pilot Areas Survey Period: June 24th to 26th, 2021 Sample Size: 20 households (Water users: 20 households)

#### 1-4-3-2 Water Use, Household Information

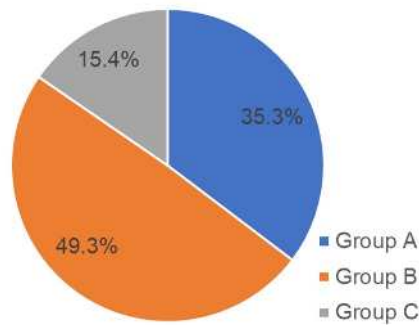
##### (1) Water Use

In the current jurisdiction of the Water and Wastewater Department of Jenin Municipality, there are two types of water meters in use: Pre-paid Water Meters (PPWM), introduced in JICA's Technical Assistance Project, where users pay for water usage in advance, and traditional post-payment meters (mechanical water meters), where users are billed based on their usage at a later date. Jenin Municipality plans to gradually replace the post-payment meters with PPWM. Additionally, there are areas within Jenin Municipality's jurisdiction where access to public water supply is not yet available. In this survey, the following three target groups were

classified:

- Group A: Existing water supply areas with PPWM
- Group B: Existing water supply areas with post-payment meters
- Group C: Areas without access to piped water supply

Figure 1-3 shows the composition ratios of each group. 84.6% of households receive water supply services from public water supply, while the proportion of households not receiving such services is 15.4%.

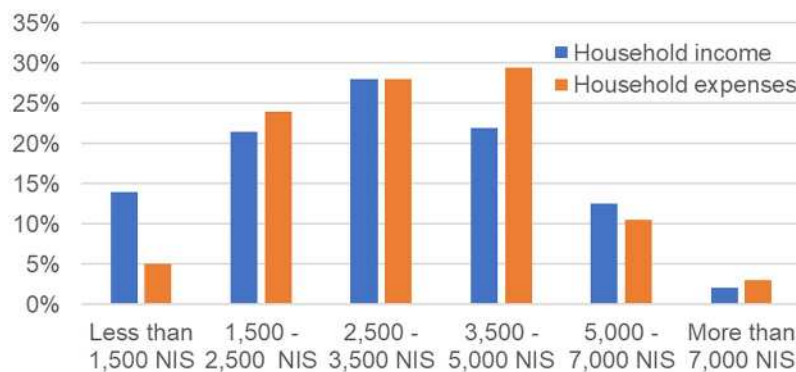


Source: Preparatory Survey Team

Figure 1-3 Ratio of Surveyed Household by Target Group

## (2) Household Income, Expenditure

Figure 1-4 illustrates the distribution of monthly household income and expenditure. The distribution of monthly household income shows that the majority, 28.0%, falls within the range of 2,500-3,500 NIS, while 35.5% have incomes below 2,500 NIS. On the other hand, the distribution of monthly household expenses shows that the highest proportion, 29.5%, falls within the range of 3,500-5,000 NIS, indicating an overall trend of expenses exceeding income.



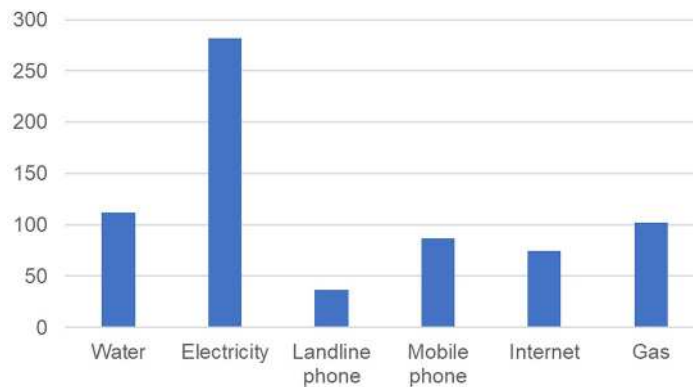
Source: Preparatory Survey Team

Figure 1-4 Household Income and Expenses

## (3) Water Expenditure

Figure 1-5 displays the monthly average expenditure for each public utility service for all households. Water

expenditure is the second-largest expense after electricity, with an average monthly water expenditure of 112 NIS per household. It is estimated to account for approximately 3-4% of the income for the surveyed households.



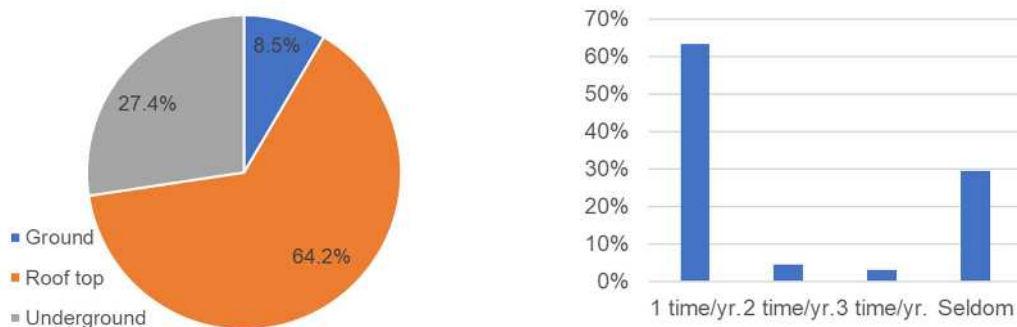
Source: Preparatory Survey Team

Figure 1-5 Monthly Average Expenditure for Public Utility Service

The average monthly water expenditure for households in the non-piped water supply areas (Group C) is 90 NIS, which is not significantly higher compared to the existing water supply areas. However, in the existing water supply areas (Group A/B), approximately 47.1% of households also reported purchasing water from private vendors, indicating a significant reliance on sources other than public water supply.

#### (4) Water Storage Tank

Since water supply hours are intermittent in Jenin, storage tanks are installed in all residential houses. Regardless of water service areas (Group A/B) or non-service areas (Group C), all households visited during the social conditions survey are equipped with their own storage tanks. These storage tanks come in different forms, including above-ground, rooftop, and underground tanks. Figure 1-6 illustrates the types of storage tanks and their cleaning frequencies.



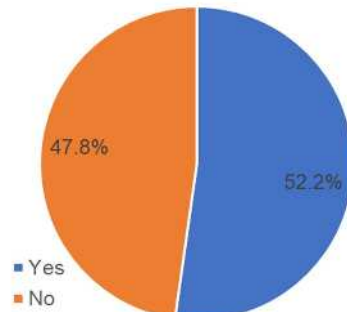
Source: Preparatory Survey Team

Figure 1-6 Type of Storage and Cleaning Frequencies

While 71% of households clean their storage tanks at least once a year, 29% of households clean them less frequently, increasing the possibility of contamination in the storage tanks.

(5) Sewerage Connection

The ratio of household connected to the sewerage system is shown in the Figure 1-7



Source: Preparatory Survey Team

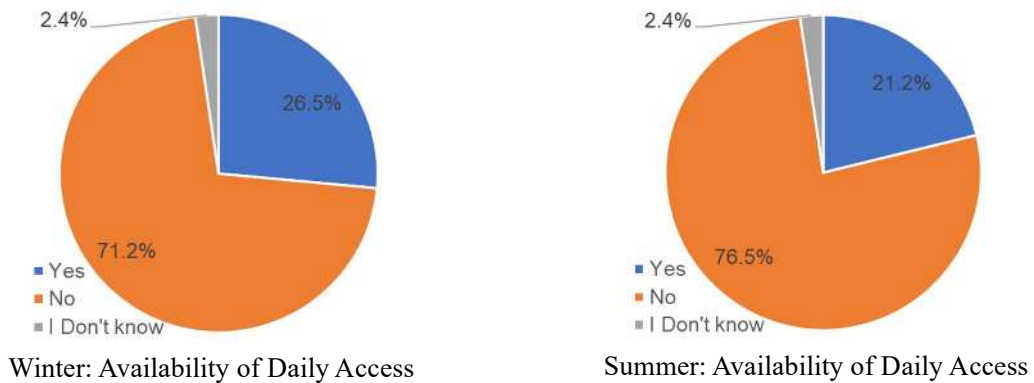
Figure 1-7 Households Connected to the Sewerage System

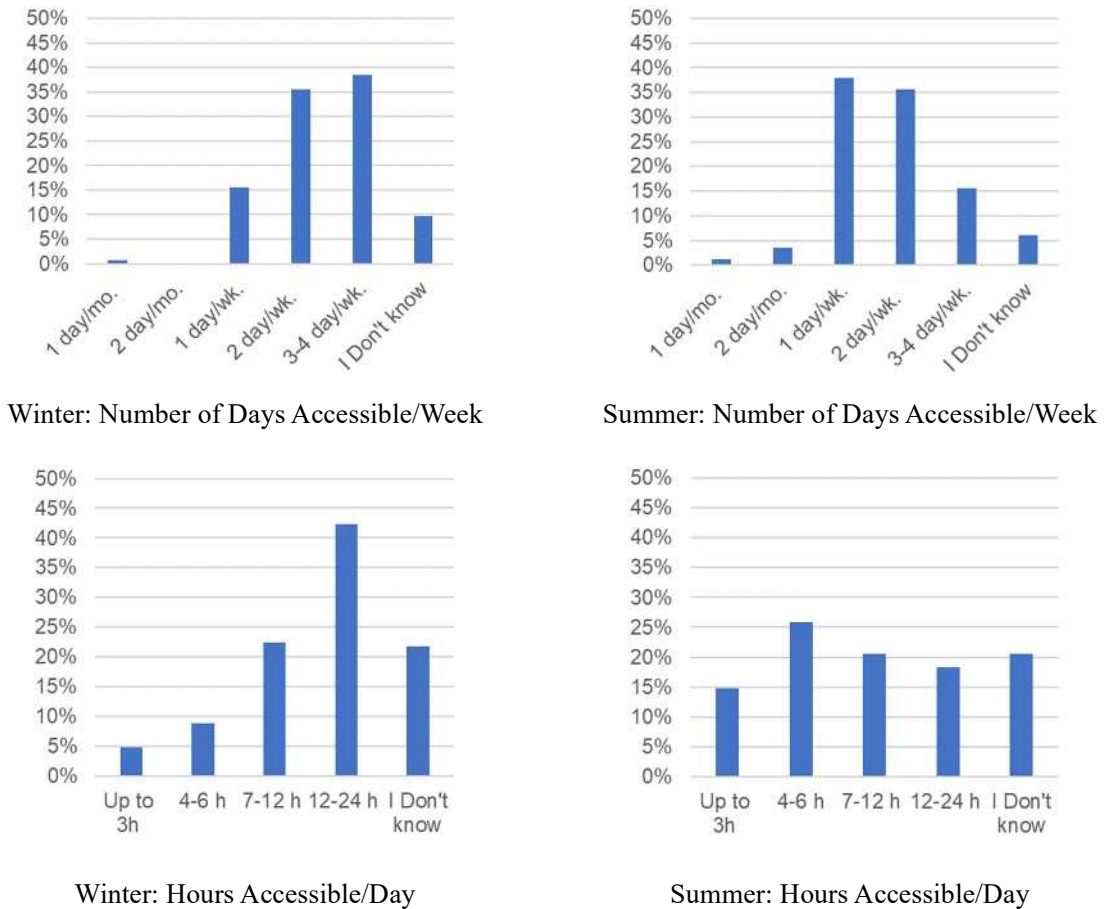
52.2% of the households were connected to sewerage services, while 47.8% of the unconnected households used septic tanks. 12 out of 201 households answered having waterborne diseases in their households in the past 3 months, which required an expenditure of NIS 100-300 for treatment.

**1-4-3-3 Water Supply Situations and Satisfaction**

(1) Water Supply Hours

Figure 1-8 illustrates the access to water supply services in the existing water supply areas (Group A/B) during the winter and summer seasons.





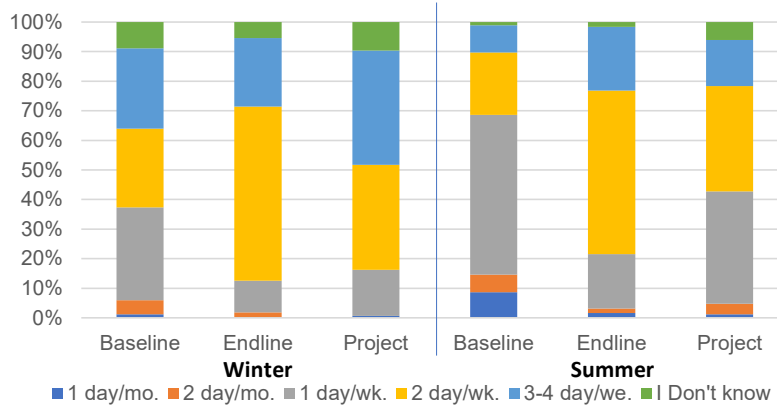
Source: Preparatory Survey Team

Figure 1-8 Access to Water Supply Service

The percentage of households with daily access to water supply services is 26.5% during the winter and 21.2% during the summer. Regarding the number of days with access, 74.1% of respondents reported having access 2-4 days a week during the winter, while 73.5% reported having access 1-2 days a week during the summer. Furthermore, in terms of hours of access, 12-24 hours per day is the most common response during the winter (42.4%), while 4-6 hours per day is the most common response during the summer (25.9%). Jenin experiences increased water demand during the summer, resulting in a deterioration of access to water supply services.

Figure 1-9 shows comparisons of the results of access to water supply services between this preparatory survey and the previous Technical Assistance Project (baseline and endline surveys).





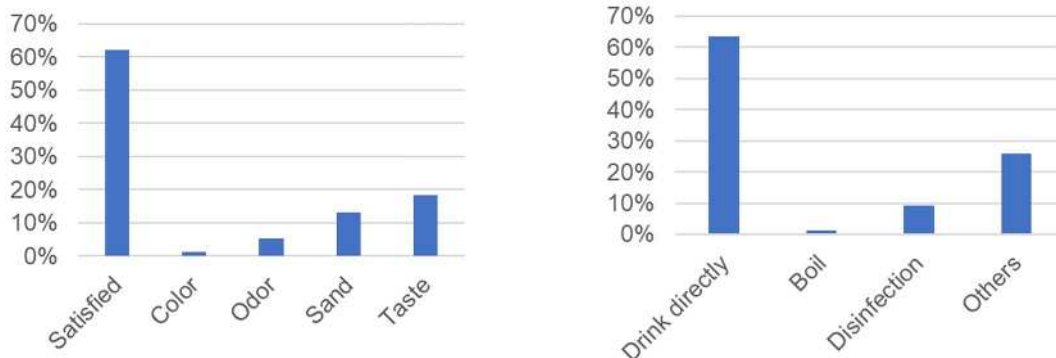
Source: Preparatory Survey Team

Figure 1-9 Comparison of Access to Water Supply Services

The results imply an improvement in the number of days with access per week during both winter and summer seasons compared to the baseline survey conducted during the Technical Assistance Project.

## (2) Water Quality

Figure 1-10 presents residents' awareness of water quality and the usage of tap water as drinking water in the existing water supply areas (Group A/B).



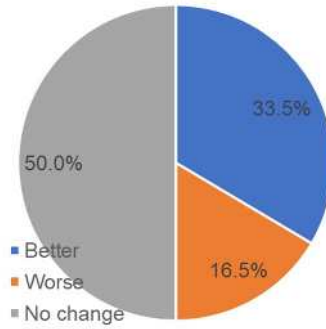
Source: Preparatory Survey Team

Figure 1-10 Awareness of Water Quality

62.1% of households are satisfied with water quality, and 63.5% of households use tap water directly as drinking water. Therefore, it can be inferred that households satisfied with water quality use tap water directly as drinking water. On the other hand, the remaining 36.5% of residents are not satisfied with water quality and either boil or disinfect tap water for consumption or use bottled water for drinking.

## (3) Awareness of Water Supply Service

Figure 1-11 shows residents' awareness of the current water supply service conditions in Jenin in the existing water supply areas (Group A/B).



Source: Preparatory Survey Team

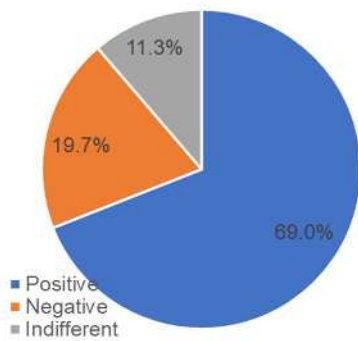
Figure 1-11 Awareness of Water Supply Service

50.0% of households responded that the water supply service conditions have remained unchanged. However, 35.5% of households reported improvements, while 16.5% stated that conditions had deteriorated. Considering that water facilities of Jenin Municipality have not implemented major construction projects, especially those requiring significant investment in the recent years, it is likely that many residents perceive that the water supply service conditions have remained unchanged from their perspective.

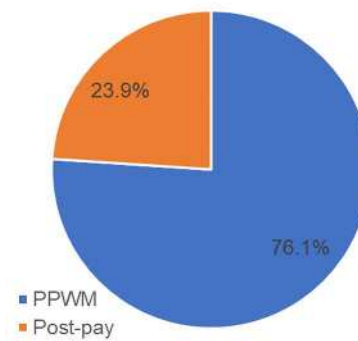
**1-4-3-4 Awareness of Water Meters**

**(1) Pre-Paid Water Meters (PPWM)**

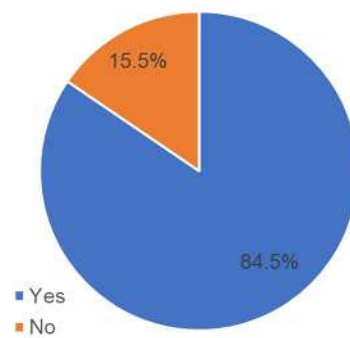
A survey on resident awareness and satisfaction regarding PPWM was conducted in the existing water supply areas using PPWM (Group A). Figure 1-12 illustrates the awareness and recognition of PPWM.



Resident Awareness of PPWM



Meter Selection



Approval for Introducing PPWM

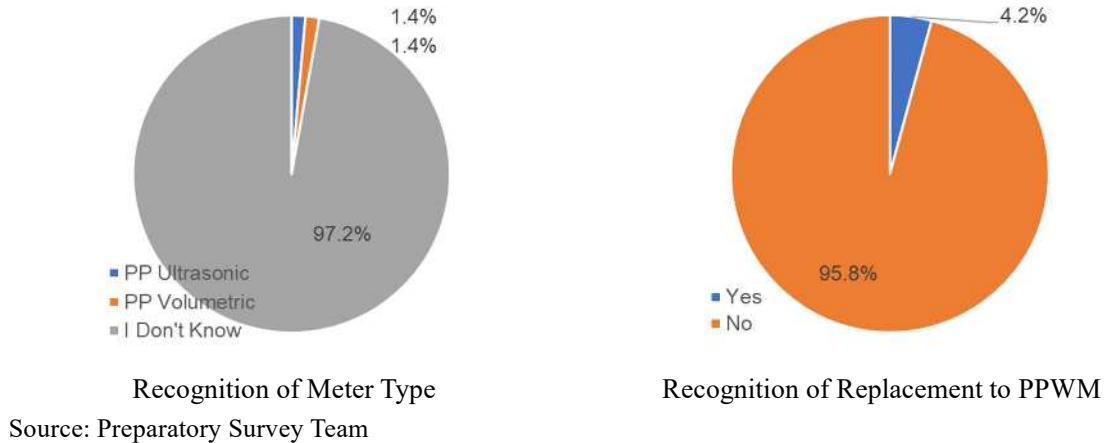


Figure 1-12 Awareness and Recognition of PPWM

The majority of households (69.0%) currently using PPWM have a positive opinion. Additionally, 77.1% prefer PPWM over conventional postpaid meters, and 84.5% approve of replacing all households to prepaid meters in the future. However, 97.2% of households do not recognize the meter type they are using, and 95.8% do not recognize the advantages of PPWM.

In the pilot area (PA1) where JICA Technical Assistance Project introduced PPWM, another social condition survey was conducted in October 2017 as part of the baseline survey. Figure 1-13 shows the awareness of PPWM in the pilot area before their introduction under the Technical Assistance Project.

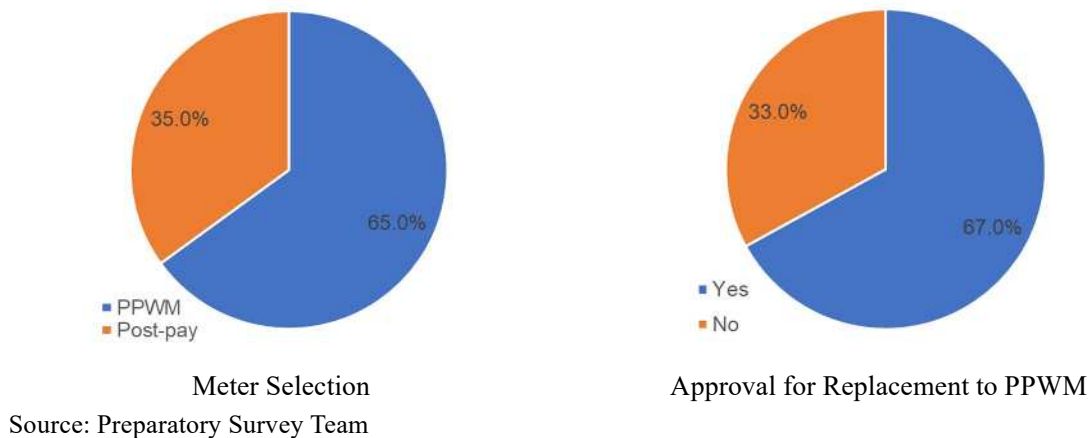
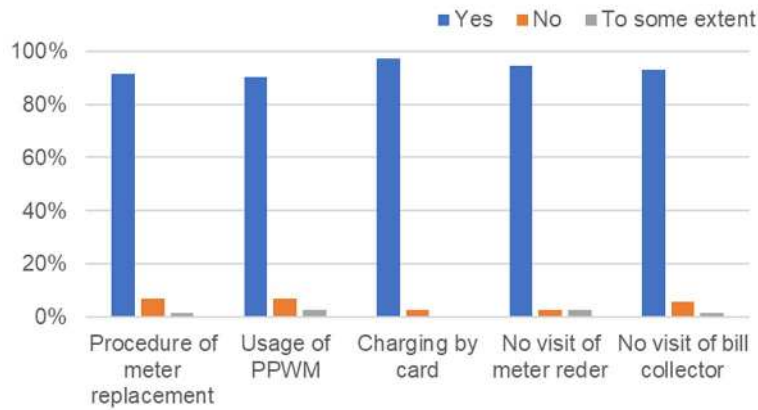


Figure 1-13 Awareness and Recognition of PPWM (Results of the Technical Assistance Project)

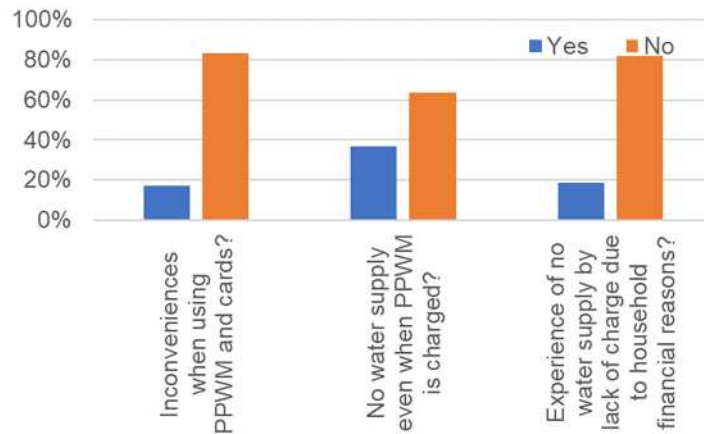
When comparing the results between this preparatory survey and the baseline survey of the Technical Assistance Project, the percentage of households favoring PPWM increased from 65.3% before their introduction to 77.1% after using them for three years. Similarly, the percentage of households in favor of replacing to prepaid meters increased from 66.9% before introduction to 84.5% after their introduction. This implies that households have increasingly supported PPWM meters after experiencing their advantages and convenience. The satisfaction of residents with PPWM is shown in Figure 1-14



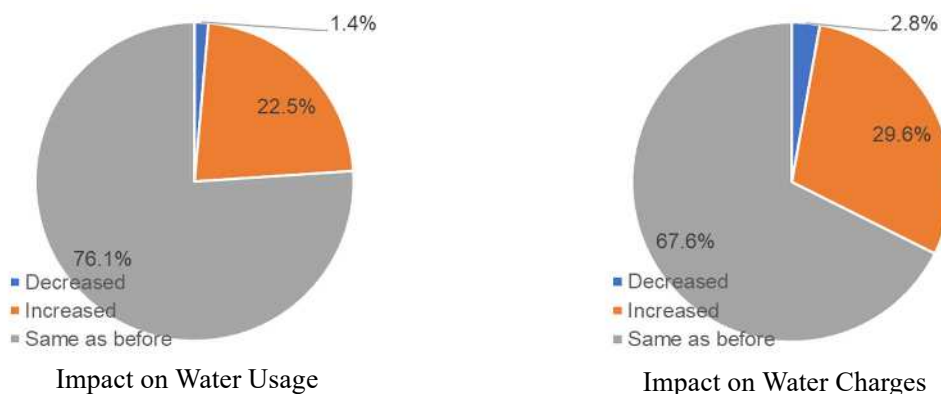
Source: Preparatory Survey Team

Figure 1-14 Satisfaction with PPWM

Over 90% of households using PPWM are satisfied with all aspects, indicating high customer satisfaction. Figure 1-15 shows the issues, difficulties, inconveniences, and impacts on water usage and water charges associated with PPWM.



Usage of Prepaid Water Meters



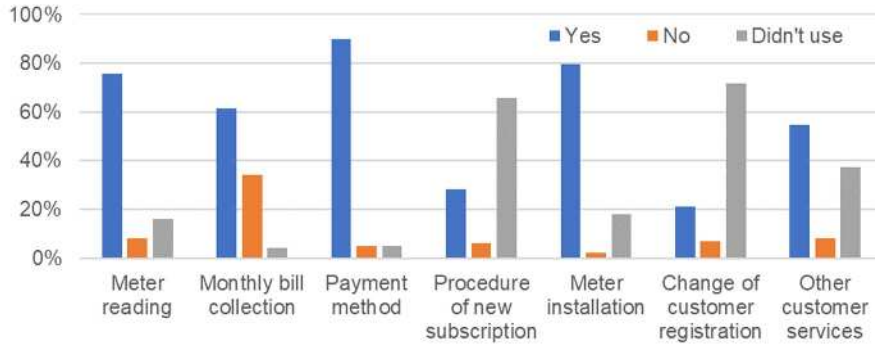
Source: Preparatory Survey Team

Figure 1-15 Issues, Difficulties, Inconveniences, and Impacts associated with PPWM

While 83.1% of households reported having no issues with PPWM, 18.3% mentioned they could not pay water charges due to financial reasons, resulting in a lack of water supply. Regarding water usage and water charges, most households reported no changes after meter replacement. However, there was a decrease in the number of households reporting an increase in water usage or charges after the meter replacement.

(2) Postpaid Water Meters

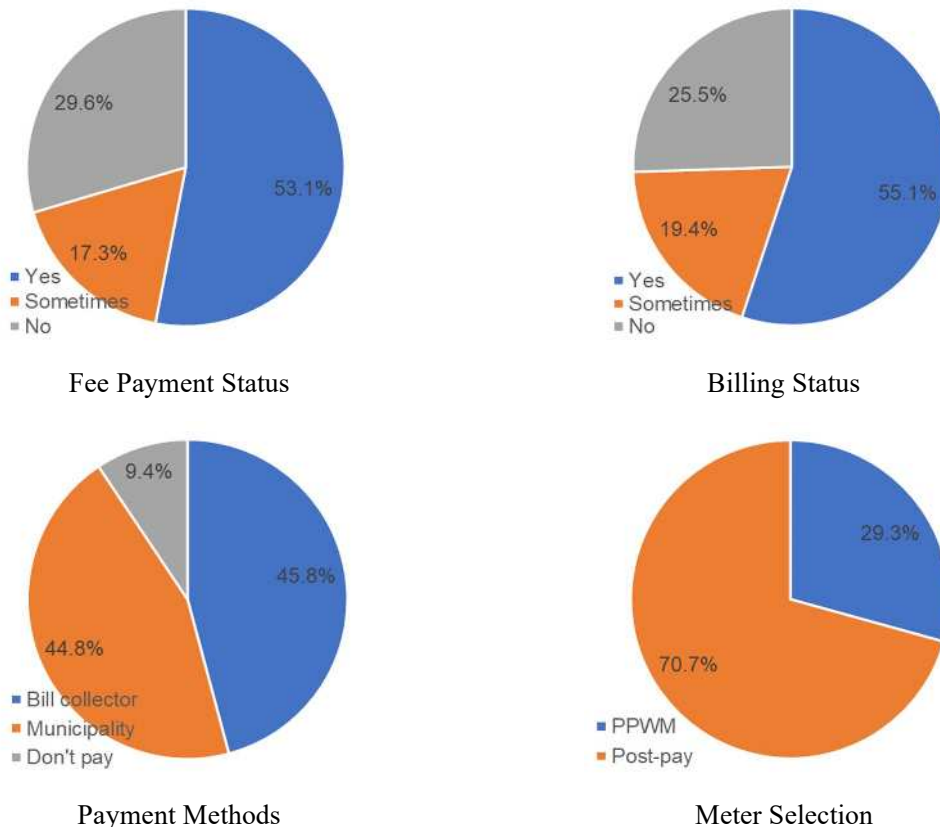
A survey on resident awareness and satisfaction regarding conventional postpaid water meters was conducted in the existing water supply areas using postpaid meters (Group B). Figure 1-16 shows customer satisfaction with postpaid meters.



Source: Preparatory Survey Team

Figure 1-16 Customer Satisfaction with Postpaid Meter

The proportion of households satisfied with postpaid meters is higher than the proportion dissatisfied for all aspects except monthly fee collection, where 34.3% of households expressed dissatisfaction. This dissatisfaction may be due to the burden of payment procedures, as indicated in Figure 1-17



Source: Preparatory Survey Team

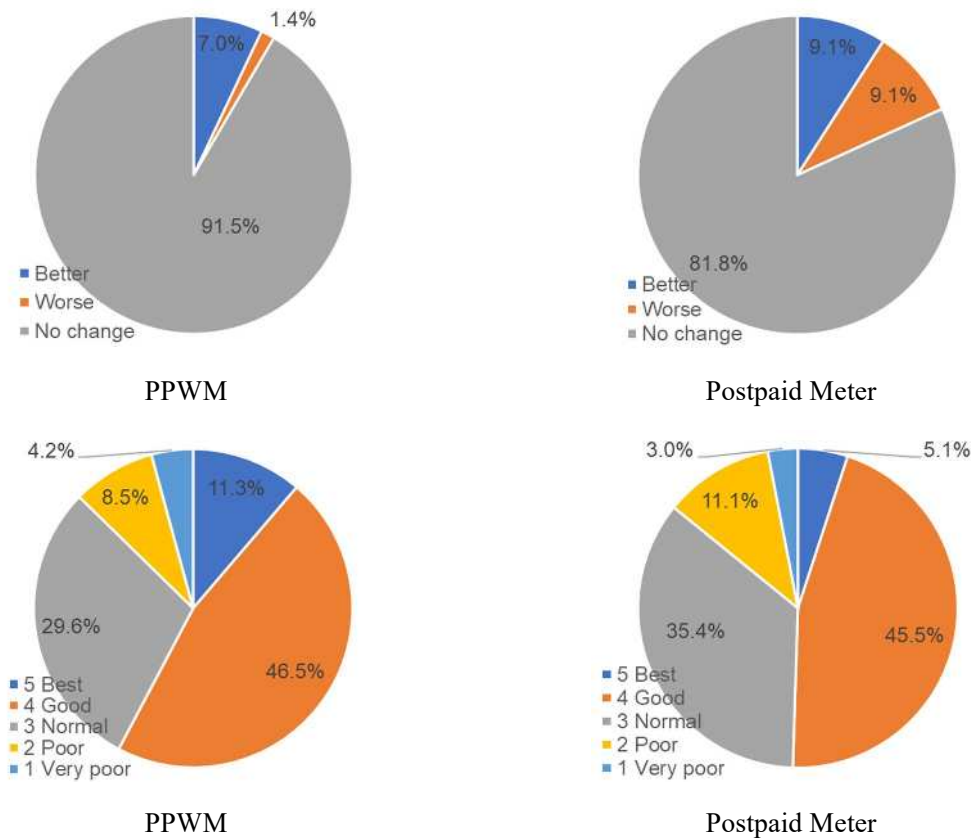
Figure 1-17 Awareness of Postpaid Water Meters

Approximately 46.9% of households do not pay water charges every month, and 9.4% of households reported

not paying water charges at all. This indicates a low willingness to pay among some households, potentially affecting the bill collection rate. Therefore, the replacement of postpaid meter with PPWM can be an effective solution to improve bill collection rates. However, 70.7% of households currently using postpaid meters prefer them over PPWM, indicating a tendency to favor the existing meter type they are satisfied with.

(3) Impact of Meter Type on Customer Satisfaction

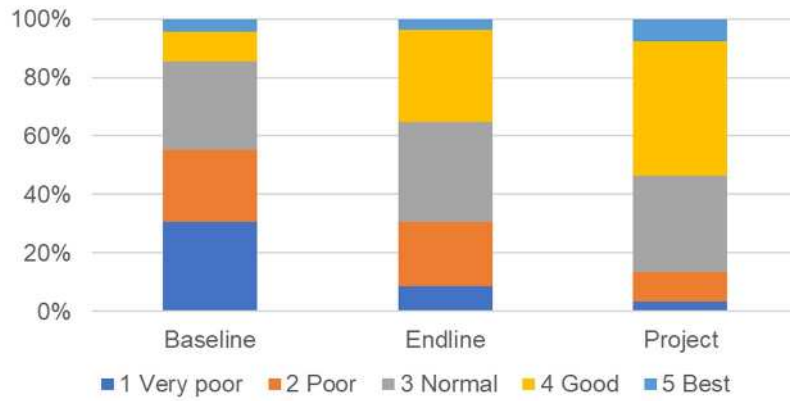
Figure 1-18 shows resident awareness and satisfaction with water supply services in Jenin in recent years based on meter type in the existing water supply areas (Group A/B).



Source: Preparatory Survey Team

Figure 1-18 Customer Satisfaction by Type of Water Meter

Regardless of the meter type, the majority of households reported that water supply service conditions have not changed from previous years. However, in the evaluation of satisfaction on a 5-point scale, Group A (prepaid meters) had higher satisfaction rates (57.8% Best/Good and 12.7% Poor/Very poor) compared to Group B (postpaid meters), where 50.6% were satisfied and 14.1% were dissatisfied. This indicates that PPWM are associated with higher customer satisfaction rates. Figure 1-19 compares the satisfaction results between this preparatory survey and the Technical Assistance Project's baseline and endline surveys.



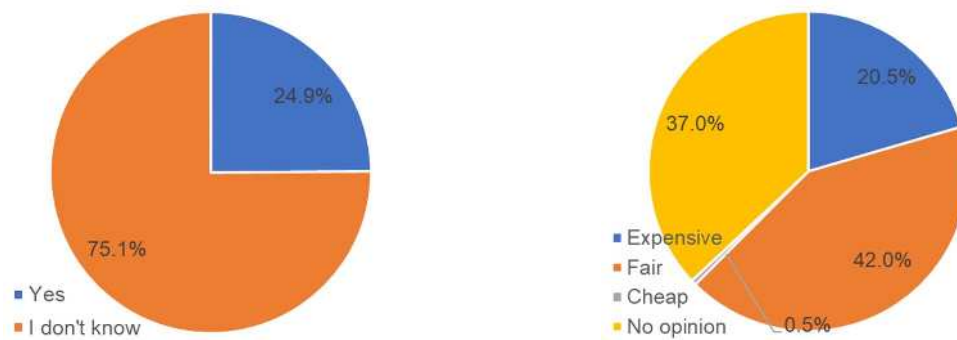
Source: Preparatory Survey Team

Figure 1-19 Comparison on Customer Satisfaction

The results show an improvement in the evaluation of satisfaction on a 5-point scale regarding water supply services from the baseline survey of the Technical Assistance Project to the preparatory survey.

### 1-4-3-5 Willingness to Pay Water Charges

Figure 1-20 shows the recognition and opinion of water tariff in Jenin.

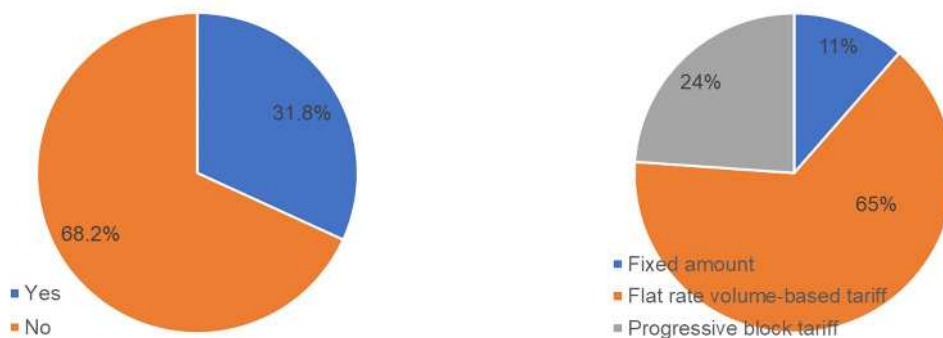


Source: Preparatory Survey Team

Figure 1-20 Recognition and Opinion of the Water Tariff

The specific tariff prices are not recognized by the majority, with 75.1% of households lacking awareness. However, in the opinions of the residents, 42.0% of households consider the prices fair, and 20.5% perceive them as high.

Figure 1-21 shows residents' willingness to pay for improved water supply services and their opinion of the water tariff system.



Source: Preparatory Survey Team

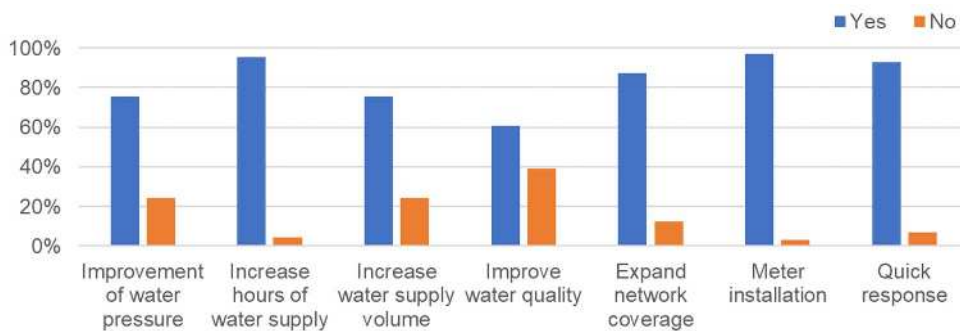
Figure 1-21 Willingness to Pay and Opinion of the Water Tariff System

31.8% of households express a willingness to pay for improved water supply services, while 68.2% state that they are not willing to pay more than the current prices. Additionally, 65.0% of households consider a flat rate volume-based tariff system, regardless of water consumption, to be appropriate.

### 1-4-3-6 Demands for Improved Water and Sewerage Services

#### (1) Demands for Improved Water Services

Figure 1-22 illustrates residents' demands for improved water services in Jenin.



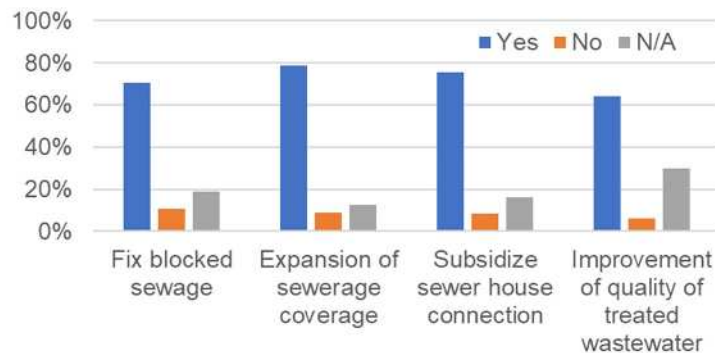
Source: Preparatory Survey Team

Figure 1-22 Demand for Improved Water Supply Services

For all aspects, the majority of households, over 60%, desire improvements. There are high demands for extended water supply hours (95.5%) and the installation of water meters (97.0%). This suggests that residents prioritize equitable access and improvements in water supply services, as these aspects have the highest priority.

#### (2) Demands for Improved Sewerage Services

Figure 1-23 shows residents' demands for improved sewerage services in Jenin.



Source: Preparatory Survey Team

Figure 1-23 Demand for Improved Sewerage Service

Similar to water services, over 60% of households express demands for improvements in all aspects.



Particularly, there are high demands for the expansion of sewerage areas (78.6%) and assistance with individual household connections (75.6%). This indicates a strong willingness to connect to the sewerage services for the improvement of hygiene and sanitation in the area.

## **1-5 Environmental and Social Considerations**

### **1-5-1 Environmental Impact Assessment**

The Project is classified as Category B in accordance with the "Japan International Cooperation Agency (JICA) Guidelines for Environmental and Social Considerations (April 2010)" (hereinafter referred to as "JICA Guidelines"). It is considered that the potential adverse environmental and social impacts are smaller than those of Category A, the impacts are limited to the project site itself, there are almost no irreversible impacts, and standard mitigation measures can be easily planned. However, the PWA will confirm the necessity of EIA or IEE with the Environmental Quality Authority (EQA) in accordance with domestic law, and after the scope of the project is determined, it will obtain official approval from the EQA as necessary.

The results of confirming what environmental and social considerations are required for the Project under Palestinian domestic law are as follows. Under the Palestinian Environmental Law (1999), the EQA is required to set standards and norms for collecting, treating, reusing, or disposing of waste and rainwater in an appropriate manner for environmental conservation and public health (Article 29). The law also stipulates that the EQA sets norms to determine which projects and areas are subject to environmental impact assessment. The EQA also creates a list of these projects and sets rules and procedures for environmental impact assessment.

Annex 1 of the Palestinian Environmental Impact Assessment Policy (2000) includes a list of 14 types of development projects (including the wastewater sector) that are required to undergo a full environmental impact assessment without conditions, but improvements to the water supply system like the Project are not included in this list. On the other hand, Annex 2 of the Environmental Impact Assessment Policy lists the following six items as criteria for reviewing projects that require an EIA:

1. Utilize natural resources.
2. Require the relocation of residents or communities.
3. Located near areas vulnerable to environmental impacts.
4. Have an impact on the environment.
5. Raise public concerns.
6. Require further development with significant impacts.

Since some components of the Project may fall under these, the Preparatory Survey Team explained the project plan to the head of the EQA Jenin branch, which has the legal authority and responsibility under the environmental law, and confirmed whether the Project requires an EIA and/or a Resettlement Action Plan (RAP) and approval by the EQA under domestic law (November 11, 2021). As a result, it was confirmed that EIA or IEE and approval by the EQA are not usually required for water supply projects, and that if a project like the Project receives foreign assistance and the assistant agency requires special environmental and social

considerations for the project, those requirements will be accepted. It should be noted that if the Project results in the acquisition of privately owned land or involuntary resettlement of residents, the procedure is governed by the Land Expropriation Law (1953), etc., and the EQA does not have the authority to approve it. As described later, it was confirmed that these social impacts do not occur in the Project.

Based on the above, the Survey Team conducted a survey on environmental and social impacts at the IEE level for the Project, which is classified as Category B in accordance with the JICA Guidelines. The results of the IEE survey conducted by local subconsultant are shown in Appendix 3, and the summary of the IEE results is shown below.

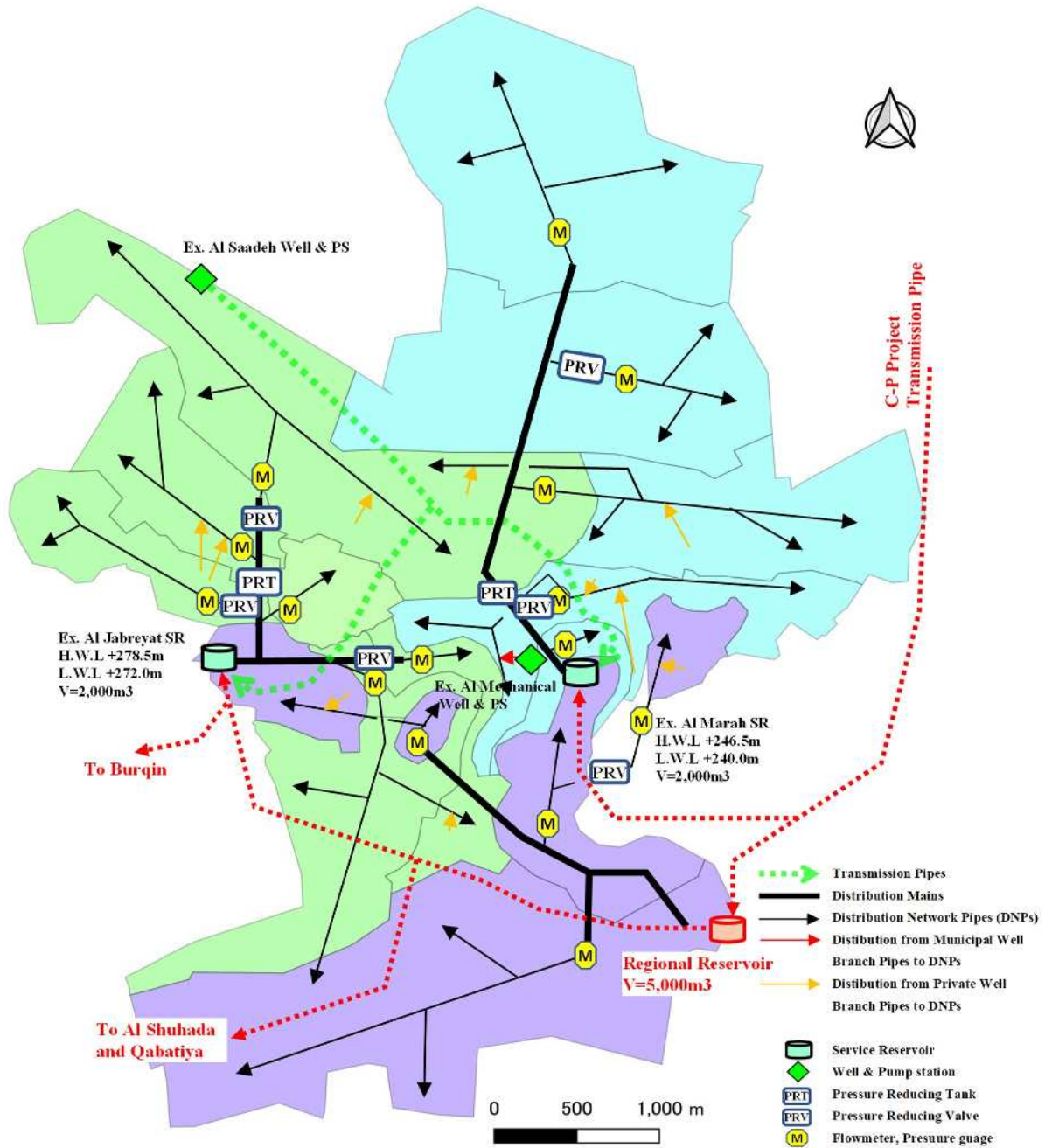
## **1-5-2 Environmental and Social Impact of the Project Components**

### **1-5-2-1 Project Name**

The Project for the Improvement of Water Supply System in Jenin

### **1-5-2-2 Target Area**

The map of the Project area is shown below.



Source: Preparatory Survey Team

Figure 1-24 Project Area

### 1-5-2-3 Facility Overview

The components of the Project are: (i) rehabilitation of existing municipality wells, (ii) rehabilitation of transmission pumps, (iii) rehabilitation of existing service reservoirs, (iv) installation of distribution mains (pipe length: 8.3 km), (v) replacement and new installation of water distribution networks (pipe length: 55 km), (vi) construction of DMA (Distribution Management Area), (vii) installation of pressure reducing devices, (viii) replacement of existing water supply connections, and (ix) introduction of SCADA system. The environmental and social impacts of all these components were examined.

### **1-5-3 Baseline Environmental and Social Conditions**

#### **1-5-3-1 Natural Environment**

##### **(1) Precipitation**

Refer to 1-4-1 (1).

##### **(2) Temperature**

Refer to 1-4-1 (2).

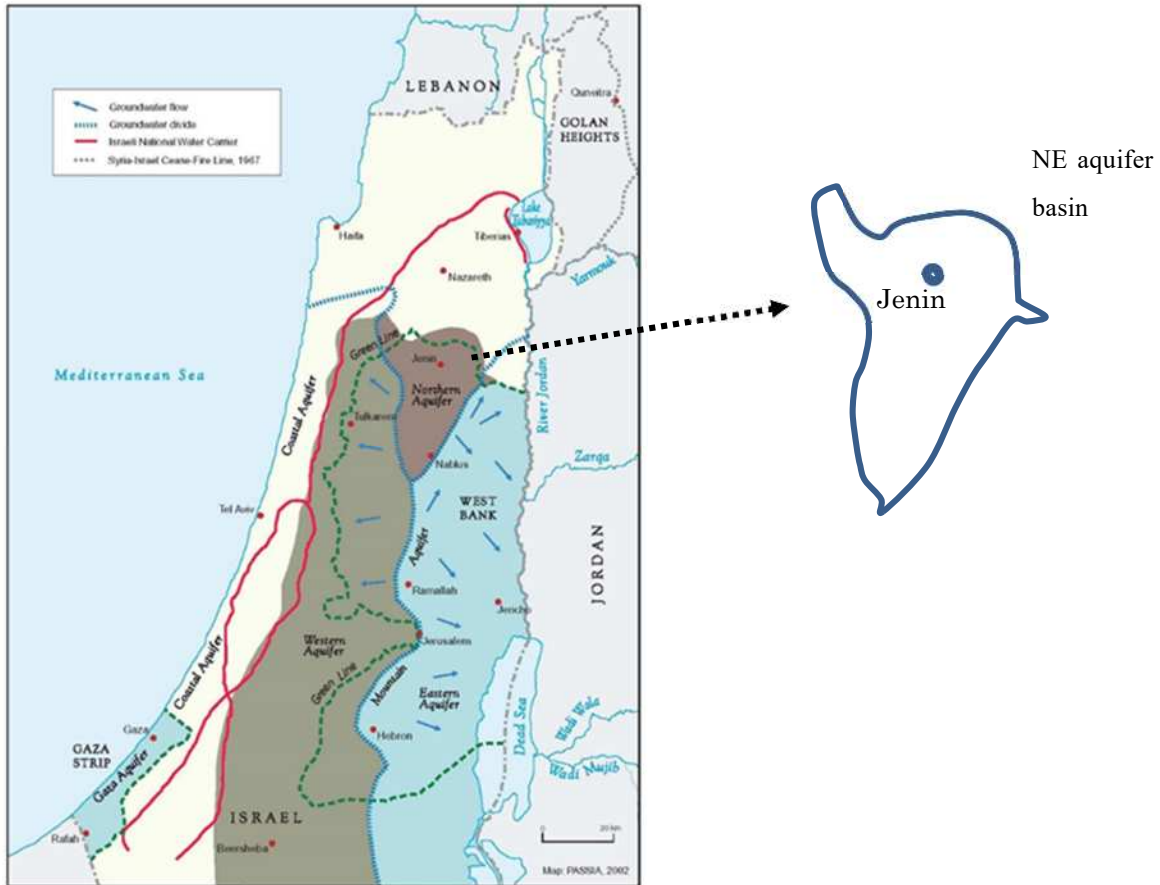
##### **(3) Topography and Geology**

Jenin municipality is located in the northernmost part of the West Bank and is characterized by its hilly terrain with significant undulation. The elevation of the Project Area varies significantly, ranging from approximately 105m to 300m. The southern side of Jenin consists of hilly areas, while the northern side, which includes the city center, is comprised of a plain. The geology of the Jenin has limestone bedrock in the slopes and near the tops of steep mountains.

##### **(4) Hydrogeology**

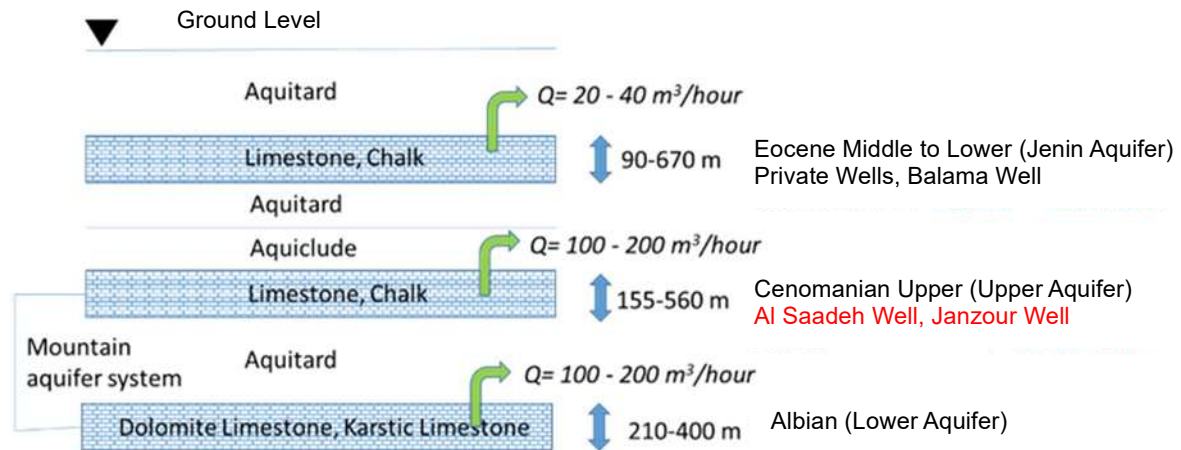
###### **1) Aquifer Classification and Groundwater Potential**

Jenin is located in the Northeast Aquifer Basin, as shown in Figure 1-25. It is estimated that the Northeast Aquifer Basin has an annual recharge to the groundwater estimated at 135-187 MCM (million m<sup>3</sup>), of which 123 MCM of groundwater is currently being exploited (PWA 2012). The main aquifers are the Tertiary aquifer and the Cretaceous aquifer as shown in Figure 1-26. Private wells and the Al Balama well draw water from the Tertiary aquifer, while the Al Saadeh well and the currently drilled Janzour well extract water from the Cretaceous layer. The groundwater development potential is about 20-40m<sup>3</sup>/h in the Tertiary aquifer and 100-200m<sup>3</sup>/h in the Cretaceous aquifer, which is deeper and has higher potential.



Source: Preparatory Survey Team based on “Palestinian Water Management – Policies and Pitfalls, Julie Trottier, HAL Open Science, 2019”

Figure 1-25 Groundwater Basin Classification



Source: Preparatory Survey Team

Figure 1-26 NE Aquifer Classification

## 2) Results of Investigation of existing wells

The survey results of the existing wells are shown in Table 1-8. The drilling depth and yield capacity of the private wells were estimated from the interview results. As can be seen from the table, all private wells and the Al Balama well extract shallow groundwater (Tertiary aquifer) at a rate of 15-50m³/h. The dynamic water levels in private wells have not been measured, and they were not constructed in a way that water level can

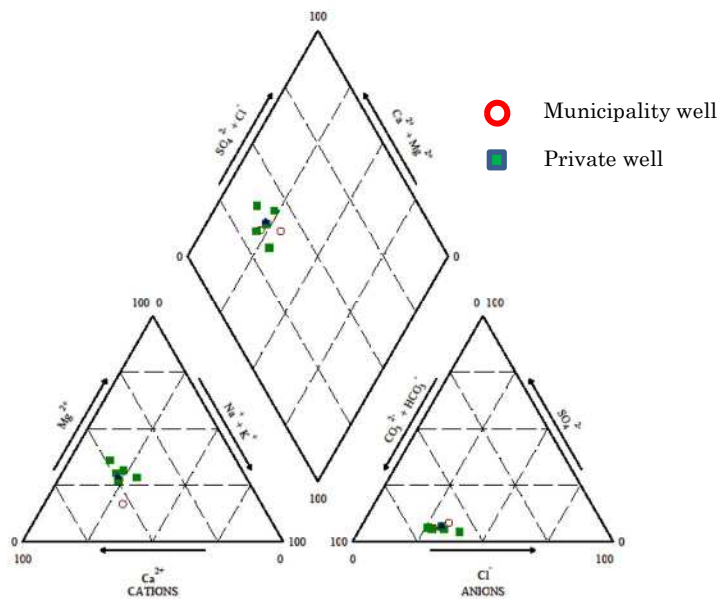
be measured with a water level meter.

Table 1-8 Existing Well Survey Results

Classification	Name	Depth (m)	Yield Capacity (m <sup>3</sup> /hour)	Aquifer	Remarks
Public Wells	Al Mechanic Well	20	30		It is a hand-dug well with a diameter of 2 m and does not draw water from the aquifer. High nitrate concentrations.
	Al Saadeh Well	885	102	Upper Cretaceous Period	Water quantity is decreasing; around 70% of the appropriate capacity for pumping in 2014.
	Balama Well	230	20	Tertiary Period	
Private Wells	Farathy Well	290	50	Tertiary Period	
	Qasrawi Well	350	30	Tertiary Period	
	Turkman Well	204	35	Tertiary Period	
	Abu Sameer Well	302	20	Tertiary Period	
	Abu Hatab Well No.1	230	50	Tertiary Period	
	Abu Hatab Well No.2	320	15	Tertiary Period	
	Ashraf Well	365	30	Tertiary Period	High nitrate concentrations.
	Alawneh Well	300	30	Tertiary Period	Registered Well. High nitrate concentrations.
	Jarrar Well	260	20	Tertiary Period	
	Ala Al Sadi Well	200	30	Tertiary Period	

Source: Preparatory Survey Team based on the information provided by WWD

The groundwater characteristics of the existing wells are shown in a trilinear diagram (Figure 1-27). All groundwater is classified as calcium bicarbonate type, indicating that groundwater is being recharged. It is evident that it is circulating groundwater.

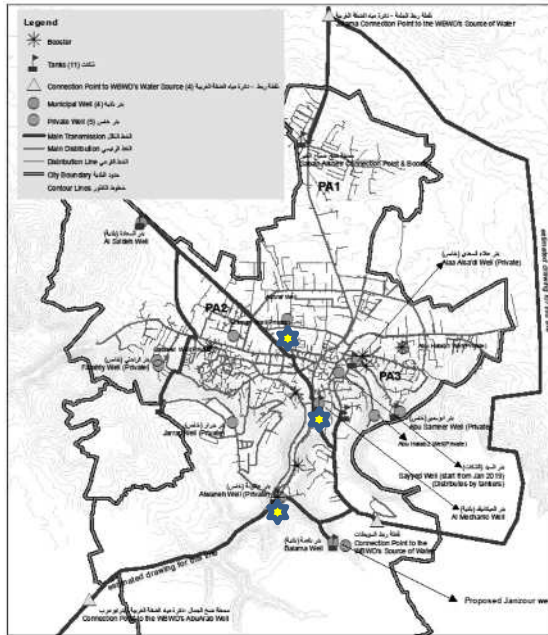


Source: Preparatory Survey Team

Figure 1-27 Groundwater Characteristics

The water quality of the existing wells showed that the concentration of nitrate nitrogen (NO<sub>3</sub>-N) exceeded the standard limits<sup>6</sup> in three wells of the Al Mechanic Well (municipal) at 67.2 mg/l, Ashraf Well (private) at 58.9 mg/l, and Alawneh Well (private) at 48.9 mg/l. The locations of the wells where nitrate nitrogen concentrations exceed the standard limits are shown in Figure 1-28.

In the Project, Ashraf Well and Alawneh Well will not be used, and water from Al Mechanic Well will be blended with water from other wells before distribution. As a result, the drinking water quality will not exceed the nitrate nitrogen drinking water quality standards.



- ★ Wells where NO<sub>3</sub> exceeded drinking water standards (50 mg/L)
- Al Mechanic well (Municipality well)
- Ashraf well (Private well)
- Alawneh well (Private well)

Source: Preparatory Survey Team

Figure 1-28 Wells with Nitrate Nitrogen Concentrations Exceeding Standard Values

### 1-5-3-2 Social Environment

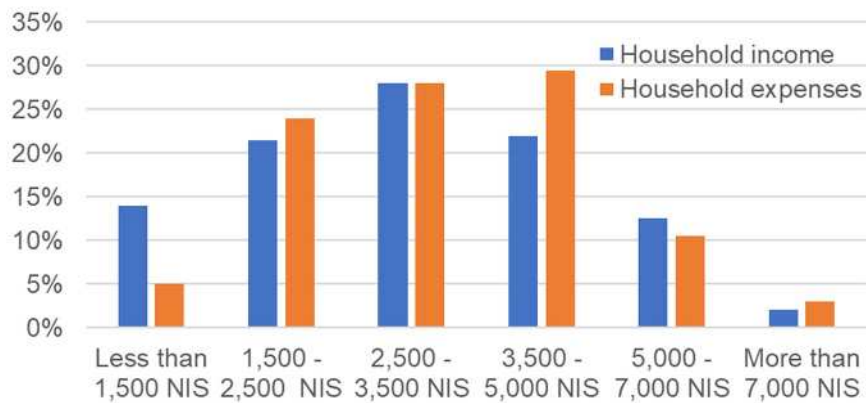
#### (1) Population

The latest census conducted in Palestine was carried out in 2017, indicating a population of 60,201 in Jenin municipality. This includes 10,417 people in the Jenin refugee camp. The population of Jenin is estimated to be 64,036 in 2020.

#### (2) Socioeconomic Conditions

The results of a social conditions survey conducted in August 2021 with 201 households in Jenin indicate the distribution of monthly household income and expenses. The distribution of monthly household income shows that the range of 2,500-3,500 NIS accounts for the largest portion, at 28.0%, and 35.5% is below 2,500 NIS. On the other hand, the distribution of monthly household expenses shows that the range of 3,500-5,000 NIS accounts for the largest portion, at 29.5%, indicating a general trend of expenses exceeding income.

<sup>6</sup> There are no specific values for nitrate nitrogen (NO<sub>3</sub>-N) in the drinking water quality standards in Palestine. However, WHO guidelines for Drinking Water Quality recommend that the concentration of nitrate nitrogen should be 50 mg/l or less.



Source: Preparatory Survey Team

Figure 1-29 Distribution of Household Income and Expenses

#### 1-5-4 Environmental and Social Consideration Systems and Organizations in the Recipient Country

##### (1) Overview of Palestinian Laws and Regulations related to Environmental and Social Considerations

To implement the Project in accordance with the laws and regulations applicable in Palestine, relevant laws, regulations, and guidelines have been reviewed. The main relevant laws and regulations are as follows:

- Palestinian Environmental Law (Law No. 7 of 1999)
- Palestinian Environmental Assessment Policy (2000)
- Palestinian Water Law (Law No. 3 of 2002)
- Land Expropriation Law (Law No. 2 of 1953)
- Palestinian Labour Law (Law No. 7 of 2000)
- Jordanian Law No. 51 on Antiquities (1966)
- Decree-Law No. 14 of 2018, amending the Agriculture Law (Law No. 2 of 2003) and its amendment
- Oslo II Accord (Articles 12 and 40)

##### (2) Gap between the Palestinian EIA System and JICA Guidelines

A gap analysis was conducted between the JICA Guidelines for Environmental and Social Considerations and Palestinian laws and regulations related to environmental and social considerations (Table 1-9). For the analysis of alternatives, public disclosure of EIA/IEE, stakeholder consultation, detailed scoping, information disclosure, and considerations for indigenous peoples required by JICA Guidelines, there are no specific provisions or more lenient regulations in Palestinian domestic laws and regulations. Therefore, the JICA guidelines will be applied to the Project concerning these issues. On the other hand, regarding considerations for ecosystems and biological communities, they are more detailed in the Palestinian Environmental Law and the ESIA and RAP TORs applied by PWA, so the Project will also follow these regulations.



Table 1-9 Comparison of JICA Guidelines with Palestinian Laws and Regulations

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
Underlying Principles	<p>1. Environmental impacts that may be caused by projects must be assessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.</p> <p>2. Such examinations must be endeavored to include an analysis of environmental and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social, and technical analyses of projects.</p> <p>3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.</p> <p>4. For projects that have a particularly high potential for adverse impacts or that are highly contentious, a committee of experts may be formed so that JICA may seek their</p>	<p>1.Environmental assessment should begin as early as possible since it is a means for both planning and evaluating development activities through all stages including decommissioning.</p> <p>2.Environmental assessment should specify measures for mitigating potential impacts, and for environmental monitoring and management, throughout the life of a development activity</p> <p>3. Proposed projects and extensions to existing projects for which an Environmental Impact Assessment must be conducted are listed in Annex 1.</p> <p>4. Depending on the complexity and scope of the project, an independent consultant may be retained to review the report and advise EQA.</p> <p>5. The consultant will evaluate all socio-economic costs.</p> <p>6. Wherever possible, the consultant will describe impacts quantitatively. In terms of environmental costs and benefits, and assign economic values when feasible.</p> <p>7. Predicted adverse environmental and social impacts for which mitigation is necessary should be identified and summarized. Effective measures to prevent or reduce significant negative impacts to acceptable levels during (i) construction and (ii)</p>	Alternative analysis is not stipulated in the domestic laws and regulations.	In this IEE study, analysis of alternative plans will be conducted among several options including the “without project” scenario.

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	opinions, in order to increase accountability.	operation. Estimate the impacts and costs of those measures.		
Information Disclosure	<p>1. In principle, project proponents etc. disclose information about the environmental and social considerations of their projects. Project proponents etc. disclose information well in advance when they have meetings with local stakeholders in an official or widely used language and in a form understandable by local people.</p> <p>2. EIA reports are required to be made available to the local residents of the country in which the project is to be implemented. The EIA reports are required to be available at all times for perusal by project stakeholders such as local residents and copying must be permitted.</p>	<p>1. Any individual has the right to Obtain the official information which is necessary for coming to know the environmental effects of any industrial, agricultural or constructional activity or other development programs according to the Law.</p> <p>2. The consultant will facilitate dissemination of information to relevant authorities and interested and affected parties (IAPs) concerning the proposed project NGOs and government departments and agencies that may have a stake in the Project and its effects should be consulted.</p>	<p>- In domestic laws and regulation, it obligates information disclosure if required by anyone and doesn't obligate the proponent to disclose information in case no one asked for it.</p> <p>- Nationally EIA reports aren't available to local residents but only to related ministries and institutions, and copying is not permitted.</p>	Disclose information in accordance with JICA guidelines.
Consultation with stakeholders and Social Acceptability	<p>1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project</p>	<p>1. Stakeholder consultation is an essential component of the EA Policy</p> <p>2. EA Committee shall ensure adequate scoping of environmental assessment studies</p> <p>3. Proponents are required to consult stakeholders during the scoping and conduct of Environmental Impact Assessments.</p> <p>4. The consultant will Prepare a Stakeholder Consultation Plan, providing an opportunity for the relevant authorities and IAPs to raise issues and concern pertaining to the proposed project and allow the identification of</p>	Stakeholder consultation during the implementation phase is not stipulated in the domestic laws and regulations.	Under JICA guidelines, this project is considered Category B and stakeholder consultations will be conducted as necessary. However, no land expropriation or involuntary resettlement is anticipated for this project.

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	<p>plans.</p> <p>2. In preparing EIA reports, consultations with stakeholders, such as local residents, must take place after sufficient information has been disclosed. Records of such consultations must be prepared;</p> <p>3. Consultations with relevant stakeholders, such as local residents, should take place, if necessary, throughout the preparation and implementation stages of a project. Holding consultations is highly desirable, especially when the items to be considered in the EIA are being selected, and when the draft report is being prepared</p> <p>In feasibility survey or master plan study for a project, for Category B studies, project proponents etc. consult with local stakeholders after the disclosure of scoping drafts when necessary. For Category B studies, consultations with local stakeholders after the disclosure of draft final reports are also conducted when necessary.</p>	<p>the additional alternatives and recommendations.</p> <p>5. Stakeholder consultation is optional when undertaking an IEE. In consultation with the proponent and the EA Committee as required, the Ministry determines whether stakeholder consultation is required and, if so, what the minimum requirements should be. It may be required during scoping and terms-of-reference preparation, and during the conduct of the IEE.</p>		
Scope of Impacts to be assessed	<p>1. The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and</p>	<p>1. Terms-of-reference (TOR) for an Initial Environmental Evaluation (IEE) are prepared by the Ministry on the advice of the EA Committee</p> <p>2. The TOR specify the minimum scope of any study. The proponent is responsible for defining the full scope of the study and for justifying it in the IEE Report</p>	<p>The impacts to be assessed are specified in more detail in the JICA Guidelines than in the domestic laws and regulations.</p>	<p>JICA guidelines shall be applied.</p>

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	<p>flora, including transboundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.</p> <p>2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project.</p>	<p>3. Strategic Environmental Assessment (SEA) is designed to address the cumulative and synergistic impacts of many projects in the same area.</p> <p>4. The Consultant shall analyse and describe all significant changes brought about by each facility/activity. These would encompass environmental, ecological and social impacts, both positive and negative, as a result of each facility/activity intervention that are likely to bring about changes in the baseline environmental and social conditions.</p> <p>5. The Consultant shall analyse and describe all occupational health and safety concerns brought about by activities during all the phases of the project. The Consultant shall make recommendations on corrective and remedial measures to be implemented under the environmental management plan.</p>		

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
Monitoring and Grievance Mechanisms	<p>1. After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results of such monitoring.</p> <p>2. In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans.</p> <p>3. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.</p> <p>4. When third parties point out, in concrete terms, that environmental and social considerations are not being fully undertaken, forums for discussion and examination of countermeasures are established based on sufficient information disclosure, including stakeholders' participation in relevant projects. Project proponents etc. should make efforts to reach an</p>	<p>1. Environmental assessment should specify measures for mitigating potential impacts, and for environmental monitoring and management, throughout the life of a development activity.</p> <p>2. EIA or IEE Report should include proposals for monitoring and managing likely impacts, especially those which affect local people</p> <p>3. Environmental Approval may specify Monitoring and reporting duties of the proponent.</p> <p>4. PWA shall have the right to inspect water resources and systems of supply, and any place where pollution is suspected and to enter any private or public property or building to accomplish this purpose in accordance with proper procedures.</p> <p>5. Any individual has the right to: Submit and follow up any complaint or judicial proceedings without looking into the private interest conditions against any natural or corporate person who causes a damage to the environment.</p> <p>6. The Consultant is required to give a specific description, and technical details, of monitoring measures for both ESMP and RAP, including the parameters to be measured, methods to be measured, methods to be Final TOR for SEIA and RAP used, sampling locations, frequency of measurements, definition of thresholds that will signal the need for corrective actions as well as deliver a monitoring</p>	<p>- Domestic laws and regulations don't require that the results of the monitoring process be available to local project stakeholders, it is just to PWA and or EQA.</p> <p>- In domestic laws and regulations, there are no third parties with the right to judge whether the project's environmental and social considerations were fully undertaken or not.</p>	<p>JICA guidelines shall be applied.</p>

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	<p>agreement on procedures to be adopted with a view to resolving problems.</p> <p>5. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.</p>	<p>and reporting procedure.</p>		
Ecosystem and Biota	<p>1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests.</p>	<p>1.It shall be prohibited for anyone to carry out any works, acts or activities which would lead to damaging the natural reserves, forest areas, public parks, archaeological and historical sites or touch on the aesthetic level of such areas.</p> <p>2. Identification of any species of special concern, namely species with conservation status or endemic to the area; commentary on conservation status of specific species; compilation of a broad scale vegetation or habitat map of the area indicating the extent to which the project would affect each vegetation or habitat type</p> <p>3. The Consultant will analyse Impacts in critical and non-critical habitats.</p>	<p>Domestic laws and regulations are more specific than the JICA guidelines.</p>	<p>Consistent with JICA guidelines and subject to more specific domestic laws.</p>
Indigenous Peoples	<p>1. Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous peoples for their losses.</p> <p>2. When projects may</p>	<p>1. Identify all affected people (e.g., people affected by construction activities and during operation) and will facilitate dissemination of information to relevant authorities and interested and affected parties (IAPs) concerning the proposed project NGOs and government departments and agencies that may have a stake in the Project and its effects should be</p>	<p>JICA Guidelines discusses and emphasises indigenous people rights in details since the very beginning of the project idea, and states the compensation right for them, while domestic</p>	<p>JICA guidelines shall be applied. However, this item does not apply to this project because no land expropriation or resettlement will occur and the presence</p>

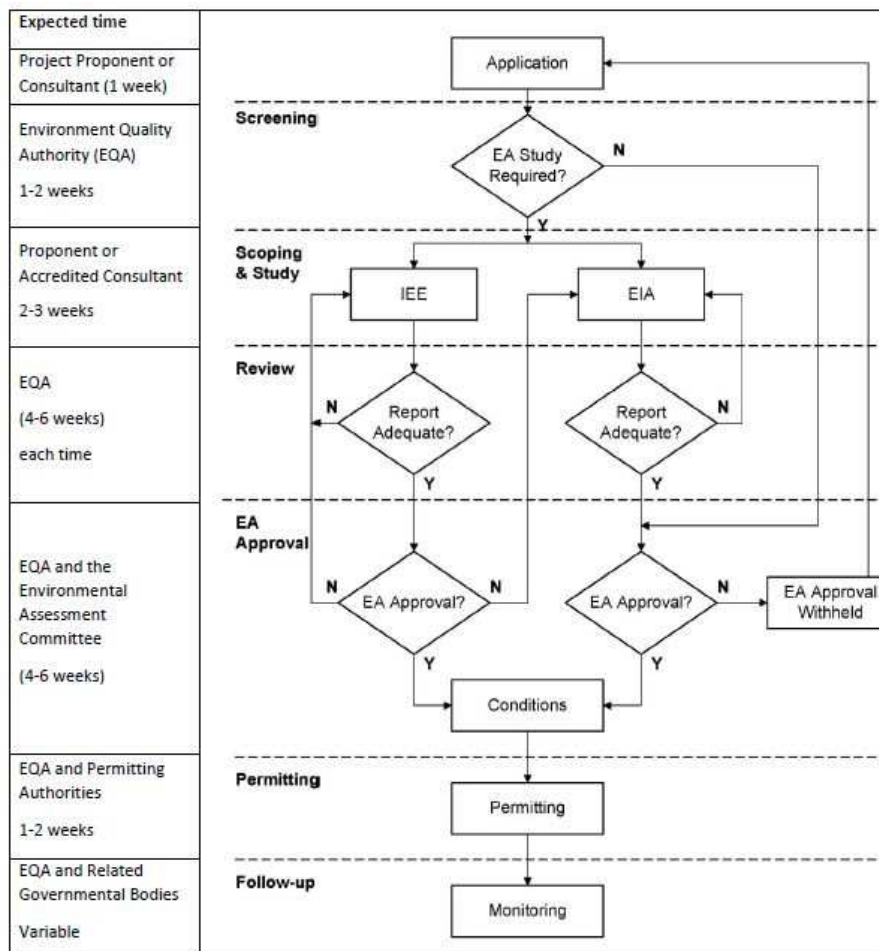
Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	<p>have adverse impacts on indigenous peoples, all of their rights in relation to land and resources must be respected in accordance with the spirit of relevant international declarations and treaties, including the United Nations Declaration on the Rights of Indigenous Peoples. Efforts must be made to obtain the consent of indigenous peoples in a process of free, prior, and informed consultation.</p> <p>3. Measures for the affected indigenous peoples must be prepared as an indigenous people's plan (which may constitute a part of other documents for environmental and social consideration) and must be made public in compliance with the relevant laws and ordinances of the host country. In preparing the indigenous peoples plan, consultations must be made with the affected indigenous peoples based on sufficient information made available to them in advance. When consultations are held, it is desirable that explanations be given in a form, manner, and language that are understandable to the people concerned. It is desirable that the indigenous peoples plan include the elements laid out in the World</p>	<p>consulted.</p> <p>2.Ensuring an adequate standard of life in all its aspects, and not negatively affecting the basic needs, and the social, cultural and historical values of people as a result of development activities.</p> <p>3. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects. Indicates the need for any resettlement plan or indigenous people's development plan.</p>	<p>laws and regulation don't cover this issue in details.</p>	<p>of indigenous peoples is not confirmed in the project area.</p>

Item	JICA Guidelines for Environmental and Social Considerations (2010)	Domestic laws and regulations (Environmental Law of 1999, TOR of ESIA and RAP by PWA in 2013, etc.)	Gaps	Gap filling measures
	Bank Safeguard Policy, OP4.10, Annex B.			

Source: The Preparatory Survey Team based on the IEE Report

### (3) EIA/IEE Procedures

In terms of institutional framework, the main governmental agencies that play major roles in the environmental and social considerations of the Project are the PWA and EQA. The PWA is authorized by Law No. 2 of 1996. The Palestinian Water Law (Law No. 3 of 2002) emphasizes the management of water resources, implementation of water policies, establishment of supervision and monitoring of water services, as well as coordination and cooperation among stakeholders affected by water management. The EQA is the central administrative body for all environmental issues in Palestine, with its main objective being the protection of environmental components. It encompasses all activities and studies related to environmental planning, environmental protection, and environmental management.



Source: World Bank (2021), "Digital West Bank and Gaza Project (ID No. P174355), Environmental and Social Management Framework."

Figure 1-30 EIA/IEE Procedures in Palestine



### 1-5-5 Examination of Alternatives (including the Option of not implementing the Project)

The following four project alternatives were compared in terms of their contribution to water supply in Jenin city, socio-economic effects, environmental and social impacts, technical advantages and disadvantages, project cost, and operation cost:

- Alternative 1: A plan that includes the rehabilitation of wells, replacement of transmission facility, construction of new service reservoir, installation of distribution main pipes, and the installation of distribution network.
- Alternative 2: A plan that doesn't include the construction of new service reservoir but includes the rehabilitation of wells, replacement of transmission facility, installation of distribution main pipes, and the installation of distribution network.
- Alternative 3: Not implementing the project.
- Alternative 4: Zero option ("not implementing a project subject to the Environmental Impact Assessment Law, yet able to achieve the Project objectives"). In most cases, water supply projects are not included in the project types subject to Japan's Environmental Impact Assessment Law. Therefore, the zero option is equivalent to Alternatives 1 and 2.

The results are as shown in Table 1-10. For more detailed information and the basis of the evaluation, refer to Table 16 in Appendix 8 (IEE Study Report). In terms of environmental and social impacts, Alternative 3 (not implementing the Project) was rated highest, and both Alternatives 1 and 2 were evaluated to have similar environmental and social impacts. Alternative 4 (zero option) is equivalent to Alternatives 1 and 2. From a comprehensive comparative analysis, Alternative 2, which has relatively low environmental and social impacts and contributes highly to water supply in Jenin with significant socio-economic benefits, is the most preferable.

Table 1-10 Comparison among the Alternatives

	Alternative 1	Alternative 2	Alternative 3
Overview of alternative plans	Plans include well rehabilitation, renewal of water transmission facilities, construction of new water service reservoir, laying of water distribution mains, and laying of water distribution pipe network.	No new water service reservoir will be constructed. Plan includes well rehabilitation, water distribution main installation, and water distribution pipe network installation.	Do not implement the project
Improvement of water supply in Jenin and its benefit to the economies and society	A	A	C
Environmental and Social Impact	C	C	A
Technical Advantages/Disadvantages	A	A	C
Construction Cost	C	B	A
Operation Costs	A	A	C
Total Evaluation	B	A	C

(Note) A: Highest evaluation, B: Moderate, C: Lowest evaluation

Source: The Preparatory Survey Team

### 1-5-6 Scoping and TOR for Environmental and Social Considerations

In the Project planning, the evaluation items for potential significant environmental and social impacts were examined. The results are presented in Table 13 and Table 14 of Appendix 8 (IEE Study Report). Air pollution, water pollution, noise and vibration, waste/hazardous substances, climate/weather, groundwater, protected areas/forests, landscape, land use, regional/urban planning, unequal distribution of benefits and harms, local conflicts of interest, poverty groups, public health, occupational safety and health, and accidents have been scoped as the significant evaluation items for the Project. Environmental and social considerations surveys were conducted on these items. The results are shown in Table 1-11 and Table 1-12. TOR of IEE is presented in Table 1-13.

Table 1-11 Scoping Checklist (Environmental Impact)

Item	Scoping Analysis of the Anticipated Environmental Impacts			Rational of the Impact Assessment
	Pre-construction	Construction stage	Operation stage	
<b>Pollution</b>				
Air Pollution		✓		P: No impact is expected. C: Some negative impacts are expected due to asphalt cutting, excavations and backfilling, roadside paving, and vehicle emissions. O: No or negligible impact is expected.
Offensive Odor				P/C/O: No impact is expected.
Water Pollution		✓	✓	P: No impact is expected. C: Turbid water during replacement of water distribution mains and distribution network pipes O: If the harvest of groundwater exceeds the allowable limit there will be a possibility for the sewage or agricultural wastewater to intrude into the aquifer and pollute the ground water.
Bottom Sediment Contamination				P/C/O: No impact is expected.
Soil Contamination		✓		P: No impact is expected C: Little risk is expected. Soil in and nearby the construction areas might be contaminated by different materials used in the construction phase such as cement, concrete, bitumen, oil/grease, etc. O: No impact expected.
Ground Subsidence				P/C/O: No impact is expected. (The land nature will not cause ground subsidence; groundwater harvest is within the allowable range)
Noise and Vibration		✓		P: No impact is expected. C: Due to asphalt cutting, excavation works, construction, paving and vehicle movement. O: the operation of pumps and other machines will cause some noise and vibration; it will be of no significant impact since the low humming noises from pumps are often completely normal.
Sunshine Obstruction				P/C/O: No impact is expected.
Wastes/ Hazardous Materials		✓		P: No impact is expected C: Construction work of the facilities will generate surplus soil and construction debris.

Item	Scoping Analysis of the Anticipated Environmental Impacts			Rational of the Impact Assessment
	Pre-construction	Construction stage	Operation stage	
				O: No significant impact
<b>Natural Environment</b>				
Climate/ Meteorological Phenomena		✓	✓	P: No impact is expected. C/O: negligible scale.
Topography				P/C/O: No impact is expected.
Geology				P/C/O: No impact is expected.
Soil Erosion				P/C/O: No impact is expected.
Hydrology				P/C/O: No impact is expected.
Groundwater			✓	P/C: No impact is expected. O: The operation of the improved facilities by the project will increase harvest of groundwater in Jenin and would have an impact on ground water level/ capacity of aquifer in and around Jenin.
Ecosystem, Flora, Fauna and Biodiversity				P/C/O: Virtually no impact expected. Endangered/rare species is not observed in the project area.
Protected Area/ Forest Reserve		✓	✓	P: No impact expected C/O: Removal of some trees in the other parts of the project area.
Coastal Zone				P/C/O: No coastal zones in the project area.
Landscape		✓	✓	P: No impact is expected C: During excavation, however it is for short periods only. O: A slight landscape change since a small number of trees will be removed.
Natural Disaster				P/C/O: No impact is expected.

Table 1-12 Scoping Analysis of the Social Scoping Matrix

Item	Scoping Analysis of the Social Scoping Matrix			Rational of the Impact Assessment
	Pre-construction	Construction stage	Operation stage	
Involuntary Resettlement				P/C/O: No impacts are anticipated because the project implementation area is a public area.
Land Use				P/C/O: No impacts are anticipated.
Utilization of Local Resources				P: No impacts are anticipated. C: Relatively small amounts of resources such as sand and quarry stone are used in the construction of the facility. O: The impact on groundwater levels is negligible.
General, Regional/City Plans			✓	P: No Impact expected. C: No impact expected. O: Reduce the overexploitation of private wells
Social Institutions and Local Decision- making Institutions				P/C/O: No impact expected
Social Infrastructure and Services				P/C/O: No impact expected

Item	Scoping Analysis of the Social Scoping Matrix			Rational of the Impact Assessment
	Pre-construction	Construction stage	Operation stage	
Local Economy and Livelihood				P/C/O: No negative impact expected
Uneven distribution of damage and benefits		✓	✓	P: No impacts are anticipated. C: Some people will be adversely affected by the construction, albeit temporarily, while others will only benefit from the Project. O: Some residents living near the Al Saadeh well will not benefit from the improved water supply (no water distribution network). Other residents living farther from the water source will receive improved water supply services.
Local Conflicts of Interests			✓	P: No impacts are anticipated. C: No impact is anticipated. O: Al Saadeh Uneven distribution of costs and benefits related to well improvements can cause conflicts.
Water Usage, Water Rights and Communal Rights			✓	P/C/: No impact is anticipated. O: In some areas, people's water rights are fulfilled and water use becomes more versatile.
Cultural and Historical Heritage			✓	P/C/: No impact is anticipated. O: More water will be available for cultural and historical heritage.
Religious Facilities				P/C/O: No negative impacts are anticipated.
Sensitive Facilities (ex. Hospital, school, precision machine factory)				P/C/O: No negative impacts are anticipated.
Poor People		✓	✓	P: No impacts are anticipated. C: Possibility of getting a temporary job. O: Some people benefit from the availability of water at a lower cost (instead of buying higher cost water in tanks).
Ethnic Minorities/ Indigenous People				There are no indigenous peoples or ethnic minorities in the project area.
Gender				P/C/O: No impact is anticipated.
Children's Rights				P/C/O: No impact is anticipated.
Public Health (sanitation and infectious diseases)		✓	✓	P: No impacts are anticipated. C: Possible Covid-19 infection among workers. O: Water supply improvements improve public health.
Occupational Health and Safety (OHS)		✓	✓	P: No impacts are anticipated. C: Accidents and injuries associated with or occurring during the construction phase. O: Accidents and injuries resulting from operation and maintenance work.
<b>Other</b>				
Accidents		✓	✓	P: No impacts are anticipated. C: Accidents associated with construction work. O: Accidents associated with operation and maintenance work.
Climate Change				P: No impacts are anticipated. C: The impact of carbon dioxide emissions from vehicles and construction equipment is negligible. O: No impact is anticipated.

Source: The Preparatory Survey Team (quoted from the attached IEE report).

Table 1-13 TOR for Environmental and Social Considerations (IEE)

#	Item	Study/Survey	Methodology
1	Air quality	Primary baseline data collection and Secondary data collection	<ul style="list-style-type: none"> <li>● Secondary Collection of air quality data for project affected area (within project sites or representative locations within 2km radios from project boundary) including temporal use during construction from secondary data (reliable documentations such as EIA less than 10years old, officially published environmental survey report and websites (UNEP air quality monitoring site) etc.</li> <li>● Primary data collection of air quality (10 locations) as per the items required by Environment Impact Assessment Policy (1999) or TOR for ESIA (2013 by PWA), minimum items (PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub>)</li> </ul>
2	Water	Secondary data collection	<ul style="list-style-type: none"> <li>● Secondary Collection of water quality data of the existing wells from Jenin Municipality</li> </ul>
3	Waste	Secondary data collection	<ul style="list-style-type: none"> <li>● Secondary Collection of disposal site information from relevant authorities in Jenin Municipality</li> </ul>
4	Noise and Vibration	Secondary and primary Baseline data collection	<ul style="list-style-type: none"> <li>● Secondary Collection of noise and vibration data for project affected area (within project sites or representative locations within 2km radios from project boundary) including temporal use during construction from secondary data (reliable documentations such as EIA less than 10years old, officially published environmental survey report etc.)</li> <li>● Primary data collection of noise (10 locations)</li> </ul>
5	Protected Area	Secondary data collection	<ul style="list-style-type: none"> <li>● Secondary Collection of protected area information from official documents by competent authorities</li> </ul>
6	Ecosystem	Secondary data collection with field confirmation only	<ul style="list-style-type: none"> <li>● Secondary Collection of ecosystem data for project affected area (5km radios from project boundary) including temporal use during construction from secondary data</li> <li>● Field Confirmation of present land use and ecosystem based on rapid field observation only, not detailed ecosystem survey</li> </ul>
7	Resettlement	Secondary data collection and field confirmation only	<ul style="list-style-type: none"> <li>● Secondary Collection of land use for project affected area including temporal use during construction based on secondary data (land use map, satellite images, and land registration/records</li> <li>● Confirmation of land use based on the rapid field observation only, not detailed survey</li> </ul>
8	Heritage	Secondary data collection & field confirmation only	<ul style="list-style-type: none"> <li>● Secondary Collection of culturally sensitive area and based on secondary data</li> <li>● Confirmation of sensitive area based on the rapid field observation only, not detailed ecosystem survey</li> </ul>
9	Climate change	Secondary data collection & Consultation with competent authorities	<ul style="list-style-type: none"> <li>● Secondary Collection of climate change related information from relevant authorities, such as EQA</li> <li>● Expected documents to be reviewed and find any updates: <a href="https://www4.unfccc.int/sites/NAPC/Pages/Palestine_NAP.aspx">https://www4.unfccc.int/sites/NAPC/Pages/Palestine_NAP.aspx</a> <a href="https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=PSE">https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=PSE</a></li> </ul>

Source: The Preparatory Survey Team (quoted from the Appendix 8 IEE Study Report)

## 1-5-7 Results of Environmental and Social Considerations Survey

### (1) Air Quality, Noise

The results of air quality and noise measurements at 10 locations in Jenin, along with environmental standards, are shown in the table below. All of the measured air quality values are within the limits of the Palestinian domestic law and the environmental standards set by the Ministry of Environment, and there is no significant air pollution at present. The results of noise measurements were within the environmental standards set by the Palestinian domestic law and the Ministry of Environment, except for the noise at one point along a road

with a high volume of traffic.

Table 1-14 Air Quality and Noise Measurements in Jenin

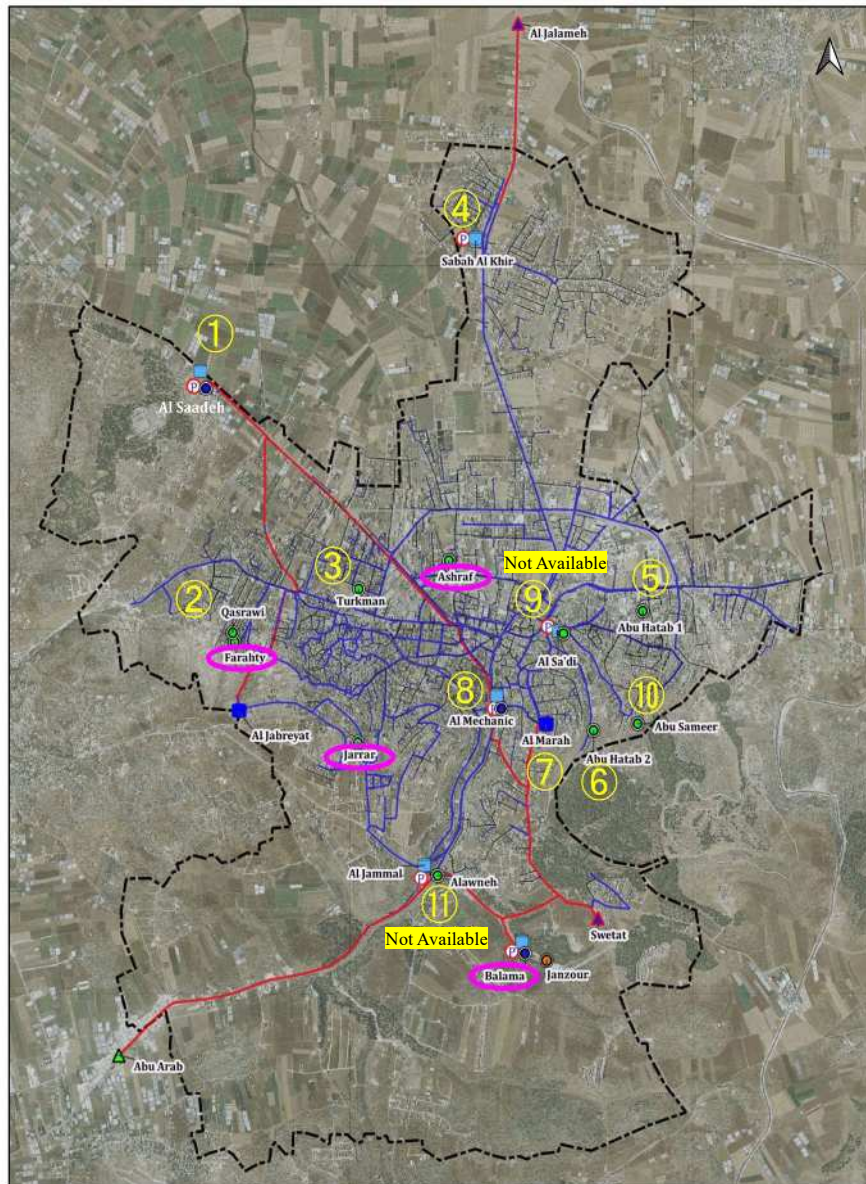
Location #	Coordinates (East, North)	Area description	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (ppm)	SO <sub>2</sub> (ppm)	Sound level (dB)
10	E: 178822.95 N: 206839.99	At Al Marah Reservoir	9	13	0	0	41
7	E: 178764.25 N: 206997.26	Old Marah Reservoir	11	14	0	0	42
1	E: 180126.92 N: 206964.27	New reservoir	11	38	0	0	45
8	E: 178639.44 N: 207123.2	280m to the northwest of Al Marah Reservoir	32	46	0	0	46
9	E: 178475.26 N: 206957.19	Al Mekanik	18	46	0.2	0	66
2	E:176366.62 N:209173.56	Al Saadeh Well, near Haifa Street and Al Saadeh Forest	13	30	0	0	51
4	E: 176628.0 N: 207120.07	200m to the north of Al Jabreyat reservoir	22	29	0	0	38
6	E: 176751.17 N: 207341.75	Al Hadaf PRT+200	4	18	0.1	0	42
5	E: 176770.53 N: 207381.74	Al Hadaf PRT+180	13	27	0.2	0	43
3	E: 1766002.43 N: 206931.21	Al Jabreyat reservoir	9	26	0.2	0	42
Environmental standard (Ministry of Environment)			Annual average of 15 µg/m <sup>3</sup> or less and daily average of 35 µg/m <sup>3</sup> or less	The daily average of the hourly value must be less than 100 µg/m <sup>3</sup> and the daily average of the hourly value must be less than 200 µg/m <sup>3</sup> . (Reference value: SPM's standard value which is somewhat different from PM <sub>10</sub> )	The daily average of hourly values shall be within or below the zone of 0.04ppm to 0.06ppm.	The daily average of 1-hour value shall be 0.04ppm or less, and the 1-hour value shall be 0.1ppm or less.	Daytime 55 dB or less, nighttime 45 dB or less (residential areas)

Source: The Preparatory Survey Team (quoted from the Appendix 8 IEE Study Report).

## (2) Water Quality

The results of the water quality analysis of samples from the 9 existing wells and connection points in Jenin shown in Figure 1-31 are presented in Table 1-15. These results almost meet the WHO guideline for drinking

water (calcium values at 6 locations and the nitrate values at 1 location slightly exceed the standard).



Source: The Preparatory Survey Team

Figure 1-31 Locations of Existing wells and Connection Point in Jenin where water quality survey was conducted

Table 1-15 Water Quality of Existing Wells and Connection Point

Parameter	Unit	Al Saadeh Well	Al Qasrawi Well	Waled Turkman Well	Sabah Al Khir Station	Abu Hatab Well 1	Abu Hatab Well 2	Mechanic Well	Abu Sameer Well	Sewtat Point	WHO Guideline Value
Electric Conductivity	µs/cm	1107	770	957	1122	884	961	1228	920	995	N/A
Solids (total dissolved)	mg/l	642	380	478	562	455	470	711	460	485	1,000
Turbidity	NTU	0.32	0.32	0.16	1.3	0.97	0.61	0.34	0.11	1.5	5
pH	N/A	7.45	7.13	7.03	7.4	7.02	7.2	7.42	7.11	7.33	6.5-8.5
Fecal coliform	number/100ml	0	0	0	0	0	0	0	0	0	0

Parameter	Unit	Al Saadeh Well	Al Qasrawi Well	Waled Turkman Well	Sabah Al Khir Station	Abu Hatab Well 1	Abu Hatab Well 2	Mechanic Well	Abu Sameer Well	Sewtat Point	WHO Guideline Value
Total coliform	number/101ml	0	0	0	0	0	0	0	0	0	0
Barium	mg/l	1.2	2	1.01	1.25	0.96	1.3	1.3	0.98	1.2	2
Fluoride	mg/l	0.39	0.57	0.28	0.49	0.34	0.511	0.34	0.388	0.41	1.5
Magnesium	mg/l	47.52	32.7	43.98	52.7	39.77	44.63	27.09	39.11	43.25	100
Sulphate	mg/l	35.7	15	32.4	44.1	25.33	34.12	52.9	29.7	30.7	400
Sulphide	mg/l	0.0	0.0	0.0	0.0	0	0	0	0.0	0.0	N/A
Chloride	mg/l	123	100	112	146	97	147	152.6	90.7	98	250
Hardness	mg/l as CaCO <sub>3</sub>	499	250	395	510	399	486	470	413	420	500
Nitrate	mg/l as NO <sub>3</sub>	13.8	4.2	12.4	27.5	15.3	16.8	67.2	14.6	17.5	50
Nitrite	mg/l as NO <sub>2</sub>	0	0	0	0	0	0	0	0	0	3
Calcium	mg/l as Ca	121.6	98.6	105	150.3	97.6	99.32	143.8	104	121.6	100
Sodium	mg/l as Na	62.99	52.9	59.3	75.6	78.6	34.78	90.32	49.39	66.4	200
Potassium	mg/l as K	3.418	0.4	2.9	4.287	0.42	3.31	5.129	2.7	3.4	10
Ammonia	mg/l	0	0	0	0	0	0	0	0	0	N/A

Source: Preparatory Survey Team, based on data from WWD of Jenin Municipality

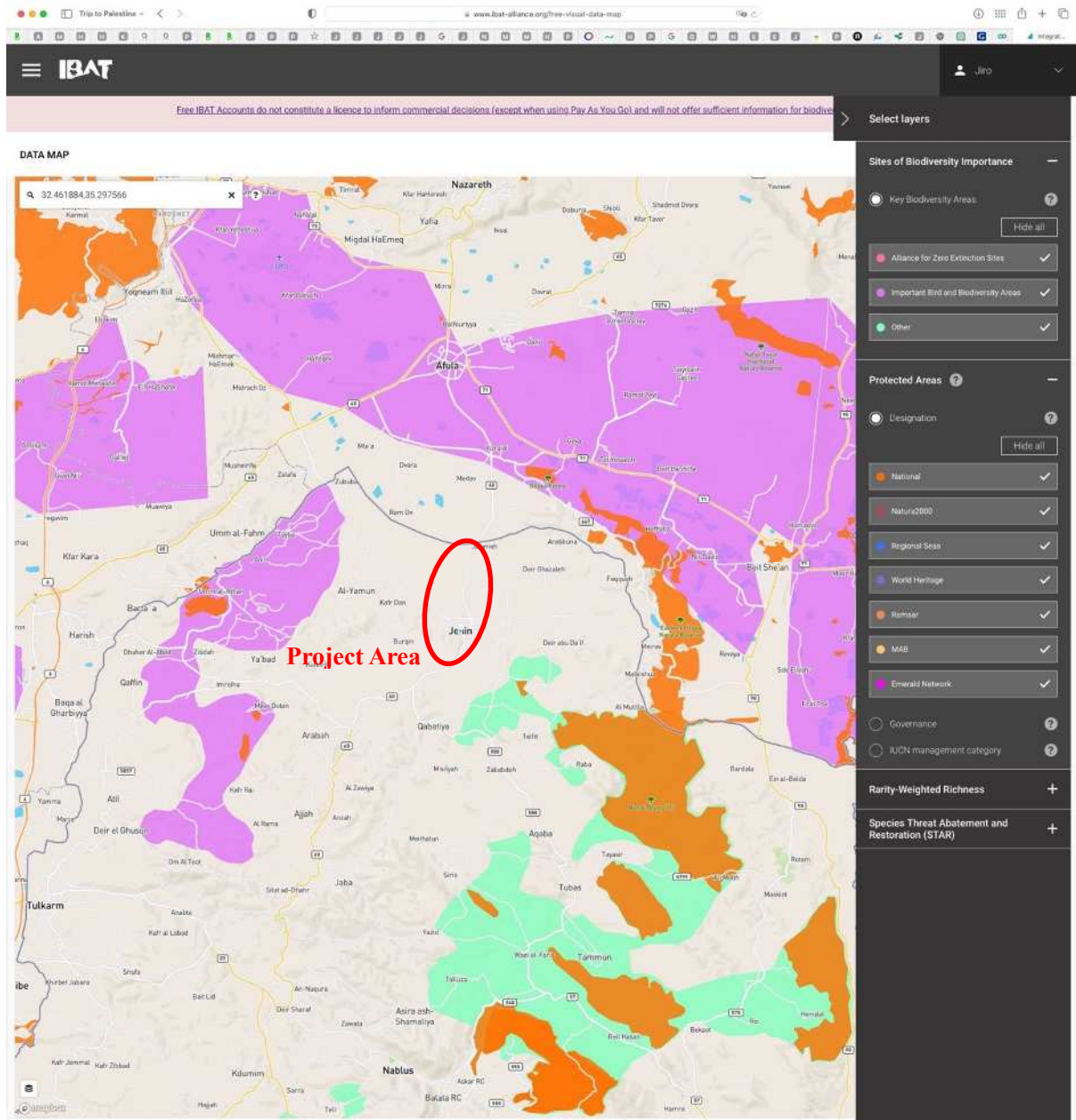
### (3) Waste

In Jenin, there are issues with the collection and disposal of municipal waste. On the other hand, construction waste and residual soil are backfilled and buried in appropriate landfill sites. Proper disposal of construction waste and residual soil generated by the Project can also be planned.

### (4) Protected Areas

The protected areas and Key Biodiversity Areas (areas internationally important from a biodiversity conservation perspective) around Jenin, as created by IBAT based on WDPA data and others, are shown in Figure 1-32. There are no protected areas or internationally important areas from a biodiversity conservation perspective within the Project area.





Source: Integrated Biodiversity Assessment Tool (<https://www.ibat-alliance.org>)

Figure 1-32 Protected Areas and Key Biodiversity Areas around Jenin

## (5) Ecosystem and Biodiversity

As mentioned earlier, considerations for ecosystem and biodiversity are required by the Palestinian Environmental Law and the TOR of ESIA and RAP applied by PWA. They state that "1. Activities that would impair the aesthetic standards of protected areas, forests, public parks, archaeological or historical sites, or any such areas are prohibited. 2. Identification of protected species and specifically concerned species that are native to the region; assessment of the conservation status of specific species; preparation of maps of large-scale vegetation or habitat indicating the extent of the project's impact on each vegetation and habitat type. 3. The consultant shall analyze the impacts on significant habitats and other habitats." A survey on ecosystem and biodiversity was conducted accordingly.

According to the International Union for Conservation of Nature (IUCN) Red List, 35 endangered species (11 plant species, 15 bird species, 4 reptile species, and 5 mammal species) are listed in Palestine for forests, terrestrial artificial areas, savannahs, shrublands, grasslands, rocky areas, and deserts as shown in Table 1-16.

Table 1-16 Endangered Species Listed in Palestine (Forests, Terrestrial Artificial Areas, Savannahs, Shrublands, Grasslands, Rocky Areas, Deserts)

Scientific Name		Family	Red List Category	Red List Criteria	Publication Year	Assessment Date
<i>Lathyrus gloeosperma</i>	dicotyledon network	Fabaceae (pea family of plants)	Serious Crisis	C2a (i)	2019	2018-02-25
<i>Bellevialia warburgii</i>	monocotyledon network	family of flowering plants comprising the muntjacs	crisis	B2ab (iv,v)	2017	2016-02-03
<i>Ornithogalum fuscescens</i>	monocotyledon network	family of flowering plants comprising the muntjacs	crisis	A4ac	2017	2016-02-05
<i>Lathyrus hirticarpus</i>	dicotyledon network	Fabaceae (pea family of plants)	crisis	B1ab (iii,v)+2ab (iii,v)	2019	2018-02-25
<i>Chalcides guentheri</i>	reptile net	Squamata (family of scaled reptiles, sometimes esp. the Sauria or Lacertilia)	endangerment (of a species)	B1ab (iii)	2006	2006-01-31
<i>Acanthodactylus beershebensis</i>	reptile net	family of viverrids (e.g. pythons)	Serious Crisis	A2c; B2ab (iii)	2006	2006-01-31
<i>Telescopus hoogstraali</i>	reptile net	Colubridae (family of snakes)	crisis	B1ab (iii)	2006	2006-01-31
<i>Trapelus savignii</i>	reptile net	Agamidae (plant family)	endangerment (of a species)	A2abcd	2006	2006-01-31
<i>Iris lortetii</i>	monocotyledon network	family of flowering plants comprising the irises	crisis	B1ab (i,ii,iii,iv) + 2ab (i,ii,iii,iv)	2016	2016-02-04
<i>Iris haynei</i>	monocotyledon network	family of flowering plants comprising the irises	endangerment (of a species)	A3c; B1ab (ii,iii,v) + 2ab (ii,iii,v)	2016	2016-02-04
<i>Aegilops sharonensis</i>	monocotyledon network	family comprising the true grasses	endangerment (of a species)	A3c	2017	2015-02-04
<i>Rhinolophus mehelyi</i>	mammal net	family of bats	endangerment (of a species)	A4c	2016	2016-04-25
<i>Gazella gazella</i>	mammal net	Bovidae	crisis	A2acd	2017	2016-08-01
<i>Cousinia libanotica</i>	dicotyledon network	Compositae	endangerment (of a species)	B1ab (iii) + 2ab (iii)	2020	2017-12-19
<i>Dama mesopotamica</i>	mammal net	family comprising the deers	crisis	D	2015	2015-07-25
<i>Iris vartanii</i>	monocotyledon network	family of flowering plants comprising the irises	endangerment (of a species)	B1ab (i,ii,iii) + 2ab (i,ii,iii); D2	2016	2015-02-17
<i>Lathyrus libani</i>	dicotyledon network	Fabaceae (pea family of plants)	crisis	B2ab (iii,v)	2019	2018-02-25
<i>Lathyrus stenolobus</i>	dicotyledon network	Fabaceae (pea family of plants)	crisis	B2ab (iii)	2019	2018-02-25

Scientific Name		Family	Red List Category	Red List Criteria	Publication Year	Assessment Date
<i>Numenius tenuirostris</i>	fowling net	family comprising the snipes	Serious Crisis	C2a (i,ii);D	2018	2018-08-15
<i>Puffinus yelkouan</i>	fowling net	family comprising the petrels	endangerment (of a species)	A4bcde	2018	2018-08-17
<i>Meriones sacramenti</i>	mammal net	mouse family	endangerment (of a species)	B1ab (iii)	2021	2019-08-23
<i>Streptopelia turtur</i>	fowling net	Columbidae (family of pigeons comprising pigeons and doves)	endangerment (of a species)	A2bcd + 3bcd + 4bcd	2019	2019-08-14
<i>Aquila heliaca</i>	fowling net	family comprising the hawks	endangerment (of a species)	C2a (ii)	2019	2016-10-01
<i>Vanellus gregarius</i>	fowling net	Charadriidae	Serious Crisis	A3bcd + 4bcd	2019	2018-08-07
<i>Falco concolor</i>	fowling net	Falconidae	endangerment (of a species)	C2a (ii)	2021	2020-07-30
<i>Larus audouinii</i>	fowling net	family of birds including gulls, geese and swans	endangerment (of a species)	A4b	2020	2020-08-30
<i>Miniopterus schreibersii</i>	mammal net	family of long-nosed bats	endangerment (of a species)	A2c	2020	2019-07-04
<i>Falco vespertinus</i>	fowling net	Falconidae	endangerment (of a species)	A2abc + 3bc + 4abc	2021	2021-04-22
<i>Clanga clanga</i>	fowling net	family comprising the hawks	endangerment (of a species)	A2cde	2021	2021-07-01
<i>Falco cherrug</i>	fowling net	Falconidae	crisis	A2bcde + 3cde + 4bcde	2021	2021-07-05
<i>Neophron percnopterus</i>	fowling net	family comprising the hawks	crisis	a2abcde + 3bcde + 4abcde	2021	2021-07-21
<i>Torgos tracheliotos</i>	fowling net	family comprising the hawks	crisis	A2abcd + 3bcd + 4abcd	2021	2021-07-21
<i>Chlamydotis macqueenii</i>	fowling net	family of birds including ducks, geese and swans	endangerment (of a species)	A4acd	2021	2021-08-18
<i>Aquila nipalensis</i>	fowling net	family comprising the hawks	crisis	A2abcd + 3bcd + 4abcd	2021	2021-07-23
<i>Serinus syriacus</i>	fowling net	family comprising the pigeons	endangerment (of a species)	C2a (ii)	2022	2022-07-15

Source: Preparatory Survey Team based on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List.

To verify the presence of important habitats for these endangered species, maps of Jenin, satellite imagery, the aforementioned protected areas and Key Biodiversity Areas, and observation records of species on iNaturalist were referred to. Observation records of the endangered species were not found in urbanized areas of Jenin, including the Project area. In addition, field surveys were conducted by both domestic and international experts of the Preparatory Survey Team, to assess the project site and ecosystems with relatively high species diversity (forests, wetlands, etc.) in and around the city and its environs. A total of 46 species of non-threatened birds, reptiles, mammals, and insect species were observed, but no endangered species were

observed.<sup>7</sup> Based on these findings, no significant habitats of these endangered species were identified within the project-affected areas.

As shown in Figure 1-33, there is a forest located 200m southwest of the Al Saadeh well, which is classified as a forest in the Ministry of Local Government's land use plan. However, upon conducting surveys of this forest, no internationally recognized significant ecological value was identified. Furthermore, due to the distance from the Project, it is not expected to have any impact on this forest.



Source: Preparatory Survey Team

Figure 1-33 Al Saadeh Well Located near the Forest

## (6) Involuntary Resettlement

Based on the confirmation of cadastral maps available in Palestine's spatial information system and the Project's planning maps, it has been determined that all facilities of the Project are located on public land, and no land acquisition is required. Additionally, during the field reconnaissance conducted by the international and Palestinian experts of the Preparatory Survey Team in November 2021, the land use status of the Project site was verified. It was found that there were no affected residents requiring involuntary resettlement, such as landowners, non-landowner residents, agricultural workers, or temporary shop/kiosk owners. Therefore, it is concluded that there will be no involuntary resettlement under the Project.

## (7) Cultural Heritage

There are numerous archaeological sites within Jenin city, which are protected by the Jordanian Law No. 51 of 1966 concerning historical heritage and the Palestinian Legislative Decree No. 11 of 2018 concerning tangible cultural heritage. All of these sites are located at a sufficient distance from the Project Area, and therefore, they will not be affected by the Project.

<sup>7</sup> [https://www.inaturalist.org/observations?nelat=32.55209992395806&nelng=35.57405205496413&place\\_id=any&subview=map&swlat=31.21969098090997&swlng=34.21010005461393&user\\_id=jiroiguchi&verifiable=any&view=species](https://www.inaturalist.org/observations?nelat=32.55209992395806&nelng=35.57405205496413&place_id=any&subview=map&swlat=31.21969098090997&swlng=34.21010005461393&user_id=jiroiguchi&verifiable=any&view=species)

(8) Climate Change

It is anticipated that the Project will result in a slight increase in electricity consumption compared to the baseline condition. However, the changes in greenhouse gas (GHG) emissions caused by the Project will be minimal.

The evaluated environmental aspects include air pollution, noise and vibration, solid waste, impact on protected areas, impact on ecosystems, resettlement, cultural heritage, and climate change. The results indicate that there are no significant environmental and social impact issues observed for all of these environmental aspects.

**1-5-8 Impact Assessment**

The results of Environmental Impact Assessment are summarized in Table 1-17. The survey results, impact evaluations, and mitigation measures for each assessment item are provided in Chapter 4 and Section 6.2 of Appendix 8 (IEE Survey Report). The predicted impacts from the Project on all scoped evaluation aspects can be mitigated through environmental monitoring and commonly used mitigation measures.

Table 1-17 Environmental Impact Assessment Results

Classification.	Item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for Evaluation
		Pre-Construction, Construction stage	Operation stage	Pre-Construction, Construction stage	Operation stage	
Pollution Control	Air pollution	✓		B-	N/A	During construction: Emissions from the movement and operation of construction machineries and vehicles, and the generation of dust from road excavation during the installing pipes, etc., are expected to temporarily worsen air quality.
	Water pollution	✓	✓	B-	B-	During construction: Turbid water may be generated during construction of water main and network pipes. During operation: If groundwater exploitation exceeds allowable levels, sewage and agricultural runoff may enter the aquifer and contaminate the groundwater.
	Noise and Vibration	✓		B-	D-	During construction: Noise and vibration will be generated due to road pavement cutting, excavation work, construction, paving, and vehicle movement. During operation: Operation of pumps and other machinery will generate noise and vibration; however, noise and vibration from pumps will not have a significant impact.
	Soil contamination	✓		B-	N/A	There is a small risk that soil within and near the construction site will be contaminated by materials used during the construction phase, such as cement, concrete, asphalt, and

Classification.	Item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for Evaluation
		Pre-Construction, Construction stage	Operation stage	Pre-Construction, Construction stage	Operation stage	
						oil/grease.
	Waste	✓		B-	N/A	During construction: Construction of facilities generates construction wastes and debris.
Natural Environment	Climate/Meteorological phenomena		✓	N/A	D-	During operation: No impact on climate and weather.
	Groundwater		✓	N/A	B-	During operation: Operation of the facilities to be improved by the Project may increase the amount of groundwater extraction in the Jenin and impact groundwater levels
	Ecosystems, Flora, Fauna, Biodiversity	✓		D-	N/A	During Construction: No critical habitat for endangered species or ecosystems of high conservation value are identified within the area affected by the Project.
	Protected Area / Forest Reserve			B-	D-	No protected areas exist within the Project area of influence.
	Landscape	✓	✓	B-	D-	During Construction: Impact on landscape during road excavation. However, they will be for a short period.
Social Environment	Involuntary Resettlement	✓		D-	N/A	Before and during construction: No affected residents requiring involuntary resettlement were identified. In addition, all project facilities are located on public land and do not require the acquisition of private land.
	Land Use			D-	D-	During construction and operation: No impact is identified.
	General, Regional / City Plans		✓	N/A	D-	During operation: No impact is anticipated.
	Unequal Distribution of Benefit and Damage	✓	✓	B-	B-	During construction: While some people will be adversely affected by the construction, albeit temporarily, others will only benefit from the Project. During operation: Some residents living near the Al Saadeh well will not benefit from the improved water supply (no water distribution network). Others who live further away from the water source will receive improved water service.
	Local Conflicts of Interests		✓	N/A	B-	During operation: some residents living near the Al Saadeh well will not benefit from the improved water supply (no water distribution network), while others living farther from the water source will receive improved water service.
	Poor People		✓	N/A	D+	During operation: Some of the poor will gain relatively large benefits from the use of water from the Project.
	Public Health (sanitation and infectious diseases)	✓	✓	B-	B+	During construction: Influx of construction workers may spread corona and other infectious diseases.

Classification.	Item	Impact assessment during scoping		Impact assessment based on survey results		Reasons for Evaluation
		Pre-Construction, Construction stage	Operation stage	Pre-Construction, Construction stage	Operation stage	
						During operation: Public health may improve as a result of improved water supply conditions due to the Project.
	Occupational Health and Safety (OHS)	✓	✓	B-	B-	During construction: Possible accident/injury. During operation: Risk of accidents and injuries associated with operation and maintenance work.
Others	Accidents	✓	✓	B-	B-	During construction: there is a risk of accidents occurring. During operation: Possible accidents due to operation and maintenance work.
	Climate Change		✓	N/A	D-	During construction and operation: No impact is identified.

Evaluation: A: Significant impact is expected. B: Some degree of impact is expected. C: The degree of impact is unknown, and a confirmation survey is needed in the future. D: The impact is minor and no further investigation is required.

+: positive influence, -: negative influence

Source: Preparatory Survey Team (quoted from the Appendix 8 IEE Study Report)

### 1-5-9 Mitigation Measures (Environmental Management Plan) and Environmental Monitoring Plan, and Costs for Implementation

The Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP), which provides mitigation measures for the identified impacts in the above environmental impact assessment results are presented in Table 1-18 and Table 1-19. As stated in the monitoring plan, the monitoring activities will primarily be conducted by the Jenin Municipality, with involvement from the EQA, Ministry of Health, and Ministry of Agriculture for specific environmental aspects. The monitoring results will be reported to JICA using the Monitoring Form as described in section 1-5-13.

Table 1-18 Environmental Management Plan (EMP)

#### Pre-Construction phase:

Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
Air Quality	Gas and particulate matter emission	Laws and regulations review	Jenin Municipality	Jenin Municipality
Land Use	Tree cutting	Obtain a permit from ministry of Agriculture	Jenin Municipality	Jenin Municipality

**Construction and Operation Phase:**

Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
Air Quality	Emissions from vehicles	- Implement the manufacturer recommended engine maintenance programs - Drive within safe speed limits and choose appropriate route and time.	Contractor	Included in construction cost
	Dust caused by asphalt cutting, excavations and backfilling, and construction works	- Dust suppressants, watering the site, and proper transporting and storage of excavation materials. - Separation of stockpiles areas with workers/vehicle movement paths to avoid disturbing the stockpiled material. - Covering of stored spoil material and vehicles removing waste. - Choose a relatively new construction and transportation vehicles with lower emissions. - Avoid windy days. - Identification of disposal sites for unsuitable excavated material	Contractor Jenin Municipality	Included in construction cost
Water Pollution	Turbidity	Best management practices during the construction or repair of water mains	Contractor	- Included in construction cost (construction) - Jenin Municipality (operation)
Water pollution (groundwater) during operation phase	Sewage and agricultural based pollution	- Control of harvest of groundwater and its amount according to monitoring result of pollution	Jenin Municipality	Jenin Municipality
Noise and vibration	- Asphalt cutting, excavation works, construction, paving and vehicle movement.	Proper activity scheduling and working hours and days and limit the activities to day times and prevent any construction activities at weekends.	Contractor	Included in construction cost
Wastes/Hazardous Materials	- Surplus soil and construction debris. - Oil spills.	- Identification of disposal sites. - Substitution, or elimination of hazardous substances.	- Jenin Municipality - Contractor	Included in construction cost
Groundwater level during operation phase	Lowering groundwater level	- Control of harvest of groundwater and its amount according to monitoring result	Jenin Municipality	Jenin Municipality
Landscape	Excavation and construction work	- Follow all mitigation measures that minimize and/or control the dust, and aesthetic features.	- Jenin Municipality - Contractor	Included in construction cost
Unequal Distribution of Benefit and Damage	Nuisance for some people during project implementation	Compensate by ensuring service improvement in water and other issues.	Jenin Municipality	Jenin Municipality
Local Conflicts of Interests	while Some residents who live near Al Saadeh well will not benefit from the Improvement of water supply (no distribution network), other residents who live far from water	Put this area on top priority to provide it with a distribution network.	Jenin municipality	Jenin Municipality



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Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
	source will receive the improved water supply service.			
Public Health (sanitation and infectious diseases)	Covid 19 infection possibility among workers	- Provide Masks for workers. - Healthcare education for workers and inhabitants.	- Contractor - Jenin municipality and ministry of health	Included in construction cost
Occupational Health and Safety (OHS)	Accidents and injuries associated with, or occurring during the course of the construction and operation phase.	- Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Provide appropriate equipment to minimize risks - Provide first aid facilities in all the work sites. - Provide safe drinking water, clean eating and resting areas.	Contractor	Included in construction cost
Accidents	Accidents associated with construction, operation and maintenance work	- Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Provide first aid facilities in all the work sites.	Contractor	Included in construction cost
General	Complaint	Response to Complaints	Contractor (construction) Jenin Municipality (operation)	Included in construction cost (construction) Jenin Municipality (operation)

Source: Preparatory Survey Team (quoted from the attached IEE report).

Table 1-19 Environmental Monitoring Plan

Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency	
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>- Implement the manufacturer recommended engine maintenance programs</li> <li>- Drive within safe speed limits and choose appropriate route and time.</li> <li>- Dust suppressants, watering the site, and proper transporting and storage of excavation materials.</li> <li>- Separation of stockpiles areas with workers/vehicle movement paths to avoid disturbing the stockpiled material.</li> <li>- Covering of stored spoil material and vehicles removing waste.</li> <li>- Choose a relatively new construction and transportation vehicles with lower emissions.</li> <li>- Avoid windy days.</li> <li>- Identification of disposal sites for unsuitable excavated material</li> </ul>	Odor (observation by sense of smell)	No abnormal odor is generated.	Construction site	Contractor Jenin Municipality and Environment Department), EQA	Every day In the event of an abnormality	
		Dust (visual, respiratory and other sensory observations)	No abnormal dust is generated.	Construction site	Contractor	Every day	
		Sample test (PM <sub>2.5</sub> , PM <sub>10</sub> , NO <sub>2</sub> , SO <sub>2</sub> )	Domestic Standards	WHO (2021)	Construction site (sampling)	Jenin Municipality and Environment Department), EQA	In the event of an abnormality
		PM <sub>2.5</sub> (µg/m <sup>3</sup> )	N/A	5 (annual), 15 (24-hour)			
		PM <sub>10</sub> (µg/m <sup>3</sup> )	N/A	15 (annual), 45 (24-hour)			
NO <sub>2</sub> (ppm)	N/A	10 (annual), 25 (24-hour)					
SO <sub>2</sub> (ppm)	N/A	40 (24-hour)					
<b>Water Pollution</b>	Best management practices during the construction or repair of water mains	Water temperature, appearance, odor, color, and transparency (sensory observation)	No abnormalities.	Construction site	Contractor	every day	
		Sample test (pH, EC, Total coliforms, Faecal coliforms, Nitrate, Turbidity)	Domestic Standards	WHO	Construction site (sampling)	Jenin Municipality and Environment Department), EQA	In the event of an abnormality
		pH (measure of acidity)	6.5-8.5	6.5-8.5			
		EC (µScm <sup>-1</sup> )	Less than 2000	Less than 2000			
		Coliform group count (CFU/100 mL)	0-3	0			
Fecal coliforms (CFU/100)	0	0					

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Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency	
<b>Water pollution (groundwater) during operation phase</b>	- Control of harvest of groundwater and its amount according to monitoring result of pollution	Sample test	mL	less than 10	Wells to rehabilitate under the Project, Connection Point Project	Jenin Municipality	Follow the regular water quality monitoring (every 4-6 months).
			Nitrate nitrogen value (mg-NO <sub>3</sub> -N/L)	less than 10			
			Turbidity (NTU)	Less than 5.0			
				WHO Standards			
			Chloride (mg/l)	N/A			
			Hardness/Calcium carbonate content (CaCO <sub>3</sub> ) (mg/l)	N/A			
			Electrical conductivity (µS)	Less than 2000			
			Total dissolved solids (mg/l)	N/A			
			Nitrate (mg/l)	N/A			
			Turbidity (NTU)	Less than 5.0			
<b>Noise and Vibration</b>	Proper activity scheduling and limit working hours and days, and limit the activities to day times and prevent any construction activities at weekends.	Noise and vibration (observation by hearing, etc.)	Faecal coliform bacteria (CFU/100ml)	0	Construction site	Contractor	Every day
			Total coliform bacteria (CFU/100ml)	0-3			
<b>Wastes/hazardous materials</b>	- Identification of disposal sites. - Substitution, or elimination of hazardous substances.	Construction waste and debris (visual inspection)	No abnormal noise or vibration is generated.		Construction site	Jenin Municipality (Health Environment Department), EQA	In the event of an abnormality
			Instrumental noise measurement (dB) *Domestic standards not identified; WHO standards are <30 dB (community noise), <35 dB (bedroom at night), and <40 dB (night, annual average). There is no improper dumping of leftover soil and construction waste.				
Groundwater level during operation phase	- Control of harvest of groundwater and its amount according to monitoring result	Groundwater level (visual)	No abnormal groundwater level fluctuations		Project wells existing in the vicinity	Jenin Municipality	Follow the regular groundwater level monitoring.

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Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency
Landscape	- Following all mitigation measures that minimize and/or control the dust, and aesthetic features.	Landscape (visual)	No loss of landscape.	Included in construction cost	Jenin Municipality (Health Environment Department), EQA	every day
Unequal Distribution of Benefit and Damage	Compensate by ensuring service improvement in water and other issues.	Complaint	There have been no complaints regarding the distribution of profits from this project.	Project area	Jenin Municipality (Health Environment Department)	As needed (when confirming complaints, etc.)
Local Conflicts of Interests	Put this area on top priority to provide it with a distribution network.	Complaint	No complaints about conflicts of interest.	Project area	Jenin Municipality (Water Department)	As needed (when confirming complaints, etc.)
Public Health (sanitation and infectious diseases)	- Provide Masks for workers.	Mask usage	Masks are being used appropriately.		Contractor	Every day
	- Healthcare education for workers and inhabitants.	Health Care Education	Health care education is being implemented.	Construction site	Contractor Jenin Municipality (Health Environment Department)	Every week
Occupational Health and Safety (OHS)	- Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Provide appropriate equipment to minimize risks - Provide first aid facilities in all the work sites. - Provide safe drinking water, clean eating and resting areas.	Implementation status of mitigation measures	Mitigation measures are being implemented as planned.	Construction site	Contractor Jenin Municipality (Health Environment Department)	Every day Every week
Accidents	- Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Provide appropriate equipment to minimize risks - Provide first aid facilities in all the	Same as above	Same as above	Construction site	Jenin Municipality (Health Environment Department)	Every day

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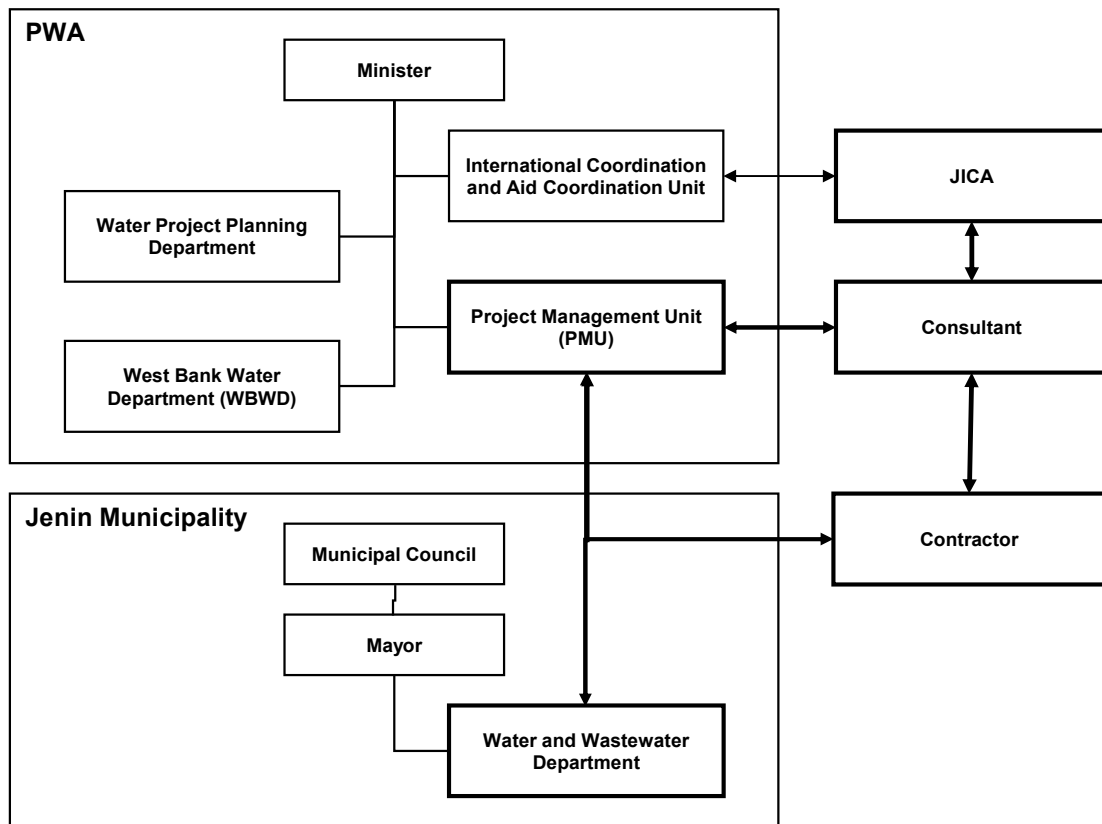
Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency
	work sites. - Provide safe drinking water, clean eating and resting areas.					
<b>General</b>	Response to Complaints	Existence, nature, and status of complaints handled	Appropriate handling grievances	Construction office and Jenin Municipality (during construction) Jenin Municipality (operation)	Contractor (during construction) Jenin Municipality (Water Department) (during construction and operation)	As needed (hearing complaints)

Source: Preparatory Survey Team

### 1-5-10 Implementation Organization

As outlined in the Environmental Monitoring Plan, the monitoring and implementation of mitigation measures will be supervised and carried out by the Jenin Municipality, Ministry of Agriculture, Ministry of Health, and construction contractor, etc.

The overall implementation organization of the Project is shown in Figure 1-34. The implementation of environmental monitoring and mitigation measures will also follow this structure. The Executing Agency responsible for project implementation is the Palestinian Water Authority (PWA), while the coordination agency during project implementation and the responsible agency for operation and maintenance after project completion is the Jenin Municipality. In addition to the above organization, reporting to the EQA, the regulatory and supervisory body for environmental impacts, will be carried out by the PWA's Project Management Unit (PMU) or the WWD. During the operation phase, a revised organization is anticipated, which includes service providers responsible for the maintenance and management of the water supply system, replacing the construction contractors and construction supervision consultants.



Source: The Preparatory Survey Team

Figure 1-34 Project Implementation Organization (during construction)

In both the construction and operation phases, regular analysis of complaint records will be conducted to review and revise the monitoring plan as necessary. As indicated in Table 4 of the IEE Report, based on Palestinian domestic law, individuals have the right to submit and pursue complaints and legal proceedings without considering the private interests of natural or legal persons causing environmental harm.

Jenin Municipality has established a system for receiving and handling complaints related to the services it provides. The main municipality office houses the Public Service Center, which receives complaints related to all municipal affairs. Complaints concerning the water supply are reported to the WWD. The process for handling complaints related to water meters and meter reading is as follows:

1. The Customer Service Manager or Assistant Officer fills out a complaint form based on the complaint received.
2. The completed form is sent to the Director/Head of the WWD.
3. After the Director of the WWD provides explanations and notes on the complaint form, the form is

forwarded to the Customer Service Manager.

4. If the complaint pertains to the water meter and its reading, the Customer Service Manager dispatches a meter reader or technical staff to re-read the water meter and verify the issue raised in the complaint.
5. A second water meter is installed behind the original water meter for testing and comparison.
6. If the problem is found to be a technical issue with the water meter, the customer is requested to repair or replace it.
7. If the issue is related to incorrect meter reading, the Customer Service adjusts the reading accordingly.

Complaints may also be received through an "emergency hotline" directly to the responsible personnel in the WWD. Recently, the WWD has been implementing complaint handling through web platforms and WhatsApp. Complaints related to the Project will be processed through the existing grievance mechanisms mentioned above.

### 1-5-11 Stakeholder Consultation

The Project involves the confirmation and implementation of construction within the existing water supply facilities and beneath public roads, and does not involve land acquisition or resident relocation. The Project is classified as Category B according to the JICA Guidelines. According to the JICA Guidelines for Category B projects, it is stated that the recipient country should engage in discussions with local stakeholders as necessary. Furthermore, according to the revised JICA Guidelines for Environmental and Social Considerations in 2022, for projects that are deemed to have significant environmental and social impacts, it is necessary to consider alternative project plans from the early stages, ensure information is disclosed, and engage in sufficient discussions with local stakeholders, with the results reflected in the Project components. As described in the aforementioned impact assessment, several environmental and social impacts are anticipated during the construction and operation phases of the Project, and mitigation measures will be implemented. Due to the need to confirm social consensus, including with the affected residents, the Jenin Municipality held stakeholder consultations.

The minutes of the stakeholder consultation are provided in Appendix 8 (3). The consultation took place on June 25, 2023, from 11:00 AM at the Child Culture Centre in Jenin. The participants included 10 general citizens, 3 Jenin Municipality staff, 4 survey team members (including subcontracted survey company), 2 Jenin Municipal Council members, and 2 representatives from the EQA, totalling 21 participants, including 9 women. During the consultation, Jenin Municipality presented an overview of the Project plan, anticipated environmental impacts, and mitigation measures. A question-and-answer session was conducted, with the questions focusing on topics such as safety management during construction, water quality of municipality wells, coordination between Jenin Municipality and PWA, equity in water distribution, traffic obstruction and pollution mitigation measures during construction, and the continued use of private wells after the Project. Jenin Municipality provided responses to the questions. It was confirmed that the participants had a thorough understanding of the Project and its impacts, and agreement was reached on the Project.

Furthermore, during the field survey of the Preparatory Survey, interviews and discussions were conducted with stakeholders, including Jenin Municipality, PWA, and the EQA, as well as private well owners (Table 1-20). These stakeholders have also expressed no opposition to the Project, and agreement has been reached.

Table 1-20 Record of Interviews and Consultations with Stakeholders

Target	Date, Location	Participants	Method	Contents
Representatives of the Project Affected Residents, etc.	20.06.2023 Child Culture Centre, Jenin Municipality	General citizens, Jenin Municipality staff, survey team member, Jenin Municipal council members, EQA staff	Stakeholder meeting	Explanation of the Project overview, anticipated environmental impacts, and mitigation measures. Question and answer.
EQA (Director, Jenin Branch Office)	10.11.2021 EQA, Jenin Branch	Director, Jenin Branch, EQA Preparatory Survey Team	Interview	Briefing on the project plan and potential environmental and social impacts. Coverage of environmental permit requirements and procedures.
AI Mechanic well personnel	09.11.2021 AI Mechanic well	Well Control Officer, City of Jenin Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.

Target	Date, Location	Participants	Method	Contents
Al Saadeh well officials	09.11.2021 Al Saadeh Well	Well Control Officer, City of Jenin Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Farathy well (private well) personnel	16.11.2021 Farathy Well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Jarrar well (private well) concerned	16.11.2021 Jarrar Well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Alwaneh wells (private well) officials	16.11.2021 Alwaneh Well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Alaa Alsa'di well (private well) concerned	16.11.2021 Alaa Alsa'di well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Ashraf well (private well) officials	16.11.2021 Ashraf Well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Alaa Alsa'di well (private well) concerned	16.11.2021 Alaa Alsa'di well	Well Owner/Manager Preparatory Survey Team	Confirmation of existing facilities	Confirmation of status and issues with existing wells.
Director, EQA, Jenin Branch	22.11.2021 EQA, Jenin Branch	Director, EQA, Jenin branch Preparatory Survey Team	Interview	Briefing on the project plan and potential environmental and social impacts. Coverage of environmental permit requirements and procedures.
Director of PWA Planning Department	02.12. 2021 PWA main office (Ramallah)	Director of PWA Planning Dept. Preparatory Survey Team	Interview	Project overview and description of potential environmental and social impacts of the project, covering PWA's project implementation structure and its role in environmental and social considerations.

Source: Preparatory Survey Team

### 1-5-12 Land Acquisition and Resettlement

In December 2021, a field observation of the Project site was conducted by international experts of the Preparatory Survey Team and Palestinian experts. Based on this observation, as well as the examination of available maps in the Palestinian spatial information system and project maps, it was concluded that there would be no involuntary resettlement under the Project. Affected residents requiring involuntary resettlement, such as landowners, non-owner residents, agricultural workers, and temporary shop/kiosk owners, were not identified. Furthermore, all project facilities are located on public land and do not require the acquisition of private land. Therefore, a Resettlement Action Plan (RAP) will not be prepared.

### 1-5-13 Monitoring Form (Draft)

The draft monitoring form to be used for implementing the environmental monitoring plan is presented in Table 1-21 and Table 1-22.

Table 1-21 Draft Monitoring Form (Construction Phase)

Construction site (Daily monitoring)					
Monitoring Item	Procedure	Result	Measures to be taken	Reference standard	Frequency
Air quality/dust	Visual inspection, monitoring of odor			Acceptable or not	Daily



Monitoring Item		Procedure	Result	Measures to be taken	Reference standard	Frequency	
Air quality		Laboratory test			WHO(2021) 5 (annual), 15 (24-hour) 15 (annual), 45 (24-hour) 10 (annual), 25 (24 hour) 40 (24-hour)	In case of abnormal status detected by daily monitoring	
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )						
	PM <sub>10</sub> (µg/m <sup>3</sup> )						
	NO <sub>2</sub> (ppm)						
	SO <sub>2</sub> (ppm)						
Noise		Sensory inspection			Acceptable or not	Daily	
		Instrumental measurement			No domestic standards.  WHO standards: 30 dB (community area), 35 dB (bedroom at night), 40 dB (at night, annual average).	In case of abnormal status detected by daily monitoring	
Water quality in pipes and wells		Visual inspection			Acceptable or not	Daily	
Water quality in pipes and wells		Laboratory test			Domestic standard	WHO	In case of abnormal status detected by daily monitoring, or following the regular monitoring set by Jenin city
	pH (measure of acidity)				6.5-8.5	6.5-8.5	
	EC(µScm <sup>-1</sup> )				Up to 2000	Up to 2000	
	Total coliforms (CFU/100 mL)				0-3	0	
	Faecal coliforms (CFU/100 mL)				0	0	
	Nitrate (mg-NO <sub>3</sub> <sup>-</sup> N/L)				Up to 10	Up to 10	
	Turbidity (NTU)			Up to 5.0	Up to 5.0		
Landscape		Visual inspection			Acceptable or not	Daily	
Public Health (sanitation and infectious diseases)		Monitoring of workers and sanitary facilities			If any infectious diseases or sanitation problem observed	Daily	
Occupational Health, Safety (OHS) and accident		Observation of the construction site, reporting from workers			If any accident or abnormal incident for OHS happened	Daily	
Grievance (including those on unequal distribution of benefit and damage, including Local Conflicts of Interests, etc.)		Receipt of grievance			If the grievance is caused by the project	Daily	

Construction site (Weekly monitoring)

Monitoring Item	Procedure	Result	Measures to be taken	Reference standard	Frequency
Waste (Domestic)	Patrol			Acceptable or not	Weekly
Labor's awareness on health care, infectious disease, public health and safety	Lecture and monitoring			Implemented or not	Weekly

Source: Preparatory Survey Team

Table 1-22 Draft Monitoring Form (In-Service)

Monitoring Item	Procedure	Result	Measures to be taken	Reference standard	Frequency
Water quality of wells and connection points	Visual and sensory inspection			Normal condition or not	Daily

Monitoring Item		Procedure	Result	Measures to be taken	Reference standard		Frequency
		Sampling and laboratory analysis			Domestic/international standards of drinking water		Following the standard procedure of Jenin City
Water quality in wells and connection points		Laboratory test			Domestic standard	WHO	Following the regular monitoring set by Jenin city (every 6 months)
	Chloride (mg/l)				N/A	250	
	Hardness as CaCO <sub>3</sub> (mg/l)				N/A	500	
	Conductivity (μS)				2000	N/A	
	Total dissolved solid (mg/l)				N/A	1000	
	Nitrate (mg/l)				N/A	50	
	Turbidity (NTU)				5.0	5.0	
	Faecal coliforms (CFU/100 mL)				0	0	
Total coliforms (CFU/100 mL)			0-3	0			
Ground water level of the wells		Visual observation			Any change or not		Daily
Noise and vibration		Patrol and maintenance			Normal condition or not		Daily

Source: Preparatory Survey Team

#### 1-5-14 Environmental Checklist

An environmental checklist in accordance with JICA's format for the "Water Supply" sector is attached in Appendix 8 (2) and Table 15 of Appendix 8 (1) respectively.

### 1-6 Climate Change Adaptation

#### 1-6-1 Project Summary

##### (1) Project Objectives

The objective of the Project is to improve water supply services and contribute to the improvement of residents' living environment in Jenin Municipality, in the West Bank of the Jordan River, through the rehabilitation and construction of water distribution facilities and the improvement of intake facilities.

##### (2) Project Components

###### 1) Facilities and Equipment:

Rehabilitation of intake facilities (1 unit)

Rehabilitation and upgrading of water pumping stations (1 location)

Rehabilitation of water reservoirs (2 locations)

Installation of distribution mains (approximately 8.3 km)

Replacement and installation of water distribution networks (approximately 55 km)

Construction of water distribution zones (15 DMAs)

Installation of pressure reduction devices (pressure reducing tanks: 2 locations, pressure reducing valves: 6 locations)

Replacement of existing water connections during the replacement of existing pipes

Introduction of SCADA and water supply monitoring system

###### 2) Consulting Services/Soft Components:

Consulting services: Detailed design, bidding assistance, construction supervision

Soft components: Operation and maintenance of facilities, water distribution management and operation support, support for new water connections, operation support for monitoring systems and water distribution management

3) Procurement/Construction Method:

The construction equipment will be procured locally whenever possible. For equipment that is difficult to procure locally but can be imported from Japan or a third country, they will be procured from Japan or a third country. The construction contractor is assumed to be a Japanese company.

(3) Project Beneficiaries (Target Group)

A total of 77,080 residents in Jenin municipality and a part of surrounding areas (estimated water supply population for 2030).

**1-6-2 “Exposure” in the Project**

In the Project, the following project components are considered to be potentially affected by climate change: municipality wells, C-P Project facilities, water distribution mains and networks, pressure reducing tanks, water reservoirs, pumping stations, and surrounding residents.

**1-6-3 “Hazards” associated with the Project**

Based on discussions with relevant local organizations and implementing agencies, hazards that are likely to be associated with the Project were considered, taking into account possible climate scenarios.

Based on the Initial National Communication Report (INCR) of Palestine submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016, the most pessimistic scenario was selected, assuming sustained emissions. According to this scenario, it is projected that the temperature will rise by approximately 1.5°C by 2025 and approximately 2.5°C by 2055. Both the shortening of cold periods and the increase in warm periods will become more significant over time. The overall precipitation is predicted to decrease by approximately 20% by 2055. Generally, a decrease in daily average precipitation and a reduction in the contribution of intense rainfall days to total precipitation, along with an extension of the dry season and a decrease in the rainy season duration, are expected, resulting in an increased risk of drought. According to INCR, climate change could lead to an increase in localized rainstorms and flooding. There is a possibility that water supply facilities may be damaged by water-related disasters, such as floods. In the West Bank in particular, there is also an indication of a potential increase in the occurrence of extreme rainfall events.

**1-6-4 “Climate Risk Assessment” using the Climate Risk Assessment Matrix**

After reviewing climate change projections, potential climate hazards that could affect the project during its implementation period in the Project area were identified. A Climate Risk Matrix was created as follows:

Table 1-23 Climate Risk Matrix

		Climate Hazard (Hazard)			
		H1 High temperature	H2 Precipitation decrease	H3 Shift in rainfall season, drought	H4 Localized heavy rainstorm and flooding
Current occurrence (frequency, etc.)		++	+	+	+
Future		↗	↗	↗	→
Exposure	E1: Municipality well	2	3	0	2
	E2: C-P Project Facility	2	2	1	0
	E3: Distribution main	0	0	0	0
	E4: Distribution networks	0	0	0	0
	E5: Pressure reducing tank	1	0	0	0
	E6: Water service reservoir	1	0	0	0

E7: Pumping station	1	0	0	1
E8: Surrounding people	2	2	1	2
E9: Water Distribution Areas (DMAs)	1	1	0	0

Scale for evaluating the frequency of occurrence of a hazard

- ++ Frequently occurring thus far or at present
- + Sometimes occurring thus far or at present
- Has hardly occurred thus far or at present

Scale for assessing the level of impact already occurring today

- 3 Events and impacts that have occurred thus far have been so difficult that they cannot be addressed and handled.
- 2 Events and impacts that have occurred to date have been moderately difficult to manage and deal with.
- 1 It has not been so difficult to manage the events and impacts that have occurred thus far. The resulting impact was minor and was managed to some extent.
- 0 The impacts of events that have occurred to date have been negligible.

Direction of future changes in "hazard" (future trends)

Directions for future change (future trends) are examined and noted with arrows.

Potentially significant future impacts (i.e., risks) of the Project

Based on the degree of impact, the impacts (i.e., risks) that are likely to be significant in the future in the Project are circled in red, taking into account the direction of future changes in the hazard.

Source: Preparatory Survey Team

Considering the degree of impact described in the table and the direction of future changes in climate hazards, three combinations of "climate hazard" and "exposure" were selected as shown in the circle that should be monitored in the Project.

Next, for each combination of "climate hazard" and "exposure" that should be monitored in the Projects selected above, "vulnerability" that may contribute (or has already contributed) to the occurrence of "climate risk" that could become significant in the future was considered, and climate risk that could become significant in the future was confirmed (see Table 1-24).

Table 1-24 Narrowing Down Possible Future Impacts (Risks) of the Project

	A	B	C
	Impacts (climate risks) that may be significant in the future (Exposure + Hazard)	Vulnerabilities contributing to the development of impacts (Susceptibility to and capacity to cope with impacts)	Impact climate risks (risks ultimately selected) that may be significant in the future for the target project
1	H2 (Decreasing Precipitation) + E1 (Water Supply: Wells) - A decrease in precipitation leads to reduced groundwater recharge, resulting in decreasing exploitable groundwater capacity.	V1: Decreasing groundwater recharge adversely affect the water supply function of the wells.	R1: Exploitable groundwater capacity will decrease if use of groundwater is not controlled and precipitation continues to decline in future.
2	H1 (High Temperature) + E2 (Water Supply: Connection Points) - Higher temperature increases water consumption both inside and outside the Green Line <sup>#</sup> , may reduce the amount of water available to Jenin from the connection point.	V2: Lack of alternative water sources and relationships between Palestine and Israel may lead to decreased water supply to Jenin. During summer season when water demand is high, water supply hours may potentially be restricted.	R2: Water supply quantity from Israel to Palestine and Jenin may be reduced.
3	H1 (High Temperatures) + E8 (Surrounding Residents) - During hot seasons, people consume more water than the water supply capacity of Jenin Municipality.	V3: Emergency response plans to supply adequate amount of water to the surrounding residents are either weak or nonexistent.	

4	H4 (Increasing Local Heavy Rainstorm and Flooding) + E1 (Water Supply: Wells) and E7 (Pump Stations) - Localized flooding would negatively impact the wells and pump stations to be implemented under the Project.	V4: Flooding can potentially degrade the water quality extracted from the wells. Flooding may damage pump stations.	R3: Localized rainstorm and flooding will cause degradation of water quality of wells. Flooding may damage pump stations.
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(Note) # Green line: Israel's borders before 1967

Source: Preparatory Survey Team

### 1-6-5 Examination of "Adaptation Options" for Potentially Significant Future Impacts (Climate Risks) of the Project

The "Adaptation Options" for the climate risks identified above, along with the corresponding SDG items are shown in Table 1-25.

Table 1-25 Adaptation Options

Risk	Impact climate risk considered likely to be significant in the future	Adaptation options for climate risk	Corresponding SDG items
1	Water supply-demand imbalance: increased water demand and insufficient water supply	Option 1(A1): Implementation of water conservation awareness programs	6 CLEAN WATER AND SANITATION 
		Option 2(A2): Implementation of water reuse (e.g. reuse of gray water)	6 CLEAN WATER AND SANITATION 
		Option 3(A3): Emergency response plan (water purchase from outside of Municipality, tanker supply)	11 SUSTAINABLE CITIES AND COMMUNITIES 
2	Decrease in groundwater resources used for water supply	Option 4(A4): Alternative water source (new well construction)	6 CLEAN WATER AND SANITATION 
		Option 5(A5): Improvement of the existing water sources (wells)	6 CLEAN WATER AND SANITATION 
		Option 6(A6): Rainwater harvesting (water harvesting from the roof during winter or rain season, water harvesting from agricultural houses)	6 CLEAN WATER AND SANITATION 
		Option 7(A7): Securing bulk water supply from Israel	16 PEACE, JUSTICE AND STRONG INSTITUTIONS 
3	Localized rainstorm and flooding will cause degradation of water quality of wells. Flooding may damage pump stations.	Option 8(A8): Stormwater drainage facility for wells and pump stations	6 CLEAN WATER AND SANITATION 

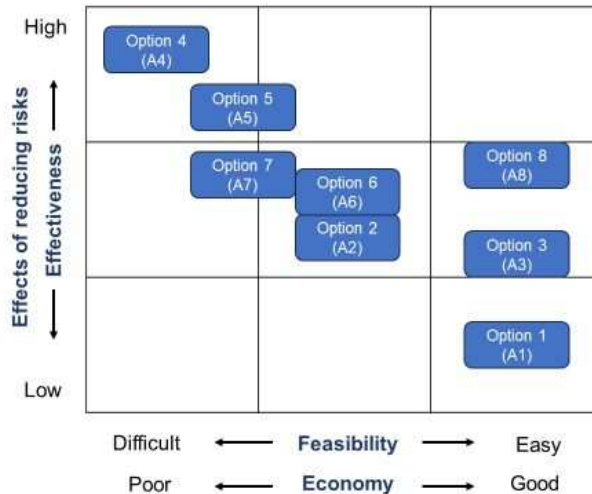
Source: Preparatory Survey Team

In reference to the eight adaptation options identified above, a comparative assessment of these options was conducted in Source: Preparatory Survey Team

Figure 1-35, considering economic viability, effectiveness, and feasibility. This assessment aims to ensure that the residual risks remain within acceptable limits for the Project. Option 5 (A5: Improvement of existing water sources) and Option 7 (A7: Securing stable water supply from Israel) can already be considered adopted taking into account the rehabilitation of the municipality wells to be implemented under the Project and cooperation with the C-P Project.

Option 1 (A1: Water reuse), Option 2 (A2: Emergency response plan), Option 4 (A4: Construction of new wells), and Option 6 (A6: Rainwater harvesting) fall outside the scope of the Project. To mitigate the residual risks associated with the climate risks mentioned above, it is recommended that the executing agency examines the feasibility of those options.

Option 8 (A8: Stormwater drainage facility for wells and pump stations) is recommended to be addressed during the detailed facility design phase.

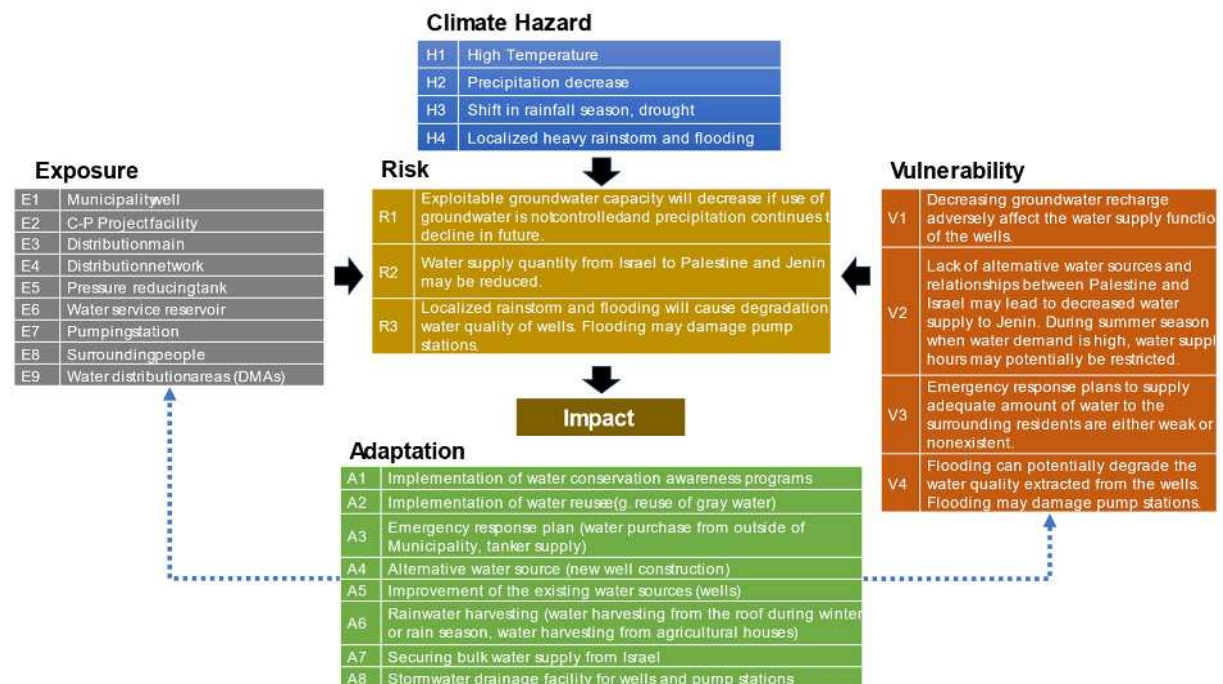


Source: Preparatory Survey Team

Figure 1-35 Matrix of the Effects of the Adaptation Measure and Feasibility

### 1-6-6 Climate Risk Tree

Based on the above analysis, a climate risk tree is prepared as Figure 1-36.



Source: Preparatory Survey Team

Figure 1-36 Climate Risk Tree

## Chapter 2 Contents of the Project

### 2-1 Basic Concept of the Project

The Project aims to improve water supply services and contribute to the improvement of the living environment for the citizens of Jenin Municipality on the West Bank of the Jordan River. This will be achieved through the rehabilitation and renewal of distribution facilities, as well as the rehabilitation of the intake facility. In other words, the Project seeks to improve the water supply service by reducing leakage, increasing water supply volume, and normalizing pressure. This can be achieved through the replacement of the aging distribution network, reconstruction of the distribution system, and rehabilitation of the existing municipality wells in Jenin Municipality, where the own water sources are limited and the service levels are insufficient. Additionally, the Project will improve the water supply coverage rate by installation of new distribution pipes.

By implementing the Project, it is anticipated that the population in Jenin Municipality with access to water supply will increase from the current 51,680 people (as of 2020) to 77,080 people by the target year of 2030. Furthermore, the average daily per capita water consumption is expected to increase from 82 liters/person/day to 120 liters/person/day. The components of the Grant are shown in Table 2-1.

Table 2-1 Components of the Project

Item	Contents
Construction of facility	<ul style="list-style-type: none"> <li>➤ Rehabilitation of Al Saadeh Municipality Well</li> <li>➤ Rehabilitation of pumping facilities at Al Saadeh water pumping station</li> <li>➤ Rehabilitation of site piping within the existing water reservoirs (Al Marah and Al Jabreyat reservoirs)</li> <li>➤ Construction of new water distribution mains (pipe length: 8.3 km)</li> <li>➤ Replacement and new installation of water distribution networks (pipe length: 55 km)</li> <li>➤ Construction of District Metered Areas (DMAs) (15 DMAs)</li> <li>➤ Installation of pressure reducing equipment (pressure reducing tanks: 2 tanks, pressure reducing valves: 6 valves)</li> <li>➤ Reconnection of the existing water supply connection to the newly installed pipes</li> <li>➤ Introduction of SCADA system</li> </ul>
Soft components	<p>The following technical assistance is provided to ensure the smooth commencement of the operational use and sustainable operation and maintenance of the facilities constructed under the Grant project.</p> <ul style="list-style-type: none"> <li>➤ Technical assistance to implement proper water distribution management and water operations</li> <li>➤ Technical assistance to facilitate new water supply connections and promote efficient NRW measures</li> </ul>

Source: The Preparatory Survey Team

### 2-2 Outline Design of the Requested Japanese Assistance

#### 2-2-1 Design Policy

##### 2-2-1-1 Basic Policy

###### (1) Coordination with the C-P Project

The Project is planned to receive approximately 73% of its water source from the C-P project's bulk water supply. Therefore, the Project planning and components must be aligned with the C-P project. As the C-P project is a crucial prerequisite for achieving the intended effects of the Project, the Project must be planned in coordination with the C-P Project in terms of design, construction, taking-over schedule, etc. (refer to 1-3 for details about the C-P Project)

###### (2) Utilization of the Outcomes of the Technical Assistance Project

The JICA's Technical Assistance Project, "The Project for Strengthening the Capacity of Water Service Management in Jenin Municipality" has previously been implemented to develop capacities related to strategic planning for NRW reduction and water revenue collection. The Grant Project will be planned to maximize the synergies between the capacity developments assisted by the Technical Assistance Project and

the infrastructure improvement supported by the Grant Project.

### (3) New Service Reservoir

During the field survey in October 2021, the Jenin Municipality requested the construction of a new service reservoir. In the Technical Note (October 2021), the PA agreed to proceed with the process of land acquisition. However, it was discovered that the proposed site belongs to Area C, which is under Israeli control. Despite negotiations conducted by PWA with Israeli authorities to obtain land use and construction permits, the necessary documents confirming permissions could not be obtained by the agreed-upon deadline stated in the M/D (July 2022). Considering the capacity of the existing reservoir, which already allows for approximately 8 hours of water retention for distribution, it was agreed to proceed with the design approach that does not involve construction of a new service reservoir.

### (4) Scope of the Japanese Grant

During the explanation of the Inception Report, it was explained and agreed that the scope of Japanese Assistance would be determined by considering cost-effectiveness and priority of each component, taking into account the appropriate scale of the project as a Japanese Grant. In particular, the scope of replacing the water distribution network would be determined through examinations such as the function, age, material of the pipes, etc. since replacing the total pipe length will be expensive.

### (5) Water Source Plan

The water sources of Jenin will be the municipality wells and bulk water supply from the C-P Project, having the design capacity of 4,000m<sup>3</sup>/day and 10,800 m<sup>3</sup>/day respectively. The private wells will not be used as the water source of the Project, since the existing private wells do not have the licenses for water source.

However, according to PWA, the use of private wells may be accepted as emergency backup water sources, in situations such as severe water shortages or water cutoffs. For this reason, emergency connection pipes with the private wells will be equipped in the Project.

### (6) Water Transmission and Distribution Plan

- ✓ Water transmission and distribution facilities will be separated to ensure a stable water supply system.
- ✓ As the scope of the water transmission pipelines from the C-P Project to the existing service reservoirs was confirmed to be a part of the C-P Project, these pipelines were excluded from the scope of the Japanese grant. The existing transmission pipeline from the Al Saadeh Pump Station to the existing Service Reservoirs will be used as it is. Since the pipeline (steel pipe, Dia. 200mm) was constructed 17 years ago (as of 2021), necessity of replacement was determined as low taking into account that the issue of aging material is less and pipe diameter is hydraulically capable of transmitting water quantity.
- ✓ Water distribution system by gravity flow from the Service Reservoirs is employed as much as applicable, in order to ensure a stable system that can adjust to changes in water demand over time and maintain a consistent water supply in emergencies.
- ✓ To regulate proper water pressure in the water service area, the Distribution Management Areas (DMA) will be established that can distribute water at the appropriate pressure. The distribution main pipelines will be constructed from the distribution reservoirs to each DMA, together with the distribution branch pipes within the DMAs (only replacing aging pipelines). Additionally, pressure reducing valves and pressure-reducing tanks will be installed at branching points from the DMA's distribution main pipelines as needed to regulate the water pressure.
- ✓ The system will be designed to provide 24-hour water supply. On the other hand, the system will also be capable of using the existing private wells and operating with restricted water supply in case of delays in completion of the C-P Project.
- ✓ A monitoring system will be established to monitor and record flow rates and water pressure in each DMA, enabling effective operational management.

#### **2-2-1-2 Policy for Natural Environmental Conditions**

The average daily temperature in Jenin over the past 10 years has been 22.5°C, with an annual precipitation of just under 200mm. In the summer (July), the temperature averages around 29.5°C, while in the winter (January), it drops to 13.25°C. Rainfall is concentrated from November to March, but the total amount is around 200mm, so there is generally little heavy rainfall. Therefore, a significant decrease in construction



efficiency due to weather conditions is not anticipated.

### **2-2-1-3 Policy for Socioeconomic Conditions**

The majority of the residents are Muslims and their social life is influenced by the teachings of Islam. Therefore, the construction plan should take into account different customs, such as Ramadan and other multi-day religious holidays, as well as the five times a day daily prayers, etc.

### **2-2-1-4 Policies for Construction/Procurement Conditions**

Materials and equipment, labor, and construction machinery that are available locally will be procured from the local market in Palestine. However, materials and equipment that are not manufactured in Palestine, such as ductile iron pipes and pumps, are to be procured from Japan or third countries. Importing materials and equipment to Palestine requires an import permit from the Coordinator of Government Activities in the Territories (COGAT) in Israel. The procurement plan will be formulated, taking into considerations the procedures required on the Israeli side as well.

### **2-2-1-5 Policies to Use Local Construction Companies**

A number of construction projects, including Japanese ODA and other internationally funded projects, have been implemented in Palestine. There are several construction companies in Palestine that have experience in both domestic and international projects. In Jenin, small and medium-scale civil and architectural construction projects have been carried out. Therefore, the construction plan is formulated with the assumption that local construction companies will be utilized, under the supervision of Japanese construction companies, to ensure project management, quality control, safety management, and other aspects.

### **2-2-1-6 Policy for Operation and Maintenance**

After the Project implementation, the WWD of Jenin Municipality will be responsible for the operation and maintenance. Therefore, the facility's grade will align with the current level of maintenance capacity. Through the establishment of DMAs and the introduction of a SCADA system, effective water distribution management and fair water allocation will be realized. Since the SCADA system will be newly introduced, technical instructions will be provided by the Soft Component to facilitate water distribution management and operation, utilizing operational records and flow data.

### **2-2-1-7 Policy on Grade of Facilities and Equipment**

The materials and equipment used for water piping in construction work shall comply with the internationally recognized standards such as ISO, IEC, JIS, BS, and others. For facility planning, the standards specified in the manuals and other applicable documents in Palestine will be followed in principle. However, in cases where specific standards are not provided, the planning will conform to the Japanese Design Criteria for Water Supply Facilities and other relevant guidelines.

### **2-2-1-8 Policy on Construction Methods/Procurement Methods and Construction Schedule**

In the Project, the water pipe installation work covers a total length of approximately 63 km, which is critical for the construction schedule. In order to achieve an optimal construction period, the installation of water pipes will be carried out by multiple teams, with the aim of reducing the construction duration. Additionally, since the water pipe installation involves open trench construction, a construction plan will be devised to prioritize the safety of third parties and minimize disruptions to traffic as much as possible.

### **2-2-1-9 Policy on Construction Supervision**

Since the water pipe installation work is expected to involve multiple teams, a construction supervision organization will be established. The organization will allocate personnel who are capable of accommodating this arrangement by utilizing local engineers. Additionally, the Project includes the rehabilitation of the existing municipality well. Considering the risks associated with the existing well, such as potential borehole wall collapse due to exposed aquifer sections, the rehabilitation work will be managed by a well engineering expert with sufficient knowledge and experience in similar work.

### **2-2-1-10 Policy on Safety Measures**

The project area includes a refugee camp in Jenin Municipality, where clashes between Israeli security forces and residents have occurred frequently. Therefore, special attention needs to be given to the security situation within the refugee camp. While ensuring that the residents of the refugee camp also benefit from the project,

the facility planning of the Project is to exclude pipe construction works inside the refugee camp in order to avoid security risks.

## **2-3 Basic Plan (Facility Plan)**

### **2-3-1 Water Supply Planning**

#### **(1) Target Year**

The target year for the Project was agreed upon with the PA in the M/D as 2030, which aligns with the mid-term phase of the Jenin Water and Wastewater Master Plan.<sup>8</sup> The target year is set as four years after the completion of the construction of the facilities under the Project, which is deemed reasonable from the viewpoint of realizing the Project's effects.

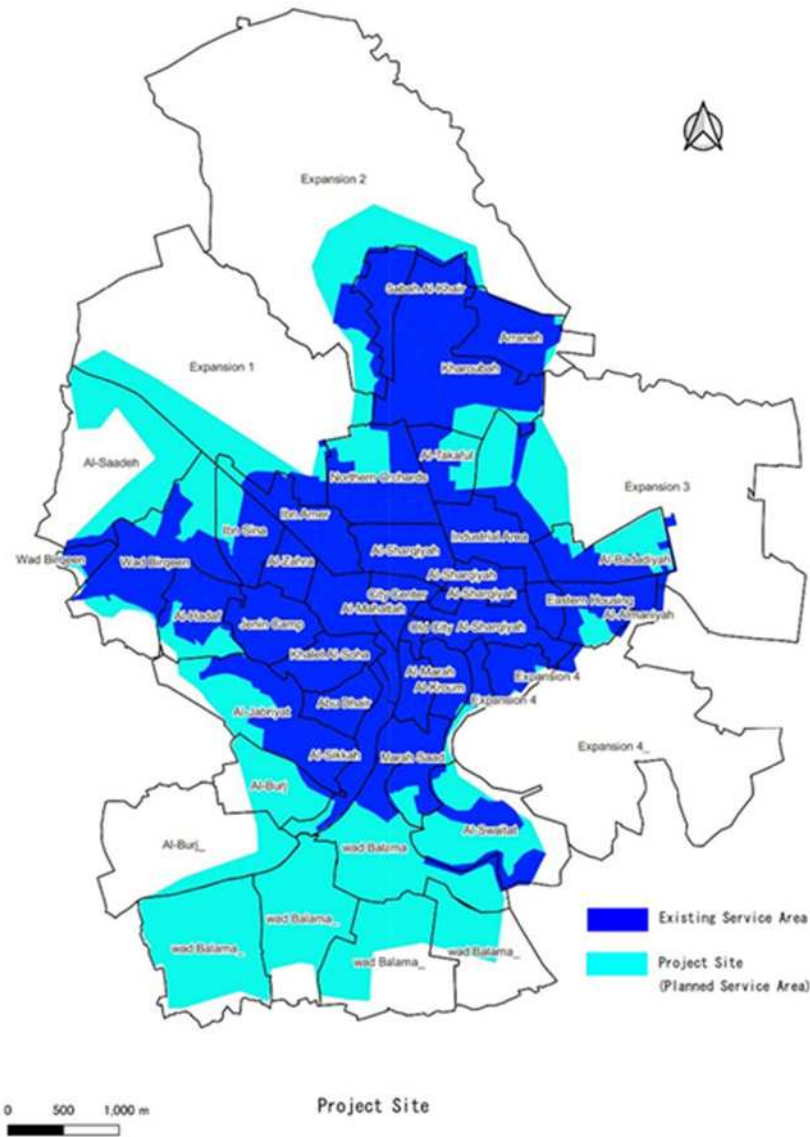
#### **(2) Water Service Area**

The existing water service area includes certain areas outside the administrative boundaries of Jenin Municipality that are adjacent to the Municipality. Although these areas are outside the administrative jurisdiction of Jenin Municipality, they are currently under examination for future expansion of the administrative boundaries, and are included in the census population of Jenin Municipality. Out of the total population of 60,201 people in Jenin Municipality (including refugee camps), 3,584 people, accounting for approximately 6%, reside in these areas (2017 census).

These areas adjacent to Jenin Municipality, although outside the administrative boundaries of Jenin Municipality, are the areas experiencing urban expansion. According to Jenin Municipality, there are plans to provide water supply from the Jenin Water Supply System to these areas. Therefore, it is considered reasonable to include a portion of the expansion areas adjacent to Jenin Municipality in the planned water service area of the Project. As a result, the planned water service area of the Project encompasses the existing water supply area (in blue) as shown in Figure 2-1, as well as the expansion areas (in light blue) that will be covered by the Project to provide service to previously unserved areas.

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<sup>8</sup> "Diagnostic Study for Water and Wastewater Systems in Jenin City Phase IV: Master Plan Report" (2016).



Source: Prepared by the Preparatory Survey Team  
Figure 2-1 Planned Water Service Area

### (3) Service Coverage Ratio

Based on satellite images of the planned water supply area, the distribution of residential areas was examined. The feasibility of water distribution by gravity was taken into consideration when determining the planned service coverage ratio for each census block. The planned service coverage ratios for each census block are presented in Table 2-2.

Table 2-2 Planned Coverage Ratio by Census Block

Classification within and outside Jenin Municipality	Existing water service area/ Unserved area	Census Block	Coverage Ratio
Within the administration boundary of Jenin Municipality	Existing water service area	Abu Dhair, Al-Almaniyah, Al-Badadiyah, Al-Hadaf, Al-Jabriyat, Al-Kroum, Al-Mahattah, Al-Marah, Al-Nabatat, Al-Sharqiyah_1, Al-Sharqiyah_2, Al-Sharqiyah_3, Al-Sharqiyah_4, Al-Sikkah, Al-Swaitat, Al-Takaful, Al-Zahra, Arraneh, City Center, Eastern Housing, Ibn Amer, Ibn Sina, Industrial Area, Khalet Al-Soha, Kharoubah,	100%.

Classification within and outside Jenin Municipality	Existing water service area/ Unserved area	Census Block	Coverage Ratio
		Kharoubah, Marah Saad, Northern Orchards, Old City, Sabah Al-Khair, Wad Balama1, Wad Birqeen1, Wad Birqeen 2, Jenin Camp	
	unserved area	Al-Burj_1	80%.
		Al-Burj_2	100%.
		Al Saadeh	100%.
		Wad Balama2	80%.
		Wad Balama3	100%.
		Wad Balama4	80%.
	Wad Balama5	80%.	
Expansion areas included in the census population outside the administration boundary of Jenin Municipality	Existing water service area	Expansion 1	90%.
		Expansion 2	80%.
		Expansion 3	90%.
		Expansion 4_2	100%.
		Expansion 4_3	100%.
	Unserved area	Expansion 4_1	0

Source: Prepared by the Preparatory Survey Team

#### (4) Population Served

Based on the 2017 Census data<sup>9</sup> and population projections from the Palestinian Central Bureau of Statistics (PCBS)<sup>10</sup>, the population growth rate of the city was estimated to be 2.08% per year. However, for the population in refugee camps, it was assumed that the growth rate will continue at the past growth rate of 0.23% per year<sup>11</sup>, as it is believed that the population in the camps has already approached saturation due to the housing conditions.

Based on the above, the projected future population in the planned water service area for the target year (2030) is estimated to be 78,673 people. The planned population served, calculated based on the projected service coverage rates shown in Table 2-2, is 77,080 people. As a result, the overall service coverage ratio for the entire water service area is 98%.

#### (5) Water Consumption Per Capita

According to the Palestinian "National Water Policy,"<sup>12</sup> the per capita water consumption is set at 120 liters/person/day. In the "Jenin Municipality Water and Wastewater Master Plan"<sup>13</sup> too, a benchmark of 120 liters/person/day is adopted. However, the C-P Project currently adopts a lower value of 100 liters/person/day, which is inconsistent with the established benchmarks. The Technical Assistance Project measured the actual water consumption of the households in the Pilot Area where 24-hour water supply was implemented. The results indicated that an actual per capita water consumption was 120 liters/person/day. Based on this finding, it was determined that setting the per capita consumption for the Project at 120 liters/person/day is reasonable, and this agreement was reached in the M/D (July 2022).

It is important to note that the C-P Project encompasses not only urban areas but also surrounding villages as a regional water supply project. Water consumption in village areas is generally lower compared to urban areas. Therefore, it is considered appropriate to set an average per capita consumption of 100 liters/person/day for the entire area covered by the C-P Project.

<sup>9</sup> PCBS, "Population, Housing and Establishments Census 2017" (2019).

<sup>10</sup> PCBS, "Projected Mid-Year Population for Jenin Governorate by Locality 2017-2021"

<sup>11</sup> Annual population growth rate of Jenin Camp is 0.23% during 2007 and 2017.

<sup>12</sup> Palestinian Water Authority, "National Water Policy for Palestine 2013-2032" (2013)

<sup>13</sup> "Diagnostic Study for Water and Wastewater Systems in Jenin City Phase IV: Master Plan Report" (2016).

## (6) Leakage Rate

The leakage rate in 2020 is estimated at 50 %<sup>14</sup>, primarily due to aging pipes and excessive water pressure. However, for the target year, the planned target for the leakage rate is set at 25%, taking into account the Project components, lessons learned from the Technical Assistance Project, and the geographical features of Jenin Municipality.

- In the Project, approximately 53km of pipes are planned for replacement, which accounts for around 34% of the total existing pipe length of 153 km in Jenin. This means that about 66% of the distribution network will continue to use existing pipes, which are aging and will not be subjected to replacement under the Project. This poses challenges in improving leakage from these deteriorated pipes.
- By installing 8 km of main distribution pipes, pressure-reducing tanks/valves, and establishing DMAs, the distribution system will be reconstructed, allowing distribution at appropriate water pressure and reducing excessive pressure, which is expected to contribute to leakage reduction.
- Flow rate and water pressure will be measured and recorded for each DMA, enabling the analysis of minimum night flow and water balance in relation to water consumption. This analysis will facilitate the effective implementation of leakage reduction measures.
- The results of activities to reduce NRW in the Pilot Area of the Technical Assistance Project show an improvement from a baseline value of 59.4% in 2018 to 46.1% in 2022, representing an annual improvement of approximately 3 percentage points. As reducing NRW requires sustained efforts, it is crucial to continue these activities alongside leakage reduction measures.
- The planned water service area of Jenin Municipality has significant terrain variations. Even when attempting to optimize water pressure by dividing the distribution zones, localized high water pressure may occur within the distribution zones due to differences in elevation. This presents unfavorable hydraulic conditions for leakage prevention.

The NRW ratio is determined by combining physical losses attributed to leakage and commercial losses. Based on the analysis and evaluation of NRW conducted by measuring minimum night flow (MNF) in the Pilot Area of the Technical Assistance Project, it was found that the commercial losses accounted for 8% of the distribution volume. Therefore, the planned target for the NRW ratio in the target year is set at 33% in the Project.

## (7) Maximum Daily Factor (Load Factor)

The maximum daily factor is a coefficient that indicates the magnitude of seasonal variations in water supply, that varies based on the size, characteristics, and climatic conditions of the service area. The actual monthly water distribution volumes for the past four years, from 2018 to 2021, in Jenin Municipality are presented in Table 2-3.

Table 2-3 Actual Monthly Water Distribution

	2018	2019	2020	2021
January	241,282 m <sup>3</sup>	264,719 m <sup>3</sup>	288,495 m <sup>3</sup>	294,788 m <sup>3</sup>
February	232,788 m <sup>3</sup>	264,532 m <sup>3</sup>	278,881 m <sup>3</sup>	286,772 m <sup>3</sup>
March	236,026 m <sup>3</sup>	294,489 m <sup>3</sup>	316,564 m <sup>3</sup>	295,420 m <sup>3</sup>
April	320,852 m <sup>3</sup>	287,333 m <sup>3</sup>	316,654 m <sup>3</sup>	346,018 m <sup>3</sup>
May	278,123 m <sup>3</sup>	294,317 m <sup>3</sup>	316,564 m <sup>3</sup>	343,905 m <sup>3</sup>
June	276,533 m <sup>3</sup>	241,925 m <sup>3</sup>	305,340 m <sup>3</sup>	331,421 m <sup>3</sup>
July	287,549 m <sup>3</sup>	290,516 m <sup>3</sup>	304,169 m <sup>3</sup>	321,977 m <sup>3</sup>
August	286,742 m <sup>3</sup>	290,516 m <sup>3</sup>	331,648 m <sup>3</sup>	315,994 m <sup>3</sup>
September	261,812 m <sup>3</sup>	290,516 m <sup>3</sup>	321,321 m <sup>3</sup>	283,794 m <sup>3</sup>
October	240,652 m <sup>3</sup>	290,516 m <sup>3</sup>	306,950 m <sup>3</sup>	282,184 m <sup>3</sup>
November	222,910 m <sup>3</sup>	290,516 m <sup>3</sup>	306,950 m <sup>3</sup>	265,026 m <sup>3</sup>
December	267,622 m <sup>3</sup>	192,679 m <sup>3</sup>	317,089 m <sup>3</sup>	281,532 m <sup>3</sup>
Total	3,152,891 m <sup>3</sup>	3,392,574 m <sup>3</sup>	3,692,563 m <sup>3</sup>	3,648,338 m <sup>3</sup>

Source: The Completion Report of the Technical Assistance Project

<sup>14</sup> Estimation by the Preparatory Survey Team

Based on the above actual monthly water distribution volume from 2018 to 2021, the daily average water distribution and coefficient of variation for the last four years are presented in Table 2-4.

Table 2-4 Average Daily Water Distribution and Coefficient of Variation

	Average Daily Water Distribution	Coefficient of Variation
January	8,785 m <sup>3</sup> /day	0.923
February	9,491 m <sup>3</sup> /day	0.998
March	9,214 m <sup>3</sup> /day	0.969
April	10,590 m <sup>3</sup> /day	1.113
May	9,943 m <sup>3</sup> /day	1.045
June	9,629 m <sup>3</sup> /day	1.012
July	9,711 m <sup>3</sup> /day	1.021
August	9,878 m <sup>3</sup> /day	1.038
September	9,465 m <sup>3</sup> /day	1.014
October	9,035 m <sup>3</sup> /day	0.950
November	8,895 m <sup>3</sup> /day	0.935
December	9,342 m <sup>3</sup> /day	0.982
Average	9,513 m <sup>3</sup> /day	1.000

Source: Prepared by the Preparatory Survey Team based on the Completion Report of the Technical Assistance Project

Based on the past data, the coefficient of variation reaches its maximum of 1.113 in April and its minimum of 0.935 in November. Generally, water demand increases during the summer and decreases during the winter. In Jenin Municipality, water demand is suppressed during the summer due to water scarcity. Therefore, the actual coefficient of variation for water demand may be higher than the observed values from past records. However, to avoid excessive investment caused by an oversized facility, the planned value for the peak factor is set at 1.12, considering the coefficient of variation of 1.113 derived from the data of the past four years.

## (8) Water Demand Forecast

Based on the aforementioned plan, the estimated water demand for the target year (2030) is determined to be 14,800 m<sup>3</sup>/day, as shown in Table 2-5. It was agreed upon with the PA.

Table 2-5 Target Year (2030) Water Demand Forecast for the Target Year (2030)

[1]	Water supply population	77,080 people	
[2]	Average daily per capita domestic water consumption	120 L/person/day	
[3]	Average daily non-domestic water consumption per capita	8 L/person/day	[3] = 7% <sup>15</sup> x [2]
[4]	Average daily per capita water consumption	128 L/person/day	[4] = [2] + [3]
[5]	Average daily water consumption	9,866 m <sup>3</sup> /day	[5] = [1] x [4]
[6]	Leakage	3,289 m <sup>3</sup> /day	25%.
[7]	Average daily water demand	13,155 m <sup>3</sup> /day	[7] = [5] + [6]
[8]	Maximum daily factor	1.12	
[9]	Maximum daily water demand	14,734 m <sup>3</sup> /day	[9] = [7] x [8]

Source: T/N (2) (August 2022)

## 2-3-2 Water Source Planning

### (1) Bulk Water Supply

In the M/D (July 2022), the water supply volume to Jenin Municipality from the C-P Project has been agreed to be 10,800 m<sup>3</sup>/day. The existing bulk water supply from Israel (Mekorot) to the West Bank Water Department (WBWD) will be integrated into the ongoing C-P Project.

Regarding the Janzour well, which is currently under construction, the C-P Project plans to transmit the well water to the regional reservoir to be constructed under the C-P project. As a result, the water intake volume from the Janzour well will be included in the bulk water supply volume from the C-P Project. However, as

<sup>15</sup> PWA, "National Water and Wastewater Strategy for Palestine," July 2013, Strategic objectives of 2032

the construction of the Janzour well is currently on hold and its future direction is undecided, it presents a high level of risk. Therefore, in the M/D in July 2022, it was agreed that the water supply volume to Jenin Municipality will be ensured regardless of the future production volume of the Janzour well.

## (2) Municipality Well

### 1) Al Saadeh Municipality Well

During the pumping test conducted in 2007, a pumping yield of 4,800 m<sup>3</sup>/day was achieved. However, the yield subsequently declined due to factors such as aquifer clogging and well deterioration. In 2014, rehabilitation measures, including airlifting, were implemented, resulting in the restoration of the yield to 3,600 m<sup>3</sup>/day. However, the current water yield has decreased to 2,437 m<sup>3</sup>/day. Considering that nearly 10 years has passed since the last rehabilitation, it is planned to perform well cleansing to remove sediment at the bottom of the well and address aquifer clogging using hydrochloric acid (HCl). The objective is to restore the water yield to approximately 3,500 m<sup>3</sup>/day.

### 2) Al Mechanic Municipality Well

The well is a shallow well with a diameter of 2 m and 20m in depth. There is an aquifer located near the bottom of the well. Being unconfined groundwater, the water level directly responds to rainfall fluctuation. Due to its large-diameter open hole structure, rehabilitation methods such as airlifting are not expected to achieve sufficient results<sup>16</sup>. Although the groundwater level decreases near the bottom of the well during the dry season, limiting the continuous pumping time, it is still possible to extract approximately 500 m<sup>3</sup>/day throughout the year. Despite its location in the city center, which poses a high risk of contamination due to its shallow depth, the well holds a license for drinking water extraction. Considering the current difficulties in obtaining licenses for new wells<sup>17</sup>, it is planned to continue using the well with water quality monitoring.

### 3) Al Balama Municipality Well

The well holds a water extraction license for agricultural purposes, and its pumping capacity is very low at 30 m<sup>3</sup>/day. As an alternative, a new Janzour well is under construction on the same site. Once the Janzour well is completed, the plan is to discontinue the use of the Al Balama well.

### 4) Private Well

As private wells do not hold the necessary licenses, they are deemed unsuitable as water sources for the public water supply and are not included in the water source plan of the Project. The PWA permits the use of private wells as supplemental water sources cases of large-scale water shortages or emergencies that result in water supply interruptions. In the facility planning of the Project, emergency connections with private wells will be considered based on their technical and economic feasibility. These connections will enable the utilization of the private wells as supplementary water sources during emergencies. Given that Jenin Municipality relies on Israel for more than 70% of its water sources, any disruption in the supply could potentially pose a security threat. Therefore, it is necessary to establish emergency connections as contingency measures.

### 5) Water Source Plan

According to the water source plan outlined above, the volume of water sources is estimated to be 14,800 m<sup>3</sup>/day (maximum daily) as shown in Table 2-6, which is sufficient to meet the water demand for the target year (2030).

Table 2-6 Water Source Plan

Type	Water Source	Production	Remarks
Municipality well	Al Saadeh Well	3,500 m <sup>3</sup> /day	Rehabilitation
	Al Mechanic Well	500 m <sup>3</sup> /day	Continuation
	Al Balama Well	-	Abandonment
Private well		-	Abandonment
WBWD	Connection Point Project	10,800 m <sup>3</sup> /day	
	Existing Al Jalameh Receiving Point	-	Abandonment

<sup>16</sup> T/N (2) (August 2022) agreed to include the rehabilitation of wells in the scope, but decided not to rehabilitate them based on the well structure and the lack of expected rehabilitation benefits.

<sup>17</sup> According to the Oslo Accords, permission by Israeli authority is required for new well development, which is considered difficult to obtain based on the current situation.

Type	Water Source	Production	Remarks
	Existing Al Swetat Receiving Point	-	Abandonment
	Abo Arab Wells	-	Abandonment
	Total	14,800 m <sup>3</sup> /day	

Source: T/N(2) (August 2022)

### 2-3-3 Water Transmission and Distribution Facility Plan

#### (1) Basic Policy

The basic policy for water transmission and distribution facilities is summarized below.

- Water distribution to each distribution zone will be done via service reservoirs to create a stable system capable of adjusting to time fluctuations in water demand and ensuring a constant water supply, even during emergencies.
- A new system will be designed to maximize the utilization of the existing facilities such as service reservoirs, pumping stations, and pipelines that can still be utilized effectively.
- The appropriate distribution zones (DMAs) will be established by subdividing each water distribution zone, taking into consideration factors such as the layout of existing pipelines that will continue to be used, the new pipelines, elevation of the distribution zone, and the placement of pressure reducing valves and tanks to maintain proper water pressure.
- Gravity flow type from the service reservoir is preferred over the pumping type for water distribution.
- Distribution pipes will be divided into distribution mains and distribution network pipes, and water will be distributed to each DMA via branches from the distribution mains to create a system that will ensure appropriate water pressure and fair distribution flow.
- Existing pipelines that will continue to be utilized will be selected and planned so that the length of new pipelines will be shortened.
- The water distribution system will be designed to enable 24-hour water supply, but consideration will be given to the possibility of operating with a limited water supply, assuming that this may not be possible immediately after the completion of the project.
- The monitoring system will target the inflow and water pressure to each DMA, enabling the management of distribution flows and water pressure at each DMA.

#### (2) Distribution Zone

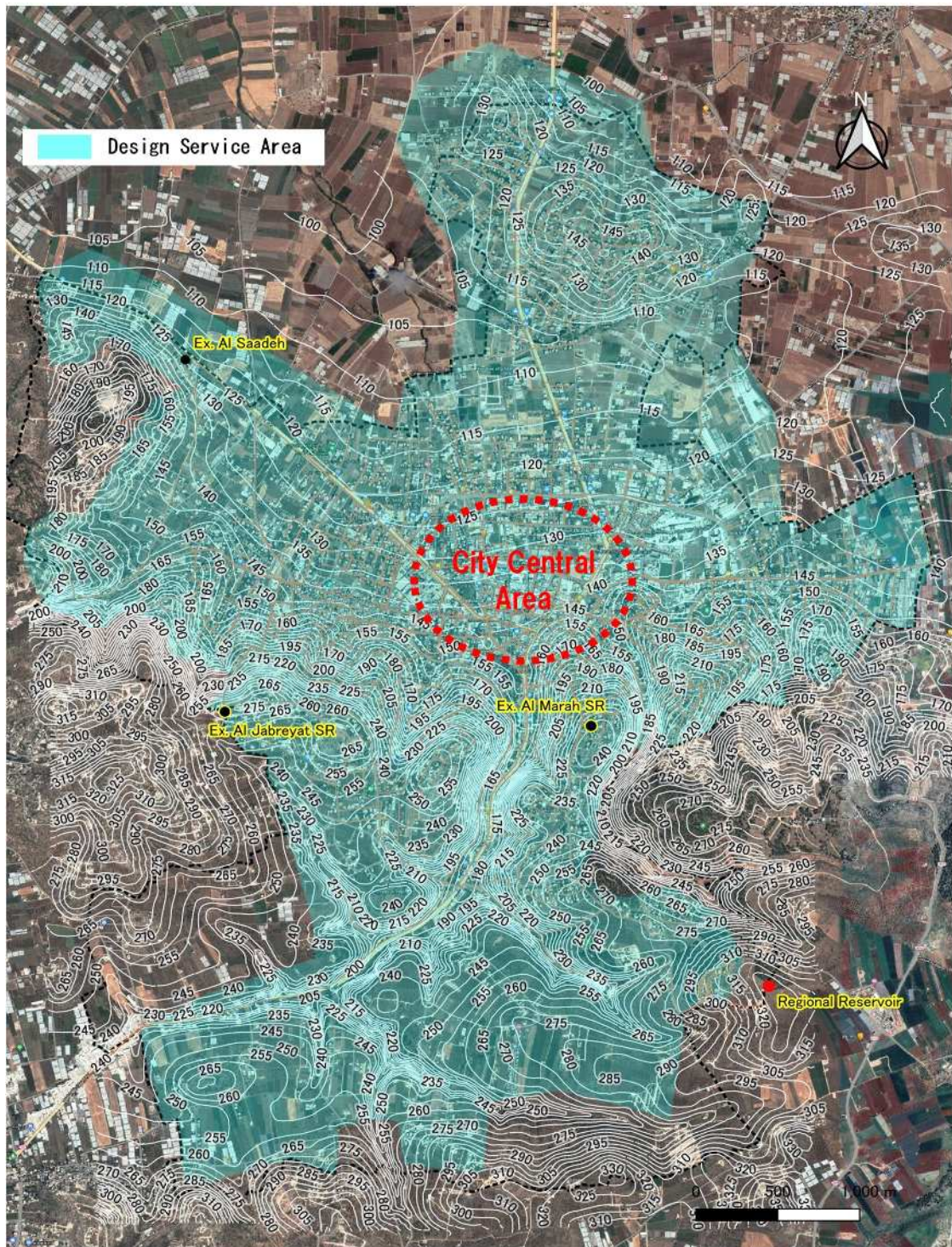
The topography of Jenin Municipality is characterized by significant undulations. The design service area varies widely in elevation, ranging from 105m to 300m. Figure 2-2 shows a contour map of the planned water supply area. The southern part of the design service area is hilly, while the northern part, including the central part of the city, is plain. As the urban area becomes more crowded, the hilly area has been converted into residential land, resulting in numerous relatively affluent residences in this area.

Based on the above basic policy, water supply areas where gravity flow type is possible from the existing Al Marah and Al Jabreyet reservoirs at elevation will adopt this distribution type.

On the other hand, the design service area also includes high-elevation areas, that are situated above the elevation of the existing reservoirs, as well as areas where gravity flow type distribution is not possible due to insufficient water supply pressure at the same elevation. It is possible to construct a new service reservoir at a higher elevation site and distribute water through gravity flow. However, there are no suitable government-owned sites meeting the hydrologic requirements within the administrative control area of Jenin municipality, and acquiring a new site is challenging. Alternatively, it is possible to construct a new water distribution pumping station on the site of the existing service reservoir. This station would receive water from the existing reservoir and then pump the water to the high-elevation area. However, this option is not considered reasonable for the following reasons.

- Transmission of water naturally from the Regional reservoir to the two service reservoirs is not energy-efficient, as it is released and loses pressure, requiring energy from the pumps for distribution.
- The population served in the high elevation area is minimal, making the construction of a new water distribution pumping station economically impractical in terms of cost-effectiveness.
- Additional facilities are not recommended due to associated increase in human resource requirements and maintenance costs for operation and maintenance.





Source: Preparatory Survey Team based on the Satellite Image of Google Earth

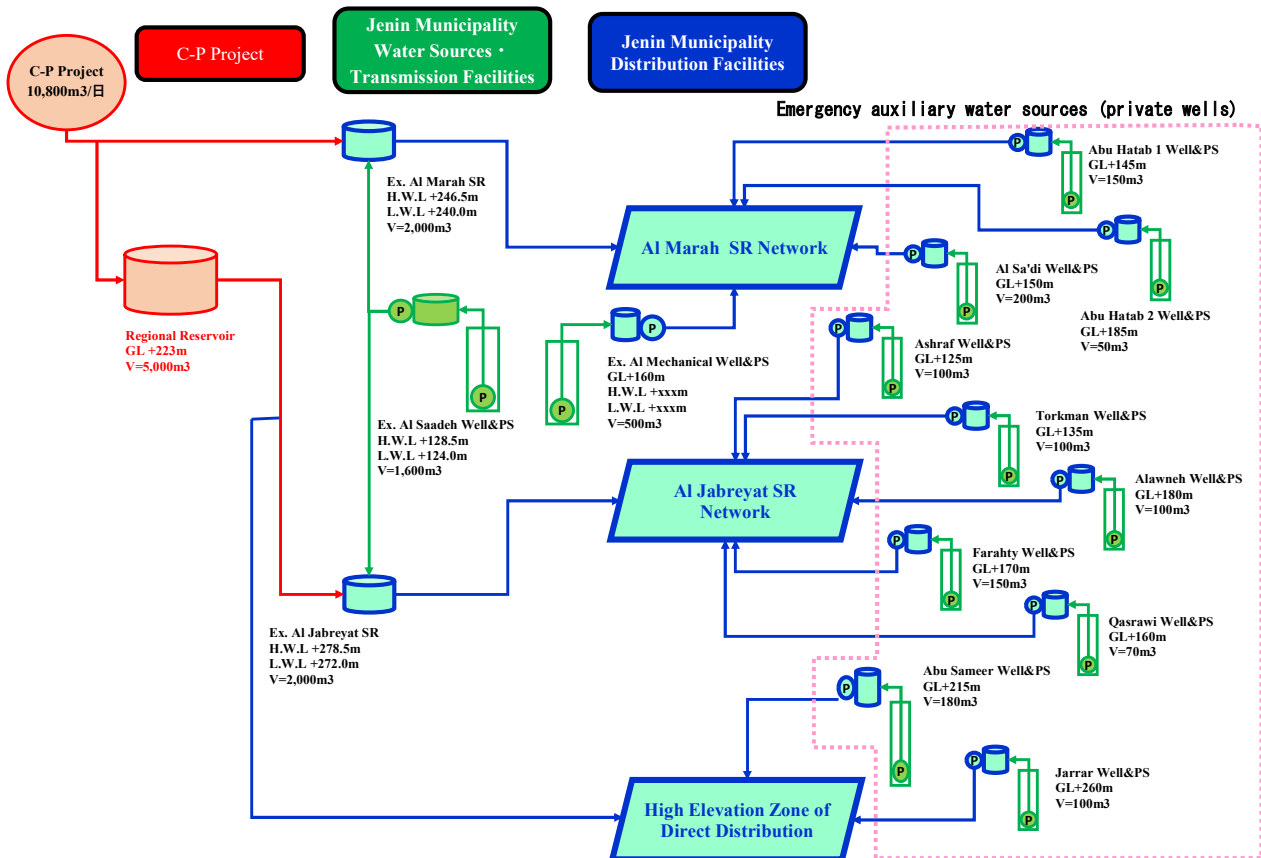
Figure 2-2 Contour map of planned water supply area

Based on the above considerations, the high elevation areas, where gravity flow distribution from the existing service reservoirs is not possible, will be addressed by branching off from the outflow pipe of the Regional distribution reservoir, which will be constructed in the C-P project. Therefore, the design service area for the project will consist of the following three water distribution zones.

- Distribution zone with gravity flow from Al Marah reservoir
- Distribution zone with gravity flow from Al Jabreyat reservoir
- Distribution zone with gravity flow from Regional reservoir constructed in the C-P project

### (3) Separation of water transmission and distribution systems

The lack of classification of transmission pipes and distribution pipes in the existing transmission and distribution facilities, based on their specific uses, is the main cause of the difficulty in managing stable water flow and appropriate water pressure. Based on the water supply sources described in 2-3-2 Water Source Planning and the three distribution zones mentioned above, the classification of the reconstructed water transmission and distribution system is shown in Figure 2-3.



Source: Preparatory Survey Team

Figure 2-3 Classification of Transmission and Distribution Systems

The transmission system will consist of the two systems listed below.

- A system that uses a municipal well (Al Saadeh well) as a water source and transmits water to existing service reservoirs (Al Marah and Al Jabreyat reservoirs).
- A system that takes the bulk water supply from the C-P project as its source and transmits it to the existing service reservoirs (Al Marah and Al Jabreyat reservoirs).

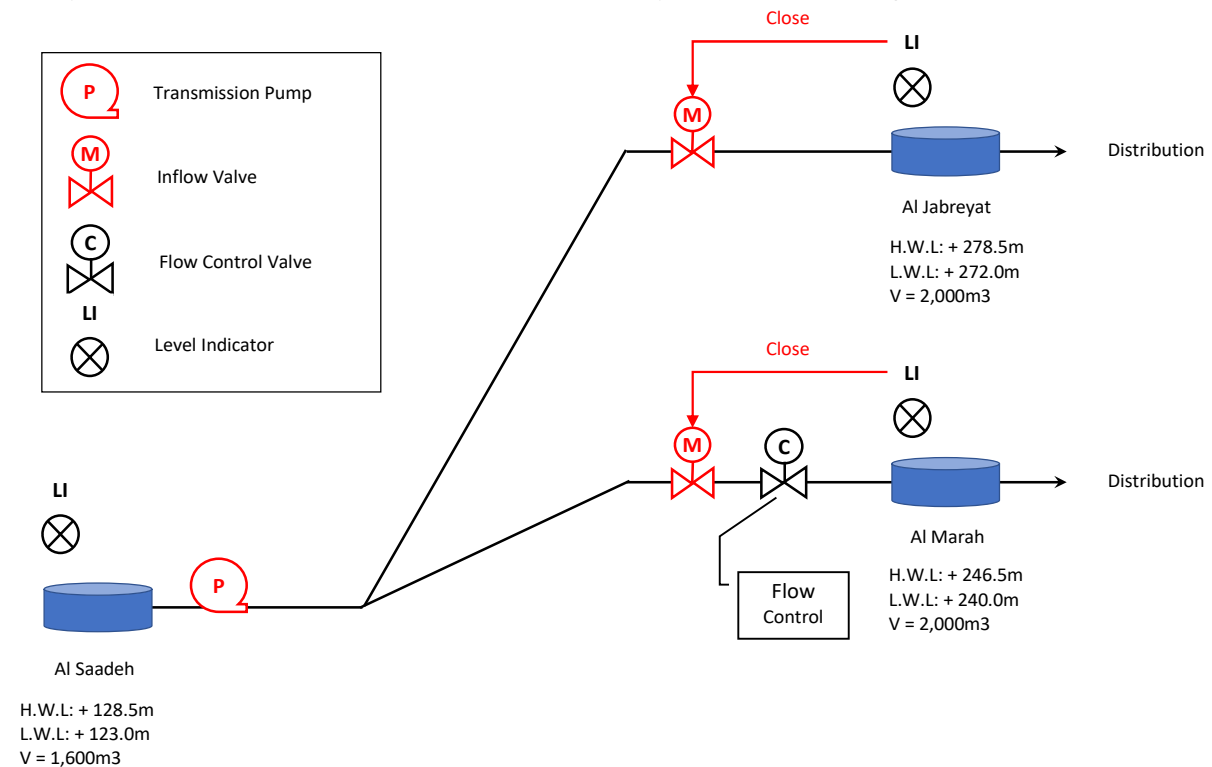
In addition to the Al Saadeh well, there is an Al Mechanic well as a municipal well; however, as the well's production is limited to 500 m<sup>3</sup>/day, the water from the Al Mechanic well is planned to be distributed directly instead of via a service reservoir. The water distribution system will consist of two systems: one system that distributes water to the three distribution zones, and another system that distributes water directly from private wells and the Al Mechanic well, which will serve as an auxiliary water source in case of emergency.

### (4) Transmission system using municipal well (Al Saadeh) as water source

#### 1) Basic Policy

Al Saadeh pumping station transmits water to the Al Marah and Al Jabreyat reservoirs and will continue to do so after the Project. A flow control valve will be installed on the inflow side of the Al Marah reservoir to ensure equal transmission of water to both reservoirs simultaneously. Since water resources are scarce and precious in Palestine, water level gauges will be used to detect and close the inflow valves when the service reservoirs reach full capacity, preventing overflow from the reservoirs. Therefore, the operation of the Al

Saadeh pumping station is planned to pump water equally to both reservoirs under normal conditions. However, when either reservoir becomes full, the water will be pumped independently to either the Al Jabreyat or Al Marah reservoirs. The water transmission system is shown in Figure 2-4.



Source: Preparatory Survey Team

Figure 2-4 Water Transmission System Outline

The design flow of the treated water transmission will be set after the renovation of the deep wells on the site, and the water taken from the deep wells will be pumped to the pumping well by a fixed-speed pump. The existing pipeline will be used for the transmission pipes. The design conditions for the Al Saadeh pumping station are shown in Table 2-7.

Table 2-7 Design conditions for Transmission pump

Design treated water transmission flow	3,500 m <sup>3</sup> /day (=146 m <sup>3</sup> /hour)		
Design water level	Al Saadeh pumping well H.W.L: + 128.5m L.W.L: + 123.0m	Al Marah S.R. H.W.L: + 246.5m L.W.L: + 240.0m	Al Jabreyat S.R. H.W.L: + 278.5m L.W.L: + 272.0m

Source: Prepared by the Survey Team

## 2) Water Hammer Countermeasures

With the operation of the aforementioned Al Saadeh pumping station, the pumping station has three different water transmission destinations in operation, which are as follows.

- Case 1: Equal water transmission to Al Marah and Al Jabreyat reservoirs
- Case 2: Sole water transmission to Al Jabreyat reservoir
- Case 3: Sole water transmission to Al Marah reservoir

When the maximum negative pressure drops to about 10 m, a cavity is formed in the water inside the pipe, causing water column separation. Following the separation, the rejoining of the upstream water with the downstream water generates an abnormally high impact pressure, potentially leading to accidents such as damage to the pipeline, making it necessary to take measures against water hammer.

The results of the pressure gradient line analysis for the profile of the water transmission pipelines in each of the aforementioned operations are shown in Table 2-8. The details of the analysis results for the water hammer study are shown in Appendix 12.

Table 2-8 Results of Water Hammer Calculation

	Without Countermeasure		With Countermeasure	
	Maximum Negative Pressure	Maximum Negative Pressure Point	Maximum Negative Pressure	Maximum Negative Pressure Point
Case 1	Approx. 11m	Al Saadeh-Al Marah section Approx. 3,700m point	No negative pressure	-
Case 2	No negative pressure	-		
Case 3	Approx. 36m	Al Saadeh-Al Marah section Approx. 3,700m point	Approx. 6m	Al Saadeh-Al Marah section Approx. 3,700m point

Source: Prepared by the survey team

The analysis results show that there is a route section where the pipe profile exceeds the minimum pressure line and negative pressure occurs during the following water transmission.

- When water is equally distributed to the Al Jabreyat and Al Marah reservoirs, a negative pressure of up to approximately 11 meters is generated at a point approximately 3,700 meters along the route from the Al Saadeh pumping station to the Al Marah reservoir.
- When water is pumped to the Al Marah reservoir alone, a negative pressure of up to approximately 36 m arises at a point approximately 3,700 m along the route from the Al Saadeh pumping station to the Al Marah reservoir, which is the destination of the water.

Water hammer countermeasures using the flywheel method are reliable and are also the most advantageous in terms of maintenance and cost. In the same analysis, after the implementation of the flywheel (25 kgf-m<sup>2</sup>) countermeasure, the maximum negative pressure was reduced to about 6 m, effectively preventing the occurrence of water column separation. Therefore, the plan is to equip the water pump with a flywheel to prevent water hammer.

### 3) Specifications of Water Transmission Pump Equipment

The required head of the water pumps is high due to the difference in elevation between the facilities, and a flywheel must be installed to prevent water hammer. Therefore, the selected pump type is a horizontal-shaft multistage volute pump. Moreover, although the pumping equipment at the pumping station has deteriorated significantly, the service life of the building, which is a structure, exceeds that of the equipment. Therefore, the existing building can be used effectively, and only the pumping equipment will be replaced. Considering the available installation space and the maintenance requirements of the pump room in the existing buildings, two pumps will be installed, with one serving as a spare. The head of the water pumps was set based on the difference in elevation between the facilities and calculations of piping losses, so that the planned water delivery volume can be secured even when the suction tank is at the lowest water level (L.W.L.). The specifications of the water pumps to be replaced under this plan are shown in Table 2-9.

Table 2-9 Water Transmission Pump Specifications

Model	Horizontal-shaft multistage volute pump	
Discharge volume	146 m <sup>3</sup> /hour	
Total head	170 m	
Output	110 kW	Reference value
Pump efficiency	70 % or more	Reference value
Suction/discharge diameter	150 mm / 125 mm	Reference value
Power Specifications	400 V / 50 Hz / 3 phase	
Electric motor type	Three-phase cage induction motor	
Startup (interval of) time	Start of Korndorfer	
Rotation speed	(Synchronous) 1,500 min <sup>-1</sup>	
Material (Body)	Cast iron or equivalent	
Material (Impeller)	Cast stainless steel or equivalent	
Number of pumps	2 units (1 unit in reserve)	

Source: Prepared by the Survey Team

#### 4) Specifications of Electrical Equipment

The Al Saadeh pumping station receives power from the 22kV high-voltage system of the Northern Electric Distribution Company (NEDCO), which is in charge of electricity supply in Jenin. The pumping station receives power after being stepped down to 400V by a 630kVA transformer. The power company owns the pumping station up to the circuit breaker installed downstream of the transformer, while the wiring after the circuit breaker is owned by Al Saadeh pumping station.

In this plan, the electrical equipment to be renewed for the water transmission pumps includes the power receiving panel, pump power control panel, and power distribution panel. Existing facilities, such as well pumps, which are not included in the renewal in this plan, will be supplied with electricity by reconnecting their wiring to the renewed power receiving panel or power distribution panel. The main electrical equipment for the water transmission pumps to be installed at the water pumping station under this plan will consist of the following.

- Power receiving panel (1 side)
- Pump power control panel (2 sides)
- Power distribution panel (1 side)
- Instrumentation panel (1 side)
- Building equipment switchboard (1 side)

The panels that make up the SCADA secondary stations are planned to be powered from the power distribution panel described above.

#### 5) Operation Policy for Water Transmission Pumping Facilities

Since water resources are scarce and precious in Palestine, based on the above basic policy, the following controls will be implemented to prevent overflow from the service reservoirs.

- Automatic closure of inflow valves due to high water levels in each service reservoir (automatic closing of inflow valves when water levels rise above a set level, as measured by water level gauges installed to prevent overflow from the reservoir)

The pump will be started up using a shutoff operation, where the discharge valve installed on the discharge side of the pump will be as electrically controlled and operated in conjunction with the pump. This is done to reduce the electrical load on the electric motor by reducing the starting current and the load on the pipeline due to shocks and other occurrences. In addition, the following controls shall be installed to protect the pump and avoid serious damage to the pump:

- Automatic pump shutdown in case of low flow rate (to protect the pump by automatically shutting down the pump when the flow rate falls below the set flow rate as measured by a flow meter installed on the outflow side of the pump. It is because operating in a small water flow area below the minimum flow rate can cause damage due to heating).
- Automatic pump shutdown in case of low water level in the suction water tank (to protect the pump by automatically shutting down the pump when the water level falls below the set water level as measured by a water level gauge installed in the suction water tank. It is because a low water level in the suction water tank can cause abnormal vibration, noise, and performance degradation due to harmful vortex generation).

In order to prevent overflow, the inflow valves of the service reservoirs automatically close when they become full. Additionally, to protect the pumps, they automatically shut down when both reservoirs are full and remain in the shutdown stage. Conversely, the suction tank at the Al Saadeh pumping station receives continuous supply of water taken from a deep well on the site. In order to effectively utilize limited water resources and ensure efficient water pumping into the service reservoirs, the inflow valve will automatically open when the water level in the reservoirs drops below a set level, triggering the pumps to resume water pumping operations.

#### (5) Water transmission system using bulk water supply from the C-P Project as the water source

##### 1) Basic Policy

The total bulk water supply to the Jenin Municipality from the C-P Project is 10,800 m<sup>3</sup>/day from 2-3-2 Water Source Planning and is transmitted from the Regional reservoir, which will be constructed in the C-P Project. Table 2-10 shows the allocation of the bulk water supply for C-P Project to each destination.

Table 2-10 Bulk Water Supply for C-P Project

	Transmission Destination	Flow
1	Al Marah Water Service Reservoir	4,150 m <sup>3</sup> /day
2	Al Jabreyat Service Reservoir	4,150 m <sup>3</sup> /day
3	Direct Water Distribution from Regional Reservoir	2,500 m <sup>3</sup> /day

Source: Prepared by the Survey Team

2) Water transmission pipes to be constructed under the C-P Project

The water transmission pipes for bulk water supply under the C-P Project will be implemented up to the inflow of both Al Marah and Al Jabreyat water reservoirs. The route of the branch pipe for bulk water supply to both service reservoirs, which branches from the water transmission pipe, is shown in Figure 2-5 and Figure 2-6.



Source: Prepared by the survey team based on the Satellite Image of Google Earth

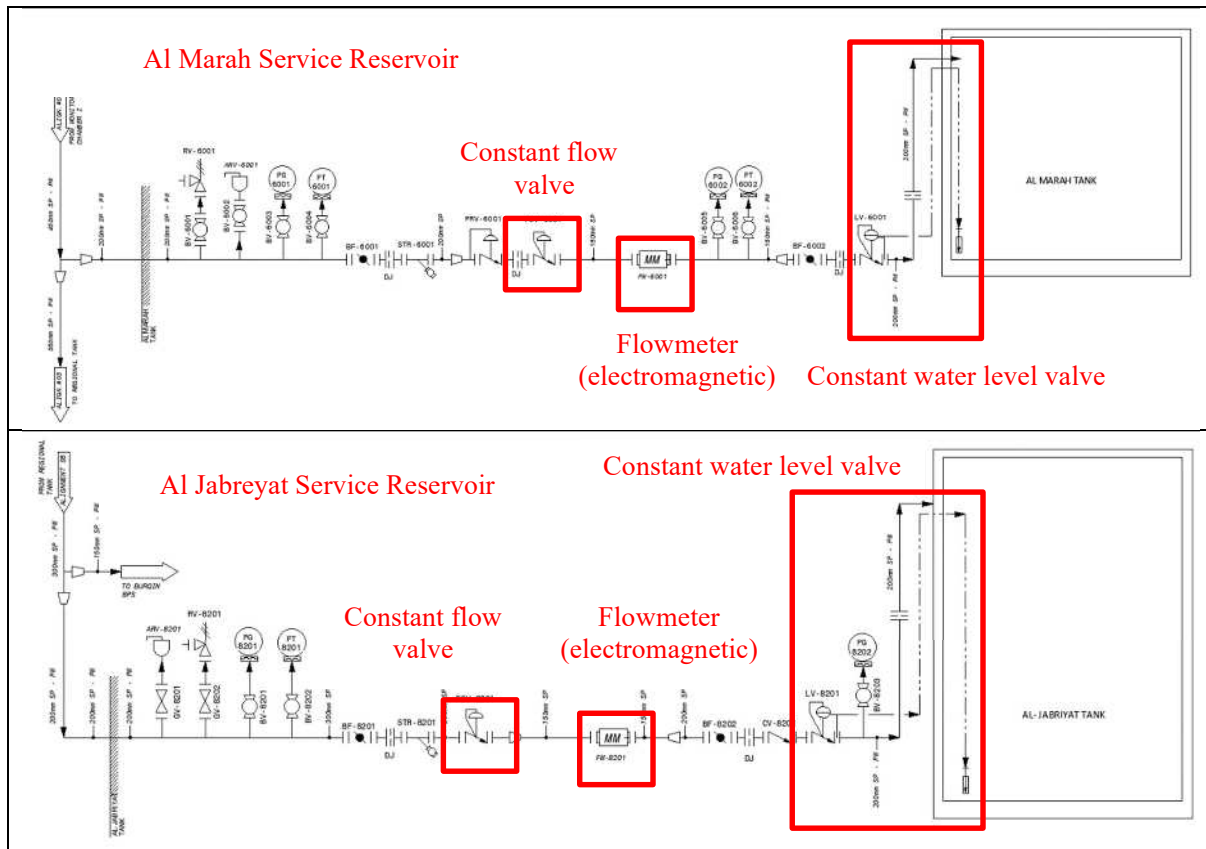
Figure 2-5 Route of Branch Pipe to Al Marah Service Reservoir



Source: Prepared by the survey team based on the Satellite Image of Google Earth

Figure 2-6 Route of branch pipe to Al Jabreyat Service Reservoir

In bulk water supply to both service reservoirs for the C-P Project, the flow rate is controlled to protect the above-mentioned bulk water supply allocations, and at the same time, the inflow to both service reservoirs is controlled to prevent overflow from the service reservoirs. The installation of automatic valves and instrumentation, as shown in Figure 2-7, is planned in the water transmission pipes on the premises of both reservoirs.



Source: Prepared by the survey team based on the Connection Point Project report.

Figure 2-7 Automatic valves and instrumentation in Bulk Water Supply pipes under the C-P project

The installation of the constant flow valve and the constant water level valve enables automatic control of water flow into both service reservoirs, maintaining the specified installed values without the need for on-site personnel operation or control by electrical circuits. Additionally, reservoir inflow control is automatically performed, allowing for the stopping and resuming of inflow at the specified set water level.

### (6) Service reservoir

The PWA guideline<sup>18</sup> states that the required capacity of a service reservoir is the sum of 7.5 hours of maximum daily water supply plus 150m<sup>3</sup> of fire water. Table 2-11 shows the calculation of the required capacity of the service reservoirs in this plan.

Table 2-11 Required Capacity of Service Reservoirs

Zone	Maximum daily water supply (m <sup>3</sup> /day)	Required Capacity (m <sup>3</sup> )	Existing service reservoir capacity (m <sup>3</sup> )
Al Marah S.R.	6,150	2,072	2,000
Al Jabreyat S.R.	6,100	2,052	2,000

Source: Prepared by the survey team

Based on the above calculations, the capacity of the existing service reservoirs generally meets the required capacity. Therefore, as indicated in 2-2-1-1 Basic Policy, the plan is to utilize the existing reservoirs without constructing new ones. However, it is necessary to renovate the ancillary piping around the existing service reservoirs to install instrumentation equipment associated with the reconstruction of the water transmission

<sup>18</sup> "Design Guidelines for the Construction of Water Tanks" (PWA, September 2003).

and distribution system and the introduction of monitoring by the Project. Additionally, the C-P Project will require the installation of a new water transmission pipe in the existing service reservoirs, as shown above. Table 2-12 summarizes the details of the ancillary piping modifications to be implemented in each of the service reservoirs under the Project.

Table 2-12 Rehabilitation of Service Reservoirs

Target Facilities		Contents	Remarks
Al Marah Service Reservoir	Inflow pipe (Al Saadeh well water transmission system)	Electric valves, Flow control valves, Flowmeters, Ancillary piping and valves	Scope of the Project
	Outlet pipe	Flowmeters, Ancillary piping and valves	Scope of the Project
	Inflow pipe (C-P Project Bulk water supply system)	Constant water level valve, Flow meter, Constant flow valve, Pressure reducing valve, Ancillary piping and valves	C-P Project Scope
Al Jabreyat Service Reservoir	Inflow pipe (Al Saadeh well water transmission system)	Electric valves, Flowmeters, Ancillary piping and valves	Scope of the Project
	Outlet pipe	Flowmeters, Ancillary piping and valves	Scope of the Project
	Inflow pipe (C-P Project Bulk water supply system)	Constant water level valve, Flowmeter, Constant flow valve, Ancillary piping and valves	C-P Project Scope

Source: Prepared by the Survey Team

#### (7) Water Distribution Zones

As there is a significant difference in elevation among the three water distribution zones mentioned above, it is necessary to subdivide and reconstruct each zone into appropriate water distribution zones (DMAs) to ensure adequate water pressure. As there are no rivers, railways, major highways or other factors physically dividing the water distribution zones within the design service area, the following factors should be taken into account in setting the water distribution zones (DMAs), excluding these physical factors.

- Adequate distribution water pressure (0.2MPa~0.8MPa) will be ensured as far as possible throughout each DMA.
- The pipe materials used in the Jenin Municipality will adhere to the standard specification (PN16) to avoid exceeding the allowed pressure, even in areas with partially higher water distribution pressure.
- Each zone will be appropriately sized based on the number of consumers and the area.
- Existing water blocks will be considered when establishing the zones for time-limited water supply.
- As pipe improvements are not covered in refugee camps, it should be noted that water pressure in those areas should be as adequate as possible.

The water distribution mains that supply water to each DMA from both existing reservoirs should be planned so that the pipelines are as short as possible to minimize hydraulic losses. Additionally, since both reservoirs have the same capacity, each DMAs served by both reservoirs will be designed to have equal level of demand.

A pressure reducing tank (PRT) and pressure reducing valve (PRV) will be installed to ensure appropriate water pressure distribution at the branch points from the distribution mains to each DMA, while instrumentation (flowmeters and pressure gauges) is to be installed to monitor the flow and pressure to each DMA. For the following reasons, priority shall be given to the pressure reducing tanks.

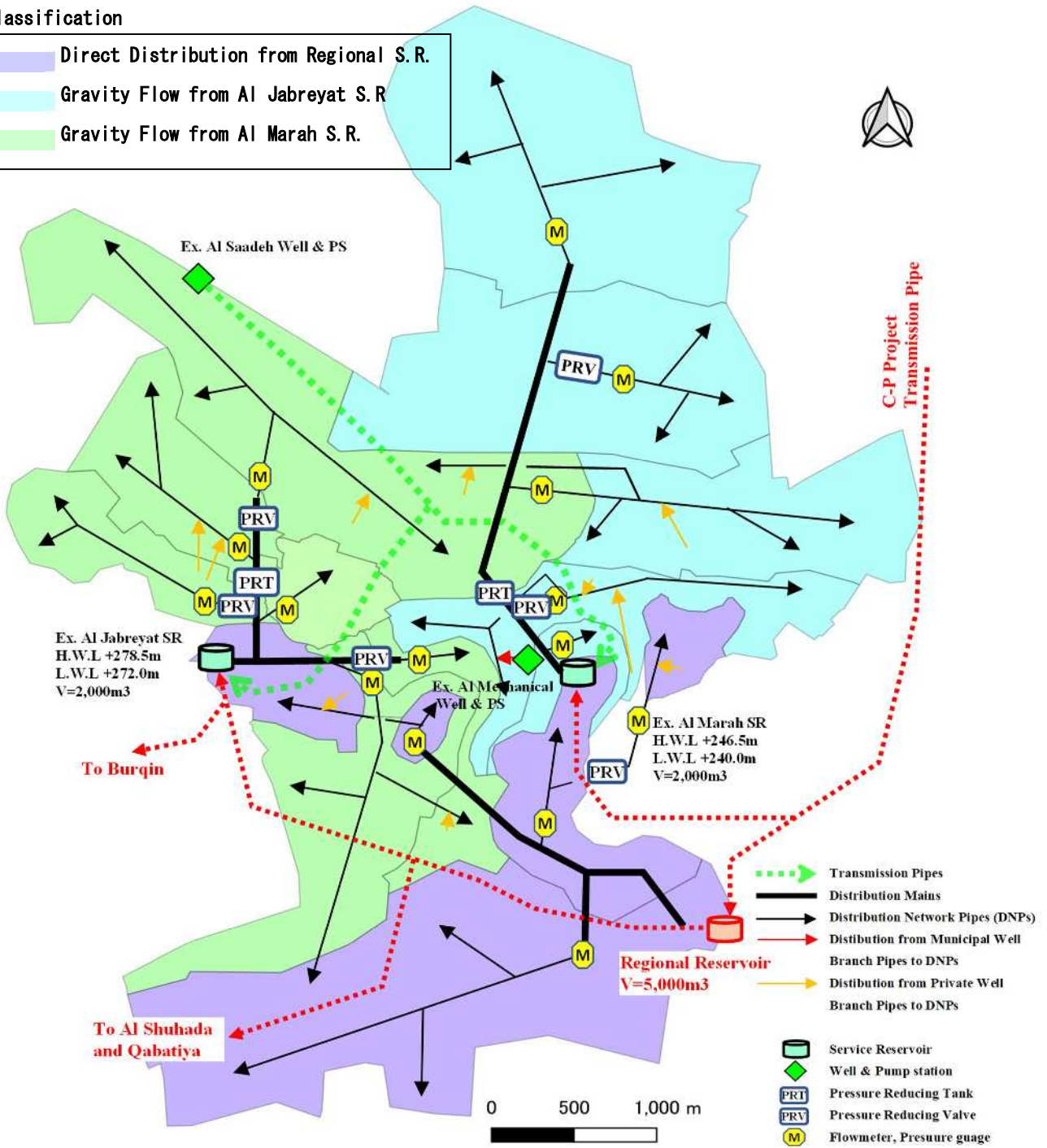
- If two or more PRVs are installed in series without sufficient separation, they may interfere with each other, resulting in frequent failures.
- PRTs are structurally limited in terms of their installation options compared to PRVs due to the because the secondary pressure at the installation site is zero. However, PRTs exhibit a high level of stability in their pressure reducing function and have a low frequency of failures.

A schematic diagram of the water transmission and distribution system, including the DMA allocations after reconstruction of the water transmission and distribution facilities, is shown in Figure 2-8. The elevation diagram can be found in Figure 2-9, and a summary of the distribution zones is in Table 2-13.



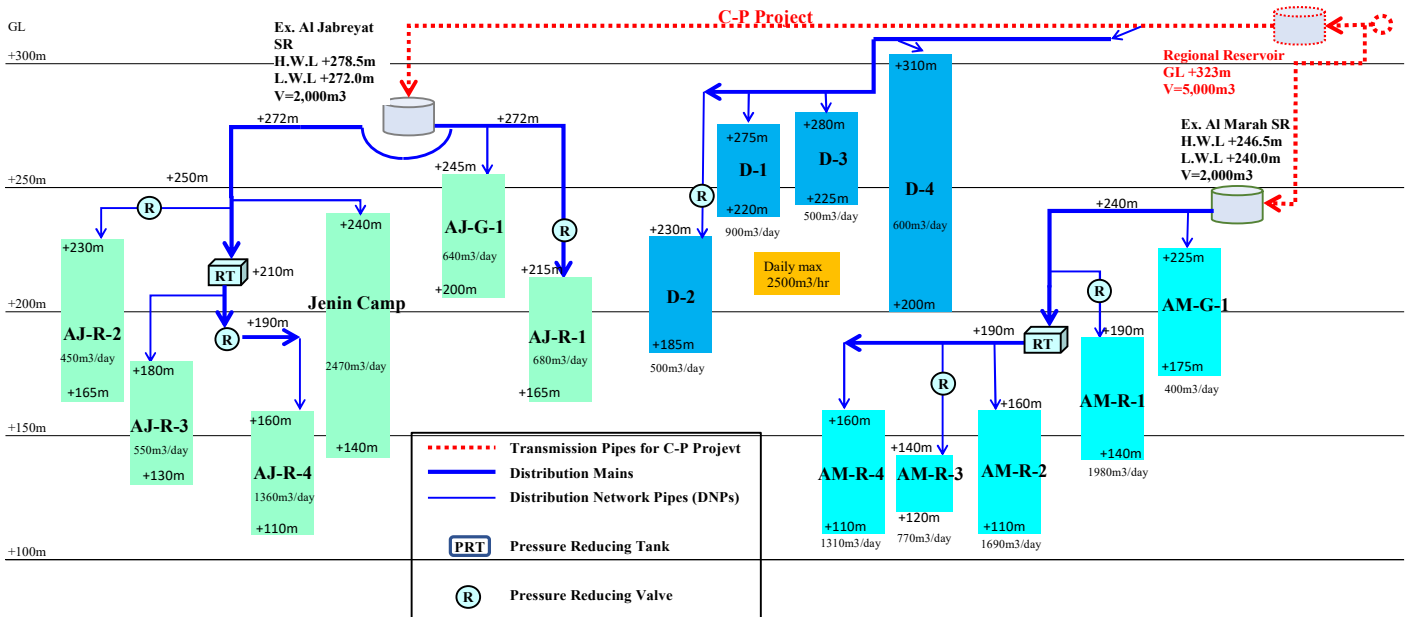
classification

- Direct Distribution from Regional S. R.
- Gravity Flow from Al Jabreyat S. R.
- Gravity Flow from Al Marah S. R.



Source: Preparatory Survey Team

Figure 2-8 Schematic Diagram of Water Transmission and Distribution System



Source: Prepared by the survey team

Figure 2-9 Elevation Diagram of Water Transmission and Distribution System

Table 2-13 Summary of Water Distribution Zones and DMAs

Zone	DMA Name	Elevation
Gravity Flow from Al Marah S.R.	AM-G-1	+225m ~ +175m
	AM-R-1	+190m ~ +140m
	AM-R-2	+160m ~ +110m
	AM-R-3	+140m ~ +120m
	AM-R-4	+160m ~ +110m
Gravity Flow from Al Jabreyat S.R.	AJ-G-1	+245m ~ +200m
	AJ-R-1	+215m ~ +165m
	AJ-R-2	+230m ~ +160m
	AJ-R-3	+180m ~ +130m
	AJ-R-4	+160m ~ +110m
Jenin Camp	+240m ~ +140m	
Direct Distribution from Regional S.R.	D-1	+275m ~ +220m
	D-2	+230m ~ +185m
	D-3	+280m ~ +225m
	D-4	+310m ~ +200m

Source: Prepared by the survey team

In order to form appropriate DMAs, the existing pipes that currently connect the DMAs need to be separated. The separation of existing pipes will be carried out concurrently with the transition to the new water distribution system. However, since this process will involve an interruption in the water supply, it will need to be coordinated with the time-limited water supply currently in place. It should be dealt with as indicated in 2-6-2 Implementation Conditions, so that the process can proceed as smoothly as possible without affecting the lives of the residents.

## (8) Distribution pipes

### 1) Policy for Renewal of Existing Water Pipes

The total length of existing water pipes is approximately 153 km, and leakage rate is relatively high. It is necessary to renew all old pipes to reduce the leakage rate, but this poses challenge due to budget constraints and the inefficiency of replacing all pipes at once in terms of cost-effectiveness. Therefore, it is important to systematically renew old pipes based on their cost-effectiveness. In this plan, the following pipelines are targeted for renewal.

- Routes that have been laid for more than 30 years
- Routes with high leakage rates based on past leakage records

## 2) Classification and Pipe Classification for Distribution pipes

A plan will be designed to create a block system, so that appropriate water distribution zones can be formed to ensure adequate water pressure distribution and equitable water distribution. The advantages of introducing the block system are as follows.

- Enables proper water distribution management (water flow and water pressure)
- Enables efficient implementation of leakage control measures
- Limited scope of water shutoffs during water main repairs
- Enables planned water pipe renewal
- The division of roles of water distribution pipes (distribution mains and distribution network pipes) will be clarified

The design policy for each role of water distribution pipes is shown in Table 2-14.

Table 2-14 Role Classification of Water Distribution Pipes

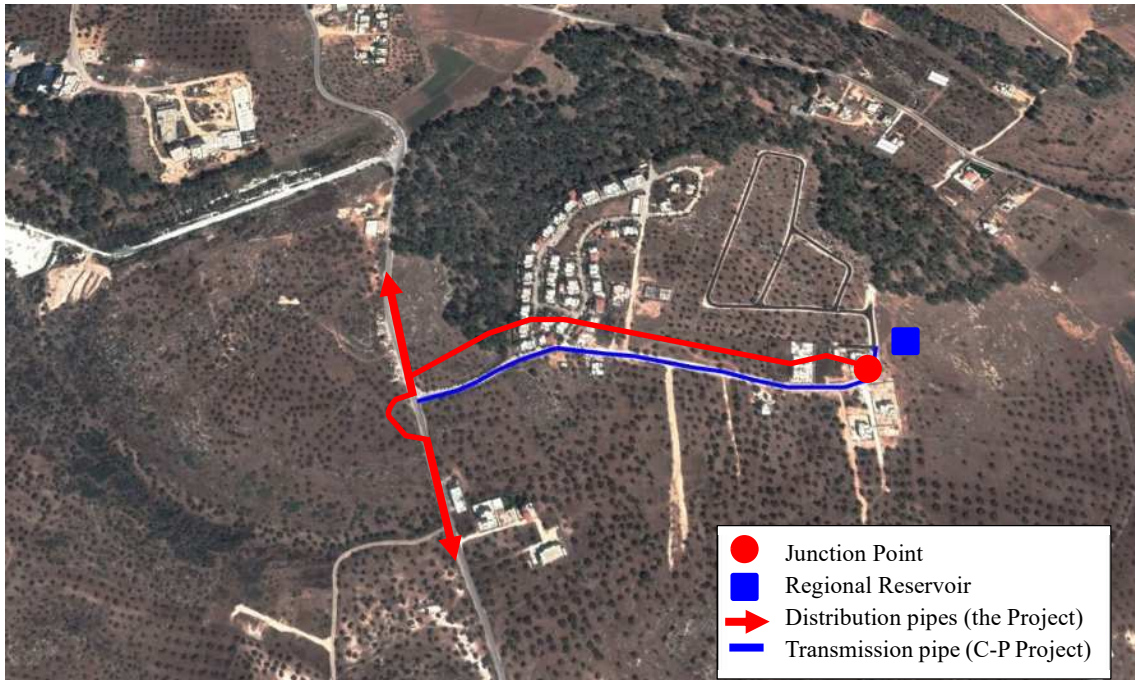
Name	Role	Design Policy
Distribution Mains	Distribution pipes from service reservoir to the branch of each DMA with no service connection	The existing pipes generally have small diameters and do not have the capacity to ensure adequate water pressure over a wide area, and are aging. Distribution mains are planned to be as short as possible from the service reservoir to the branching points of each DMA to minimize hydraulic losses.
Distribution Network Pipes	Distribution pipes for service connections within each DMA	The reconstruction of the distribution network pipes will involve constructing distribution branch pipes to cater to the expansion areas and reinforce the pipes in each DMA to increase their water distribution capacity. The existing pipes will be used as effectively as possible, and the length of new distribution network pipes will be kept to a minimum.

Source: Prepared by the survey team

For the distribution mains, ductile iron pipes (DIP) are chosen as they are highly durable and strong, considering the significance of the pipeline and its potential impact in case of accidents. On the other hand, high-density polyethylene (HDPE) pipes, which are lightweight and easy to install, are selected for the distribution network pipes because of their suitability for long laying distances. Furthermore, the pressure-resistant specification of the pipes will be based on PN16, which is the standard specification of the Jenin Municipality.

## 3) Connection to the Transmission pipe to be constructed in the C-P Project

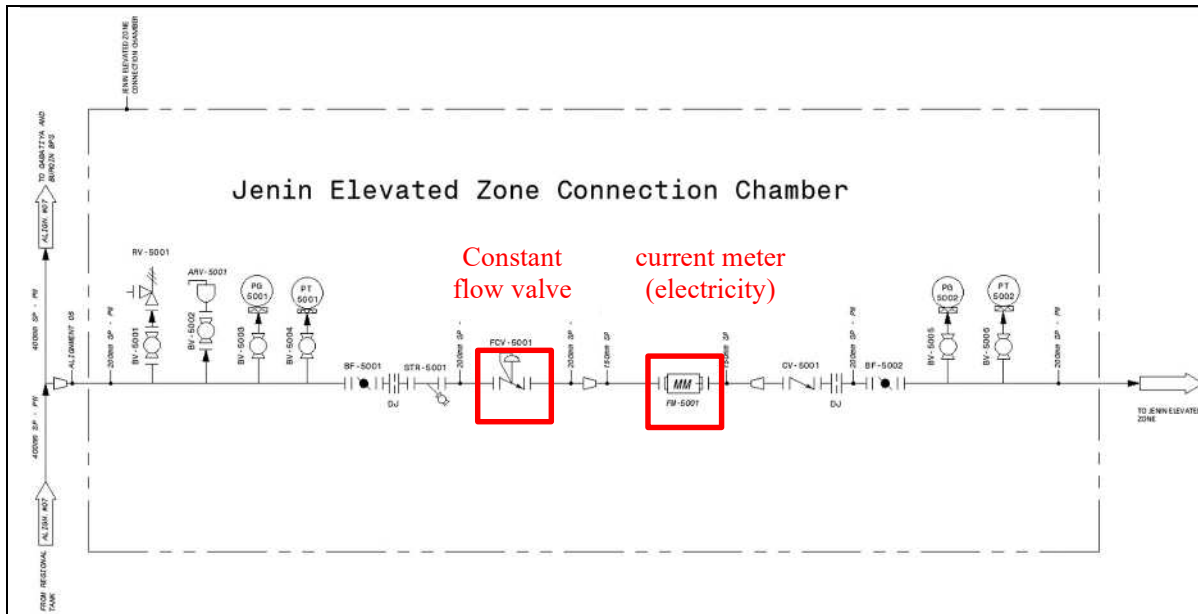
The bulk water supply provided by the C-P Project is shown in Figure 2-8. The connection point between the outflow pipe from the Regional reservoir to be constructed as part of the C-P Project, and the distribution pipe that will be installed within the Project to distribute water directly from the Regional reservoir is shown in Figure 2-10.



Source: Prepared by the survey team based on the Satellite Image of Google Earth

Figure 2-10 Connection Point with Transmission pipe from Reginal Reservoir

Automatic valves and instrumentation are planned to be installed at the connection points within the scope of the C-P Project, as shown in Figure 2-11, in order to control the flow rate in the same way as in the water transmission system.



Source: Prepared by the Survey Team based on the Connection Point Project report.

Figure 2-11 Automatic valves and instrumentation to be installed in the C-P Project

The installation of constant flow valves will limit the allocation of the bulk water supply to ensure that the flow does not exceed a certain amount. The allocation is set at 2,500 m<sup>3</sup>/day, but as the bulk water supplied from the C-P Project is distributed directly, the flow distributed fluctuates from day to day depending on the water use of the consumers. Therefore, the set flow rate, which is considered to be limited by the constant flow valve, is not 2,500 m<sup>3</sup>/day, but 3,750 m<sup>3</sup>/day in the C-P Project, taking into account the time variability of water demand.

#### 4) Selection of Water Distribution Pipe Diameter

The diameter of each distribution pipe is set by pipe network analysis using the analysis conditions shown in Table 2-15 to ensure that the appropriate water distribution pressure is maintained throughout each distribution zone. The analysis is performed using the “EPANET ver. 2.2” software, and the Hazen-Williams formula is used to calculate the pipe loss. Details of the analysis results of the pipe network analysis are shown in Appendix 11.

Table 2-15 Pipe Network Analysis Conditions

Item	Adoption value	Remarks
Minimum pressure	0.2 MPa	Up to 0.1 MPa allowed in hydraulically adverse areas
Maximum pressure	0.8 MPa	Partially allowable up to pressure-resistant specification of water distribution pipes
Time Coefficient	1.3	Applied to pipe network analysis within a water distribution district
	2.0	Water distribution mains are applied with future expansion in demand
Flow Coefficient (C value)	110	Applicable to existing pipes and new DIP pipes
	130	Applicable to new HDPE pipes

Source: Prepared by the Survey Team

#### 5) Design Pipeline Length

The lengths of the water distribution pipes to be renewed and newly constructed in the project will be summarized in Table 2-16.

Table 2-16 Design Pipeline Length

Name	Diameter	Length	Classification
Distribution Mains	DN400mm	205 m	Ductile iron pipe (DIP)
	DN300mm	219 m	
	DN300mm	599 m	
	DN 250mm	4,963 m	
	DN200mm	2,321 m	
Distribution Network Pipes	OD280mm	98 m	High-density polyethylene pipe (HDPE)
	OD225mm	1,213 m	
	OD180mm	8,929 m	
	OD125mm	13,537 m	
	OD90mm	17,901 m	
	OD63mm	13,287 m	

Source: Prepared by the survey team

#### 6) Branch Pipe for Water Service Connection

The house connection pipes from the new distribution pipe will be installed under responsibility of the Jenin Municipality. In some instances, the service connection pipe may need to cross paved roads, necessitating excavation and restoration of pavement. Recognizing that these road-crossing works could place a burden on the Jenin Municipality, branch pipes from the newly installed pipeline will be included into the Project component for crossing wide pavement roads. This approach will facilitate the installation of the water service connections by WWD.

#### 7) Pressure Reducing Device

The location of pressure reducing tanks and valves to be installed in the Project to ensure adequate water pressure distribution is shown in Table 2-17 and shown in Figure 2-8 and Figure 2-9.

Table 2-17 Pressure Reducing Device

Device	Installation Location	Remarks
Pressure Reducing Tank	Al Marah Distribution Mains: elevation +190 m	
	Al Jabreyat Distribution Mains: elevation +210 m	
Pressure reducing valve	Al Marah Distribution Mains: Inlet point of DMA (AM-R-1)	Dia. 250mm
	Al Marah Distribution Mains: Inlet point of DMA (AM-R-3)	Dia. 150mm
	Al Jabreyat Distribution Mains: Inlet point of DMA (AJ-R-1)	Dia. 150mm
	Al Jabreyat Distribution Mains: Inlet point of DMA (AJ-R-2)	Dia. 150mm

Device	Installation Location	Remarks
	Al Jabreyat Distribution Mains: Inlet point of DMA (AJ-R-4)	Dia. 150mm
	C-P Project Direct Distribution Mains: Inlet point of DMA (D-2)	Dia. 150mm

Source: Prepared by the survey team

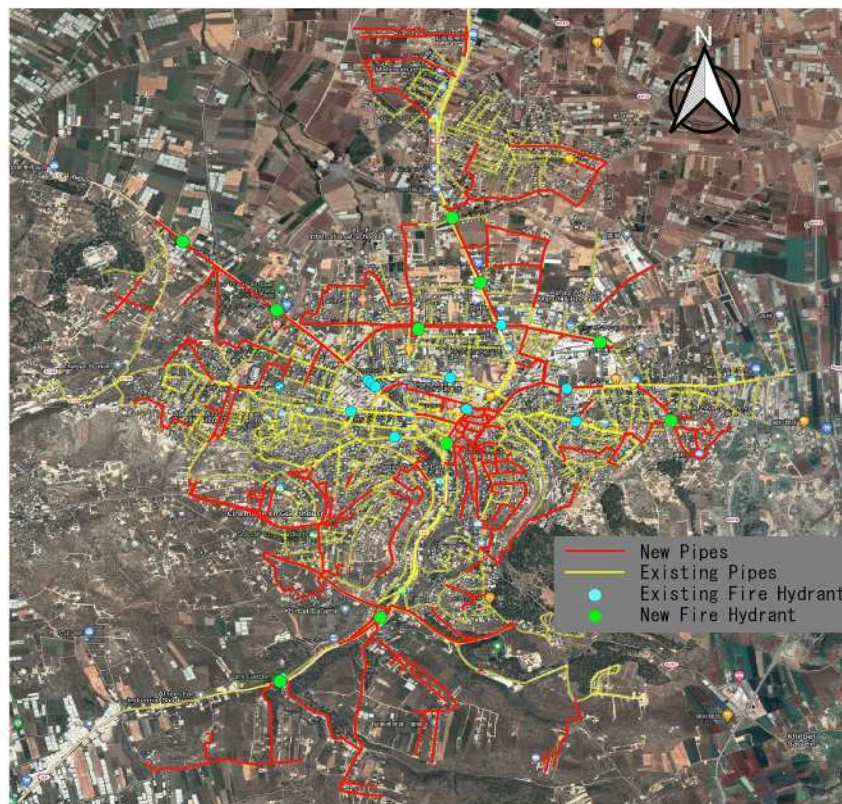
## 8) Construction Policy

The following is a summary of the construction policy for laying piping.

- T-type ductile pipe (push-on joint), which is easy to install, economical, and watertight, will be used as the joint method for DIP pipes.
- Since the planned route has many urban roads and arterial roads, the fittings of the DIP will adopt a joint restraint system in consideration of the impact on traffic.
- Fusion welding, a highly reliable joint construction method, will be used for joining HDPE pipes, which has been locally adopted in recent years.
- Pipelines are laid using the open-cut method.
- Rehabilitation and temporary rehabilitation of roads will be carried out according to the standards of the Jenin Municipal Road Department.
- Priority will be given to laying pipes in unpaved areas outside of pavement or within the shoulder of the road.
- Instrumentation (flowmeters and pressure gauges) and ancillary equipment to be installed in the branches of DMAs shall be of the ground-based type commonly used in the field.
- The pressure reducing device (pressure reducing tank and pressure reducing valve) will also be ground-based in the same style as mentioned above.
- The depth of cover for pipes will be 0.9 m for diameters of 150 mm or larger and 0.7 m for diameters of less than 150 mm.
- Air valves and drainage valves will be installed where necessary, along with closure valves at appropriate locations for maintenance and management.

## (9) Fire Hydrant

Based on the location of the 10 existing hydrants, 10 new hydrants will be installed along the route where the new distribution pipes are laid as shown in Figure 2-12.



Source: Prepared by the survey team based on the Satellite Image of Google Earth  
Figure 2-12 Location of Existing and New Fire Hydrants

## **2-3-4 Service Connection Facility Plan**

### **(1) Basic Policy**

The following works for water service connection will be required in the Project.

- When renewing existing old pipes in the existing service area, the water service pipes connected to the existing pipes will be reconnected to the new pipes to be laid in the Project.

For routes where existing pipes are to be renewed, it is reasonable, in terms of cost sharing and efficiency, to reconnect water service connections that are currently connected to the existing pipes to the renewed pipes within the scope of the Project. However, it is important to note that the connection fees for new water supply connections for customers in the unserved areas are typically to be paid by the beneficiaries. Including these new connections in the scope of the Project may lead to difference in cost burden between existing and new costumers. Therefore, it is recommended that new connections should not be included in the Project and should be borne by the beneficiary as in the past.

### **(2) Reconnection of Water Service Connections**

The pipe length of the old pipes to be renewed under the Project will be 6.9 km, and the replacement of water service connections for the renewal of old pipes will be carried out within the scope of the Project. Based on the GIS database of customers established in the technical cooperation project, it is estimated that approximately 571 number of water service connections will be covered by the Project. The final number of water service connections to be covered by the Project will be confirmed during the detailed design phase by conducting on-site inspection of the routes of the old pipes to be renewed. The detailed design drawings will also reflect the locations of existing water meters and the routes of water supply pipes from branch pipes to water meters, etc.. The policy for reconnection of water supply connections is summarized below.

- The renewal pipe will be laid with the water service branch saddle installed to ensure work efficiency, eliminating the need for re-excavation.
- The existing service meter will continue to be used.
- Considering the actual occurrence of leakage in existing pipes, the water supply pipes from the water service branch saddle to the service meter will also be renewed due to the large number of leakage occurrences.
- Lightweight and easy-to-install HDPE pipes will be used for the water service pipes.
- A water stopcock will be installed on the primary side of the service meter to facilitate maintenance of the service meter.

Although the reconnection of the existing water service connection can be prepared in advance up to the water service pipe to the service meter, the final disconnection of the existing water service pipe and connection of the new water service pipe to the existing service meter must be performed in conjunction with the operational changeover from the existing pipe to the renewal pipe. The work should be handled as described in 2-6-2 Implementation Conditions to ensure that the work proceeds as smoothly as possible with as little impact on the lives of residents as possible.

### **(3) New Water Service Connection in the Project Areas**

Existing and the Expansion Service Area are illustrated in Figure 2-13.

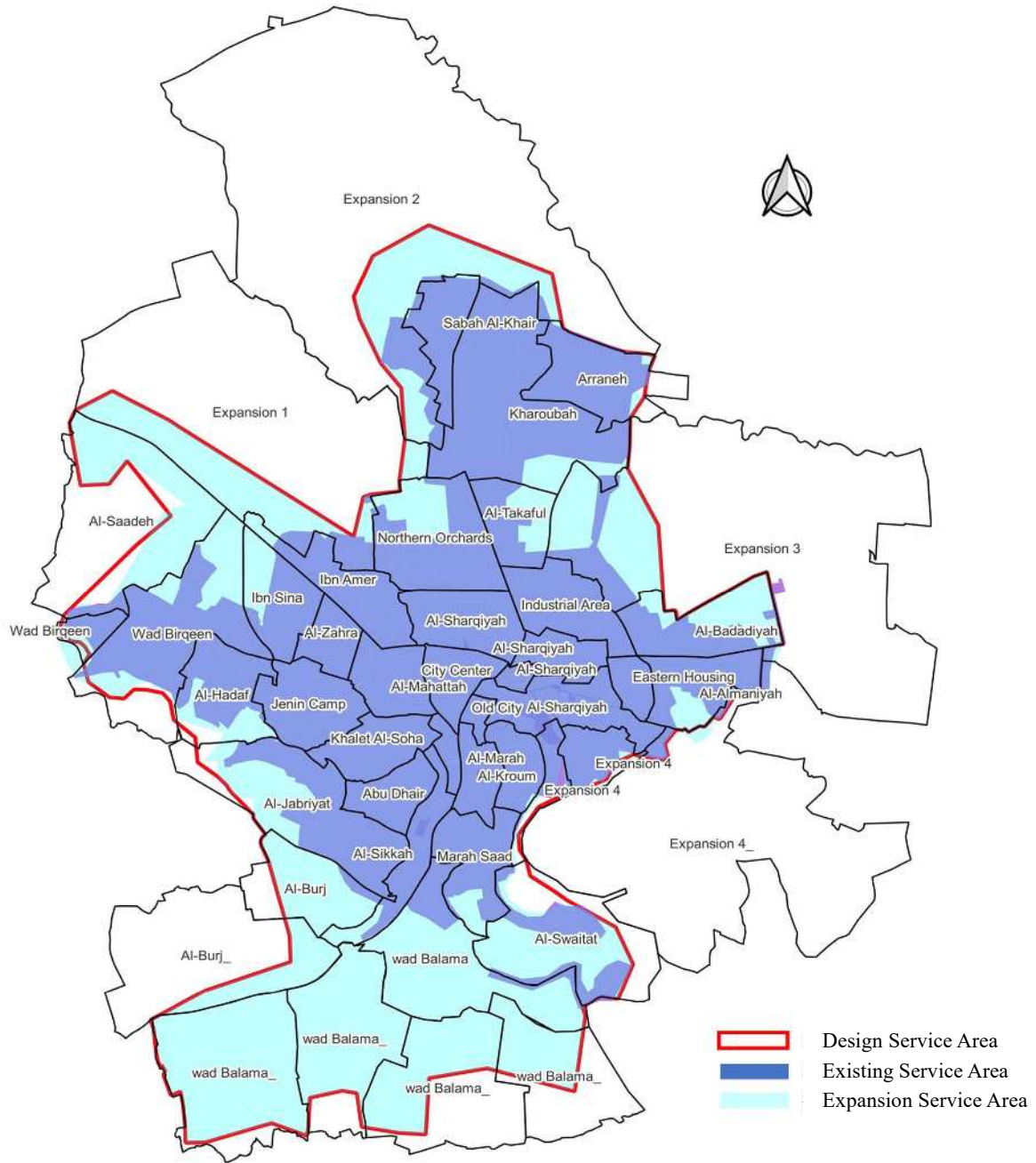


Figure 2-13 Existing and the Expansion Service Area

Based on the above basic policy, the installation of new water service connections in areas where water service connections have not yet been installed will continue to be carried out at the expense of the beneficiaries. Similarly, new water service connections within the existing water service areas will also be installed at the beneficiary's expense. The estimated population and number of new service connections are shown in Table 2-18.

Table 2-18 Estimated Number of Service Connections in the Existing Service Areas and Expansion Areas

	2020		2030		Change	
	Population	Household	Population	Household	Population	Household
Population served in the existing service area	43,983	9,479	68,171	13,634	16,491	4,155
Population receiving water from neighbors	7,697	-	-	-	-	-



	2020		2030		Change	
	Population	Household	Population	Household	Population	Household
Population served in the expansion area	-	-	8,909	1,782	8,909	1,782
Total	51,680	9,479	77,080	15,416	25,400	5,937

(Notes)

#1 Population receiving water from neighbors is estimated assuming that no water meter is installed, and water is purchased from the neighboring houses with meter connections.

#2 Number of households are estimated to be equal to the number of connections, and the average household size is estimated as 4.64 persons in 2020 and 5.0 persons in 2030.

## 2-3-5 Monitoring and Control Plan

### (1) Basic Policy

For the purpose of efficient and stable water supply, the Project will install instrumentation and Supervisory Control and Data Acquisition (SCADA) equipment to enable proper water distribution management and equal water use.

By installing flowmeters and pressure gauges at the inflow points of each of the 15 DMAs (water distribution zones) set in this plan, the water distribution status will be centrally managed by monitoring the water flow and water pressure distributed to each DMA. By being able to accurately grasp the amount of water distributed to each DMA, fair water distribution can be realized. At the same time, it enables the observation of trends in water demand and changes in water pressure distribution on an hourly basis, facilitating appropriate water distribution management. Furthermore, the obtained water distribution data can be analyzed to accurately assess the water supply efficiency in each DMA. This evaluation enables the prioritization of each DMA and the efficient implementation of water leakage countermeasures, based on the analysis and interpretation of the data.

- Calculation of the accurate leakage rate in each DMA by comparing the total water consumption of customers within a certain period of time in each DMA with the total water distribution.
- Determination of the minimum nighttime water volume in each DMA.

Additionally, the plan will incorporate information on the core facilities of the water supply system in Jenin Municipality, as listed in Table 2-19, so that the operational status and water balance of the entire water system in Jenin Municipality can be determined. The transmission pumps at the Al Saadeh pumping station and the electric valves at the Al Marah and Al Jabreyat service reservoirs, among the main facilities mentioned above, are planned to be remotely operable from the central monitoring room. This will enable the monitoring of their operation status and facilitate prompt and appropriate responses in case of emergencies such as water leakage accidents or disasters.

Table 2-19 Transmission Items of Core Facility

Facility Classification	Facility Name	Transmission Items
Water Transmission Facilities	Al Saadeh pumping station	Flow rate (instantaneous value, totalized value) Water level (instantaneous value: suction tank) Operational status (pump start/stop)
Water Distribution Facilities	Al Jabreyat Service Reservoir Al Marah Service Reservoir Al Mechanic distribution pump	Flow rate (instantaneous value, totalized value) Water level (instantaneous value: distribution reservoir) Pressure (instantaneous value: water distribution pump) Operating conditions (opening/closing of electric valves: water distribution reservoir)
Water supply district	DMA: 15 areas	Flow rate (instantaneous value, totalized value) Pressure (instantaneous value)

Source: Preparatory Survey Team

### (2) Systems Planning

The SCADA system will enable monitoring and operation of the status of equipment and instrumentation at remote locations, accumulation of collected data, and preparation of reports. The main functions of the

SCADA system in the Project are listed in Table 2-20.

Table 2-20 Main Functions of the SCADA System

Function	Contents
Monitoring	By centrally monitoring the operational status of multiple facilities and instrumentation dispersed over a wide area in a central monitoring room, centralized data management and accurate status monitoring become possible, realizing labor-saving and efficient operation and maintenance management of facilities and equipment.
Alarm Management	Prompt and reliable reporting of information on equipment and instrumentation failures and restoration, abnormalities in various measured values such as flow, pressure, and water level, and power outages at facilities, etc., for early detection of problems and appropriate measures to protect facilities and realize stable water supply.
Data Logger	Collects time series of various measurements such as flow rate, pressure, and water level, and automatically generates daily, monthly, and annual reports to reduce workload and improve efficiency, while providing information necessary for water distribution planning and leakage management, etc. and improving the efficiency of information analysis.
Remote Control	Centralized management and streamlining of operation and operation of widely dispersed facilities and equipment, as well as realization of appropriate and prompt response to problems such as water leakage accidents and disasters

Source: Prepared by the survey team

The central monitoring unit, which will be the core of the SCADA system, is planned to be installed in a room in the building of the Water and Sewerage Department of the Jenin Municipality and will consist of the following main equipment.

- SCADA Server
- SCADA Client
- Communication equipment (routers)
- Uninterruptible Power Supply (UPS)
- Printer

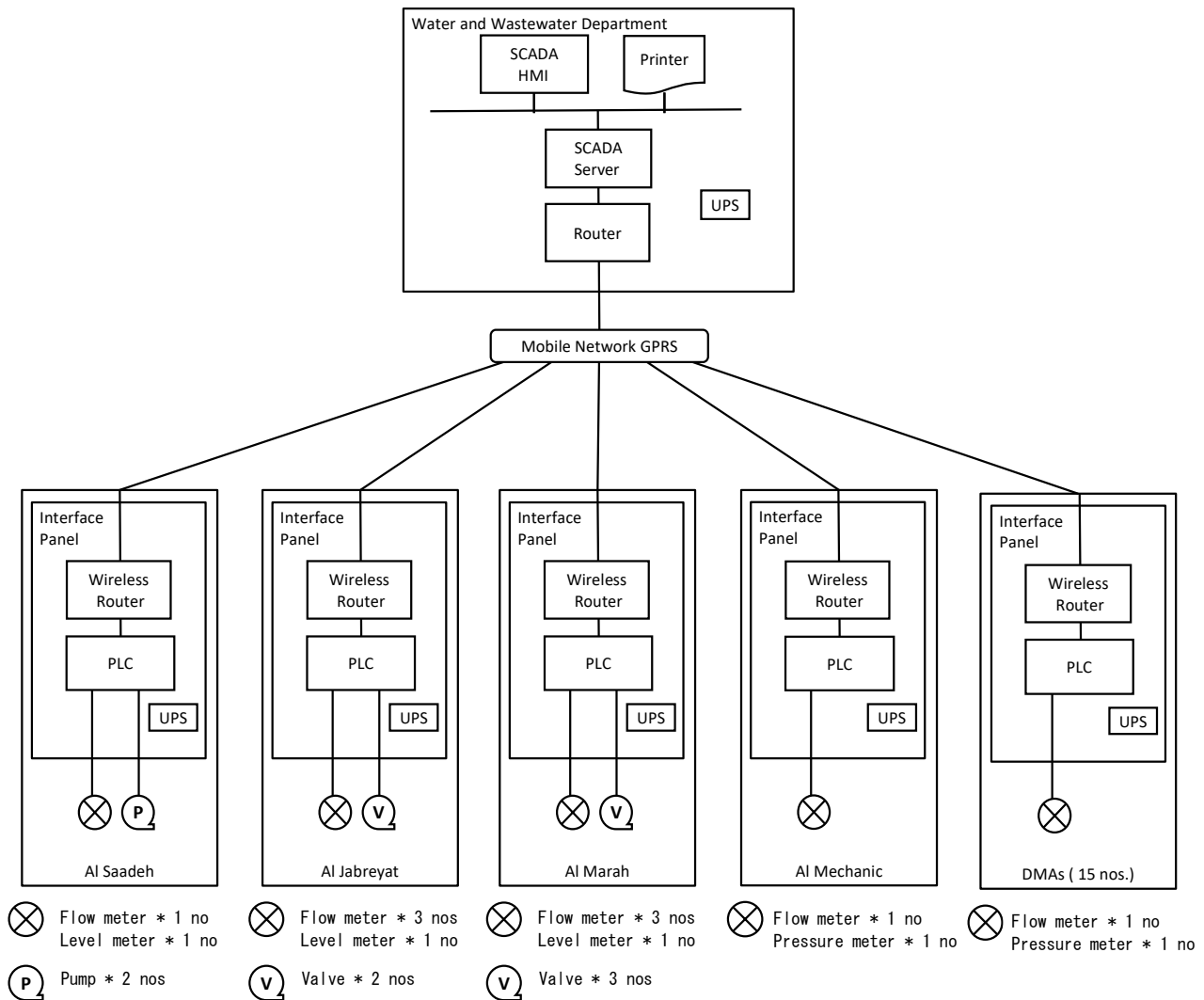
The equipment installed in the DMAs and in the sub-stations of the backbone facilities consist of the following major equipment items.

- Interface board
- Instrumentation (flowmeters, pressure gauges and water level meters)
- Programmable Logic Controller (PLC)
- Communication equipment (routers)
- Uninterruptible Power Supply (UPS)

The SCADA system to be introduced in the Project has a small number of signals per sub-station, and the General Packet Radio Service (GPRS), a radio system using the general cellular telephone network that is widely used in the Palestinian region, is sufficient to support the system. Therefore, the existing GPRS will be used as the communication system between the central monitoring room and the sub-stations. This study has confirmed that the existing general-purpose cellular phone radio network provides communication coverage, enabling GPRS communication at all locations where the central monitoring room and sub-stations of the SCADA system will be installed in the Project.

### (3) System Conceptual Diagram

The conceptual diagram of the SCADA system to be installed in this plan is shown in Figure 2-14.



Source: Prepared by the survey team

Figure 2-14 Conceptual Diagram of SCADA System

#### (4) Instrumentation Equipment

The instrumentation equipment listed in Table 2-21 will be installed to monitor the operation of the water supply system throughout Jenin Municipality and gather the necessary data for water distribution management.

Table 2-21 Instrumentation

Instrumentation	Location	Objective
Flowmeter	Al Saadeh P.S. Al Marah S.R. Al Jabreyat S.R. Al Mechanic Distribution Pump DMAs: 15 locations	By monitoring and collecting data on the flow rates of water transmitted and distributed at the main facilities and DMAs, it will be possible to determine the balance of water flow, enabling fair water operation and appropriate water distribution management. The flowmeter will be an electromagnetic type, which has excellent measurement accuracy and is commonly used in the field.
Water Level Gauge	Al Marah S.R. Al Jabreyat S.R. Al Saadeh Pumping Tank	The water levels of each service reservoir and pumping tank will be monitored to ascertain the storage status, and at the same time, the water levels of each tank will be used to operate the water pumps and select the destination of the water to be delivered. The water level gauges will be of the throw-in type, which has excellent measurement accuracy and can be installed in the existing service reservoir structure.
Pressure Gauge	DMAs: 15 locations	By monitoring the water pressure at the entrance of each water

Instrumentation	Location	Objective
	Al Mechanic Distribution Pump	distribution section and continuously monitoring the distribution water pressure in each section, appropriate water distribution management and early detection of abnormalities become possible. It is also effective in reducing the amount of water leakage by reducing excessive pressure. Diaphragm type pressure gauges are used for the pressure gauges.

Source: Prepared by the Survey Team

## 2-4 Outline Design Drawings

Drawings of outline design are attached in Appendix 9. The list of outline design drawings is shown in Table 2-22.

Table 2-22 List of Outline Design Drawings

Drawing No.	Drawing Title
G-01	General Layout of Design Facilities
DP-01	Location Map for Distribution Pipelines
DP-02	Distribution Pipe Plan (1)
DP-03	Distribution Pipe Plan (2)
DP-04	Distribution Pipe Plan (3)
DP-05	Distribution Pipe Plan (4)
DP-06	Distribution Pipe Plan (5)
DP-07	Distribution Pipe Plan (6)
DP-08	Distribution Pipe Plan (7)
DP-09	Distribution Pipe Plan (8)
DP-10	Distribution Pipe Plan (9)
DP-11	Distribution Pipe Plan (10)
DP-12	Distribution Pipe Plan (11)
DP-13	Distribution Pipe Plan (12)
DP-14	Distribution Pipe Plan (13)
DP-15	Distribution Pipe Plan (14)
DP-16	Distribution Pipe Plan (15)
DP-17	Existing Distribution Pipe Division Plan (1)
DP-18	Existing Distribution Pipe Division Plan (2)
DP-19	Existing Distribution Pipe Division Plan (3)
DP-20	Existing Distribution Pipe Division Plan (4)
DP-21	Existing Distribution Pipe Division Plan (5)
SD-01	General Earth Work for Pipe Laying
SD-02	Typical Drawing for Pipe Laying (1)
SD-03	Typical Drawing for Pipe Laying (2)
SD-04	Typical Drawing for Pipe Laying (3)
SD-05	Typical Drawing for Installation of Air Valve and Washout
SD-06	Typical Drawing for Installation of Pressure Reducing Valve
SD-07	Typical Drawing for Installation of Flowmeter
PS-01	General plan of Al Saadeh pumping station
PS-02	Renewal Plan of Al Saadeh pumping station
SR-01	General plan of Al Marah Service Reservoir
SR-02	Renewal plan of pipeline around Al Marah Service Reservoir
SR-03	General plan of Al Jabreyat Service Reservoir
SR-04	Renewal plan of pipeline around Al Jabreyat Service Reservoir
SC-01	SCADA System Plan

## **2-6 Implementation Plan**

### **2-6-1 Implementation Policy**

The Project will be implemented under Japan's grant aid scheme. The implementation of the Project will require approval from both governments, and it will proceed once the Exchange of Notes (E/N) and Grant Agreement (G/A) have been exchanged. Following this, the Palestinian Water Authority (PWA), the implementing agency of the Palestinian Authority, will enter into a contract with the Japanese firm to undertake the detailed design, construction, and procurement phases.

Taking into consideration the grant aid framework and specific requirements of the facility construction, a construction plan and procurement plan will be formulated for the project, based on the following basic policies.

#### **(1) Project Implementing Entity**

The PWA serves as the executing agency for the Project, while Jenin Municipality acts as the coordinating agency during the implementation of the project and assumes responsibility for its operation and maintenance following implementation.

#### **(2) Consultant**

To oversee the construction of facilities under the Project, a Japanese consulting firm will enter into a contract with the implementing agency of the Palestinian Authority. The consultant's role includes conducting detailed design, construction supervision, and procurement supervision. The consultant will be responsible for preparing bidding documents, supporting the pre-qualification evaluation and bidding process carried out by the implementing agency, and facilitating the selection of a contractor through public tender. After the construction of the facility has commenced, the consultant will objectively supervise the construction work and ensure the appropriate utilization of grant aid funds.

#### **(3) Contractor for Construction and Procurement**

Under the framework of Japan's grant aid scheme, a Japanese contractor will be selected through a public tendering process to undertake the construction of facilities and procure materials and equipment for the Project. As the construction and procurement of the facilities will take place in a remote area with different social environment backgrounds compared to Japan, the selected contractor must possess necessary capacity to successfully complete the construction and procurement overseas. Additionally, the Project requires the use of locally procured labor, materials and equipment, as well as construction in urban areas. Therefore, the contractor must possess a comprehensive understanding of the local market, labor laws, local customs and practices, and other relevant conditions.

### **2-6-2 Implementation Conditions**

#### **(1) Tax Exemption**

The tax exemption procedures for implementing the Project will be the responsibility of the Palestinian side. The actual procedures will be carried out by the PWA and the Ministry of Finance (MoF) of Palestine, based on the tax exemption provisions stated in the E/N.

There are two methods for value-added tax (VAT) exemption: the refund method, which involves receiving a refund for purchases made at prices inclusive of VAT, and the zero VAT method, which involves purchasing at prices exclusive of VAT with VAT exemption approval letter from MoF.

The consultant and construction contracts between PWA and Japanese companies are subject to the "zero VAT method" after PWA applies for tax exemption to MoF and obtains a tax exemption approval letter. However, the "zero VAT method" cannot be applied to the purchase of materials and equipment by contractors and payments to subcontractors in the Palestinian territories. Therefore, the "refund method" is used to obtain tax exemption in these cases.

To apply for VAT exemption under the "refund method", receipts for the procurement of goods and services eligible for refund, along with the tax exemption approval letter from MoF, must be submitted. If the documents and procedures are in order, approval is generally obtained within 30 days. The actual receipt of the refund may take varying amounts of time depending on the refund amount and the fiscal situation in Palestine. In some cases, it may take a long time to receive the refund due to chronic fiscal constraints.

The import of materials and equipment for the Project, whether from Japan or third countries, will be done via Israeli ports. The taxation on imported materials and equipment to Palestine is handled by the Israeli government, and the tax exemption procedure requires an application to the Coordinator of Government Activities in the Territories (COGAT), the organization responsible for customs supervision in Israel, through MoF.

The tax exemption procedure involves submitting a complete set of documents to the MoF, including a list of imported items required for the Project, and these documents will be reviewed by COGAT.

## (2) Import License

On the Israeli side, security controls are implemented at the same time as the above tax exemption screening to prevent imports to Palestine from being diverted for military purposes. Once the contractor determines the final specifications of the materials and equipment to be imported, a document containing the details of the imported materials and equipment is submitted to COGAT for examination. Since the imported materials and equipment required for the Project are expected to include ductile iron pipes (DIP) for piping work and equipment for facilities work, the procurement plan should be carefully planned to avoid any impact on the construction period.

## (3) Overall Construction Period

In the Project, the total length of the pipe installation work is 63 km, which forms the critical path for the overall construction period. However, the geological conditions in Jenin, as shown in "2-1-1(5) Policy for Natural Environmental Conditions", include limestone bedrock in steep mountainous areas and near mountain tops, which can affect the progress of the construction. Therefore, to ensure an appropriate project duration, it is necessary to plan for the installation of water pipes to be carried out by multiple teams in order to shorten the construction period. Additionally, as mentioned above, the importation of materials and equipment to Palestine requires an import permit from COGAT. The importation of DIP used in the installation of water pipes is also crucial, and it is important to note that any delays in their procurement may cause overall project delays.

## (4) Pipe Laying Work

Both the water distribution main and branch pipes are laid on busy urban roads and residential roads. It is important to plan for temporary road diversions while considering safety measures to avoid disturbing general traffic and pedestrians, and to be mindful of existing underground utilities. However, in urban areas, stores and restaurants are scattered along the pipeline route, and on-street parking is prevalent due to lack of nearby parking. Prior to commencing the pipe laying work, it is necessary to hold explanatory meetings with neighboring shop owners and residents, requesting their cooperation and ensuring that the construction activities do not cause any disruptions. Additionally, consideration will be given to conducting the work during the nighttime.

## (5) Pipe Switching Work

The Project involves reconstructing the existing water distribution pipe network to introduce a water distribution system that incorporates DMAs and replaces deteriorated aging water distribution pipes. Therefore, it is anticipated that the transition of the water distribution system will be accompanied by water outages. Currently, the water supply area is divided into 81 water supply areas, and water is distributed on a time-limited basis, making the operations conducted by staff from Jenin Municipality quite complex. In order to minimize the impact on residents' lives as much as possible, it is necessary to shorten the water shutoff period for each house and efficiently implement the sequential pipe switching work. Given the limited construction period, the construction supervision personnel listed in Table 2-23 will be deployed to ensure efficient execution of the pipe switching work.

Table 2-23 Pipe Switching Work

Engineer	Duties
Civil Engineer (Water Supply Main and Water Distribution District)	Before and after the switchover of the water distribution system, the water supply route to each customer in the distribution pipe network will be different. Basically, the policy is to sequentially disconnect the current supply route and construct water distribution districts while securing both the current and post-switchover supply routes, but this needs to be done in coordination with the current water distribution operations. Therefore, it is required to develop plans and procedures for the water

Engineer	Duties
	distribution system, and at the same time provide advice and guidance to both the contractor and the water authority of the Jenin Municipality to coordinate water distribution operations with the existing pipe disconnection work to construct the water distribution zone.
Civil Engineer (Water Supply Connection)	When renewing deteriorated aging existing pipes, because the water supply pipes are also connected to the existing pipes to be renewed, it is necessary to sequentially reconnect the water supply pipes at each customer from the existing pipes to the new pipes, while utilizing both the existing pipes and the newly laid water distribution pipes. Consequently, detailed plans and procedures for the reconnection of water supply connections will be developed, and at the same time, advice and guidance will be provided to both the contractor and the water authority of the Jenin Municipality to effectively coordinate the reconnection work of water supply connections and water distribution operations.

Source: The Preparatory Survey Team

#### (6) Well Rehabilitation Work

The project includes rehabilitating an existing well located within the Al Saadeh water pumping station premises. The rehabilitation of this well requires careful consideration in the construction plan (methods, schedule, procedures, etc.) due to the potential risk of collapse of the wellbore walls, as the aquifer portion of the existing well is exposed. Moreover, the effectiveness of well acid cleaning for rehabilitation purposes is uncertain. Therefore, to restore the pumping capacity of the existing well to the planned water yield, it may be necessary to repeat the acid cleaning process several times. The existing well serves as a primary water source for the Jenin Municipality. During the rehabilitation work, pumping from the well will not be possible. Hence, it is essential to minimize the duration of the rehabilitation work and consider the timing of implementation in relation to the seasonal variations in water demand. For instance, works during October and March, when the water demands are less than average, may mitigate impacts to the water supply.

#### (7) Renewal of the Existing Water Pumps

The existing water pumps currently in use at the Al Saadeh water pumping station will be replaced with new pumps that improve the water supply capacity in line with the aforementioned rehabilitation work on the wells. The replacement of the pumps will be carried out simultaneously with the cessation of operation of the existing water pumps during the well renovation work. It will be necessary to complete the pump replacement work within a short period, which includes constructing reinforced concrete pump foundations to accommodate the new pumps and performing electrical installation work for the associated pump control panels. A detailed construction procedure plan is required, which should encompass the procurement plan, including import procedures, to ensure the timely acquisition of the pump units, piping materials, instruments, control panels, and other necessary components. The plan should also cover the removal of the existing water pumps and the subsequent reactivation of the water supply using the new pumps.

### 2-6-3 Scope of Works

Basically, the construction work for the Project will be carried out by the Japanese side. The details of the projects to be undertaken by the Palestinian side are described in 2-7 Obligation of the Recipient Country.

### 2-6-4 Construction Supervision

#### (1) Basic Policy for Construction Supervision/Procurement Supervision

The Project will be implemented under Japan's grant aid scheme, and the consultant will be responsible for detailed design, tendering, construction supervision/procurement supervision, and soft component activities based on the framework of Japan's grant aid system. During construction supervision/procurement supervision, the consultant will closely communicate and report to the both government agencies, provide prompt and appropriate advice to the contractor, and conduct quality and progress supervision to ensure the quality required in the contract documents ensure timely completion of the project within the construction period.

#### (2) Implementation of Construction Supervision/Procurement Supervision

Since construction supervision/procurement supervision requires continuous work from the start of construction until the facility is completed and delivered, the consultant shall dispatch a Japanese resident

engineer to oversee the entire process throughout the entire construction period. Additionally, the consultant will organize engineers in charge of each specialized field in Japan and establish a system for liaison and coordination with related organizations in Japan, providing support to the resident supervisory engineer. Moreover, the engineer in charge of each specialized field shall review materials and equipment submitted by the contractor as well as the construction drawings and other documents for which approval is requested. They will also make short-term visits to the construction site at key stages of the project to supervise quality, offer on-site construction guidance, and witness inspections, tests, and trial operations. The consultant's construction supervision/procurement supervision and the duties of each engineer are shown in Table 2-24 shows the work of each engineer.

Table 2-24 Construction Supervision/Procurement Supervision

Engineer	Duty
Construction Supervisory Engineer (Chief Consultant)	<ul style="list-style-type: none"> <li>➤ Construction kickoff meeting</li> <li>➤ Instruction on construction safety management</li> <li>➤ Final testing and joint inspection for handover</li> </ul>
Construction Resident Supervisory Engineer	<ul style="list-style-type: none"> <li>➤ Construction kickoff meeting</li> <li>➤ Preparation and submission of monthly and other reports</li> <li>➤ Quality supervision (including witnessing during inspections)</li> <li>➤ Construction progress supervision</li> <li>➤ Safety supervision (including implementation of regular safety patrols with the contractor)</li> <li>➤ Meeting with relevant authorities and contractor</li> </ul>
Well Engineer	<ul style="list-style-type: none"> <li>➤ Confirmation of current status with relevant authorities and approval of well rehabilitation plans (rehabilitation methods, schedule, procedures, etc.) submitted by the contractor</li> <li>➤ Inspection of the bottom of the borehole using a borehole camera</li> <li>➤ Inspection of rehabilitation work (preparation work, acid cleaning, reinstallation of well pump, etc.)</li> <li>➤ Witnessing of pumping tests (preliminary, step down, and continuous) and water level recovery tests</li> </ul>
Civil Engineer (Water distribution pipe and water distribution district)	<ul style="list-style-type: none"> <li>➤ Confirmation of the pipeline routes and locations of pressure reducing valve/ water tank with the relevant authorities</li> <li>➤ Development and technical guidance for existing pipe switching plans, procedures, and schedule for the construction of water distribution pipes and technical guidance</li> <li>➤ Pre-completion inspection of water distribution pipe work</li> </ul>
Civil Engineer (Water supply connection)	<ul style="list-style-type: none"> <li>➤ Development and technical guidance for switching water supply connections plans, procedures, and schedule</li> <li>➤ Pre-completion inspection of water pipe connection work</li> </ul>
Mechanical Engineer	<ul style="list-style-type: none"> <li>➤ Approval of fabrication drawings, factory test procedures and renewal plans for water pumps and associated pipe works</li> <li>➤ Witnessing factory testing of water pumps</li> <li>➤ Supervision of renewal work and technical guidance during installation of water pumps and associated pipe works</li> <li>➤ Inspection of machinery and equipment upon completion (appearance, performance, vibration, noise, etc.) and witnessing of trial operations</li> </ul>
Electrical Engineer	<ul style="list-style-type: none"> <li>➤ Approval of fabrication drawings, factory test procedures and renewal working plans for electrical equipment</li> <li>➤ Witness factory testing of main boards</li> <li>➤ Construction supervision and technical guidance during installation of electrical equipment</li> <li>➤ Inspection of electrical equipment upon completion (appearance, performance, operation, accuracy, etc.) and witnessing of commissioning</li> </ul>



Engineer	Duty
SCADA System Engineer	<ul style="list-style-type: none"> <li>➤ Confirmation of DMA sub-station locations with relevant authorities</li> <li>➤ Approval of fabrication drawings and factory test procedures for SCADA equipment and coordination and assistance with contracts with local telecommunications companies</li> <li>➤ Witness factory testing of SCADA equipment</li> <li>➤ Construction supervision and technical guidance during installation of SCADA equipment</li> <li>➤ Witness inspection (appearance, performance, operation, accuracy, etc.) and commissioning of SCADA equipment upon completion</li> </ul>
Inspection Engineer	<ul style="list-style-type: none"> <li>➤ Witness inspection before defects liability period</li> </ul>

Source: The Preparatory Survey Team

### 2-6-5 Quality Control Plan

The consultant shall prepare construction supervision procedures based on the quality control plan and implement quality control, progress control, safety and environmental control accordingly. The main items of quality control are listed in Table 2-25.

Table 2-25 Main Items of Quality Control

Type	Control item	Method of Testing
Concrete works	Aggregate	Particle size test
	Cement	Verification of quality certificates
	Concrete	Test formula
		Compression strength test
	Slump test	
Rebar and formwork	Rebar strength	Tensile strength test
	Rebar fixing work	Inspection of rebar arrangement
	Formwork	Inspection of formwork
Pipe Materials	Pipe quality	Confirmation of factory inspection report
	Accessioning	Visual inspection
Pile laying	Sub-base and asphalt pavement	Material testing
		Consolidation test
		Asphalt testing
	Pipe leakage	Water pressure test
Mechanical, electrical and SCADA equipment	Machinery and equipment functions	Witness factory inspections and review reports
	Machinery and equipment installation	Inspection of machinery and equipment installation
	Electrical and SCADA equipment functions	Witness factory inspections and review reports
	Installation of electrical and SCADA equipment	Insulation resistance measurement
	test run	Stand-alone operation and interlocked operation
		Real-load operation test
		Response operation check

Source: The Preparatory Survey Team

### 2-6-6 Procurement Plan

The sources for procuring the necessary materials and equipment for implementing the Project include local suppliers, Japan, and third countries. Table 2-26 shows the planned suppliers of major materials and equipment. It should be noted that among the locally procured materials and equipment, with the exception of fine aggregate for concrete, sub-base materials, and polyethylene pipes for water supply will be procured by local suppliers from Israel or third country.

Table 2-26 Procurement Plan of Major Materials and Equipment

Item	Local	Japan	Third country
Cement	○		
Aggregate	○		
Reinforcement steel bar	○		
Fuel (gasoline, diesel)	○		
Formwork materials	○		
Ductile iron pipes		○	○
Polyethylene pipes for water supply	○		○
Valves		○	○
Sub-base materials	○		
Asphalt materials	○		
Scaffolding and shoring materials	○	○	
Temporary lateral support materials (lightweight steel sheet piles)		○	
Water transmission pump		○	
Electrical equipment		○	○
SCADA system equipment		○	○

Source: The Preparatory Survey Team

The West Bank of Palestine is located inland and does not have a seaport, so the materials and equipment procured from Japan and third countries will be unloaded at trading ports in Israel. The major trading ports in Israel are Ashdod Port and Haifa Port on the Mediterranean Sea, and Eilat Port on the Red Sea. Depending on the procurement source and shipping routes of the cargo vessels, it is necessary to determine which port to utilize. After unloading at the trading ports in Israel, the materials and equipment will be transported inland to the site of Jenin. If the cargo is unloaded at Ashdod Port, the distance of land transportation to the storage location in Jenin is approximately 150km. In the case of Haifa Port, it is approximately 50km, and for Eilat Port, it is approximately 400km.

As mentioned earlier, in the Israeli ports, along with customs procedures, security management by COGAT, an organization of the Israeli government, is conducted for imported materials and equipment procured from overseas. Normally, customs clearance at the port takes about one week, but if the import permit is not approved by COGAT before customs clearance, the materials and equipment will be stranded at the port. Therefore, it is crucial for the contractor to carefully manage the security management procedures, which require permission from the Israeli organization, allowing sufficient time for the process. When importing equipment from Japan or a third country, it is necessary to ensure that all necessary documents for import permit application sent through MoP to COGAT are complete and accurate. Additionally, it is important to track the progress of the permission process on a daily basis and proceed with shipment only after obtaining the import permission from COGAT.

### 2-6-7 Operational Guidance Plan

The contractor is responsible for providing initial operational guidance to the engineers and operational staff of the Jenin Municipality, which is the organization responsible for the operation and maintenance of the

construction facilities. The purpose of this guidance is to instruct them on the necessary technology and knowledge to ensure proper operation and maintenance after taking over. The consultant supervises the implementation of these instructions by the contractor and confirms whether the personnel responsible for operation and maintenance have obtained sufficient understanding through the guidance.

The contractor will dispatch knowledgeable technicians who have sufficient knowledge about the well-maintained facilities to provide guidance based on the operation and maintenance manuals. These guidance activities are primarily planned to be conducted during the commissioning and adjustment period after the installation of the facilities. However, if necessary, they may also be conducted during the installation of the facilities. The details of the initial operation guidance for each facility are shown in Table 2-27.

Table 2-27 Initial Operational Guidance

Facility	Contents
Water Transmission Pump	<ul style="list-style-type: none"> <li>➤ Operating procedures for water pumps (normal and abnormal conditions)</li> <li>➤ Handling of ancillary equipment for water pumps (valves, instrumentation, electrical panels, etc.)</li> <li>➤ Inspection and repair methods of mechanical equipment (pump equipment, valves, etc.)</li> <li>➤ Inspection and repair methods of electrical equipment (power distribution panel, motor control panel, distribution panel, operation panel, etc.)</li> </ul>
SCADA System	<ul style="list-style-type: none"> <li>➤ Operating procedures for SCADA system (central monitoring room and substations)</li> <li>➤ Inspection, calibration and repair method of instrumentation (flow meters, pressure gauges, water level gauges, etc.)</li> <li>➤ Inspect and repair method of SCADA system</li> </ul>

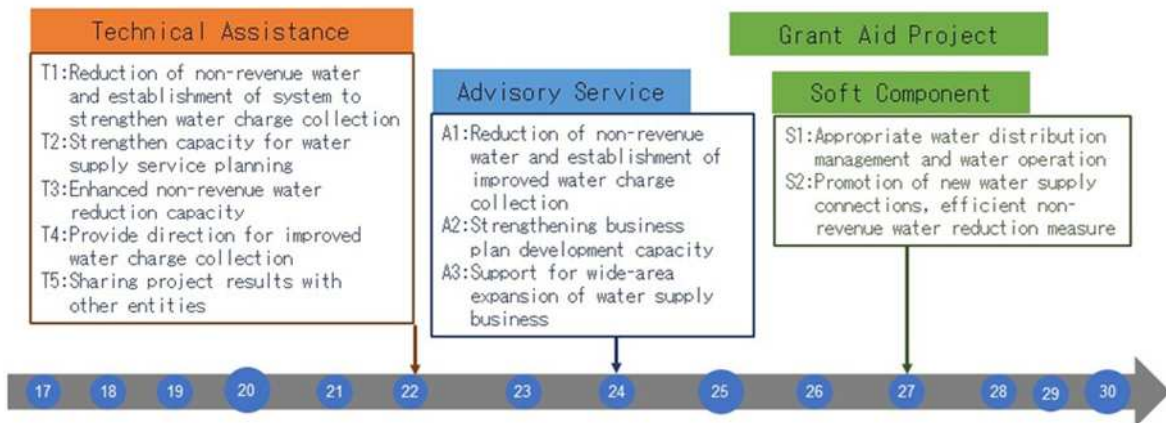
Source: The Preparatory Survey Team

The initial operational training of the SCADA system mentioned here aims to provide instructions on the basic operation and maintenance of the equipment. Technical support, as outlined in the 2-6-8 Soft Component Plan, is planned to further enhance the operation guidance and utilization of the SCADA system.

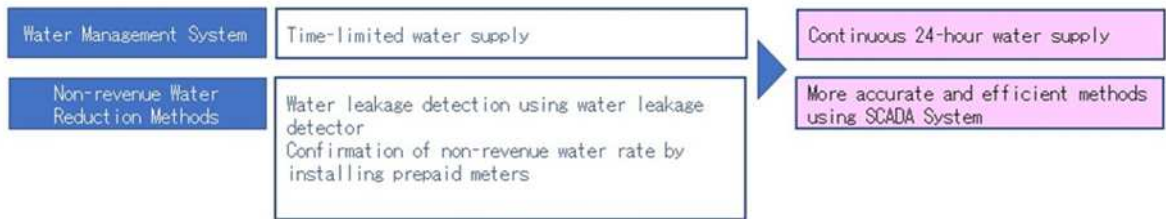
### 2-6-8 Soft Component (Technical Assistance) Plan

Firstly, the following Figure 2-15 shows relationship between the "Project for Strengthening the Capacity of Water Service Management in Jenin Municipality" which was implemented from October 2017 to October 2022, the ongoing "Advisory for Water Service Management in Jenin Municipality", and the soft component in the Project.

● Background of Technical Assistance · Advisory Services and Soft Component under the Grant Aid Project



● Items to be changed after the Grant Aid Project



● Results of Technical Assistance · Advisory Services and Relationship with Soft Component under the Grant Aid Project

Item	Result of Technical Assistance / Advisory Service	Capabilities required after implementation of the Grant Aid Project	Soft Component
Non-revenue water reduction	<ul style="list-style-type: none"> <li>Establishment of implementation system and capacity strengthening (T1, T3)</li> <li>Establishment of activities (A1)</li> </ul>	<ul style="list-style-type: none"> <li>Understanding of proper conditions (both system and data) for 24-hour continuous water supply operation</li> <li>Management method of reasonable water distribution volume and appropriate water pressure for each DMA using SCADA system</li> </ul>	<ul style="list-style-type: none"> <li>S1-2&amp;2-1: Update water supply pipe network and customer GIS data</li> <li>S2-5: Strengthen quality control of house connection water pipe work</li> <li>S2-6: Calculation of non-revenue water ratio for each DMA</li> <li>S2-7: Use of minimum nighttime flow analysis</li> </ul>
Water charge collection	<ul style="list-style-type: none"> <li>Establishment of implementation system and capacity strengthening (T1, T4)</li> <li>Establishment of activities (A1)</li> </ul>	<ul style="list-style-type: none"> <li>Update GIS data and EPANET data</li> </ul>	<ul style="list-style-type: none"> <li>S2-1: Update water supply pipe network and customer GIS data</li> <li>S2-2: Calculation of non-revenue water ratio for each DMA</li> </ul>
Water Supply Business Plan	<ul style="list-style-type: none"> <li>Strengthen planning capacity (T2)</li> <li>Business plan after the Grant Aid Project implementation (A2)</li> </ul>	<ul style="list-style-type: none"> <li>Methodology for Identifying Targets for Non-Revenue Water Reduction by SCADA system</li> </ul>	<ul style="list-style-type: none"> <li>S2-3: Sharing the objectives of the Project</li> <li>S2-4: Facilitate new customer house connections</li> </ul>
Others	<ul style="list-style-type: none"> <li>Sharing results with other entities (T5)</li> <li>Widening Support (A3)</li> </ul>	<ul style="list-style-type: none"> <li>Promote new house connections</li> </ul>	<ul style="list-style-type: none"> <li>S1-1,3,5: Understanding New Water Management Systems</li> <li>S1-4,6,7: Strengthening of appropriate operational management capacity</li> </ul>

Source: The Preparatory Survey Team

Figure 2-15 Relationship between the Outcomes of Technical Assistance · Advisory Services and Soft Component

## (1) Background for Planning Soft Component

The water supply situation in Jenin has been plagued by chronic water shortages caused by leakage from aging water pipes and lack of water pressure, etc. Each water supply area is supplied with water on a 10-day cycle, but most areas only receive water for 1 to 3 days out of those 10 days. Additionally, due to restrictions imposed by Israel under the Oslo Accords, the development of new water resources is tightly controlled. Therefore, the priority is to reduce the NRW ratio to effectively utilize the limited water resources and restructure the water transmission and distribution system to ensure a fair and stable water supply through rational water management.

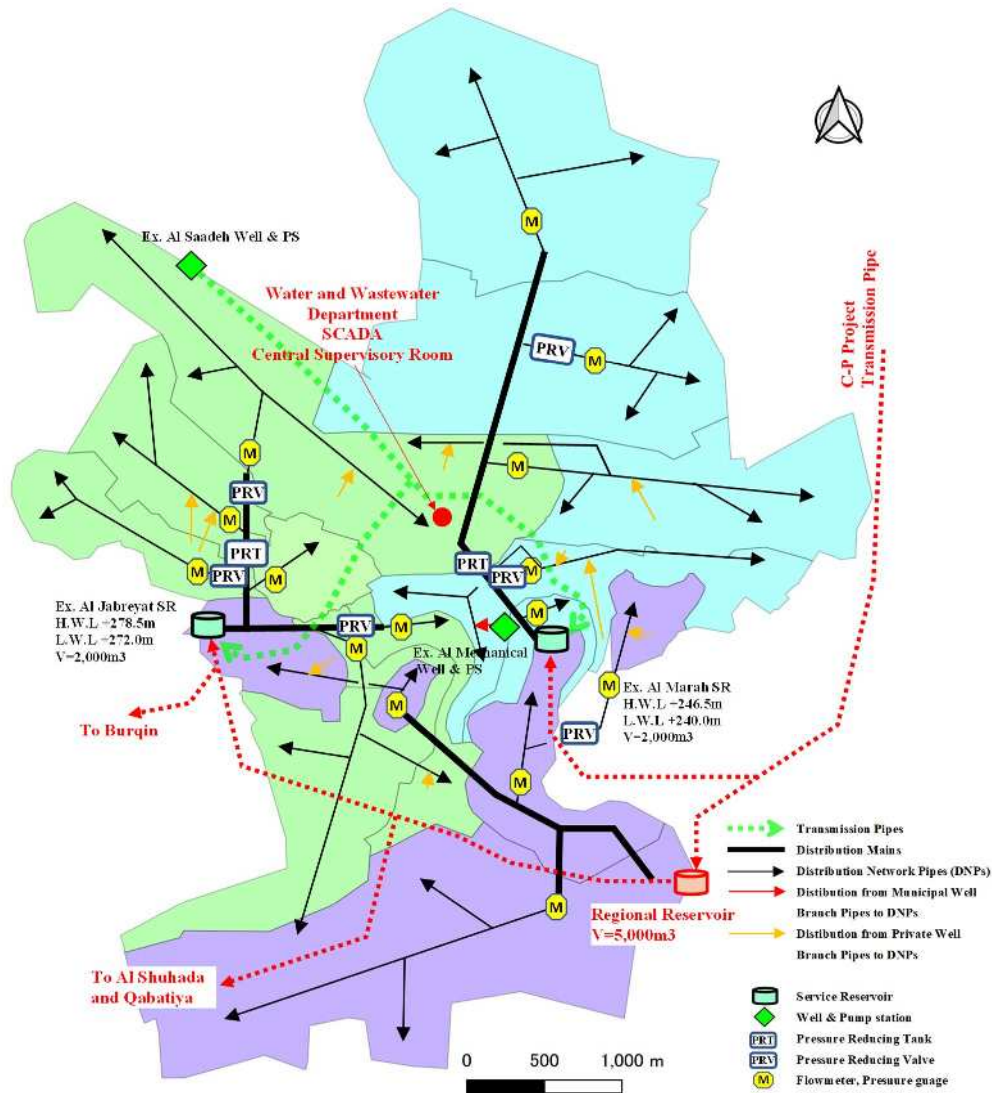
To improve this situation, the following activities were carried out from October 2017 to October 2022 under the technical assistance of the Project for Strengthening the Capacity of Water Service Management in Jenin Municipality, with the aim of strengthening the capacity to reduce non-revenue water, collect water charges, and formulating water utility operational plans.

- i) Support for the preparation of a medium- to long-term water supply business management plan (2017 - 2027) (hereinafter referred to as the "Business Plan") and the development of the city's annual business management plan based on said Business Plan.
- ii) Implementation of cost-effective activities to reduce non-revenue water through training, periodic leak detection, and monitoring of non-revenue water rates. Furthermore, GIS data of the existing pipe network was created, and planning capacity enhancement activities were conducted using EPANET (free software for hydraulic pipe network analysis) as part of the DMA plan.
- iii) Introduction of prepaid water meters (PPWM) as an alternative to conventional mechanical water meters in pilot districts to improve the rate of fee collection. Based on the results, the use of PPWM was expanded city-wide.
- iv) At the same time, the system related to customer service was also strengthened (e.g., faster response to complaints, etc.) to improve overall customer service. Furthermore, accounting for the water supply business was made independent from the general accounting of the Jenin Municipality, and the accounting system was shifted from cash basis to accrual basis to strengthen the operational aspects of the business and provide a better understanding of the management status of the water supply business.

In the ongoing "Advisory for Water Service Management in Jenin Municipality", the following activities are being/will be carried out to ensure the continuity and sustainability of the system and activities supported by the technical cooperation project, as well as to further improve and enhance the project.

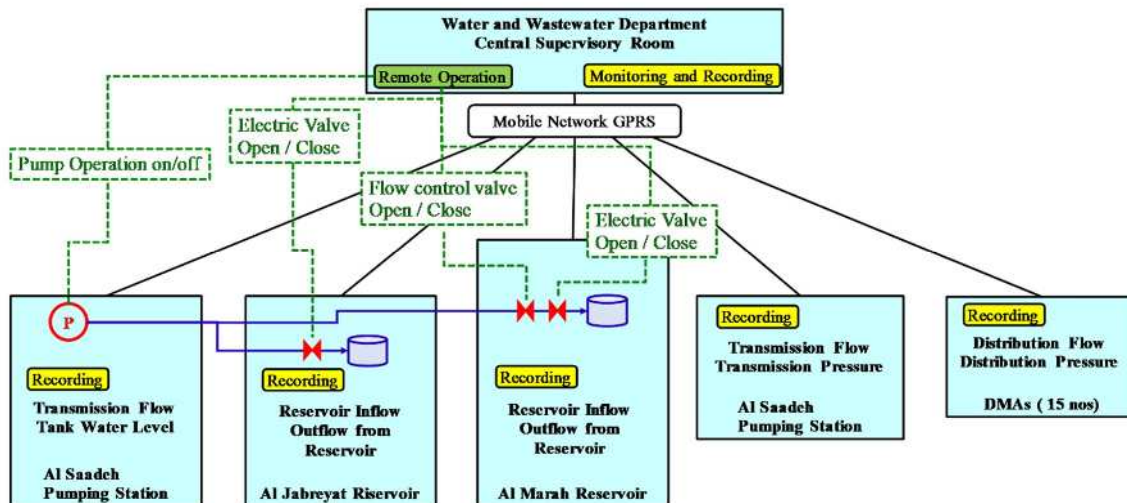
- i) Improvement and enhancement of the business plan and its accounting system
- ii) Establishment of non-revenue water reduction activities
- iii) Improvement and enhancement of fee collection capacity
- iv) Support for the implementation of PPWM
- v) Support for the promotion of wide-area expansion

"The Project for Improvement of Water Supply System in Jenin" aims to reconstruct the water transmission and distribution facilities to ensure a continuous water supply 24 hours a day. This will be achieved by securing a sufficient water source volume, including the amount of water received from the PWA (C-P Project) and the rehabilitation of existing intake well, for the purpose of efficient and stable water supply. The water distribution system as shown in Figure 2-16 includes the formation of new DMAs to distribute the increased volume of water at appropriate water pressures, the construction of distribution mains from distribution reservoirs to each DMA, and distribution branch pipes in the distribution pipe network in the DMAs (only the deteriorated aging pipes are to be renewed among the existing pipe network). Pressure reducing water tanks and valves will be installed at the branch points from the main water distribution pipes of the DMAs to ensure appropriate water pressure, while flow meters and pressure gauges will be installed to control the operational status. SCADA will be installed to monitor these operational statuses and control the operation of the water pumping stations and distribution reservoirs to enable appropriate water distribution management and equal water use. The technical assistance project initially covered water operation with time-limited water supply, but after the implementation of the Project, water will be continuously supplied 24 hours a day, so the operation and maintenance management system and on-site work will need to be reviewed. Additionally, the operation record data and flow rate data will significantly differ from the past. Understanding these factors and implementing the soft component are essential to ensure proper water distribution management and efficient water operation.



Source: The Preparatory Survey Team  
Figure 2-16 Water Supply System Overview

After the completion of the Project, it is particularly expected that the achievements of the aforementioned Technical Assistant project will be utilized, leading to synergistic effects with the Project, especially in improving activities aimed at reducing NRW. Effective utilization of the newly introduced SCADA system is essential for this purpose. Outline of SCADA is illustrated in Figure 2-17. SCADA is an effective management system that automates and centrally manages the monitoring and control of widely dispersed equipment and instruments, leading to improved operational efficiency. However, SCADA alone has limited effectiveness in facility operation improvements without a management system that includes the ability of technical staff to analyze the accumulated data and reflect it to NRW reduction measures. Although the Project includes initial operation guidance by the contractor during the installation of SCADA equipment, based on the basic usage instructions and manuals of the equipment, there is currently no provision for technical guidance regarding the utilization of flow and water pressure data acquired by SCADA for distribution management and NRW reduction measures. Therefore, the implementation of Software Components is necessary to establish an environment for utilizing the data acquired by SCADA for NRW reduction measures.



Source: The Preparatory Survey Team

Figure 2-17 SCADA Outline

(2) Objectives of the Soft Component

The objectives of the Soft Component are to ensure the smooth establishment and sustainable operation and maintenance of facilities constructed through grant aid. This is achieved by equipping the staff of the Jenin Municipality with the necessary knowledge and skills for (i) implementing proper water supply management and operation, and (ii) promoting new water connections and deploying efficient NRW reduction measures utilizing the functions of SCADA through the acquisition of relevant knowledge and know-how.

(3) Soft Component Outcomes

The direct outcomes to be achieved upon completion of the Soft Component implementation are as follows:

Outcome 1: Enable proper water supply management and operation

- i) The concept of DMAs for water supply management is understood.
- ii) Pipe network analysis model of the water distribution network is established and the hydraulic condition is understood.
- iii) The operation methods for water transmission facilities are understood
- iv) Enables fair water distribution with appropriate water pressure.
- v) Enables water supply management based on actual water demand.
- vi) Operational records are maintained.
- vii) Enable operational and maintenance management utilizing alarm records
- viii) Enables proper water supply management and operation

Table 2-28 Activities for Outcome 1

Outcome		Activity
Outcome 1-i)	The concept of distribution blocking for water supply management is understood.	The purpose of water distribution blocking will be explained, and examples of its implementation in Japan will be introduced to deepen understanding of the concept. The training will also provide guidance on water management and water distribution coordination methods based on the blocked water distribution system. *There is no overlap with the Technical Assistance project. (Acquiring concepts and management methods related to 24-hour continuous water supply.)
Outcome 1-ii)	Pipe network analysis model of the water distribution district is structured and the hydraulic condition is understood.	Based on the understanding of [Outcome 1-①], the hydraulic conditions of the water supply network will be understood by structuring a pipe network analysis model using EPANET, a free software for each DMA based on the pipe network information updated in [Outcome 2-①]. The training will also provide instruction on how to structure a pipe network analysis model and how to evaluate the analysis results.

Outcome		Activity
		*There is no overlap with the Technical Assistance project. (24-hour continuous water supply network model.)
Outcome 1-iii)	The operation methods for water transmission facilities are understood.	To manage water operations effectively, it is necessary to consider the inflow into each water distribution reservoir from the water transmission system using the water supply from the C-P plan and the municipal wells. Training will be provided on the indicators and adjustment methods to be checked for adjusting the operation of the water transmission facilities, such as the water level setting for opening and closing the inflow valve of each water distribution reservoir, the degree of opening of the flow control valve, and the operation method of the water transmission pumps. *There is no overlap with the Technical Assistance project.
Outcome 1-iv)	Enables fair water distribution with appropriate water pressure.	The secondary side pressure setting of the pressure reducing valve will be adjusted as necessary based on the hydraulic conditions resulting from the analysis in [Outcome 1-②]. This ensures proper water distribution pressure and to provide training on adjustment methods for equitable water distribution. *There is no overlap with the Technical Assistance project.
Outcome 1-v)	Enables water supply management based on actual water demand.	Existing water distribution facilities are not equipped with flow meters to check the amount of water flowing into the distribution area, and thus water supply management is not carried out according to the amount of water demand. The introduction of SCADA will enable time-series display of continuously measured values of instrumentation (water volume, water pressure, water level, etc.). By analyzing trends in actual operation results, water demand can be predicted, and water supply management based on water demand becomes possible. Along with trend analysis and forecasting methods for water demand, the training will provide guidance on water operation and operation adjustment methods. *There is no overlap with the Technical Assistance project.
Outcome 1-vi)	Operational records are maintained.	Training will be given on how to utilize SCADA's data storage and report generation functions to record the data as operational records (annual, monthly, daily, etc.). *There is no overlap with the Technical Assistance project.
Outcome 1-vii)	Enables operational and maintenance management utilizing alarm records.	By recording alarm logs using SCADA's alarm management function, it is possible to utilize them for equipment maintenance management planning and operation adjustment. The training will provide guidance on how to utilize these alarm logs for daily operation and maintenance of equipment. *There is no overlap with the Technical Assistance project.
Outcome 1-viii)	Enables proper water supply management and operation	The overall water supply system to be restructured through the Project will be explained, and technical guidance will be provided on water distribution blocking, water operation in the transmission and distribution system, and water supply management based on actual water demand with appropriate distribution pressure. In addition, training is provided on how to utilize the operation management and alarm records obtained from the SACADA system for management ledgers, reports, and maintenance management.

Source: The Preparatory Survey Team

Outcome 2: New water supply connections are promoted and efficient NRW reduction measures are developed.

- i) GIS data of pipe network and customer information will be updated after restructuring of water distribution pipe network.
- ii) Each customer will be classified by water distribution district.
- iii) The objectives of the Project will be shared with residents.
- iv) New customer water connections will be facilitated.



- v) The quality control of water pipe connection work will be strengthened.
- vi) The NRW ratio per water distribution district will be calculated.
- vii) Minimum Night Flow analysis will be utilized.
- viii) New water supply connections will be promoted and efficient non-revenue water reduction measures will be developed.

Table 2-29 Activities for Outcome 2

Outcome		Activity
Outcome 2-i)	GIS data of pipe network and customer information will be updated after restructuring of water distribution pipe network.	<p>The GIS data for the network and customer information are updated after the restructuring of the distribution pipeline network. Training is provided for updating the GIS data of the network information after the restructuring, which is necessary for the formation of new district metered areas (DMAs) in the Project. Additionally, training is given for updating the GIS data of customer information, including updates to the branching points of existing customers.</p> <p>*Relationship with the Technical Assistance project.</p> <ul style="list-style-type: none"> <li>• GIS data for the existing pipe network information prior to the Project has already been prepared by Technical Assistance. The new distribution system provides 24-hour water supply from 3 distribution points to 15 DMAs, whereas the existing system provides limited water supply from 17 distribution points to 17 DMAs and 81 distribution blocks, which is a significant change.</li> <li>• Existing customer data has already been organized in the existing water distribution area. Since attribute information will change between the existing and new water distribution areas, it is necessary to update the data by utilizing the knowledge acquired through the Technical Assistance.</li> </ul>
Outcome 2-ii)	Each customer will be classified by water distribution district.	<p>By combining the updated network data and customer data from Result 2-①, it becomes possible to classify each customer into their respective district metered areas (DMAs). Training is provided for managing customers on a DMA basis, including customer numbers and water supply volume</p> <p>*There is no overlap with the Technical Assistance project.</p>
Outcome 2-iii)	The objectives of the Project will be shared with residents.	<p>The details of the Project will be explained to the residents, and the objectives (fairness, efficiency, continuous water supply, etc.) will be shared. In addition, the advantages of continuous water supply, such as preventing pollution due to storage in the water tank (as water not having to pass through water tank), and improving water quality (by preventing pollution in the pipes as positive pressure is maintained in the distribution pipes at all times), will be highlighted. Support will be provided to promote understanding and cooperation among residents for the realization of continuous water supply and the above-mentioned benefits.</p> <p>* There is no overlap with the Technical Assistance project. (Existing is limited water supply, after the Project is 24-hour continuous water supply.)</p>
Outcome 2-iv)	New customer water connections will be facilitated.	<p>Technical guidance will be provided to ensure systematic implementation of new connections in new water supply expansion areas, as promoting new connections in these areas improves the revenue of water utilities.</p> <p>* There is no overlap with the Technical Assistance project. (Procedures from water supply application to connection work are procedurally defined.)</p>
Outcome 2-v)	Quality control of water pipe connection work will be strengthened.	<p>It is expected that the construction of water supply connections will increase rapidly from Outcome 2-④. In existing facilities, leaks from water supply connections account for the majority of water leakage incidents, and since improving the quality of water supply connections is important to prevent leakage, technical guidance will be provided for quality control of water supply connection work.</p> <p>*There is no overlap with the Technical Assistance project.</p>

Outcome		Activity
Outcome 2-vi)	Non-revenue water ratio per water distribution district will be calculated.	The total amount of water supply for each customer obtained from the prepaid water meters installed through the Technical Assistance project will be aggregated for each DMA in Outcome 2-② to calculate the total amount of water supply per DMA unit. Additionally, training will be provided on the procedure for calculating the non-revenue water ratio by comparing it to the water distribution volume per DMA obtained from Outcome 1-⑥. *Relationship with the Technical Assistance project. The ability to aggregate data in the existing distribution district has been already acquired through the Technical Assistant project. However, the calculation results will be significantly different due the change of water distribution district.
Outcome 2-vii)	Nighttime minimum flow analysis will be utilized.	Continuous monitoring of flow rates in DMA units will allow for the measurement of nighttime minimum flow rates in DMAs. The training will provide guidance on how to evaluate the nighttime minimum flow/number of customers, trends in the time series of minimum flow, and other factors, utilizing the nighttime minimum flow as an indication of the amount of leakage. *There is no overlap with the Technical Assistance project. (The existing system is a restricted water supply and the minimum flow rate cannot be measured. After the Project, the water supply will be continuous 24 hours a day and minimum flow measurement will be possible at night)
Outcome 2-viii)	New water supply connections will be promoted and efficient non-revenue water reduction measures will be developed.	Technical guidance on updating GIS data related to facility and customer information for the water supply system to be restructured after implementation of the Project, support for publicity activities to residents regarding the Project, support for promoting new connections, guidance on quality control methods for water supply connection work, and technical guidance on non-revenue water ratio calculation and nighttime minimum flow method at each water distribution district.

Source: The Preparatory Survey Team

#### (4) Soft Component Activities (Input Plan)

The Soft Component will be provided through direct support by two experts from a Japanese consultant (water leakage management specialist and water supply management specialist), with the activity duration of 6.84 M/M. The activity plan (input plan) for the Soft Component is shown on Table 2-30.

Table 2-30 Soft Component Activity Plan (Input Plan)

Outcome	Activities	Trainees	Input Plan
【Outcome 1】 Enabling proper water supply management and operation	<ul style="list-style-type: none"> <li>➤ Training on water distribution block formation</li> <li>➤ Guidance on structuring of pipe network analysis model</li> <li>➤ Guidance on water operation and management methods for water transmission facilities</li> <li>➤ Guidance on how to adjust water pressure and implement equitable water distribution</li> <li>➤ Guidance on how to adjust water management and operations based on water demand analysis and forecast</li> <li>➤ Guidance on how to maintain operation record</li> <li>➤ Guidance on how to utilize alarm record</li> </ul>	Staff of the Water and Wastewater Department of the Jenin Municipality (belonging to the Water Section and the Project and Planning Section)	1 Japanese consultant (water supply management specialist) Total 3.38 M/M Domestic preparation: 0.25 M/M 1 <sup>st</sup> Dispatch: 1.33 M/M 2 <sup>nd</sup> Dispatch: 0.73 M/M 3 <sup>rd</sup> Dispatch: 1.07 M/M
			Technical: knowledge and experience in water operation, water supply management, and operation and maintenance Specific Trade: Electrical

Outcome	Activities	Trainees	Input Plan
	➤ Guidance on implementation of water supply management and water operation		or mechanical
<b>【Outcome 2】</b> Promoting new water supply connections implementing efficient non-revenue water reduction measures	<ul style="list-style-type: none"> <li>➤ Guidance on updating GIS data for pipe network and customer information</li> <li>➤ Guidance on classification and data update for each customer's water distribution district</li> <li>➤ Support for implementation of resident awareness activities</li> <li>➤ Support for activities to promote water supply connection</li> <li>➤ Guidance for strengthening quality control of water pipe connection</li> <li>➤ Guidance on how to calculate non-revenue water ratio per water distribution district</li> <li>➤ Guidance on how to utilize nighttime minimum flow</li> <li>➤ Guidance on how to implement non-revenue water reduction measures</li> </ul>	Staff of the Water and Wastewater Department of the Jenin Municipality (belong to the Water Section and the Customer Service Section)	1 Japanese consultant (water leakage management specialist) Total 3.46 M/M Domestic preparation: 0.25M/M 1 <sup>st</sup> Dispatch: 1.07 M/M 2 <sup>nd</sup> Dispatch: 1.07 M/M 3 <sup>rd</sup> Dispatch: 1.07 M/M <hr/> Technical: knowledge and experience in leakage management, customer management, and water supply planning Specific Trade: Leakage management

Source: The Preparatory Survey Team

Draft implementation plan for the specific activities and number of days for each expert for the activities listed in Table 2-29 are shown on Table 2-31 and Table 2-32.

Table 2-31 Proposed Implementation Plan (Water Supply Management Specialist)

Activity	Year	Year 2025																		
		Man	1	7	8	14	15	21	22	28	29	35	36	40						
		-Day	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	Mon					
In Japan	Preparation of technical transfer plan	1																		
	Preparation of pre-test and questionnaire to trainees	1																		
	Preparation of training text and draft manual	3																		
	1st dispatch on-site	Travel (Japan ↔ Palestine)	4																	
		Meeting with C/P, preparation of training room	1																	
		Selection of trainees (Water supply management), pre-test, preparation of briefing	1																	
		Briefing on technical assistance program	1																	
		Basic training on water supply management: Introduction of hydrology engineering (lecture)	1																	
		Basic training on water supply management: Concerns regarding water distribution block (lecture)	1																	
		Basic training on water supply management: Introduction of case studies of water distribution block (lecture)	1																	
		Basic training on water supply management: Water supply operation (lecture)	1																	
		Basic training on water supply management: Water supply adjustment (lecture)	1																	
		Conduct short test on water supply management, evaluate test results	1																	
		Training on pipe network analysis training: EPANET software explanation and setup (lecture)	1																	
		Training on pipe network analysis: Software operation and model explanation (lecture)	1																	
		Training on pipe network analysis: Model structuring and display of analysis results (lecture)	1																	
		Training on pipe network analysis: Water demand allocation (lecture)	1																	
		Training on pipe network analysis: Pipe network model structuring and demand volume input (lecture)	1																	
		Pipe network analysis model structuring (Al Jabreyet reservoir system: 6 water distribution areas)	2																	
		Pipe network analysis model structuring (Al Marah reservoir system: 5 water distribution areas)	2																	
Pipe network analysis model structuring (direct water distribution system: 3 water distribution areas)		1																		
Exercise of pipe network analysis model structuring (on-the-job training)		3																		
Exercise of evaluation of pipe network analysis results (on-the-job training)		3																		
Development of pipe network analysis manual	1																			
2nd dispatch on-site	Travel (Japan ↔ Palestine)	4																		
	Meeting with C/P, discussion with trainee staff	1																		
	Training on water operation (lecture)	1																		
	Gathering information on water operation and operational control for the C-P project	1																		
	Operation and adjustment of water supply facilities (on-site training)	1																		
	Operation and adjustment of water supply facilities (on-the-job training)	1																		
	Training on water distribution management (lecture)	1																		
	Check and adjustment of secondary pressure setting of pressure reducing valve	1																		
	Customer analysis and calculation of water distribution volume	1																		
	Check and adjustment of secondary pressure setting of pressure reducing valve (on-the-job training)	1																		
	Exercises in customer analysis and calculation of water distribution volume (on-the-job training)	1																		
	Verification of the adequacy of water operation in the water supply system	1																		
	Confirmation of optimal water distribution pressure and verification of fairness in water allocation	1																		
	3rd dispatch on-site	Travel (Japan ↔ Palestine)	4																	
		Meeting with C/P, discussion with trainee staff	1																	
		Training on water demand analysis and forecasting (lecture)	1																	
		Data collection, analysis and forecasting of water demand on water distribution area basis	1																	
		Exercise in analyzing and forecasting water demand (on-the-job training)	1																	
		Training on operation record (lecture)	1																	
		Data collection and organization of operation records	1																	
Organization of operation records (annual reports, monthly reports, daily reports, etc.) (on-the-job training)		2																		
Training on alarm management (lecture)		1																		
Data collection, organization, and analysis of alarm logs		1																		
Develop operation and maintenance management plan for equipment (on-the-job training)		1																		
Training on development of water operation and maintenance management plan (lecture)		1																		
Preparation of water operation and maintenance management plan		3																		
Preparation of presentation of results for water operation and maintenance management plan		2																		
Presentation of results of training		1																		
Develop manuals for water operation and maintenance management plan		1																		
Preparation and submission of general report, meeting with C/P		1																		

Domestic: 5 days/20 days = 0.25MM  
 1<sup>st</sup> Dispatch on-site: 40 days/30 days = 1.33 MM, 2<sup>nd</sup> Dispatch on-site: 22 days/30 days = 0.73 MM,  
 3<sup>rd</sup> Dispatch on-site : 32 days/30 days = 1.07 M

Source: The Preparatory Survey Team

Table 2-32 Draft Implementation Plan (Water Leakage Management Specialist)

Activity	Year	Year 2025												
	Man	1	7	8	14	15	21	22	28	29	35	36	40	
	Day	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	Mon	Sun	
In Japan	Preparation of technical transfer plan	1												
	Preparation of pre-test and questionnaire to trainees	1												
	Preparation of training text and draft manual	3												
	Travel (Japan ↔ Palestine)	4												
	Meeting with C/P, preparation of training room	1												
	Selection of trainees (NRW), pre-test, preparation of briefing	1												
	1st dispatch on-site	Briefing on technical assistance program	1											
		Training on GIS database (lecture)	1											
		Collection of pipe network information and on-site check	5											
		Collection of customer information and on-site check	5											
		Pipe network data (location and attributes) GIS input	2											
		Customer data (location and attributes) GIS input	2											
		Classification and listing of each customer's district metered area (DMA)	1											
Exercise to classify each customer's district metered area (DMA) (on-the-job training)		1												
2nd dispatch on-site		Travel (Japan ↔ Palestine)	4											
		Meeting with C/P, selection of staff in charge (customer management)	1											
	Meeting with staff in charge, review of implementation system of activities	1												
	Development of awareness campaign plan	1												
	Preparation of explanatory materials for residents	2												
	Provide explanations to residents regarding project objectives	3												
	Development of promotional activity plan	1												
	Preparation of explanatory materials for residents	2												
	Provide explanations to residents regarding water supply connections	3												
	Water supply connection training: installation procedures (lecture)	1												
	Training on water supply connection installation: quality control (lecture)	1												
	Training for water supply connection work (on-the-job training)	2												
	3rd dispatch on-site	Preparation of construction check sheets for water supply connection work	1											
Development of quality management manual for water supply connection		1												
Travel (Japan ↔ Palestine)		4												
Meeting with C/P, discussion with trainee staff		1												
Basic training on revenue ratio (lecture)		1												
Collection and aggregation of customer water supply information		2												
Collection and aggregation of water distribution volume information for each water distribution area		2												
Calculation and analysis of revenue ratio per water distribution area		2												
Exercise in calculating revenue ratio (on-the-job training)		3												
Basic training on minimum nighttime flow (lecture)		1												
Organization and analysis of minimum nighttime flow		1												
Exercise of analysis of minimum nighttime flow (on-the-job training)		3												
Training on leakage reduction planning (lecture)		2												
Preparation and submission of general report	1													
Meeting with C/P	1													

Domestic: 5 days/20 days = 0.25MM  
 1<sup>st</sup> Dispatch on-site: 32 days/30 days=1.07MM, 2<sup>nd</sup> Dispatch on-site: 32 days/30 days=1.07MM,  
 3<sup>rd</sup> Dispatch on-site: 32 days/30 days=1.07MM

Source: The Preparatory Survey Team

(5) Soft Component Implementation Schedule

1) Outcome 1: Enabling appropriate water supply management and operation

The first on-site dispatch of the water supply management specialist aims to understand the concept of distribution blocks, which is the basis of water distribution management, and to understand the hydraulic conditions through pipe network analysis. The first technical guidance will be conducted after the construction of GIS data on the pipe network and customer information (13th month after the start of construction). The second on-site dispatch will take place during the commissioning period of the constructed facilities (25th month from the start of construction) to provide further technical guidance. The purpose of this second on-site dispatch is to transfer technology for optimizing water operation and adjusting water distribution volume and pressure in the post-reconstruction water supply facilities. Lastly, the third on-site dispatch aims to develop an implementation plan for water supply management and water operation based

on the operational results using SCADA data. This third technical guidance is planned to be conducted a few months after the facilities have been operational and some performance data has been accumulated in SCADA (expected in the fourth month after handover).

2) Outcome 2: Developing efficient non-revenue water reduction measures

The first on-site dispatch of the water leakage management specialist will take place during the peak period of piping laying works (12th month from the start of construction) to provide the first technical guidance. The objective is to establish GIS data on the pipe network and customer information, which is essential for the soft component of the Project. The second on-site dispatch will be during the commissioning period of the facilities (24th month from the start of construction) to provide the second round of technical guidance. The purpose of this dispatch is to promote the connection of new customers and strengthen the quality control of connection works in relation to the expansion of the water supply area. Lastly, the third on-site dispatch aims to utilize SCADA data to calculate the non-revenue water rate and develop a deployment plan for non-revenue water reduction measures. This third technical guidance is planned to be conducted a few months after the facility handover, once SCADA has been operational for some time and some performance data has been accumulated (in the fifth month after the handover).

The implementation schedule of the soft components is shown on Table 2-33.

Table 2-33 Soft Component Implementation Schedule

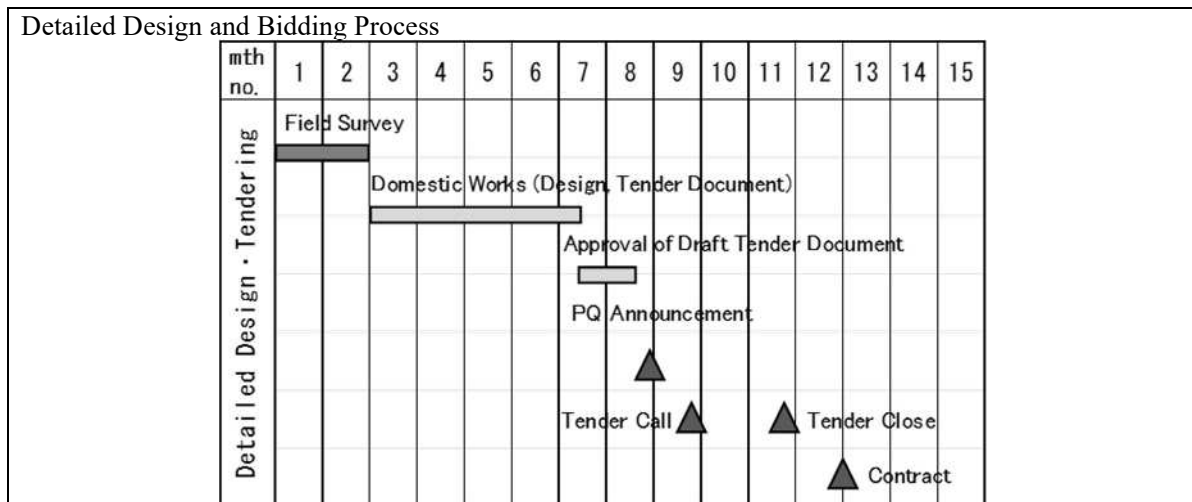
Activity	nth no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Construction	Mobilization & Demobilization	█																																
	Water Pipe Laying Works				█																													
	Installation of Plant & Equipment																		█															
	Testing & Commissioning																			█									▲	Completion of Works				
Soft Component	SCADA Data Accumulation																								█									
	Water Supply Management Specialist										In Japan				█	1st Dispatch on-site											█	2nd Dispatch on-site	█	3rd Dispatch on-site				
	Water Leakage Management Specialist											█	In Japan	█	1st Dispatch on-site											█	2nd Dispatch on-site	█	3rd Dispatch on-site					
	Local Assistant Engineer												█													█								
	Prepare & Submit Report											Progress Report	▲											Progress Report	▲	Completion Report	▲							

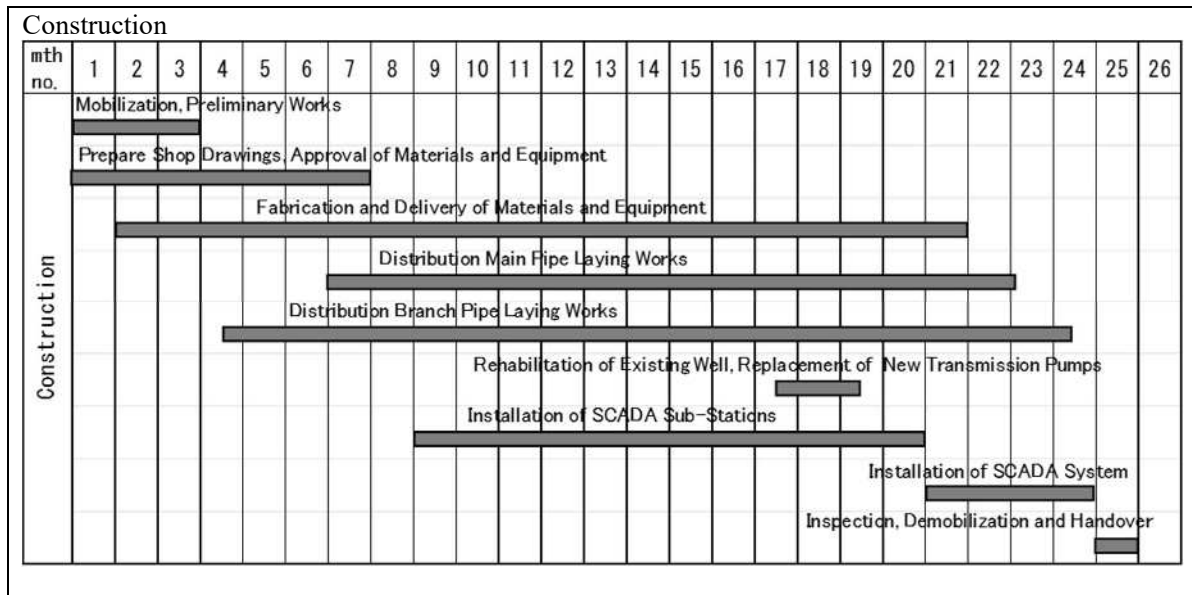
Source: The Preparatory Survey Team

2-6-9 Implementation Schedule

The Project will be implemented by the Japan's grant aid scheme based on a Grant Agreement (G/A) between the Japan International Cooperation Agency (JICA) and the Government of Palestine after the Exchange of Notes (E/N) between the Government of Japan and the Government of Palestine has been signed.

The implementation of the Project will require 12 months for detailed design and bidding process, followed by 25 months for construction works after the contract with the contractor is signed, totaling 37 months. The implementation schedule for the Project is presented on Figure 2-18.





Source: Prepared by the Survey Team

Figure 2-18 Project Implementation Schedule

## 2-7 Security Plan

### 2-7-1 Security Plan for Public Safety

The risk of armed conflict is particularly high in Israel-Palestine, especially in the vicinity of the Gaza Strip. The largest clash since 2014 occurred on November 12, 2018, and the situation remains highly unpredictable. On the other hand, the security situation in the West Bank has relatively stabilized compared to the Gaza Strip, leading to the downgrade of the danger alert issued by Ministry of Foreign Affairs of Japan from Level 3 to Level 2 on October 5, 2018. However, the security conditions in Palestine are volatile and significantly influenced by the political situation between Israel and Palestine. Therefore, the following safety precautions should be taken against security risks.

- Japanese personnel involved in construction work are required to take safety training provided by JICA prior to their on-site dispatch, and to take thorough actions to protect themselves (self-defense).
- After being dispatched to the site, the Japanese personnel involved in construction work will receive safety briefing from the JICA Palestine Office and make efforts to gather information related to the local security situation.
- Considering the possibility of unforeseen events that may restrict their movements, measures should be taken to ensure that communication methods and emergency supplies are available in case they are required to remain at their accommodation or site office.
- Japanese personnel involved in construction work who stay for a long period of time will rent secure residences, while those who stay for short period of time will stay in hotels recommended by JICA.

### 2-7-2 Safety Plan for COVID-19

The number of COVID-19 infections in Palestine has remained at a low level since peaking in February 2022, and awareness of measures to prevent COVID-19 infection is low in the city, with few people wearing masks. However, it is difficult to accurately assess the infection situation in the city, and measures to prevent infection are necessary. Therefore, the following actions to reduce the risk of COVID-19 infection and ensure thorough implementation of infection prevention measures.

- Hand washing and alcohol disinfection when returning indoors
- Avoiding large gatherings and group meals

## 2-8 Obligation of the Recipient Country

### 2-8-1 Specific Obligations of the PA

The Table 2-34, Table 2-35, and Source: Appendix 4 (3) M/D ANNEX 5 (July 2023)

Table 2-36 are lists of specific obligations to be borne by the PA before the Bidding, during the Project implementation, and after the Project, which will not be funded with the Grant.

Table 2-34 Specific Obligations of the PA (Before the Tender)

NO	Items	Deadline	In charge	Estimated Cost (NIS)
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	MoF /PWA	
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)	PWA	
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A			
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	PWA	6,000
	2) Payment commission for A/P	every payment	PWA	
4	To approve IEE/EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	PWA	
5	To secure and clear the following lands 1) temporary construction yard and stock yard near the Project area 2) borrow pit and disposal site near the Project area	before notice of the bidding documents	Jenin Municipality (JM)	383,000
6	To obtain the planning, zoning, building permit	before notice of the bidding documents	JM	
7	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	PWA	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Source: Appendix 4 (3) M/D ANNEX 5 (July 2023)

Table 2-35 Specific Obligations of the PA (During the Project Implementation)

NO	Items	Deadline	In charge	Estimated Cost (NIS)
1	To issue A/P to the Agent Bank for the payment to the supplier(s) and the contractor(s)	within 1 month after the signing of the contract(s)	MoF /PWA	
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)	PWA	70,000
	2) Payment commission for A/P	every payment	PWA	
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in Palestine.	during the Project	MoF /PWA	
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	PWA	



NO	Items	Deadline	In charge	Estimated Cost (NIS)
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	during the Project	MoF /PWA	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	PWA/JM	
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	PWA	
8	1) To submit Project Monitoring Report.	every month	PWA	
	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)	PWA	
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	PWA	
10	Cooperation during the connection of newly installed or replaced pipes with the existing water network, and during the coordination of water distribution and explanation to the residents when connecting the water service pipes to the new pipes.	During the construction	JM	
11	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)			
	1) Electricity The distributing line to the site	before start of the construction	JM	51,000
	2) Water Supply The city water distribution main to the site for flushing and pressure test.	before start of the construction	JM	
	3) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the construction	JM	
4) To install communication line to the sites	6 months before completion of the construction	JM		
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site(s) such as general furniture for operation room of Pumping Station	during the construction	JM	5,000
13	To take measure necessary for security and safety of the Project - timely security information sharing and coordination with Palestine security authority - coordinating the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - coordinating traffic control around the site(s) and on transportation routes of construction materials - installation of permanent fences around the site(s)	during the construction	JM	
14	To implement EMP and EMoP	during the construction	PWA	
15	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	PWA	
16	To allocate appropriate trainees including a manager and	before start of Soft	JM	42,310/year

NO	Items	Deadline	In charge	Estimated Cost (NIS)
	operators for SCADA system to implement Soft Component	Component		
17	To provide a room for SCADA within Water and Wastewater Department building	during the construction	JM	
18	To conduct service pipe connection work including installation of water meter during the project implementation	during the construction	JM	
19	To secure alternative water source in case the progress of C-P project delays	during the construction	PWA	
20	To secure additional necessary budget, if any delay of the Project occurred by reasons related to PA procedure	during the construction	PWA	
21	To conduct monthly meetings with PWA, Jenin Municipality and the consultant of the Grant Aid Project to share the latest update and discuss issues if any in the earliest time. The consultants of C-P project will be invited, if needed.	during the construction	PWA	

Source: Appendix 4 (3) M/D ANNEX 5 (July 2023)

**Table 2-36 Specific Obligations of the PA (After the Project)**

NO	Items	Deadline	In charge	Estimated Cost (NIS)
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PWA/JM	
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 PWA and JICA.	for 3 years after the Project	PWA	
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	JM	
4	To conduct service pipe connection work including installation of water meter after the project completion continuously	Up to 2030	JM	
5	To continuously review current water tariff and collecting amount and raise the tariff gradually	continuously	JM	

Source: Appendix 4 (3) M/D ANNEX 5 (July 2023)

## 2-8-2 Other Items to be Borne by the PA

### 2-8-2-1 Implementation Budget and Schedule of the C-P Project

As the implementation of the C-P Project is considered as a prerequisite for the Grant Project, the M/D (July 2022) stipulates conditions for the Japanese Cabinet's approval, which include securing the budget and ensuring the implementation schedule. The information provided by PWA and disclosed by the World Bank is shown in Table 2-37.

**Table 2-37 Implementation Schedule and Project Costs of the C-P Project**

Project Packages	Packages	Contract signing	Completion	Estimated cost (million USD)
Package 1	Construction of Water Transmission Pipeline Between Salem And Aljalameh Connection Points to the Main Booster Pump Station	Nov. 29 <sup>th</sup> 2023	May 22 <sup>nd</sup> 2025	11.0
Package 2	Construction of Water Transmission Pipeline from Main Booster Pump Station to the Regional Reservoir and construction of the Regional Reservoir	Jan. 23 <sup>rd</sup> 2024	July 16 <sup>th</sup> 2025	12.0

Project Packages	Packages	Contract signing	Completion	Estimated cost (million USD)
Package 3	Lot.1 (Deir Abu Daief): Construction of Water Distribution System-Deir Abu Daief	Jan. 23 <sup>rd</sup> 2024	Aug. 16 2025	11.3
	Lot.2 (Beit Qad+ Arabuna+Jalbon): Construction of Water Distribution Systems (Beit Qad+ Arabuna+Jalbon)	Jan. 23 <sup>rd</sup> 2024	Aug. 16 2025	

Source: Information provided by PWA (June 2023) and World Bank Project Information

### 2-8-2-2 New Water Service Connections

The Project aims to expand the water supply coverage to currently unserved areas, resulting in an increase in new water service connections. Upon request from applicants, WWD will be responsible for installing water service connections, including service pipes, water meters, and fittings. The beneficiaries will bear the connection fees associated with water service connections. While the application fee for water service connections is fixed, the installation costs, including materials, vary depending on factors such as the distance between the branching point and the meter within the property. These costs will be calculated based on a price list.

If new connections in the water service expansion areas do not proceed as planned, it would have a negative impact on revenue and water utility management. It is crucial to promote new connections in the new service areas in order to achieve the Project's effects. As described in 2-3-4 Service Connection Facility Plan, approximately 6,000 households are estimated to be connected by 2030 after the completion of the Project. An annual connection of about 1,500 households will be required until 2030. Therefore, as indicated in item No.4 of the above Source: Appendix 4 (3) M/D ANNEX 5 (July 2023)

Table 2-36 on the responsibility of PA, a two-team construction organization is required to carry out continuous service connection installation works.

To facilitate the process of new water service connections and ensure the construction quality, technical support will be provided through the implementation of soft components under the Project. These components will focus on promoting water service connections and managing the construction of these connections.

### 2-8-2-3 New Electricity Supply Contract

Currently, electricity is not supplied to both the Al Jabreyat and Al Marah Reservoirs. Although power lines are installed up to the electrical poles within the premises of the Al Marah reservoir, these lines were originally connected to a pump station that is no longer in use, resulting in no power supply. On the other hand, the Al Jabreyat reservoir has never been supplied with electricity, necessitating the installation of power lines from the nearest electrical pole to the site. In addition to the instrumentation and communication equipment comprising the substation of the SCADA system, electric valves will also be installed at both reservoirs, requiring a new contract for low-voltage three-phase power supply.

The central control room of the SCADA system will be installed within the existing administration building of the WWD, which already has an established power supply. Therefore, no new contract is required in this case. However, for the 15 district metered areas (DMAs) constituting the substation of the SCADA system, a new power supply contract will be necessary. Since the DMAs only require instrumentation and communication equipment, a new contract for low-voltage single-phase power supply is needed.

The power company will handle the installation of wiring up to the premises, as well as provide electricity meters and circuit breakers. The associated costs will be charged to the applicant as part of the new contract fees. Therefore, the PA should bear these new contract fees.

The Al Saadeh pumping station already has an existing power supply and can meet the required power demand after the Project using the existing transformer, which is owned by the power company. Hence, the existing power supply contract will continue without any additional costs.

### 2-8-2-4 Contract with Telecommunication Company for SCADA System

The central monitoring unit of the SCADA system is planned to be installed within the existing administration

building of the WWD. Currently, the building is already equipped with ADSL communication services provided by the telecommunications company. However, the existing contract is utilized for the operational needs of the WWD. In order to ensure exclusive access to the central monitoring unit of the SCADA system and prevent any interference with other uses, a new contract with the telecommunications company is necessary to obtain additional ADSL communication services. Furthermore, for the substation units of the SCADA system, a new contract with a mobile communication company utilizing the existing general-purpose mobile phone network known as GPRS needs to be established to provide communication services.

The ADSL communication service for the central control room is currently in operation within the building, and the ADSL cable is already installed up to the premises. Therefore, there will be no additional costs associated with establishing a new contract. Similarly, for the GPRS communication service of the substation units, since it is a wireless service and does not require any registration fees, the only charges incurred will be the usage fees when entering into a contract with the mobile communication company. Thus, no additional costs will be involved in establishing a new contract.

The ADSL communication service in the central monitoring room is already being used in the administration building, and the ADSL line is already installed in the building. Therefore, the existing ADSL line is available and no additional initial costs will be required for new contract. As for the GPRS communication service in the substation, it is a wireless communication and there are no initial costs for new contracts as there are no subscription fees, only usage fees under the agreement with the mobile communication company.

## **2-9 Project Operation Plan**

### **2-9-1 Operation and Maintenance after the Project**

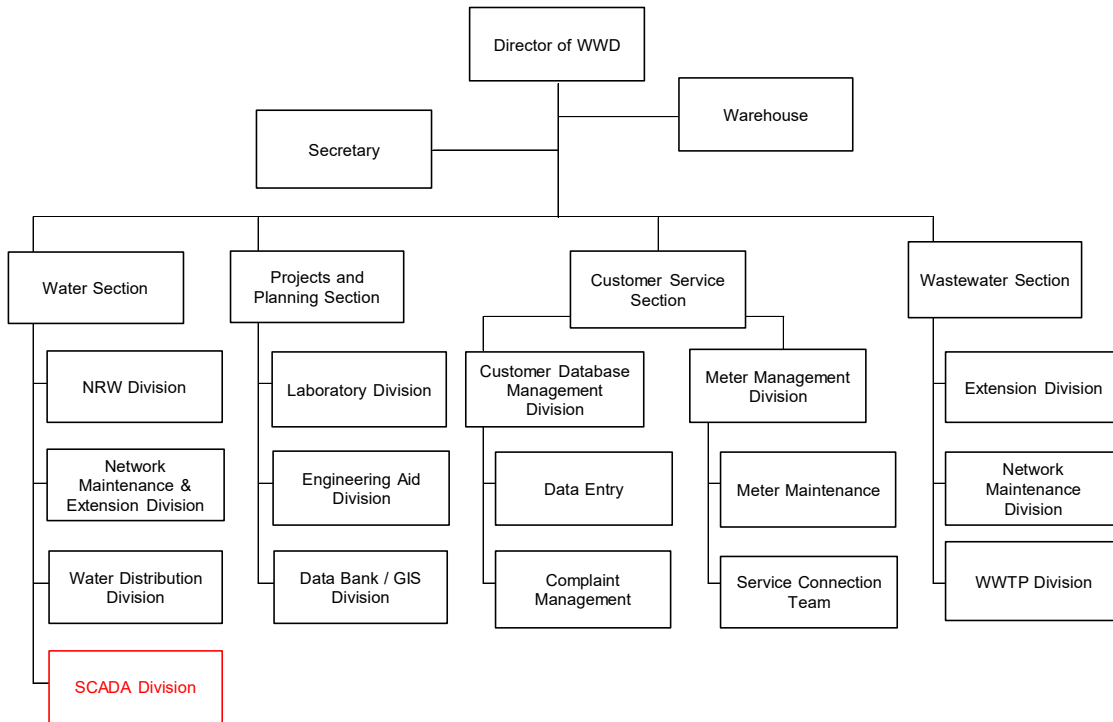
#### **2-9-1-1 Management Organization**

The Water and Wastewater Department of Jenin Municipality will be responsible for the operation and maintenance of the water supply facilities after the implementation of the Project. The Project components consist of the rehabilitation and replacement of existing facilities, the reconstruction of the water transmission and distribution system, and the introduction of a SCADA system. Since the type and grade of the newly constructed facilities will be the same as the existing ones, the current maintenance and management personnel will be able to oversee the facilities after the Project.

After the Project, 24-hour water supply will be provided. At that time, there will no longer be a need for daily valve control at sites for water rationalizing, which is currently carried out by the staff of the Water Distribution Division. With a decrease in workload, the staff of the Water Distribution Division can be reassigned to other sections such as the Service Connection Team, the NRW Division, or the SCADA Division as appropriate. This reallocation will enhance work efficiency and service levels while ensuring continued employment.

The components of the Project involve the establishment of 15 District Metered Areas (DMAs), where flow meters and pressure gauges will be installed at the entry points from the water distribution mains to the DMAs. These instruments will enable the monitoring and recording of water flow and pressure data through the SCADA system, facilitating effective water distribution management and ensuring equitable water allocation. The introduction of the SCADA system in Jenin is a first-time initiative. Since there is no experienced staff of the SCADA system within the organization, a new establishment of SCADA Division is proposed to oversee the system. The personnel in this division will be provided with technical instructions through the soft components implemented under the Project, in addition to the initial operational instructions provided by the Contractor.

The proposed structure for the operation and maintenance of the SCADA system is shown in Figure 2-19. The dedicated SCADA Division is proposed under the Water Section, responsible for the operation and maintenance of the water facilities. This division will oversee the monitoring of the water facilities from the central control room. The proposed staffing and responsibilities of the SCADA Division are outlined in Table 2-38. Provided that the monitoring of the SCADA system will be conducted on a 24-hour basis, a total of four operators will be assigned in three shifts.



Source: Preparatory Survey Team

Figure 2-19 Organizational Chart of the Water and Wastewater Department (WWD)

Table 2-38 Proposed SCADA Division

	Job title	Number of staff	Shifts	Duties
1	Manager (Electrical/Mechanical Engineer)	1 person	Daily shift	<ul style="list-style-type: none"> <li>➤ Supervision of operators</li> <li>➤ Development and management of operational maintenance policies</li> <li>➤ Maintenance and management of the system</li> <li>➤ Coordination with related departments</li> </ul>
2	Operators	4 persons	Three rotating shifts	<ul style="list-style-type: none"> <li>➤ Monitoring of DMAs (flow and pressure)</li> <li>➤ Monitoring and operation of the main facility's operational status</li> <li>➤ Organizing report data (failure, abnormality, etc.)</li> <li>➤ Organizing operational records (annual report, monthly report, daily report, etc.)</li> </ul>

Source: The Preparatory Survey Team

The data collected and organized by the SCADA Division will be shared with other divisions in order to analyze and evaluate their operations for improvement. For instance, operational records of DMAs (flow, pressure, etc.) can assist the Customer Service Section in calculating the revenue water ratio and developing NRW reduction plans. By sharing information of the alarm logs (failures, abnormalities, etc.) within the Water Section, adjustments to the operation of key facilities and planning for the maintenance of equipment will be facilitated.

The operators will monitor the system on a 24-hour basis. In case of emergencies triggered by alarms such as failures or abnormalities, they will contact the manager of the SCADA Division and dispatch the relevant staff to the site for necessary actions. Therefore, it is necessary to establish a proper communication system to ensure effective response to urgent situations.

### 2-9-1-2 Maintenance Management

In Jenin City, a prepaid water meter (PPWM) and a billing system have been introduced through JICA's Technical Assistance Project. These systems collect information from PPWMs through internet connection and store the data for centralized management, which is similar to the SCADA system. The system components and IT technology used are fundamentally the same as the SCADA system. There are technical

staff in the Customer Service Section of the WWD who are responsible for managing these systems and data and utilizing them in their daily activities. Therefore, the capacity of IT technology and maintenance management to use the system is already adequately established. Additionally, the Jenin Municipality has an IT section that provides technical support to the WWD. Consequently, it is determined that the organizational structure and technical capacity necessary for operation and maintenance are sufficient.

### 2-9-1-3 Appointment of Staff

Based on the operational organization mentioned above, the proposed SCADA section will require one manager and four operators. The SCADA system is a dedicated system for the WWD, and the server for data storage is installed within the WWD building. Therefore, the manager's role will include overall management of the section for the effective use of the SCADA system, as well as daily inspections and maintenance management. Additionally, since the SCADA system monitors the operational status of water supply facilities, it is desirable to have an engineer with expertise in electrical and mechanical engineering. Currently, there are no in-house experts in electrical and mechanical engineering within WWD. To fulfill the required new tasks after introducing the SCADA system, it is desirable that the system will be managed under the responsibility of an in-house experts of WWD. Therefore, it is necessary to recruit a qualified expert from outside the WWD. On the other hand, for the four operators who do not require specialized expertise, their appointments can be managed through internal transfers within the current staff members (job rotation).

These appointed staff members of the SCADA Division will receive initial operational guidance from the Contractor for the SCADA system and technical transfer of the soft components conducted by the Consultant. Therefore, it is crucial to determine and assign the required personnel for the SCADA Division before the trial operation period, which will take place prior to the completion of the construction works.

### 2-9-1-4 Operation and Maintenance Items for Constructed Facilities

The operation and maintenance items for the facilities to be constructed under the Project are shown in Table 2-39.

Table 2-39 Operation and Maintenance Items

Facility	Operation and Maintenance Items	Frequency
Water Pump Station (Al Saadeh)	Daily maintenance checks (vibration, abnormal noise, leaks, flow, pressure, etc.)	Daily
	Recording of operating conditions (operating time, current, voltage, temperature, etc.)	Daily
	Regular inspection of pumps and motors	2 times/month
	Regular inspection of electrical equipment	2 times/month
	Regular inspection of motorized valves	2 times/year
	Regular inspection of instrumentation equipment (flow meters, level meters)	2 times/year
	Insulation resistance measurement	1 time/year
Water Distribution Network	Patrol of pipeline routes	Daily
	Regular inspection and cleaning of pressure reducing tanks	1 time/year
	Regular inspection of pressure reducing valves	2 times/year
	Regular inspection of instrumentation equipment (flow meters, pressure gauges) of DMAs	2 times/year
	Regular inspection of fire hydrants, gate valves, air valves, etc.	1 time/year
	Implementation of leakage surveys	Daily
	Leakage repairs	On occurrence of leakage
	Residual chlorine measurement	Daily
Flushing of pipelines	1 time/year	
Water Reservoirs (Al Jabreyat / Al Marah)	Regular inspection of electrical equipment	2 times/month
	Regular inspection of motorized valves	2 times/year
	Regular inspection of instrumentation equipment (flow meters, level meters)	2 times/year
SCADA System	Preparation of daily operation reports	Daily
	Preparation of operational records (annual reports, monthly reports, daily reports, etc.)	1 time/year

Facility	Operation and Maintenance Items	Frequency
	Preparation of report data (faults, abnormalities, etc.)	1 time/year
	Maintenance checks of the system	1 time/year
	Regular inspection of electrical equipment	2 times/month

Source: Preparatory Survey Team

## 2-10 Project Cost Estimation

### 2-10-1 Initial Cost Estimation

#### 2-10-1-1 Costs borne by the Japanese Grant

Non-disclosure until the approval of the construction contracts.

#### 2-10-1-2 Costs borne by the Recipient Country

The cost borne by the Palestinian Authority is estimated to be approximately NIS 515,000 (JPY 20.2 million) as listed below:

- |       |   |                  |                           |
|-------|---|------------------|---------------------------|
| (i)   | Costs for site securing and clearing for temporary and material stock yards                             | NIS 383 thousand | (Approx. JPY 15 million)  |
| (ii)  | Initial cost of new electricity supply  | NIS 51 thousand  | (Approx. JPY 2 million)   |
| (iii) | Bank commission (expenses related to B/A and A/P)   | NIS 76 thousand  | (Approx. JPY 3 million)   |
| (iv)  | Costs for provision of equipment, furniture, facilities necessary for the implementation of the Project | NIS 5 thousand   | (Approx. JPY 0.2 million) |

#### 2-10-1-3 Conditions for Cost Estimation

- |       |                                     |  |
|-------|-------------------------------------|--|
| (i)   | Base Date of Estimation             | August 2022  |
| (ii)  | Exchange Rate                       | USD 1.00 = JPY 134.26<br>NIS 1.00 = JPY 39.251   |
| (iii) | Construction and procurement period | The duration of detailed design and construction is shown in the implementation schedule.                    |
| (iv)  | Other                               | The project cost is estimated in accordance with the procedures of the grant aid of the Government of Japan. |

## 2-10-2 Operation and Maintenance Cost

### 2-10-2-1 Operation and Maintenance Costs Associated with the Project Implementation

#### (1) Expenditure of the Water and Wastewater Department

The expenditures of the Water and Wastewater Department consist of (i) personnel expenses, (ii) water purchase from private wells, (iii) water purchase from WBWD, and (iv) pump and pipe maintenance, fuel, and other expenses. Since detailed quantities, unit costs, etc. for each item have not been provided, future expenditures were projected based on assumptions of factors that will change after the implementation of the Project. As the latest available information is as of 2020, estimates were made using the present value as of 2020.

Table 2-40 Expenditures of Water and Wastewater Department of Jenin Municipality

Expense	2016	2017	2018	2019	2020
(i) Personnel expenses	3,328,137	3,416,255	3,315,771	3,640,613	3,771,020
(ii) Water purchase cost from private wells	1,279,097	472,618	835,306	901,188	1,122,279
(iii) Water purchase cost from WBWD	2,894,034	2,990,286	2,990,000	2,990,000	3,600,000
(iv) Pump operation, piping maintenance, fuel, vehicle maintenance, insurance, and other expenses	1,303,556	1,330,838	1,583,975	1,289,148	2,436,717
Total	8,804,824	8,209,997	8,725,052	8,820,949	10,930,016

Source: Municipality of Jenin (March 2021), "Annual Report on Water Supply Service in Jenin Municipality for the Year 2020 (Draft)"

## (2) Increase in Personnel Expenses

After the Project, use of the private wells will be abandoned, and the water source will be integrated into the municipality wells and the bulk water supply from the C-P Project. The distribution facilities will be reconstructed to form a system consisting of the existing distribution reservoirs, 15 district metered areas (DMA), and distribution networks. The total length of pipelines will be increased from the current 153 km to 209 km, and the number of customers is projected to increase from 9,479 to 15,416. In other words, while the water supply facilities will be reconstructed and the facility scale will expand with the Project implementation, the components of the facilities after the Project will remain the same as the existing facilities. Therefore, the current organization and personnel will be able to manage the facilities after the Project by enhancing work efficiency. Additionally, as the field patrols and valve operations currently carried out by the water distribution division for water rationing will no longer be necessary, it will be possible to improve the service quality while maintaining employment by reallocating staff to the water service connection or leakage control sections, etc.

However, establishment of a new section for the SCADA system is necessary. As discussed in 2-9-1-3, it is planned to recruit a manager with expertise in electrical and mechanical engineering and assign four operators from other departments to fulfill these monitoring duties. Projected personnel expenses are shown in Table 2-41.

Table 2-41 Projected Personnel Expenses

(Unit: NIS)

	FY2020 (actual)	FY2030 (projection)
Staff salary of the current staff	3,771,020	4,269,816
Manager of the SCADA section (new recruit)	-	42,310
Total	3,771,020	4,312,126

(Note) Annual increase of 1.25%<sup>19</sup> is considered. The personnel expenses for the manager have been calculated taking into account the 1.25% annual increase from NIS 36,000 (FY2018) with reference to the Water Service Management Plan (2018-2027)

## (3) Change in Purchased Water Expenses

After the implementation of the Project, water purchase from private wells will be discontinued, and water supply from WBWD will be integrated into the newly constructed facility to be implemented under the C-P Project. As a result, water will be purchased from the C-P Project as shown in Table 2-42.

Table 2-42 Projected Purchased Water Expenses

Type of Water Source	Year 2020		Year 2030	
	Water volume (m <sup>3</sup> /year)	Purchase expense (NIS/year)	Water volume (m <sup>3</sup> /year)	Purchase expense (NIS/year)
Private well	1,277,342	1,122,279	0	0
Existing Al Jalameh receiving point	1,337,040	3,600,000	0	0
Existing Al Swetat receiving point				
Existing Abo Arab wells				
Connection Point Project	-	-	3,519,643	9,467,840
Total	2,614,382	4,722,279	3,519,643	9,467,840

Note: Since the unit cost of water purchased from the C-P Project is yet to be determined, the current average unit cost from WBWD: 2.69 NIS/m<sup>3</sup> has been used for estimation purpose.

Source: Prepared by the Preparatory Survey Team based on materials provided by the Jenin Municipality

## (4) Electricity Expenses

The electricity expenses to be borne by Jenin Municipality include the power costs for municipal wells, private wells, the WWD building, and pump facilities. Electricity expenses in 2030 is projected based on actual expenses in 2020 as shown in Table 2-43.

<sup>19</sup> Article 6 of Cabinet Decision No.1 of 2009 regarding the system of employees of local bodies



Table 2-43 Electricity Expenses Projection

(Unit: NIS/year)

Item	FY2020 (actual)	FY2030 (projection)	Remarks
Al Saadeh Well	1,230,694	1,974,504	Production volume: 1,230,694 m <sup>3</sup> /year (3,500 m <sup>3</sup> /day / 1.12 x 365 days) Electricity cost per production volume: 1.38 NIS/m <sup>3</sup> (based on 2020 actual data)
Other municipality wells	131,778	32,589	Production volume (Al Mechanic well): 131,778 m <sup>3</sup> /year Electricity cost per production volume: 0.20 NIS/m <sup>3</sup> (estimated by the Survey Team)
Private wells	496,696	0	Will no longer be in operation by FY2030
WWD building	24,368	24,368	
Pump stations	36,527	0	Will no longer be in operation by FY2030
SCADA system	0	7,980	35 NIS/month x 12 months x 19 stations
Total	1,920,063	2,039,441	

Source: Preparatory Survey Team based on materials provided by Jenin Municipality

#### (5) Other Expenses

Other expenses include fuel for power generator, vehicle maintenance, facility maintenances, and chemical expenses. Cost changes of fuel, chemical and communication (SCADA) are projected as Table 2-44.

Table 2-44 Other Expenses Projection

(Unit: NIS/year)

Item	FY2020 (actual)	FY2030 (projection)	Remarks
Fuel for power generator	301,125	319,847	Allocated proportionally based on changes in electricity cost
Vehicle maintenance	285,212	285,212	No change
Facility Maintenance	1,798,034	1,798,034	No change
Chemical	52,346	28,679	Production volume of municipality wells in 2030 (4,000 m <sup>3</sup> /day / 1.12 x 365 days) , Unit cost of chemical in 2020 (NIS52,346 / (1,030,300 + 1,331,700m <sup>3</sup> ) = 0.022 NIS/m <sup>3</sup> )
Communication (SCADA)	0	4,860	Central control room (ADSL line): 120 NIS/month x 12 months = 1,440 NIS/year Substations (GPRS bills): 15 NIS/month x 19 stations x 12 months = 3,420 NIS/year
Total	2,436,717	2,436,632	

#### (6) Expenditure after the Implementation of the Project

Based on the changes in the above expenditure items, the projected operation and maintenance costs for the water supply sector after the Project (2030) are estimated to increase by NIS 7,326,023 (approximately JPY 290 million), as shown in Table 2-45.

Table 2-45 Projected Operation and Maintenance Costs after the Project

(Unit: NIS)

Expense	Year 2020	Year 2030	Change
(i) Personnel expenses	3,771,020	4,312,126	+541,106
(ii) Cost of water purchased from private wells	1,122,279	0	-1,122,279
(iii) Water purchase cost from WBWD	3,600,000	9,467,840	+5,867,840
(iv) Electricity expenses	0	2,039,441	+2,039,441

Expense	Year 2020	Year 2030	Change
(iv) Pump operation, piping maintenance, fuel, vehicle maintenance, insurance, and other expenses	2,436,717	2,436,632	-85
Total	10,930,016	18,256,039	+7,326,023

(Note) Currently, the electricity bills to the power company have not been paid, and the expenditure of the WWD does not include those electricity costs.

## 2-10-2-2 Revenue after the Implementation of the Project

### (1) Revenue of the Water and Wastewater Department

The revenue of the Water and Wastewater Department is presented in Table 2-46. Water service revenues constitute approximately 60% of the total revenue. After the project, it is anticipated that water service revenues will increase as a result of an increase in water distribution volume and a reduction in NRW ratio, attributable to a decrease in the leakage rate. The projection of water service revenues after the Project is outlined in the subsequent section.

Table 2-46 Revenues of Water and Wastewater Department of Jenin Municipality

(Unit: NIS)

Item	2016	2017	2018	2019	Year 2020
(i) Water service revenues	2,540,842	2,989,693	2,867,383	2,549,418	3,222,552
(ii) Water subscription fee	90,034	101,661	111,472	108,477	276,000
(iii) Sewerage service revenue	144,276	188,584	157,619	177,693	569,802
(iv) Tanker water income	109,505	94,825	94,523	115,035	110,490
(v) Collected debts	1,477,370	2,321,073	1,653,533	1,484,882	928,665
(vi) Others	41,783	59,625	57,236	108,652	242,000
Total	4,403,810	5,755,461	4,941,766	4,544,157	5,349,509

Source: Jenin Municipality (March 2021), "Annual Report on Water Supply Service in Jenin Municipality for the Year 2020 (Draft)"

### (2) Increase in Water Service Revenues

As water distribution volume will increase after the Project and NRW ratio will decrease as a result of leakage control, the billed water volume will increase significantly. In addition, in the ongoing JICA's "Advisory for Water Service Management in Jenin Municipality" is assisting review of the water tariff structure, which is expected to be profitable in 2025 afterwards, based on the assumption of tariff revision by phases and a 100% collection rate for refugee camps and public institutions. Water service revenues after the Project is estimated as shown in Table 2-47 by adopting the average unit rate of 6.34 NIS/m<sup>3</sup> <sup>20</sup> which is under examination in the said Advisory.

Table 2-47 Projection of Water Service Revenues after the Project

Item	2020 Actual	2030 Projection	Change
Water distribution (m <sup>3</sup> /year)	3,692,561	4,801,575	+1,109,014
NRW ratio (%)	59.7	33.0	-26.7
Billed water volume (m <sup>3</sup> /year)	1,448,102	3,217,055	+2,069,832
Average unit price (NIS/m <sup>3</sup> )	2.17	6.34	-
Water Service Revenue (NIS/year)	3,222,552	20,369,129	+17,173,577

Source: Projected by the Preparatory Survey Team based on actual values from data provided by the Jenin Municipality

### (3) Revenue Projections

On the assumption that revenues other than water service revenues remain unchanged after the Project (in 2030), the revenue of the Water and Wastewater Department is projected as shown in Table 2-48. The total revenue is estimated to be NIS 17,173,577 (approximately JPY 670 million) after the Project.

<sup>20</sup> In the Advisory service, appropriate average tariff of 6.34 NIS/m<sup>3</sup> is under examination which adds 2.0 NIS to the current basic tariff of 4.34 NIS/m<sup>3</sup>.

Table 2-48 Revenue Projection after the Project

(Unit: NIS/year)			
Item	FY 2020	FY 2030	Change
Water Service Revenues	3,222,552	20,369,129	+17,173,577
Other	2,126,957	2,126,957	0
Total	5,349,509	22,523,086	+17,173,577

### 2-10-2-3 Revenue and Expenditure Forecast

The revenue of the WWD of Jenin Municipality accounts for only 49% of its expenditures at the fiscal year 2020. The deficit is covered by subsidies from the general account of the Jenin Municipality. It should be noted that the electricity bills are currently unpaid and not included in the financial report.

According to the above estimation, the projected expenditure for the year 2030 (NIS 18,256,039, including electricity costs) can be covered by the revenue (NIS 22,523,086) after the Project implementation. This is primarily due to the reduction in NRW and the revision of water tariffs. In other words, to ensure financial sustainability, it is necessary to increase revenue from tariffs to a cost recovery level. This requires strengthening measures to reduce water losses and NRW, as well as a review of water tariffs.

Despite the above positive results, since the tariff revision will be implemented gradually, it is essential that the Jenin Municipality's general budget continues to provide certain subsidies until the tariffs reach an appropriate level.



## Chapter 3 Project Evaluation

### 3-1 Preconditions

The prerequisites for project implementation are described below.

#### 3-1-1 Implementation of the C-P Project

The Project is planned to receive approximately 73% of its water supply from the C-P Project. Therefore, the implementation of the C-P Project is a crucial precondition which should be carried out simultaneously or prior to the Project. It is important to coordinate the implementation process of both the projects.

The bidding documents for the C-P Project (construction of water pipelines and regional service reservoir) have already been prepared. The procurement processes for these components are underway, with financing by the World Bank.<sup>21</sup> Assuming the contract with the contractor will be signed by the end of 2023, the project is expected to be completed in approximately three years, by 2026.

#### 3-1-2 Environmental and Social Considerations Procedure

After examining the legislation on environmental and social considerations in Palestine applicable to the Project, it has been confirmed that EIA and IEE are not required for the Project as it is water supply project. According to EQA, PWA will submit an application for environmental review of the Project after the project scope is finalized and design approval is obtained. Accordingly, it is too early for the environmental review since this project is in the preparatory survey phase and design approval has not been obtained yet. For standard water supply projects, the IEE/EIA is not required, and the project design documents and an Environmental Management Plan are to be prepared and submitted in Arabic.

#### 3-1-3 Consultant Design License Requirement

According to the local legislations, only consultants having design licenses in Palestine are eligible to apply for construction permits. After verifying the requirements for the Project, it was confirmed in the M/D held in July 2022 that PWA will grant a license to the Japanese consulting firm based on an application submitted by the Japanese consulting firm which will be assigned for the Project.

### 3-2 Necessary Inputs by Recipient Country

The following are necessary inputs by the Palestinian side to achieve the objectives of the Project.

- Promotion of water service connections in areas where there is no water service coverage
- Appropriate operation and maintenance of the facilities
- Continuation of NRW reduction and leakage control activities
- Establishment of a SCADA monitoring section and recruitment of a manager with expertise in electrical and mechanical engineering
- Reassignment of staff responsible for distribution division (water service connection, leakage control, SCADA monitoring, etc.)
- Revision of water tariff to cover the maintenance expenses

### 3-3 Important Assumptions

The following are important assumptions necessary to achieve and sustain the project effects.

- The policies of the Palestinian government regarding the water supply sector will remain unchanged.
- The political situation between Palestine and Israel will not deteriorate significantly.
- The security situation in the city of Jenin, including the refugee camp, will not exacerbate significantly.
- Approximately 52% of the estimated project cost is in local and foreign currencies. Currently, the exchange rate is fluctuating rapidly. If the Japanese Yen continues rapid depreciation in the future,

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<sup>21</sup> Information from PWA in April 2023.

it will be necessary to modify the project planning, such as reducing the scope of cooperation.

### 3-4 Project Evaluation

#### 3-4-1 Relevance

##### (1) Project Beneficiaries

The implementation of the Project will benefit a total of 77,080 residents (by 2030) in the Project area of Jenin municipality, including the refugee camp. It will improve water supply services for the current population of 56,680 people and provide water supply services to an additional 25,400 people.

##### (2) Urgency

As the water supply of Jenin municipality is persistently insufficient, most residents in the service area experience restricted water supply, receiving water only for 1 to 3 days in a 10-day period. To manage the limited water resources effectively, it is urgently required to address water leakage reduction and ensure equitable and stable water supply through the reconstruction of water distribution system.

##### (3) Consistency with National Policy and Strategy

The Palestinian "National Policy Agenda (2017-2022)" aims to develop the water supply infrastructure and ensure universal access to safe water as key strategies. "The National Water Policy (2013-2032)" also highlights sustainable water resources management and access to water supply services as key policy objectives in the water sector. The Project is consistent with the Palestinian development plans, as it aims to reduce water leakage through the reconstruction of water distribution system and improve water supply coverage.

##### (4) Consistency with Japan's Development Assistance Policy

The implementation of the Project aligns with the Japanese assistance policy towards Palestine, as outlined in the "Country Assistance Policy for the Palestinian Autonomous Territories" (September 2017). The policy emphasizes the strengthening of the financial foundation and improvement of administrative quality, and supports the reform of efficient and sustainable public services in the water supply sector. Consequently, implementation of the Project conforms to the Japanese assistance policy.

#### 3-4-2 Effectiveness

The effectiveness of the Project is expected in terms of both the following quantitative and qualitative effects.

##### (1) Quantitative Effects

For the evaluation of the water supply situation in Jenin Municipality, the estimated values in 2020 are employed as the baseline. The quantitative effects expected in the target year (2030) as a result of the implementation of the Project are shown in Table 3-1.

Table 3-1 Quantitative Effects

Indicator	Baseline (2020 actual value)	Target (2030) [4 years after completion of the project] <sup>#3</sup>
Rate of population served (%)	81	98
Population served (people)	51,680	77,080 <sup>#1</sup>
Average daily water distribution (m <sup>3</sup> /day)	10,134	13,155 <sup>#2</sup>

Note:

#1: The population forecast is estimated based on a census data and the annual population growth rate of 2.08%, with reference to the projections by PCBS.

#2: Average daily water distribution = Population served of 77,080 people × Average daily water demand of 128 liters per person per day + Leakage volume of 3,289 m<sup>3</sup> per day.

#3: This target year is set for the intermediate phase of the Jenin Water and Sewerage Master Plan, four years after project completion.

Source: Preparatory Survey Team

## (2) Qualitative Effects

The qualitative effects expected from the implementation of the Project are as follows:

- Improvement of the living environment for residents (improvement of water supply hours, reduction of NRW ratio, and convenience by reducing areas with inadequate water pressure)
- Improvement of the health and hygiene of the population (reduction of waterborne diseases)

Based on the above information, it is determined that the Project is highly justified and effective.





## **【Appendices】**



## **Appendix 1 List of the Survey Team**



## Appendix 1 Member List of the Survey Team

### (1) First Survey, Second Survey (Remote)

- First Survey (Remote): March – June 2021
- Second Survey (Remote): June – September 2021

#### JICA

Name	Assignment	Organization
Mr. Yoichi Inoue	Leader	JICA Global Environment Department Director of Water Resources Team 1, Water Resources Group
Mr. Hiroshi Kubota	Water Supply Plan	JICA Global Environment Department Senior Advisor, Water Resources Group
Mr. Yosuke Sasaki	Water Resource Development	JICA Global Environment Department Inhouse Consultant
Mr. Daiki Matsumoto	Project Coordinator	JICA Global Environment Department Water Resources Team 1, Water Resources Group

#### Consultant

Name	Assignment	Organization
Mr. Naoto Tohda	Chief Consultant/ Water Supply Planning	TEC International Co., Ltd. (TECI)
Mr. Hirotaka Sato	Deputy Chief Consultant/ Water Supply Planning	TEC International Co., Ltd. (TECI)
Dr. Kenji Yoshida	Planning of Water Resource Development	Yachiyo Engineering Co., Ltd. (YEC)
Mr. Takuro Kohara	Water Supply Facilities Planning/ Designing	TEC International Co., Ltd. (TECI)
Dr. Phatta Thapa	Pipeline Planning/ GIS	TEC International Co., Ltd. (TECI)
Mr. Norio Tanaka	Equipment Planning	TEC International Co., Ltd. (TECI)
Mr. Kazuo Shirai	Construction Planning/ Cost Estimate	TEC International Co., Ltd. (TECI)
Mr. Jiro Iguchi	Environmental and Social Considerations	PADECO Co., Ltd. (PADECO)
Mr. Natsuki Shimegi	Finance/ Management	PADECO Co., Ltd. (PADECO)
Mr. Shinji Tateno	Coordinator	TEC International Co., Ltd. (TECI)

### (2) Second Survey (Field Survey 1) : September – December 2021

#### Consultant

Name	Assignment	Field Survey	Organization
Mr. Naoto Tohda	Chief Consultant/ Water Supply Planning	01.09.2021 – 24.10.2021	TECI
Mr. Hirotaka Sato	Deputy Chief Consultant/ Water Supply Planning	1,4,9,14,16. 11.2021	TECI
Dr. Kenji Yoshida	Planning of Water Resource Development	05.11.2021 – 05.12.2021	YEC
Mr. Takuro Kohara	Water Supply Facilities Planning/ Designing	01.09.2021 – 24.10.2021	TECI

Name	Assignment	Field Survey	Organization
Dr. Phatta Thapa	Pipeline Planning/ GIS	15,16,20-23,27.12.2021	TECI
Mr. Jiro Iguchi	Environmental and Social Considerations	05.11.2021 – 04.12.2021	PADECO
Mr. Natsuki Shimegi	Finance/ Management	26.11.2021 – 17.12.2021	PADECO
Mr. Shinji Tateno	Coordinator/ Pipeline Planning 2	01.09.2021 – 24.10.2021	TECI

### (3) Second Survey (Field Survey 2) : May – August 2022

#### JICA

Name	Assignment	Field Survey	Organization
Mr. Yoichi Inoue	Leader	01.07.2022 – 08.07.2022	JICA
Mr. Hiroshi Kubota	Water Supply Plan	01.07.2022 – 08.07.2022	JICA
Ms. Haruka Kasuya	Cooperation Planning	01.07.2022 – 08.07.2022	JICA

#### Consultant

Name	Assignment	Field Survey	Organization
Mr. Naoto Tohda	Chief Consultant/ Water Supply Planning	26.05.2022 – 15.07.2022	TECI
Dr. Kenji Yoshida	Planning of Water Resource Development	19.07.2022 – 03.08.2022	YEC
Mr. Takuro Kohara	Water Supply Facilities Planning/ Designing	07.06.2022 – 15.07.2022	TECI
Mr. Norio Tanaka	Equipment Planning	30.06.2022 – 07.08.2022	TECI
Mr. Kazuo Shirai	Construction Planning/ Cost Estimate	30.06.2022 – 07.08.2022	TECI
Mr. Shinji Tateno	Coordinator/ Pipeline Planning 2	26.05.2022 – 29.06.2022	TECI

### (4) Third Survey (Draft Outline Design) : July 2023

#### JICA

Name	Assignment	Field Survey	Organization
Mr. Masahito Miyagawa	Leader	08.07.2023 – 15.07.2023	JICA Global Environment Department Director of Water Resources Team 1, Water Resources Group
Ms. Haruka Kasuya	Cooperation Planning	08.07.2023 – 15.07.2023	JICA Global Environment Department Water Resources Team 1, Water Resources Group

#### Consultant

Name	Assignment	Field Survey	Organization
Mr. Naoto Tohda	Chief Consultant/ Water Supply Planning	07.07.2023 – 21.07.2023	TECI

Mr. Takuro Kohara	Water Supply Facilities Planning/ Designing	07.07.2023 – 21.07.2023	TECI
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## **Appendix 2 Survey Schedule**



## Appendix 2 Survey Schedule

### (1) Second Survey (Field Survey 1)

No	Year/Month/Day		Activity
1	2021/9/1	Wed	Tokyo – Istanbul (Tohda, Kohara, Tateno)
2	2021/9/2	Thu	Istanbul - Tel Aviv (Tohda, Kohara, Tateno)
3	2021/9/3	Fri	Internal Meeting, Data organization
4	2021/9/4	Sat	Internal Meeting, Data organization
5	2021/9/5	Sun	Preparation of questionnaire, Examination on service area
6	2021/9/6	Mon	Explanation of Inception Report 2 (Online)
7	2021/9/7	Tue	Preparation of TOR of sub-consultancy works
8	2021/9/8	Wed	PCR Test (2nd Test at 7 days after arrival)
9	2021/9/9	Thu	Preparation of TOR of sub-consultancy works
10	2021/9/10	Fri	Internal Meeting, Data Collection
11	2021/9/11	Sat	Internal Meeting, Data Collection
12	2021/9/12	Sun	JICA Palestine Office, ROJ, PWA
13	2021/9/13	Mon	PWA Data collection (Connection Point Project)
14	2021/9/14	Tue	Security Briefing (JICA Palestine Office)
15	2021/9/15	Wed	Cautesy call to Jenin Mayort, Jenin WWD
16	2021/9/16	Thu	Site visit to Janzour well construction site
17	2021/9/17	Fri	Data organization
18	2021/9/18	Sat	Examination on water supply planning, facility planning, survey schedule
19	2021/9/19	Sun	Examination on water supply planning, facility planning, survey schedule
20	2021/9/20	Mon	Explanation on alternative plans of facility plan
21	2021/9/21	Tue	Interview about power supply conditions in Jenin
22	2021/9/22	Wed	Topographic survey (elevation of Al Saadeh balancing tank, Al Jabreyat Service Reservoir, Al Marah Service Reservoir)
23	2021/9/23	Thu	Discussion with EQA Jenin Branch Office on environmental and social consideration legislations
24	2021/9/24	Fri	Data organization
25	2021/9/25	Sat	Interview with JSC WV about the project outline
26	2021/9/26	Sun	Discussion with Jenin WWD about facility planning
27	2021/9/27	Mon	Examination and site visit to the proposed service reservoir site
28	2021/9/28	Tue	Examination on the proposed service reservoir, site elevation
29	2021/9/29	Wed	Review/ examination on service area, water demand, facility plan
30	2021/9/30	Thu	Review/ examination on service area, water demand, facility plan
31	2021/10/1	Fri	Data organization
32	2021/10/2	Sat	Preparation of PWA discussion material (water supply plan, facility plan)
33	2021/10/3	Sun	Preparation and submission of PWA discussion material (water supply plan, facility plan)
34	2021/10/4	Mon	Interview about technical specifications of pipe installation under the publicroad, fire fighting organization and responsibilities, design criteria of fire hydrant
35	2021/10/5	Tue	Interview with Jenin WWD about water consumption, existing facility Site reconnaissance for the pipeline routes
36	2021/10/6	Wed	Explanation on water demand and general facility plan of Jenin
37	2021/10/7	Thu	Site reconnaissance for the pipeline route, examination on distribution system

No	Year/Month/Day		Activity
38	2021/10/8	Fri	Internal meeting, data organization
39	2021/10/9	Sat	Meeting about TOR of the sub-consultancy work, examination on distribution system
40	2021/10/10	Sun	Water sampling of the existing wells (3 wells), examination on distribution system
41	2021/10/11	Mon	Discussion with the consultant for the C-P Project
42	2021/10/12	Tue	Discussion with Jenin WWD
43	2021/10/13	Wed	Site visit to JSC-WV
44	2021/10/14	Thu	Preparation for PWA discussion results, survey on private wells
45	2021/10/15	Fri	Internal meeting, data organization
46	2021/10/16	Sat	Preparation for PWA discussion results,
47	2021/10/17	Sun	Preparation for PWA discussion results, Preparation of Technical Note
48	2021/10/18	Mon	Reporting and discussion on the survey result, schedule
49	2021/10/19	Tue	Jenin - Jersalem
50	2021/10/20	Wed	Report to JICA / ROJ
51	2021/10/21	Thu	PCR Test
52	2021/10/22	Fri	Tokyo – Istanbul (Sato)
53	2021/10/23	Sat	Istanbul – Tel Aviv (Sato) Tel Aviv – Istanbul (Tohda, Kohara, Tateno)
54	2021/10/24	Sun	Istanbul – Tokyo (Tohda, Kohara, Tateno)
55	2021/11/1	Mon	Examination on project scope (Sato)
56	2021/11/4	Thu	Examination on distribution network drawings (Sato)
57	2021/11/5	Fri	Tokyo – Istanbul (Yoshida, Iguchi)
58	2021/11/6	Sat	Istanbul - Tel Aviv (Yoshida, Iguchi)
59	2021/11/7	Sun	Quarantine in Jersalem (Yoshida, Iguchi)
60	2021/11/8	Mon	Existing well survey (Yoshida), Visit EQA,PWA, data collection (Iguchi)
61	2021/11/9	Tue	Site visit to the proposed facility site (Sato), existing well survey (Yoshida)
62	2021/11/10	Wed	Existing well survey (Yoshida), Visit EQA,PWA, data collection (Iguchi)
63	2021/11/11	Thu	Existing well survey (Yoshida), Visit EQA,PWA, data collection (Iguchi)
64	2021/11/12	Fri	Existing well survey (Yoshida), Visit EQA,PWA, data collection (Iguchi)
65	2021/11/13	Sat	Existing well survey (Yoshida), Visit EQA,PWA, data collection (Iguchi)
66	2021/11/14	Sun	Site visit to wells (Sato), Preparation of rehabilitation plan of the Al Saadeh well (Yoshida)
67	2021/11/15	Mon	Preparation of rehabilitation plan of the Al Saadeh well (Yoshida), Visit EQA,PWA, data collection (Iguchi)
68	2021/11/16	Tue	Coordination with sub-consultancy works, environmental and social consideration survey (Sato)
69	2021/11/17	Wed	Water quality data analysis and data organization on water quality (Yoshida), Visit EQA,PWA, data collection (Iguchi)
70	2021/11/18	Thu	Water quality data analysis and data organization on water quality (Yoshida), Visit EQA,PWA, data collection (Iguchi)
71	2021/11/19	Fri	Water quality data analysis and data organization on water quality (Yoshida), Visit EQA,PWA, data collection (Iguchi)
72	2021/11/20	Sat	Water quality data analysis and data organization on water quality (Yoshida), Visit EQA,PWA, data collection (Iguchi)
73	2021/11/21	Sun	Confirmation of Janzour well construction progress and work schedule (Yoshida)
74	2021/11/22	Mon	Confirmation of Janzour well construction progress and work schedule (Yoshida)

No	Year/Month/Day		Activity
75	2021/11/23	Tue	Confirmation of Janzour well construction progress and work schedule (Yoshida)
76	2021/11/24	Wed	Confirmation of Janzour well construction progress and work schedule (Yoshida)
77	2021/11/25	Thu	Data collection on NE aquifer (Yoshida), Visit EQA and PWA, data collection (Iguchi),
78	2021/11/26	Fri	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Tokyo – Istanbul (Shimegi)
79	2021/11/27	Sat	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Istanbul - Tel Aviv (Shimegi)
80	2021/11/28	Sun	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Data collection of financial statements (Shimegi)
81	2021/11/29	Mon	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Data collection of financial statements (Shimegi)
82	2021/11/30	Tue	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Interview with the financial director of Jenin Municipality, confirmation of revenue collection process (Shimegi)
83	2021/12/1	Wed	Data collection on NE aquifer (Yoshida), Visit EQA and PWA (Iguchi), Interview with the financial director of Jenin Municipality, confirmation of revenue collection process (Shimegi)
84	2021/12/2	Thu	Discussion on rehabilitation works of the well (Yoshida)
85	2021/12/3	Fri	Data organization of water quality data (Yoshida), Tel Aviv – Istanbul (Iguchi)
86	2021/12/4	Sat	Tel Aviv – Istanbul (Yoshida), Istanbul – Tokyo (Iguchi)
87	2021/12/5	Sun	Data collection of the financial statements (Shimegi)
88	2021/12/6	Mon	Data collection of the financial statements (Shimegi)
89	2021/12/7	Tue	Interview with the financial director of Jenin Municipality, confirmation of revenue collection process (Shimegi)
90	2021/12/8	Wed	Interview with the financial director of Jenin Municipality, confirmation of revenue collection process (Shimegi)
91	2021/12/9	Thu	Interview with the financial director of Jenin Municipality, confirmation of revenue collection process (Shimegi)
92	2021/12/10	Fri	Data collection, organization (Shimegi)
93	2021/12/11	Sat	Data collection, organization (Shimegi)
94	2021/12/12	Sun	Data collection, organization (Shimegi)
95	2021/12/13	Mon	Data collection, organization (Shimegi)
96	2021/12/14	Tue	Data collection, organization (Shimegi)
97	2021/12/15	Wed	Updating information of the GIS distribution network (Thapa)
98	2021/12/16	Thu	Updating information of the GIS distribution network (Thapa), Tel Aviv – Istanbul (Shimegi)
99	2021/12/17	Fri	Istanbul – Tokyo (Shimegi)
100	2021/12/20	Mon	Updating information of the GIS distribution network (Thapa)
101	2021/12/21	Tue	Updating information of the GIS distribution network (Thapa)
102	2021/12/22	Wed	Updating information of the GIS distribution network (Thapa)
103	2021/12/23	Thu	Updating information of the GIS distribution network (Thapa)
104	2021/12/27	Mon	Updating information of the GIS distribution network (Thapa)

**(2) Second Survey (Field Survey 2)**

No	Year/Month/Day		Activity
1	2022/5/26	Thu	Narita – Dubai (Tohda, Tateno)
2	2022/5/27	Fri	Dubai - Tel Aviv (Tohda, Tateno)
3	2022/5/28	Sat	Courtesy call to Jenin Mayor, WWD
4	2022/5/29	Sun	Preparation for the meeting with PWA
5	2022/5/30	Mon	Preparation for the meeting with PWA
6	2022/5/31	Tue	Security briefing, discussion with PWA (survey contents, schedule, etc.)
7	2022/6/1	Wed	Internal meeting, examination on survey schedule
8	2022/6/2	Thu	Examination on per capita water consumption
9	2022/6/3	Fri	Data organization
10	2022/6/4	Sat	Preparation of the technical specification of the topographic survey
11	2022/6/5	Sun	Preparation of the technical specification of the topographic survey
12	2022/6/6	Mon	Examination on the draft MD
13	2022/6/7	Tue	Meeting with Jericho technical assistance team in Ramalla
14	2022/6/8	Wed	Arrival of Kohara, Internal meeting
15	2022/6/9	Thu	Ramalla – Jenin
16	2022/6/10	Fri	Data organization
17	2022/6/11	Sat	Survey on private wells, preparation of discussion agenda with PWA
18	2022/6/12	Sun	Site visit to the Al Saadeh pump station
19	2022/6/13	Mon	Technical meeting, site visit to HDPE manufacturer and factory
20	2022/6/14	Tue	Internal meeting on survey methodology after meeting with PWA
21	2022/6/15	Wed	Internal meeting on survey methodology after meeting with PWA
22	2022/6/16	Thu	Submission of the questionnaire to PWA
23	2022/6/17	Fri	Data organization
24	2022/6/18	Sat	Financial evaluation of the proposal of the sub-consultancy works
25	2022/6/19	Sun	Preparation for the meetinw with PWA
26	2022/6/20	Mon	Contract negotiation with the geotechnical survey company
27	2022/6/21	Tue	Examination on the proposed site for the new service reservoir
28	2022/6/22	Wed	Examination on the answer from PWA
29	2022/6/23	Thu	Technical meeting with PWA
30	2022/6/24	Fri	Data organization
31	2022/6/25	Sat	Review on water supply planning, contract negotiation with the topographic survey company
32	2022/6/26	Sun	Preparation for the meeting with PWA
33	2022/6/27	Mon	Meeting with AFD, PWA, JICA Palestine Office
34	2022/6/28	Tue	Report to Jenin WWD about discussion result of the meeting with PWA. Discussion about service area
35	2022/6/29	Wed	Data organization after the meeting with PWA, preparation of the explanation paper to PWA
36	2022/6/30	Thu	Submission of the explanation paper to PWA
37	2022/7/1	Fri	Data organization, Arrival of Tanaka, Shirai, Internal meeting
38	2022/7/2	Sat	Internal meeting, Meeting with JICA mission
39	2022/7/3	Sun	Site visit to the project site, Courtesy call to Jenin mayor
40	2022/7/4	Mon	Explanation and discussion of the draft MD, Travel from Jenin to Ramalla
41	2022/7/5	Tue	Discussioon with PWA about the draft MD
42	2022/7/6	Wed	Discussion with PWA about the draft MD, Report to ROJ and JICA

No	Year/Month/Day		Activity
43	2022/7/7	Thu	Signing MD, Travel from Ramalla to Jenin
44	2022/7/8	Fri	Data organization
45	2022/7/9	Sat	Internal Meeting (Facility planning, survey schedule)
46	2022/7/10	Sun	Internal Meeting (Facility planning, survey schedule)
47	2022/7/11	Mon	Site survey
48	2022/7/12	Tue	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
49	2022/7/13	Wed	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
50	2022/7/14	Thu	Tel Aviv – Dubai (Tohda, Kohara)
51	2022/7/15	Fri	Dubai – Tokyo (Tohda, Kohara)
52	2022/7/16	Sat	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
53	2022/7/17	Sun	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
54	2022/7/18	Mon	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
55	2022/7/19	Tue	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Tokyo – Istanbul (Yoshida)
56	2022/7/20	Wed	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Istanbul – Tel Aviv (Yoshida)
57	2022/7/21	Thu	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
58	2022/7/22	Fri	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
59	2022/7/23	Sat	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
60	2022/7/24	Sun	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
61	2022/7/25	Mon	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
62	2022/7/26	Tue	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
63	2022/7/27	Wed	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
64	2022/7/28	Thu	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
65	2022/7/29	Fri	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
66	2022/7/30	Sat	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
67	2022/7/31	Sun	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)

No	Year/Month/Day		Activity
68	2022/8/1	Mon	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Site survey on municipality wells (Yoshida)
69	2022/8/2	Tue	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai), Tel Aviv – Istanbul (Yoshida)
70	2022/8/3	Wed	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai) Istanbul - Tokyo (Yoshida)
71	2022/8/4	Thu	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
72	2022/8/5	Fri	Mechanical and electrical facility survey (Tanaka), Construction plan, procurement plan survey (Shirai)
73	2022/8/6	Sat	Tel Aviv – Dubai (Tanaka, Shirai)
74	2022/8/7	Sun	Dubai – Tokyo (Tanaka, Shirai)

### (3) Third Survey (Draft Outline Design)

No	Year/Month/Day		Activity
1	2023/7/7	Fri	Tokyo – Dubai (Tohda, Kohara)
2	2023/7/8	Sat	Tokyo – Dubai (Miyagawa, Kasuya) Dubai - Tel Aviv (Miyagawa, Kasuya, Tohda, Kohara) Tel Aviv - Jenin Meeting with Jenin WWD, Courtesy call to Jenin Mayor
3	2023/7/9	Sun	Meeting with Jenin WWD, Site visit to the water facilities
4	2023/7/10	Mon	Meeting with Jenin WWD, Site visit to JSC-JWV, Jenin – Ramalla
5	2023/7/11	Tue	Meeting with PWA and Jenin Municipality
6	2023/7/12	Wed	Meeting with PWA and Jenin Municipality, Meeting with MoFP about tax exemption
7	2023/7/13	Thu	MD signing, Report to ROJ, JICA Palestine Office, Meeting with World Bank Mission
8	2023/7/14	Fri	Tel Aviv – Dubai (Miyagawa, Kasuya), Ramalla – Jenin (Tohda, Kohara)
9	2023/7/15	Sat	Dubai – Tokyo (Miyagawa, Kasuya) Meeting with Jenin WWD (Tohda, Kohara)
10	2023/7/16	Sun	Meeting with Jenin WWD (Tohda, Kohara)
11	2023/7/17	Mon	Site survey (Tohda, Kohara)
12	2023/7/18	Tue	Site survey (Tohda, Kohara)
13	2023/7/19	Wed	Meeting with Jenin WWD (Tohda, Kohara)
14	2023/7/20	Thu	Tel Aviv – Dubai (Tohda, Kohara)
15	2023/7/21	Fri	Dubai – Tokyo (Tohda, Kohara)



### **Appendix 3 List of Parties Concerned in Palestine**



## Appendix 3 LIST OF PARTIES CONCERNED IN PALESTINE

### 1) Palestinian Water Authority (PWA)

Name	Position
Mr. Mazen Ghunaim	PWA Minister
Mr. Ziad Daraghme	Deputy of Project Management Unit
Mr. Adel Yasin	Director of Planning Administrative
Ms. Nujoud Abdo	Head of Aid Coordination Unit
Dr. Muath abu Saada	PMU
Mr. Omar Zayed	Sources Department
Mr. Raed Yacoub	Head of Planning Department, WBWD
Dr. Fayez Abu Helou	Technical Advisor
Mr. Fadi Abdel Ghani	WBWD
Ms. Hala Barhumi	Deputy Director of Planning Administrative PWA
Ms. Hadeel Faidi	Planning Administrative PWA

### 2) Ministry of Finance

Name	Position
Mr. Shukry Bishara	Ministry of Finance

### 3) Jenin Municipality

Name	Position
Mr. Nidal Abd Al-Fattah Obaidi	Mayor
Mr. Fayez Fares Sulaiman Al Saadi	Former Mayor
Mr. Abdalhadi Humran	Former Director of Water and Wastewater Department
Ms. Khayria Souqeha	Acting Director of Water and Wastewater Department and Head of Study and Planning Unit
Mr. Ramzi Jafar	Head of Water department
Mr. Hussam Reyah	Water department
Mr. Muhammad Alyan	Road Section
Mr. Famzy Awaise	Road Section
Mr. Shireen Abo baar	Director of Engineering Department

### 4) Representative Office of Japan to Palestine

Name	Position
Mr. Yoichi Nakashima	Ambassador for the Palestinian Affairs
Mr. Masayuki Magoshi	Former Ambassador for the Palestinian Affairs
Mr. Yusuke Tabuchi	First Secretary, Head of Economic & Development Cooperation

Name	Position
	Section
Mr. Yukiyasu Sumi	First Secretary
Mr. Yusuke Tsutsumi	Second Secretary

#### 5) JICA Palestine Office

Name	Position
Mr. Mitsutaka Hoshi	Chief Representative
Mr. Toshiya Abe	Former Chief Representative
Dr. Masaki Kudo	Senior Representative
Ms. Ritsuko Sakamoto	Former Senior Representative
Ms. Ikumi Ogiwari	Project Formulation Advisor
Mr. Ryoma Yamagishi	Representative
Ms. Kanae Hayakawa	Representative
Ms. Mariko Hattori	Representative
Mr. Raslan Yasin	Chief Program Officer

#### 6) Others

Name	Position
EQA	
Mr. Abdelmunem Shehab	Jenin Office Director
AFD	
Mr. Gautier Calmel	Project Officer (Water & Sanitation)
Mr. Hani Boullata	Senior Programs Officer (Water & Sanitation)
World Bank	
Ms. Sana Agha Al Nimer	WB&G Water Portfolio Lead
Mr. Luis Gonzaga Alvarez Garcia Moran	ET Consultant, Water Specialist
Jenin Fire Department	
Mr. Mohmd Bshara	Captain
Mr. Faisal Naeem	Civil Defence
Mr. Saman Abushamch	Civil Defence
Mr. Mahdi Nuzzal	Civil Defence
Mr. Dia Maree	Civil Defence
Mr. Imad khader	Civil Defence
Mr. Firas Quqas	Civil Defence
NEDCO (Electric Power Company)	

Name	Position
Mr. Nasser Abu Azeez	Branch Manager
Mr. Hansan Abubaker	Officer
Ms. Yasmine Saadeh	Officer
Ms. Sana Jabareen	Officer
Mr. Yazeed Suqi	Officer
Telecom Company	
Mr. Ahmad Mubaslat	Branch Manager
CEP/GKW (Consultant to the Connection Point Project)	
Mr. Osama Albazzowr	CEP/GKW
Mr. Samer Sawaftah	CEP/GKW



**Appendix 4 Minutes of Discussions (M/D)**

**(1) M/D (29.03.2021)**

**(2) M/D (07.07.2022)**

**(3) M/D (13.07.2023)**

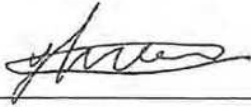




**Minutes of Discussions**  
**on the Preparatory Survey on the Project for**  
**Improvement of Water Supply in Jenin Municipality**

Based on the several preliminary discussions between the Palestinian Water Authority of the Palestinian Authority (hereinafter referred to as "PA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the Outline Design of the Project for Improvement of Water Supply in Jenin Municipality (hereinafter referred to as "the Project") to Palestine. The Team held a series of discussions with the officials of the PA. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Ramallah, Jenin, Tokyo- 29<sup>th</sup> March, 2021



Mr. Yoichi, Inoue  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Mr. Mazen Ghunaim  
Minister  
Palestinian Water Authority  
The Palestinian Authority



Mr. Fayez Alsaadi  
Mayor  
Jenin Municipality  
The Palestinian Authority



Dr. Shukry-Bishara  
Minister  
Ministry of Finance  
The Palestinian Authority



The parties acknowledge and agree that this Minutes of Discussions may be executed by electronic signature, which is considered as an original signature for all purposes and has the same force and effect as an original signature. "Electronic signature" includes faxed versions of an original signature or electronically scanned and transmitted version (e.g., via pdf) of an original signature.

Handwritten signatures and initials in blue ink. On the left is a stylized signature. In the middle is another signature with a large loop. To the right are the initials "MG".

## ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve water supply service in Jenin Municipality through rehabilitation of water source facilities, construction of water distribution facilities, construction of appropriate water distribution zonings, and expansion of distribution network, thereby contributing to improvement of the living environment of the residents.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey on the Project for Improvement of Water Supply in Jenin Municipality”.

3. Project site

Both sides confirmed that the site of the Project is Jenin Municipality, which is shown in **Annex 1**.

4. The Target year of the Project

Both sides agreed that the target year of the Project is 2030, which is four years after completion of the Project and corresponding to the Middle Term of M/P<sup>1</sup>.

5. Responsible authority for the Project

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

5-1. Palestinian Water Authority (hereinafter referred to as “PWA”) will be the executing agency for 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. The organization charts are shown in Annex 2.

5-2. Jenin Municipality will act as the coordination agency during implementation of the Project and be responsible for Operation & Maintenance of the facilities of the Project after the completion.

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<sup>1</sup>M/P: “Diagnostic Study for Water and Wastewater Systems in Jenin City Under the Umbrella of Decentralized Cooperation Between the French People and the Palestinian People Financed by Val de Marne and Seine-Saint-Denis” (2016, drafted by Consulting Engineering Center for Jenin Municipality). The M/P was updated in “Water Service Management Plan 2018-2027” (2019, Jenin Municipality).



6. Items requested by the PA

6-1. As a result of discussions, both sides confirmed that the items requested by the PA are as follows:

(1) Facilities

- Rehabilitation of existing municipality wells
- Rehabilitation and construction of pumping stations
- Rehabilitation of the intake pumps (replacement of pumps, pipes and fittings) of the above wells
- Rehabilitation of existing reservoirs and/or new construction of reservoir
- Construction and rehabilitation of the transmission pipes
- Replacement of distribution mains and distribution network pipes
- Construction of DMAs (District Metered Areas)
- Introduction of distribution monitoring system

(2) Soft (Non-physical) components

- O&M of constructed facilities
- Water distribution management
- Customer's adaptation to improved water supply such as 24/7 water supply.

(3) Detailed Design, Tendering support and Construction Supervision

6-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

6-3. The PA shall submit an official request to the Government of Japan through a diplomatic channel before the appraisal of the Project, which is scheduled in August, 2021.

7. Procedures and Basic Principles of Japanese Grant

7-1. The Palestinian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in **Annex 3** shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires the PA side to submit the Project Monitoring Report, the form of which is attached as **Annex 4**.

7-2. The Palestinian side agreed to take the necessary measures, as described in **Annex 5**, for smooth implementation of the Project. The contents of the **Annex 5** will be

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elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of **Annex 5** will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

#### 8. Schedule of the Survey

- 8-1. The Team will further survey until the middle of May, 2021.
- 8-2. The Team will implement the second survey in Palestine from the middle of May to the end of July, 2021.
- 8-3. An official request to the Government of Japan will be submitted in August, 2021.
- 8-4. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Palestine in order to explain its contents around March, 2022.
- 8-5. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Palestinian side, JICA will finalize the Preparatory Survey Report and send it to the PA around July, 2022.
- 8-6. The above schedule is tentative and subject to change.

#### 9. Environmental and Social Considerations

- 9-1. The Palestinian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).
- 9-2. The Project is categorized as “B” from the following considerations:

The Project is not located in a 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 Palestinian 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, if necessary. PWA shall submit the official letter which certifies that the EIA is not required for the Project based on the Palestinian law by the end of August 2021.
- 9-3. For the Project that will result in involuntary resettlement, the Palestinian side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the



Palestinian side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is consistent with JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.


## 10. Other Relevant Issues

### 10-1. Break down of the Survey

- (1) Both sides confirmed that first survey will be carried out by remote work from Japan and the Team will check/collect information and carry out the following items/activities;
  - 1) Existing water supply system
  - 2) Meteorological data
  - 3) Topographic data of the Project site
  - 4) Other development partners' project
  - 5) Status of Operation and Maintenance Organization
  - 6) Social survey on public awareness and living conditions
  - 7) Updating GIS data
- (2) Both sides also confirmed that the second survey will be carried out according to the policy that would be decided in analysis after the first survey in Japan. The second survey will consist of the followings
  - 1) Confirmation of the results of first analysis in Japan
  - 2) Site reconnaissance of proposed facilities
  - 3) Topographic survey
  - 4) Underground utility survey
  - 5) Trial pit survey for confirmation of rock layer depth
  - 6) Survey of the existing municipality owned wells (step drawdown pumping test)
  - 7) Survey of existing private wells being used by the Municipality. (well depth, groundwater level, production)
  - 8) Water quality tests of the existing wells being used by the Municipality.

### 10-2. Land acquisition

The construction site will be determined based on the first survey results and tentative scoping of the Project. In case any arrangements among other related parties are required, the PA side will take necessary measures and submit evidential documents for land acquisition such as prior consent of land use from land owner



to JICA by the end of January 2022.

The Team explained that entire land acquisition process should be completed by the distribution of tender documents at the latest. Unless the land acquisition process proceeds according to the explained schedule, the start of the Project will be delayed. The Palestinian side agreed to the explained schedule.

#### 10-3. Budget Preparation for Operation and Maintenance and staff assignment

Jenin Municipality agreed to secure the necessary budget for operation/maintenance of the determined facilities as well as necessary staff for operation and maintenance. Detailed information about the necessary amount of budget will be informed by March, 2022 during the explanation of outline design.

#### 10-4. Financial status of Jenin Municipality

Both sides confirmed that the Project aims to increase water revenue through providing more water to more customers, and for that, reconciliation of debts and improvement of bill collection ratio are important factors that influence the Project. The Team will assess the following issues to ensure the sustainability of future operation and maintenance of the facilities by this Grant aid.

- Installation plan of PPWM of Jenin Municipality
- Plan and progress of debts settlement
- Current financial status and forecast of future financial balance and structure
- Impact of COVID-19 to water revenue

#### 10-5. Tax exemption

Although general undertakings of the PA side are shown in **Annex 5**, the Team emphasized the responsibilities of the PA to execute the following matters and the PA agreed to it.

- Both sides confirmed that import tax, customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services will be exempted. The PA side also confirmed that MOF/PWA perform the key active administrative role, and take necessary measures without delay.

#### 10-6. Necessary Cooperation for the Survey by the PA side.

PA side agreed to facilitate the Survey by following activities:

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- (1) To provide the Team with available relevant data, information and materials necessary for the execution of the Survey,
- (2) To answer the Questionnaire presented by the Team,
- (3) To provide the Team with an office space in the Water and Wastewater Department of Jenin Municipality during the survey period,
- (4) To assign counterpart (C/P) to the Team and to play the following roles:
  - ✓ to fix the appointments and set up the meetings with the related organizations to which the Team intends to visit,
  - ✓ to attend the site survey and any other visits with the Team and to facilitate any convenience on accommodation, working room, adequate transportation and getting the permissions if required, etc., and
  - ✓ to assist and advise the Team for the collection of data and information.The counterpart's team (the C/P Team) shall be formulated including the member of PWA.
- (5) To assign GIS engineer as a counterpart  
Palestinian side is requested to assign a GIS engineer to the Team for providing explanation on preparation and maintenance condition of GIS database. In addition, exiting relevant GIS data and maps with water supply facilities shall be provided to the Team at no cost.
- (6) To participate in the survey of existing pipelines to identify pipe route and pipe attributes, and assist preparation of distribution network map in GIS in cooperation with the Team,
- (7) To participate in the preparation of the design of facilities under the scope of the Palestinian side and estimation of the required cost in cooperation with the Team,
- (8) To help the Team to measure water pressure in households,
- (9) To secure the permission for the Team, to take photographs and enter into private properties and restricted areas for proper execution of the Survey, if necessary,
- (10) To take any measures deemed necessary to secure the safety of the members of the Team,
- (11) To make arrangements to allow the Team, to bring back to Japan any necessary data, maps and materials related to the Survey, subject to approval by the Palestinian side, in order to analyze the Project and prepare the reports,
- (12) To support in obtaining other privileges and benefits, if necessary.

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**Annex 1** Project Site

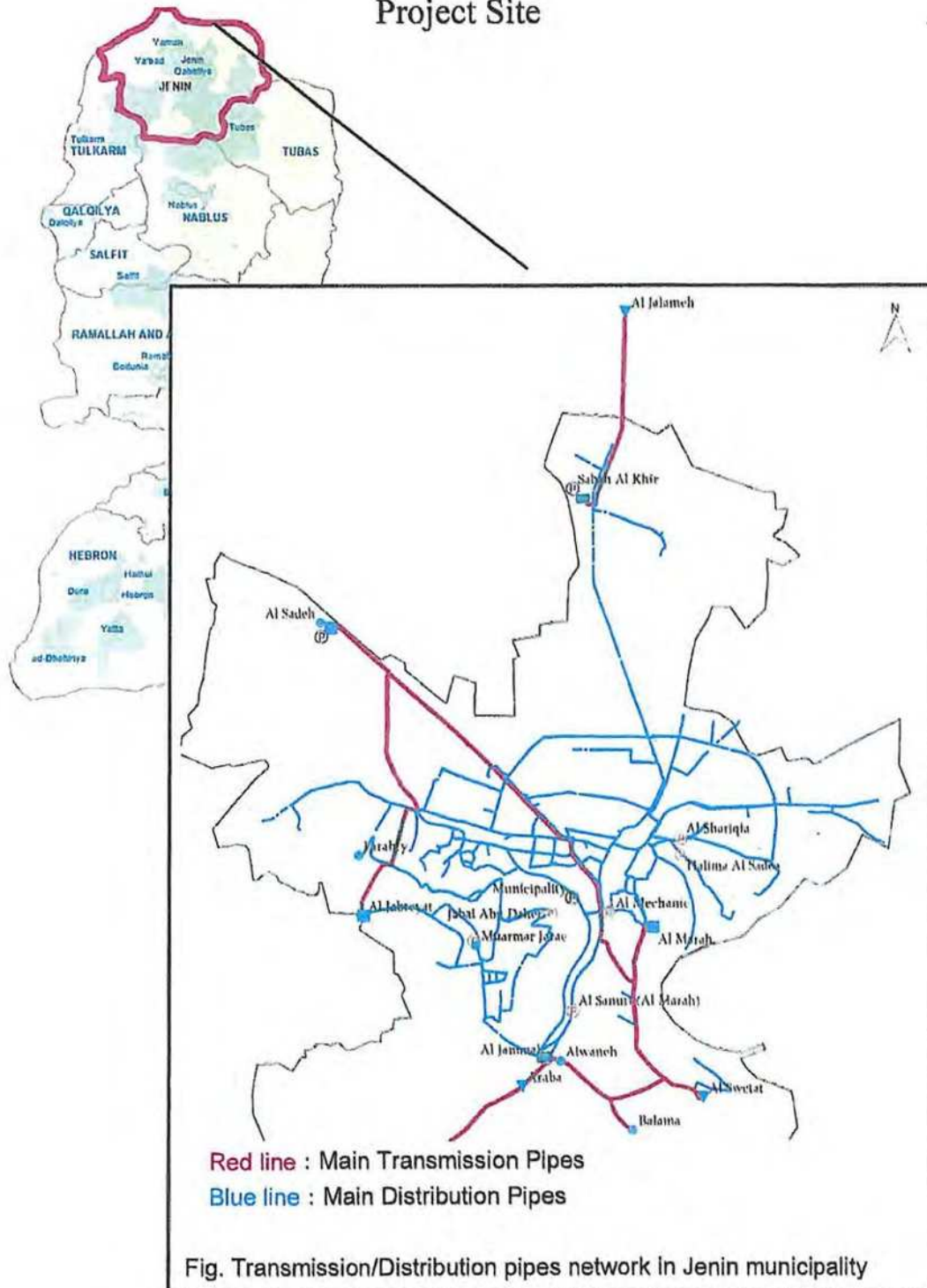
**Annex 2** Organization Chart

**Annex 3** Japanese Grant

**Annex 4** Project Monitoring Report (template)

**Annex 5** Major Undertakings to be taken by the PA

### Project Site



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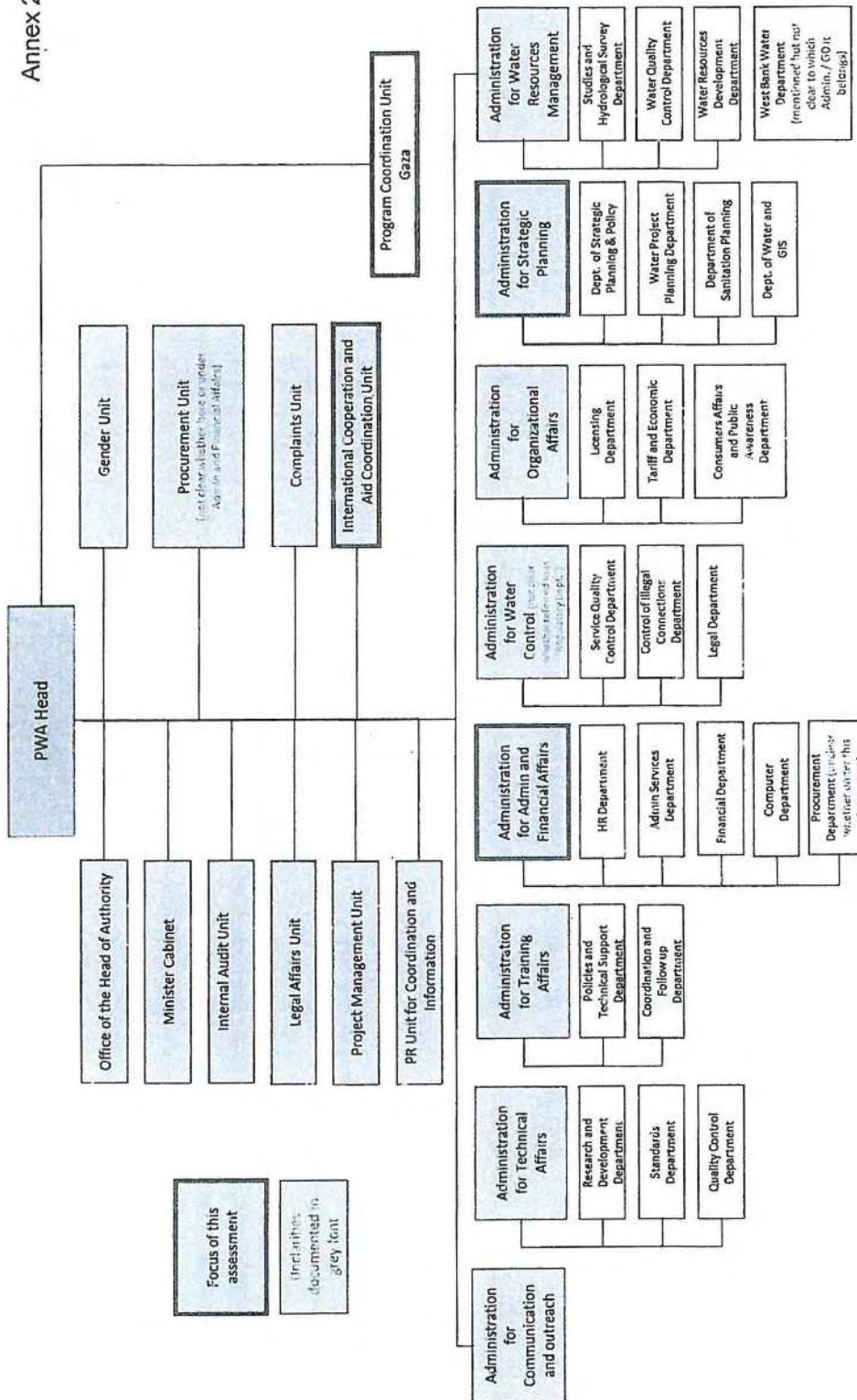


Fig 1. Organization Chart of Palestinian Water Authority

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## 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

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 YC HCG

- relevant agencies of the Recipient necessary for the implementation of the Project.
- 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 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



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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 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.

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4) Export and Re-export

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

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PROCEDURES OF JAPANESE GRANT

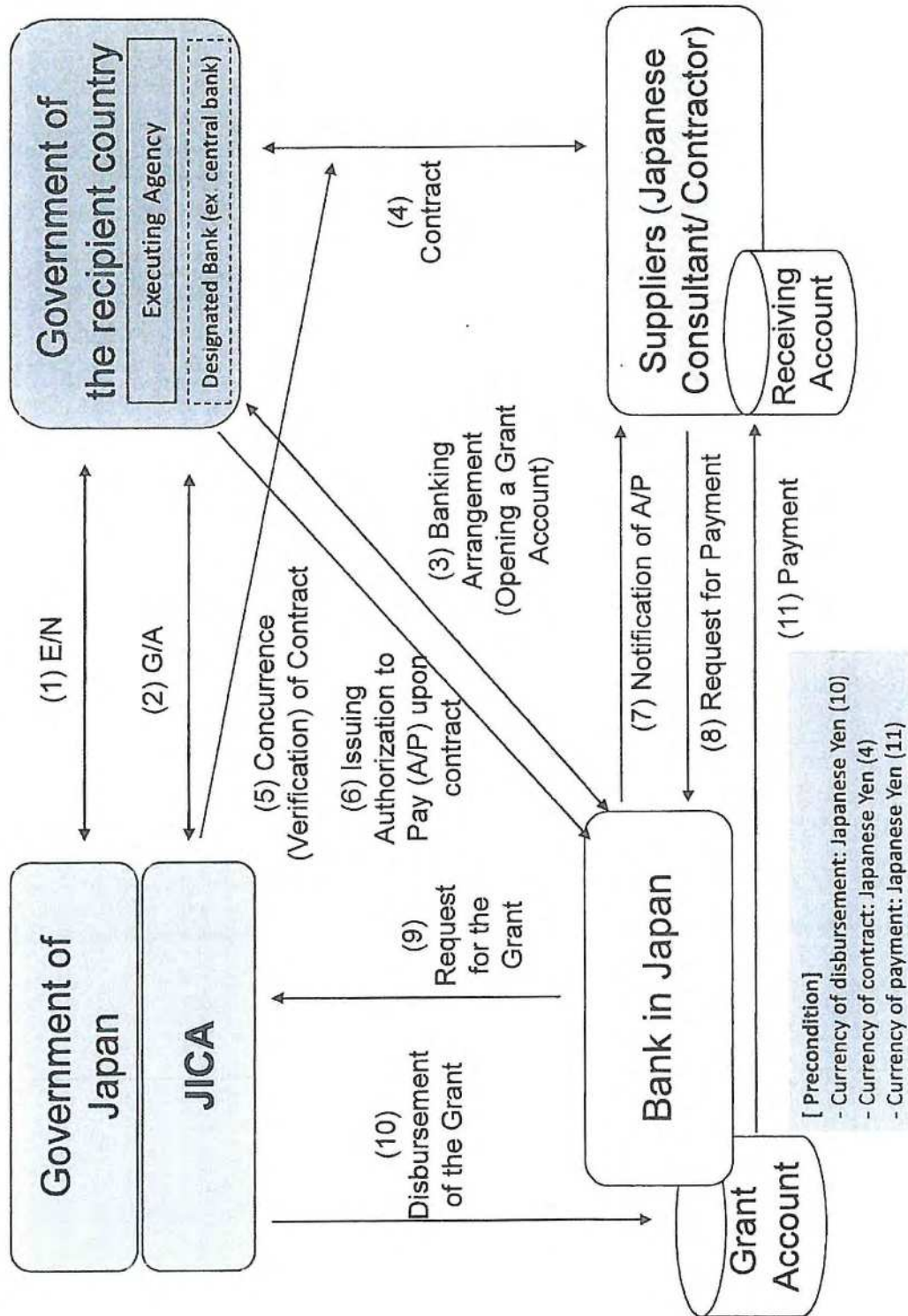
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
4. Ex-post monitoring & evaluation	(14) Completion certificate		x			x	x	
	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

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# Financial Flow of Japanese Grant (A/P Type)



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**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 (Designation) _____ Contacts      Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ Contacts      Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ Contacts      Address: _____ Phone/FAX: _____ Email: _____

**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 (_____): _____

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HG

SP

<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).

(PMR)
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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.			

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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)
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**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.

<b>Original (at the time of outline design)</b> name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual (PMR)</b>

**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).

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<b>3: Operation and Maintenance (O&amp;M)</b>
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**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.)

<b>Original (at the time of outline design)</b>
<b>Actual (PMR)</b>

**3-2 Budgetary Arrangement**

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

<b>Original (at the time of outline design)</b>
---

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:
2. (Description of Risk)	Action required during the implementation stage:
	Contingency Plan (if applicable):
	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
3. (Description of Risk)	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	Condition of payment 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%)	

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## Major Undertakings to be taken by the PA

## 1. Specific obligations of the PA 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	MOF/ PWA		
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)	PWA		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	PWA		
	2) Payment commission for A/P	every payment	PWA		
4	To approve IEE/EIA(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMO P (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	PWA		
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	PWA		
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	PWA		
7	To secure and clear the following lands 1) site for water reservoir 2) temporary construction yard and stock yard near the Project area 3) borrow pit and disposal site near the Project area	before notice of the bidding documents	Jenin Municipality (JM)		
8	To obtain the planning, zoning, building permit	before notice of the bidding documents	JM		
9	1) To demolish and remove the existing facilities and utilities that situate in the site 2) To clear, level and reclaim the sites *The details will be agreed during the Preparatory Survey	before notice of the bidding documents	JM		
10	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	PWA		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
ii	To issue A/P to the Agent Bank for the payment to the supplier(s) and the contractor(s)	within 1 month after the signing of the contract(s)	MOF/PWA		
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)	PWA		
	2) Payment commission for A/P	every payment	PWA		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the Palestine.	during the Project	PWA/MOF		
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	PWA		
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 *The details will be agreed during the Preparatory Survey	during the Project	MOF/PWA		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	JM		
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	PWA		
8	1) To submit Project Monitoring Report.	every month	PWA		
	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)	PWA		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	PWA		
10	To construct access roads 1) Outside the site *The details will be agreed during the Preparatory Survey	3 months before commencement of the construction	JM		
11	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) *The details will be agreed during the Preparatory Survey				
	1) Electricity The distributing line to the site Transformer at site	before start of the construction	JM		
	2) Water Supply The city water distribution main to the site for flushing and pressure test.	before start of the construction	JM		
	3) Drainage The city drainage main ( for storm, sewer and others ) to the site	6 months before completion of the construction	JM		

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	4) To install communication line to the sites		JM		
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site(s) such as general furniture for operation room of Pumping Station *The details will be agreed during the Preparatory Survey	during the construction	JM		
13	To take measure necessary for security and safety of the Project - coordinating the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - coordinating traffic control around the site(s) and on transportation routes of construction materials - installation of permanent fences around the site(s)	during the construction	JM		
14	To implement EMP and EMoP	during the construction	PWA		
15	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	PWA		
16	To implement RAP (livelihood restoration program)	for a period based on livelihood restoration program	PWA		
17	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 - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between the PA and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for 2 years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	PWA		


  
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(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	PWA		
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 PWA and JICA.	for 3 years after the Project	PWA		
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	JM		

2. Other obligations of the PA funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	Rehabilitation of existing municipality wells Rehabilitation and construction of pumping station Rehabilitation of the intake pumps (replacement of pumps, pipes and fittings) of the above wells Rehabilitation of existing reservoirs and/or new construction of reservoir Construction and rehabilitation of the transmission pipes Replacement of distribution mains and distribution network pipes Construction of DMAs (District Metered Areas) Introduction of distribution monitoring system *The details will be agreed during the Preparatory Survey		/
2	To implement detailed design, bidding support and construction supervision To implement Soft component to improve capacities of operation and maintenance, distribution management (Consulting Service) *The details will be agreed during the Preparatory Survey		
3	Contingencies		
	Total		XXX

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

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**Minutes of Discussions**  
**on the Preparatory Survey on the Project for**  
**Improvement of Water Supply in Jenin Municipality**

Based on the several preliminary discussions between the Palestinian Water Authority of the Palestinian Authority (hereinafter referred to as "PA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the Outline Design of the Project for Improvement of Water Supply in Jenin Municipality (hereinafter referred to as "the Project") to Palestine. The Team held a series of discussions with the officials of the PA. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Ramallah, Jenin, 7<sup>th</sup> July, 2022



Mr. Inoue Yoichi  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Mr. Nidal Abd Al-Fattah Obaidi  
Mayor  
Jenin Municipality  
The Palestinian Authority



Mr. Mazen Ghunaim  
Minister  
Palestinian Water Authority  
The Palestinian Authority



Mr. Shukry Bishara  
Minister  
Ministry of Finance  
The Palestinian Authority

## ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve water supply service in Jenin Municipality through rehabilitation of water source facilities, construction of water distribution facilities, construction of appropriate water distribution zonings, and expansion of distribution network, thereby contributing to improvement of the living environment of the residents.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey on the Project for Improvement of Water Supply in Jenin Municipality”.

3. Project site

Both sides confirmed that the site of the Project is Jenin Municipality, which is shown in **Annex 1**. The project area (Planned Service Area) will be adjusted when budgetary constraints arise.

4. The Target year of the Project

Both sides agreed that the target year of the Project is 2030, which corresponds to the Middle Term of M/P<sup>1</sup>.

5. Unit amount of water supply per capita

Both sides confirmed that in the Project, unit amount of water supply per capita is considered as 120lcd, which is prescribed in the National Water Strategy, and the figure shall be used in designing works of the Project. PWA side explained that in the Connection Point Project (hereinafter referred to as “C-P”), different unit amount of water supply per capita will be used for urban and rural areas for distribution of available water source equally, therefore there will be possibly different calculation results on the estimation of water supply population between the Project and C-P.

6. Responsible authority for the Project

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<sup>1</sup>M/P: “Diagnostic Study for Water and Wastewater Systems in Jenin City Under the Umbrella of Decentralized Cooperation Between the French People and the Palestinian People Financed by Val de Marne and Seine-Saint-Denis” (2016, drafted by Consulting Engineering Center for Jenin Municipality). The M/P was updated in “Water Service Management Plan 2018-2027” (2019, Jenin Municipality).

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

- 6-1. Palestinian Water Authority (hereinafter referred to as "PWA") will be the executing agency for 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. The organization charts are shown in Annex 2.
- 6-2. Jenin Municipality will act as the coordination agency during implementation of the Project and be responsible for Operation & Maintenance of the facilities of the Project after the completion.

7. Items requested by the Palestinian side

7-1. As a result of discussions, both sides confirmed that the items requested by the Palestinian side are as follows:

(1) Facilities

- Rehabilitation of existing municipality wells
- Rehabilitation and construction of pumping stations
- Rehabilitation of the intake pumps (replacement of pumps, pipes and fittings) of the above wells
- Rehabilitation of existing reservoirs and construction of new reservoir
- Construction and rehabilitation of the transmission pipes
- Replacement of distribution mains and distribution network pipes
- Construction of DMAs (District Metered Areas)
- Introduction of distribution monitoring system

(2) Soft (Non-physical) components

- O&M of constructed facilities
- Water distribution management
- Customer's adaptation to improved water supply such as 24/7 water supply.

(3) Detailed Design, Tendering support and Construction Supervision

7-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan. The following approach will be applied to examine the project scope.

(1) Improvement effect will be evaluated by each project component

(2) The main infrastructures, such as water intake facilities, transmission system,

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and DMAs, are considered of higher priority.

- (3) Scope of water pipe networks will be determined in examination of appropriate project scale as the Japanese Grant Aid Project. For this purpose, cost benefit analysis will be carried out in terms of pipe material, diameter, pipe age, area of importance, etc.
- (4) From the viewpoint of project impact, some components are deemed as less priority. They are; rehabilitation of wells having small production capacity, monitoring and control system, number of fire hydrants.

## 8. Procedures and Basic Principles of Japanese Grant

8-1. The Palestinian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 3 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires the Palestinian side to submit the Project Monitoring Report, the form of which is attached as Annex 4.

8-2. The Palestinian side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Project. The contents of the Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

8-3. The contents of Annex 5 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

## 9. Environmental and Social Considerations

9-1. The Palestinian side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

9-2. The Project is categorized as “B” from the following considerations:

The Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors, nor entailing large scale involuntary resettlement stipulated in the JICA Guidelines for Environmental and Social Considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

9-3. The Palestinian side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental

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Impact Assessment (EIA)/ Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project, if necessary. PWA shall submit the official letter which certifies that the EIA/IEE is not required for the Project based on the Palestinian law by the end of December 2022.

- 9-4. Based on the spatial information system map in Palestine, and after reviewing the project maps, a clear view was obtained that there will not be any involuntary resettlements, since all the project facilities are in a public land. Thus, it is not required to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. While private land acquisition should follow Land Expropriation Law 2 (1953), no acquisition of private land is required for this Project. According to the National Spatial Plan Map published on the web, the new service water reservoir proposed by Jenin Municipality lies in a governmental land classified as a forest, and the other facilities are constructed within right of way of roads.

#### 10. Connection Point Project

##### 10-1. Water resource for the Project

The Palestinian side explained that C-P will be the source of water for the Project. The Japanese side explained that progress of C-P, both planning and implementation, is the prerequisite for this Grant Aid. The Project relies on C-P for water resource to distribute water to whole part of Jenin Municipality, so the Project is not able to proceed without commitment of the implementation of C-P. The timing of the completion of the Project and C-P must be aligned, and if C-P's construction schedule is delayed, the completion of the Project is also delayed.

- 10-2. Conditions of dispatch of Draft Preparatory Survey Report Explanation Mission  
Both sides confirmed that the following conditions are prerequisites for the dispatch of the Draft Preparatory Survey Report Explanation Mission; Necessary information should be provided to JICA by the end of December 2022

- Letter on information of budget allocation of C-P by the end of December 2022
- Letter on information of the schedule of implementation of C-P by the end of December 2022
- Completion of necessary procedure for Environmental and Social Considerations to be done by December 2022.

##### 10-3. Conditions of appraisal of the Project to the Government of Japan (GOJ)

Both sides confirmed that the following conditions are prerequisites for appraisal of the Project to the Government of Japan (GOJ)

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- Determination of budget of C-P
- Determination of the schedule of construction of C-P

#### 10-4. Implementation schedule and design details of C-P

Both sides confirmed the plan of C-P as follows;

- Total volume of water allocated to Jenin Municipality from C-P for 10,800m<sup>3</sup>/day (as the average daily flow in 2030). Total volume of 10,800m<sup>3</sup>/day water will be provided to Jenin Municipality regardless of production capacity of Janzour well.

#### 10-5. Information sharing

The Japanese side emphasized that updated information of the both projects shall be shared among the parties in order to avoid discrepancies caused by miscommunication. PWA will organize coordination meeting on monthly basis.

### 11. Distribution System by Using the Existing Two Service Reservoirs and New Service Reservoir

The Japanese side explained that water distribution system of the Project will be performed by the existing Al Jabreyat and Al Marah Service Reservoirs. On the other hand, the new service reservoir, which was planned previously, will not be constructed for the following reasons:

Firstly, water distribution amount of Jenin Municipality as of 2030 has been reduced to be 14,800 m<sup>3</sup>/day taking into account of the principle that available water source shall be distributed equally to the whole project under the Connection Point Project. Secondly, water distribution to the higher elevation areas will be performed through direct connection to the transmission line from the Connection Point Project, for the sake of saving construction cost and energy consumption.

As the result of the above, the existing storage volume of 4,000 m<sup>3</sup> will be enough capable of the water supply system of Jenin municipality. In terms of project efficiency, expansion of water supply network to the current non-served population is considered more appropriate rather than construction of the new service reservoir. From another point of view, potential risk of project delay will be avoided, taking into account that new service reservoir site belongs to Area C, which may cause significant delay to obtain permission from the Israeli authority.

After the discussions, the both sides agreed that the Palestinian side will try to collect the evidential documents for the land use of the proposed new reservoir by the end of August 2022, namely 1) confirmation of land owner of the proposed site and 2)

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written consent of Israeli side on the land use of the proposed site. The both sides also agreed that new service reservoir will not be included in the Project if two evidential documents would not be submitted by the end of August 2022. The Japanese side underlined that notwithstanding submission of such evidential documents, Japanese side will examine necessity and priority of construction of the new service reservoir.

12. Design License to the Japanese consultant

The Palestinian side explained that PWA will issue Design License required in the new legislation to Japanese consulting company which undertakes the Project according to the application from the consulting company.

13. Increasing the number of water service connections

The Palestinian side will be expected to complete service connections including poor household under the Project. Both sides confirmed that it is important to carry out the connections as planned, to maximize the benefit for the people from the Project. Expected number of connection for each year is approximate 2,000 HHs.

14. Other Relevant Issues

14-1. Budget Preparation for Operation and Maintenance and staff assignment

Jenin Municipality agreed to secure the necessary budget for operation/maintenance of the determined facilities as well as necessary staff for operation and maintenance. Detailed information about the necessary amount of budget will be informed by February, 2023 during the explanation of the Draft Preparatory Survey Report.

14-2. Financial status of Jenin Municipality

Both sides confirmed that the Project aims to increase water revenue through providing more water to more customers, and for that, reconciliation of debts and improvement of bill collection ratio are important factors that influence the Project. The Team will assess the following issues to ensure the sustainability of future operation and maintenance of the facilities by this Grant aid.

- Installation plan of PPWM of Jenin Municipality
- Plan and progress of debts settlement
- Current financial status and forecast of future financial balance and structure

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- Impact of COVID-19 to water revenue
- National and Jenin Municipality's budgetary and accounting system, and recent fiscal and financial situation, including debt exemption

#### 14-3. Tax exemption

Although general undertakings of the Palestinian side are shown in Annex 5, the Team emphasized the responsibilities of the Palestinian side to execute the following matters and the Palestinian side agreed to it.

- Both sides confirmed that import tax, customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services will be exempted. The Palestinian side also confirmed that MOF/PWA perform the key active administrative role, and take necessary measures without delay.

#### 15. Schedule of the Survey

- 15-1. The Team will further survey until the first week of August, 2022.
- 15-2. An official request to the Government of Japan will be submitted by December, 2022.
- 15-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch the next mission to Palestine in order to explain its contents around February, 2023. The schedule is subject to change according to the conditions described in 10. 10-2.
- 15-4. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Palestinian side, JICA will finalize the Preparatory Survey Report and send it to the Palestinian side around May, 2023. The schedule is subject to change according to the conditions described in 10. 10-3.
- 15-5. The above schedule is tentative and subject to change.

**Annex 1** Project Site

**Annex 2** Organization Chart

**Annex 3** Japanese Grant

**Annex 4** Project Monitoring Report (template)

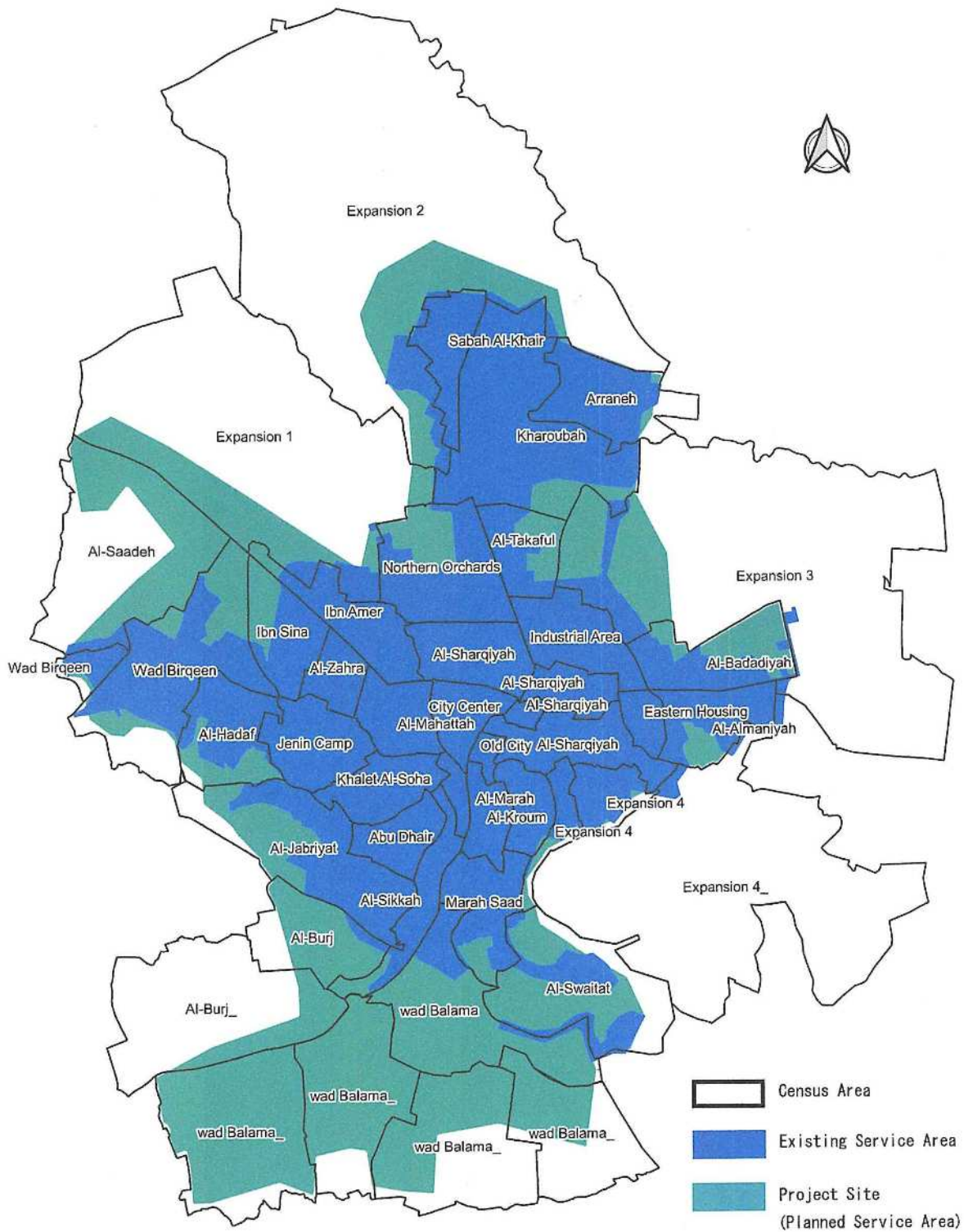
**Annex 5** Major Undertakings to be taken by the Palestinian side

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# Annex 1. Project Site



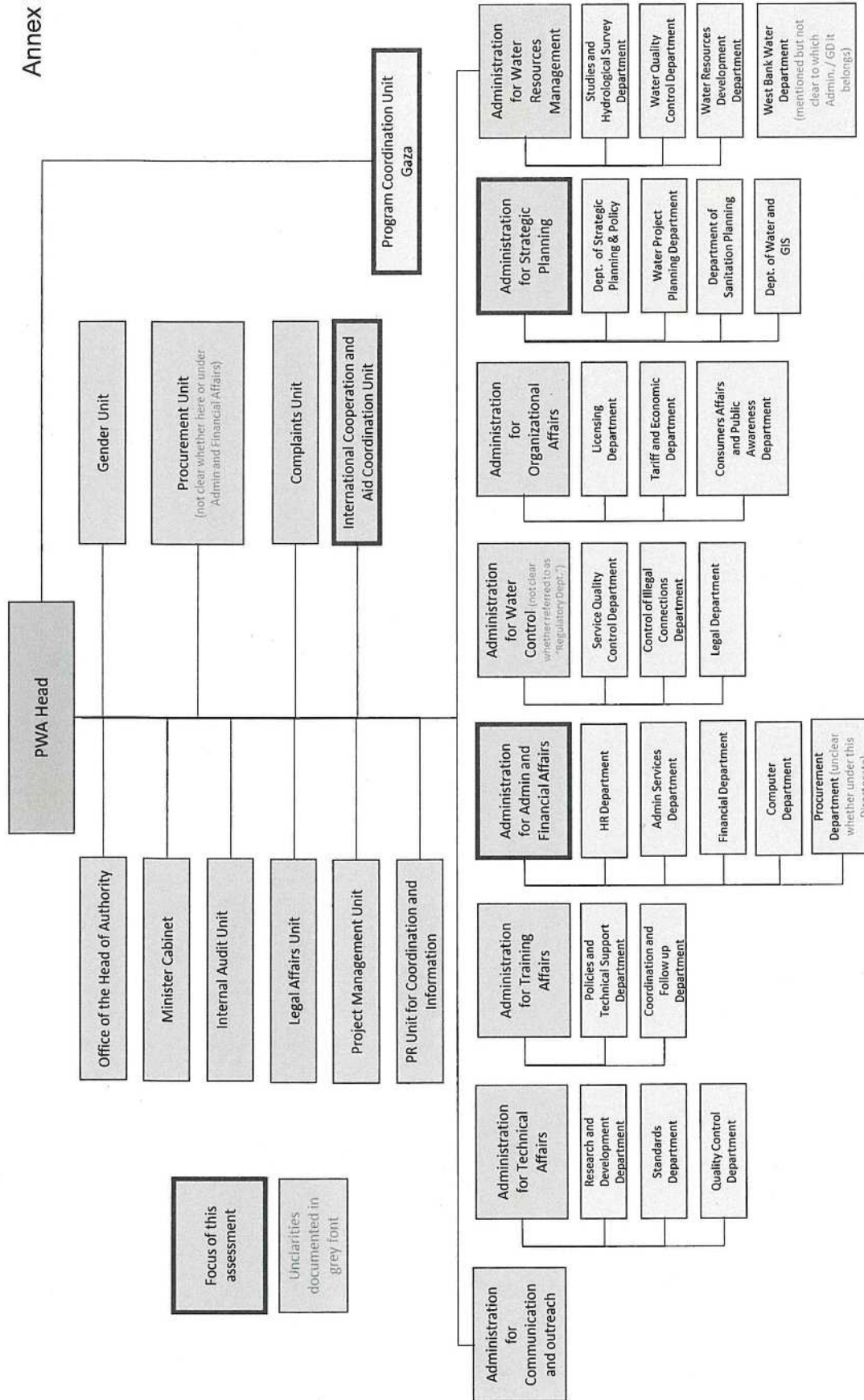


Fig 1. Organization Chart of Palestinian Water Authority

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## 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

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relevant agencies of the Recipient necessary for the implementation of the Project.

- 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)."

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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 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

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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 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) Measures to ensure more efficient implementation of the Grant

- i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

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ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GOJ will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in 2) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

#### 4) 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.

#### 5) Export and Re-export

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

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**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 _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	Person in Charge (Designation) _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	Person in Charge (Designation) _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____

**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 (_____): _____

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**1: Project Description**

**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		

**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)
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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)

**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.				

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- 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)
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**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.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (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.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**

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

<b>Original</b> (at the time of outline design)
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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:

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	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)

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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)

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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%)	

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## Major Undertakings to be taken by the Palestinian side

## 1. Specific obligations of the PA 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	MOF/ PWA		
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)	PWA		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	PWA		
	2) Payment commission for A/P	every payment	PWA		
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	PWA		
5	To secure the necessary budget for land acquisition and implement land acquisition	before notice of the bidding documents	PWA		
6	To secure and clear the following lands 1) site for service reservoir 2) temporary construction yard and stock yard near the Project area 3) borrow pit and disposal site near the Project area	before notice of the bidding documents	Jenin Municipality (JM)		
7	To obtain the planning, zoning, building permit	before notice of the bidding documents	JM		
8	1) To demolish and remove the existing facilities and utilities that situate in the site 2) To clear, level and reclaim the sites	before notice of the bidding documents	JM		
9	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	PWA		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

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## (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(s) and the contractor(s)	within 1 month after the signing of the contract(s)	MOF/ PWA		
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)	PWA		
	2) Payment commission for A/P	every payment	PWA		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in the Palestine.	during the Project	PWA/ MOF		
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	PWA		
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	during the Project	MOF/ PWA		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	JM		
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	PWA		
8	1) To submit Project Monitoring Report.	every month	PWA		
	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)	PWA		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	PWA		
10	To construct access roads 1) Outside the site	3 months before commencement of the construction	JM		
11	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) *The details will be agreed during the Preparatory Survey				
	1) Electricity The distributing line to the site Transformer at site	before start of the construction	JM		
	2) Water Supply The city water distribution main to the site for flushing and pressure test.	before start of the construction	JM		
	3) Drainage The city drainage main ( for storm, sewer and others ) to the site	6 months before completion of the construction	JM		

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	4) To install communication line to the sites		JM		
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site(s) such as general furniture for operation room of Pumping Station	during the construction	JM		
13	To take measure necessary for security and safety of the Project - coordinating the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - coordinating traffic control around the site(s) and on transportation routes of construction materials - installation of permanent fences around the site(s)	during the construction	JM		
14	To implement EMP and EMoP	during the construction	PWA		
15	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	PWA		
16	To conduct service pipe connection work including installation of water meter during the project implementation	During the construction	JM		

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Yes

(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	PWA		
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 PWA and JICA.	for 3 years after the Project	PWA		
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	JM		
4	To conduct service pipe connection work including installation of water meter after the project completion continuously	Up to XXXX	JM		

2. Other obligations of the PA funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	Rehabilitation of existing municipality wells Rehabilitation and construction of pumping station Rehabilitation of the intake pumps (replacement of pumps, pipes and fittings) of the above wells Rehabilitation of existing reservoirs and/or new construction of reservoir Construction and rehabilitation of the transmission pipes Replacement of distribution mains and distribution network pipes Construction of DMAs (District Metered Areas) Introduction of distribution monitoring system *The details will be agreed during the Preparatory Survey		/
2	To implement detailed design, bidding support and construction supervision To implement Soft component to improve capacities of operation and maintenance, distribution management (Consulting Service) *The details will be agreed during the Preparatory Survey		
3	Contingencies		
	Total		XXX

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

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**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Improvement of Water Supply in Jenin Municipality**  
**(Explanation on Draft Preparatory Survey Report)**

With reference to the Minutes of Discussions signed between Palestinian Water Authority of the Palestinian Authority (hereinafter referred to as "PA") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on July 7<sup>th</sup>, 2022 and in response to the request from the Government of Palestine dated April 13<sup>th</sup>, 2023, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Improvement of Water Supply in Jenin Municipality (hereinafter referred to as "the Project").

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

Ramallah, July 13th, 2023


  
Mr. MIYAGAWA Masahito  
Leader, Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

  
Mr. Mazen Ghunaim  
Minister  
Palestinian Water Authority  
The Palestinian Authority



  
Mr. Nidal Abd Al-Fattah Obaidi  
Mayor  
Jenin Municipality  
The Palestinian Authority



  
Mr. Shukry Bishara  
Minister  
Ministry of Finance  
The Palestinian Authority



## ATTACHMENT

1. Objective of the Project  
The objective of the Project is to improve water supply service in Jenin Municipality through rehabilitation of water source facilities, construction of water distribution facilities, construction of appropriate water distribution zonings, and expansion of distribution network, thereby contributing to improvement of the living environment of the residents.
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 Water Supply in Jenin Municipality”.
3. Project site  
Both sides confirmed that the site of the Project is Jenin Municipality, which is shown in Annex 1.
4. Responsible authority for the Project  
Both sides confirmed the authorities responsible for the Project are as follows:
  - 4-1 Executing agency  
The Palestinian Water Authority (hereinafter referred to as “PWA”) will be the executing agency for 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 taken care by relevant authorities properly and on time. The organization chart is shown in Annex 2.
  - 4-2 Coordination agency  
Jenin Municipality will act as the coordination agency during implementation of the Project and be responsible for Operation & Maintenance of the facilities of the Project after the completion. The organization chart is shown in Annex 2.
5. Contents of the Draft Report  
After the explanation of the contents of the Draft Report by the Team, the Palestinian side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Palestinian side around October 2023.
6. Cost estimate  
Both sides confirmed that the cost estimate including the contingency explained by the Team is provisional and will be examined further by the Government of Japan for its approval. If the cost exceeds the budget depending on the status of the exchange rate, it is possible to change the component of the Project. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

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7. 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.
8. Procedures and Basic Principles of Japanese Grant  
The Palestinian side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 3 shall be applied to the Project. In addition, the Palestinian side agreed to take necessary measures according to the procedures.
9. Timeline for the project implementation  
The Team explained to the Palestinian side that the expected timeline for the project implementation is as attached in Annex 4.
10. Expected outcomes and indicators  
Both sides agreed that key indicators for expected outcomes are as follows. The Palestinian side will be responsible for the achievement of agreed key indicators targeted in 2030 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

	Baseline (2020 actual value)	Target (2030) 4 years after the completion of the project
Rate of population served	82%	98%
Population served	41,680 persons	77,080 persons
Average daily water supply *	10,134 m <sup>3</sup> /day	13,155 m <sup>3</sup> /day

Note: \*Assuming unexpected events such as reducing of water supply volume by political and extreme weather will not occur.

[Qualitative indicators]

Improvement of the living environment for residents (improvement of water supply hours, decrease of Non-Revenue-Water ratio, and improvement of convenience by reducing areas with inadequate water pressure)

11. Ex-Post Evaluation  
JICA will conduct ex-post evaluation after four (4) years from the project completion, in principle, with respect to six evaluation criteria (Relevance, Coherence, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Palestinian side is required to provide necessary support for the data collection.
12. Technical assistance (“Soft Component” of the Project)  
Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project. The Palestinian side confirmed to deploy a necessary number of counterparts

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including a manager and operators for SCADA system who are appropriate and competent in terms of its purpose of the technical assistance as described in the Draft Report.

### 13. Undertakings of the Project

Both sides confirmed the major undertakings of the Project as described in Annex 5. Both sides also confirmed that the Annex 5 will be used as an attachment of G/A. The Palestinian 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.

#### 13-1 Customs duties

With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 1. (2) 5 of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by PWA during the implementation stage of the Project. The consultant and construction contracts between PWA and Japanese companies are subject to the "zero VAT method", while "refund method" is applied to obtain tax exemption for the purchase of materials and equipment by contractors and payments to subcontractors in the Palestinian territories. The import of materials and equipment from Japan or third countries for the implementation of the Project will be done via Israeli ports. The taxation on imported materials and equipment to Palestine is handled by the Israeli government, and the tax exemption procedure requires an application to the Coordinator of Government Activities in the Territories (COGAT), the organization responsible for customs supervision in Israel, through the Ministry of Finance (MoF) of PA.

#### 13-2 Import permission

Both sides confirmed that PWA will submit a document which is prepared by contractors/consultants containing the details of the imported materials and equipment to COGAT for examination. Since the imported materials and equipment required for the Project are expected to include ductile iron pipes (DIP) for piping work and equipment for facilities work, the procurement plan should be carefully planned so as not to affect the construction period.

#### 13-3 Provision of electricity

Currently, electricity is not supplied to both the Al Jabreyat and Al Marah Reservoirs. Installation of power lines from the nearest electrical pole to Al Jabreyat reservoir and a new contract for low-voltage three-phase power supply for both reservoirs is necessary.

Also, a new power supply contract for low-voltage single-phase power supply will be necessary for the 15 district metered areas (DMAs) constituting the substation of the SCADA system.

Both sides confirmed that Jenin Municipality will proceed with necessary procedures before the start of the construction.

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#### 13-4 Installation of communication line

The central monitoring unit of the SCADA system is planned to be installed within the existing administration building of the Water and Wastewater Department (WWD) of Jenin Municipality. A new contract with the telecommunications company is necessary to obtain additional fiber optics communication services to ensure exclusive access to the central monitoring unit of the SCADA system and prevent any interference with other uses. Furthermore, for the substation units of the SCADA system, a new contract with a mobile communication company utilizing the existing general-purpose mobile phone network needs to be established to provide communication services. Both sides confirmed that Jenin Municipality will proceed with necessary procedures 6 months before completion of the construction.

#### 13-5 New customer service connection work

The Project aims to expand the water supply coverage to currently unserved areas, and the delay of new pipe connection work in the expansion area will severely affect the effectiveness of the Project and financial situation of WWD. By the end of 2030, 6,000 new customer service connections are estimated, resulting in the necessity of 1,500 new connections every year after completion of the Project. Both sides confirmed that Jenin Municipality will implement new service pipe connection work to achieve the target service coverage ratio in 2030.

#### 13-6 Water tariff

WWD will be responsible for operation and maintenance of the facilities constructed by the Project. Currently, its financial situation is composed of tariff income and budget allocation from Jenin Municipality. To be a sustainable utility which is profitable and financially independent, it is necessary not only to improve water tariff collection ratio, but also to set appropriate water tariff. Both sides confirmed it is essential that Jenin Municipality and PWA continuously review current water tariff and consider adequate tariff aiming at covering the operation and maintenance and later full cost recovery including depreciation.

#### 13-7 Security measures

Both sides confirmed that PWA and Jenin Municipality shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant / the Contractor engaging in the Project, as shown in Annex 5. Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Recipient without using the Grant.

#### 13-8 Additional budget

Both sides confirmed that PWA will secure additional necessary budget, if any delay of the Project occurred by reasons related to PA procedure.

#### 14. Monitoring during the implementation

The Project will be monitored by PWA and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of

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the PMR is described in Annex 5.

15. 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 promptly by PWA, but in any event not later than six months after completion of the Project.

16. Signing of E/N and G/A

Both sides confirmed that PWA will proceed with the signing process of E/N and G/A soon after the approval of the Project by the Government of Japan.

17. Items and measures to be considered for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as follows:

17-1 Connection Point (C-P) Project

17-1-1 Water resource

The Project relies on C-P Project for 70% of water resource to distribute the whole part of Jenin Municipality. Certain implementation of C-P Project is prerequisite for this Grant Aid project, and the timing of the completion of these projects must be aligned. Both sides confirmed that C-P Project will supply 10,800m<sup>3</sup>/day of water when the Project is completed in 2026.

17-1-2 Budget and schedule

Both sides agreed upon Minutes of Discussion signed in July 2022 that determination of budget and construction schedule of C-P Project is the condition of appraisal of the Project to the Government of Japan. Both sides confirmed that the budget for the C-P project is fully financed by the World Bank. Both sides also confirmed that the latest tentative schedule of C-P project is as follows:

- March 2023                                      Completion of draft tenders documents
- January 2024                                    Signing of construction contract
- July 2025                                         Completion and handover

17-1-3 Information sharing

The completion of C-P Project without delay is a prerequisite for this Grant Aid. Both sides confirmed that monthly meetings with PWA, Jenin Municipality and the consultant of the Grand Aid Project will be organized to share the latest update and discuss issues if any in the earliest time. The consultants of C-P Project will be invited, if needed.

18. Environmental and Social Considerations

18-1 General Issues

18-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for 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

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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.

#### 18-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 7. PWA assured that they shall take the necessary measures in accordance with the Environmental Checklist and shall report to the JICA Palestine Office if any major changes affecting the environment occur during the Project. Both sides agreed that in case of major modification of the content of the Environmental Checklist, PWA shall submit the modified version to JICA in a timely manner.

#### 18-2 Environmental Issues

##### 18-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report is not required for the Project in the legal system of Palestine. PWA will request “no objection” from Environmental Quality Authority (EQA) and share the response from EQA to JICA by July 20th, 2023.

##### 18-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project are attached as Annex 8, respectively. Both sides agreed that environmental mitigation measures and monitoring shall be conducted by PWA and Jenin Municipality based on the EMP and EMoP, which may be updated during the detailed design stage.

##### 18-2-3 Consultation with Local Stakeholders

Palestinian side explained that a local stakeholder meeting on the Project with relevant stakeholders and local residents with particular attention to directly affected peoples by the Project was held at Child Culture Center-Jenin on June 25th, 2023. Advance announcements were posted on the Facebook page of Jenin Municipality. Questions and opinions such as the existence of a safety plan, necessity of well license, and construction process were raised by attendees. Jenin Municipality explained the outcome of such consultations was incorporated into the Project plans. However, there were no objections to the implementation of the Project. Details regarding the stakeholder meetings are summarized as per Annex 10. Palestinian side explained appropriate considerations have been given to vulnerable social groups during those meetings by holding the meeting at an easily accessible place.

#### 18-3 Environmental and Social Monitoring

##### 18-3-1 Environmental Monitoring

Both sides agreed that PWA will submit results of environmental monitoring to JICA as a part of Monthly Progress Report by using the monitoring form attached as Annex 9. The timing of submission of the monitoring form is described in Annex 5. In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed. The extension of the monitoring will be decided in

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accordance with the agreement between PWA and JICA.

#### 18-3-2 Information Disclosure of Monitoring Results

Both sides confirmed that PWA will take stipulated procedures for information disclosure in accordance with Palestinian Environmental Law (1999) Article 3. In addition, the Team requested PWA to disclose results of environmental and social monitoring to local stakeholders and Palestinian side agreed to disclose monitoring results through their website / in their field offices by date.

Palestinian side agreed JICA will disclose results of environmental and social monitoring submitted by PWA as the monitoring forms attached as Annex 9 on its website. If the third parties request further information, JICA disclose the information, which is subject to approval by PA.

#### 19. Other Relevant Issues

##### 19-1 Request from PWA and Jenin Municipality

PWA and Jenin Municipality requested to include construction of branch pipes to cross the road as a part of the Project. The Team explained that the Team will examine the request, but the length of distribution pipelines may be shortened due to the limitation of project budget. PWA and Jenin Municipality agreed with the condition.

##### 19-2 JICA Global Agenda / Strategies for Global Development Issues

JICA, with its partners, aims to show global impacts realizing the goals set under JICA's cooperation strategies for global issues, Global Agenda. JICA Global Agenda and its goals will be shared among partner countries and various actors, enhancing dialogue and collaboration, therefore, maximizing the development impacts. Through these efforts, JICA will comprehensively contribute to the achievement of the SDGs by 2030 as well as realize Japan's Development Cooperation Charter that focuses on "contributing to peace and prosperity", "human security in the new era", and "co-creation of social values through dialogue and cooperation with developing countries", and "leading the dissemination and implementation of international rules and guidelines based on inclusiveness, transparency, and fairness".

Under one of the Global Agenda, "Sustainable Water Resources Management and Water Supply", JICA proposes an approach of "Supporting the Growth of Water Utilities". Water supply services in developing countries are suffering a negative chain of factors, such as low service standards, people's dissatisfaction with the service, lack of trust in the water utilities, inefficient business operations, and insufficient funds, resulting in a vicious cycle. JICA will put the water supply services on a growth trajectory by shifting to a virtuous cycle of improving services, increasing operational efficiency, expanding tariff revenue, and securing investment. The first point of growth is "to expand the tariff revenue base and improve services by expanding and upgrading water supply facilities." The second starting point for growth is "to reduce Non-Revenue-Water that cannot be billed for, such as leaked or stolen water." Creating a growth spiral in this way, JICA aims to improve water supply services in more than 40 cities in the next 10 years.

JICA and PA implemented the technical cooperation project related to NRW reduction and improvement of tariff collection ratio which contributes to increased

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tariff revenue of WWD. This is followed by the advisor project aiming at sustainable water supply service, development of strategic business plan, and securing financial autonomy of WWD. This Grant Aid project as the next step will increase efficiency and effectiveness of water supply service by rehabilitation of wells, replacement of pipes, and reconstruction of the distribution network. Throughout these cooperation, Jenin Municipality is expected to be a water utility which grows independently and sustainably.

Both sides agreed to implement the Project based on JICA's strategies for global development issues and its virtuous cycle scenario attached as Annex 11.

#### 19-3 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.

#### 19-4 Climate Change

Both sides confirmed that the Project corresponds to adaptation measures of climate change, since the Project will contribute to reduction of the risk of water shortage and security of stable water supply in Jenin city.

#### 19-5 Gender Mainstreaming

Both sides confirmed that gender mainstreaming should be duly practiced for the Project implementation. In particular, both sides agreed on the following gender elements to be integrated into the Project.

- (a) Implementation of soft-component activities that considers gender balance of trainees.
- (b) To be mindful of the gender balance of workers in the construction works under the Project.
- (c) To continue promoting employment of female staff members in WWD.

#### 19-6 Safety measures

In consideration of the current situation in Jenin city, both sides confirmed that PWA, Jenin Municipality and the Japanese side will cooperate in collection and sharing of information and discussion related to security and safety.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant

Annex 4 Project Implementation Schedule

Annex 5 Major Undertakings to be taken by Palestinian Authority

Annex 6-1 Project Monitoring Report (template)

Annex 6-2 Cover Letter of Project Monitoring Report

Annex 7 Environmental Checklist

Annex 8 Environmental Management Plan / Environmental Monitoring Plan

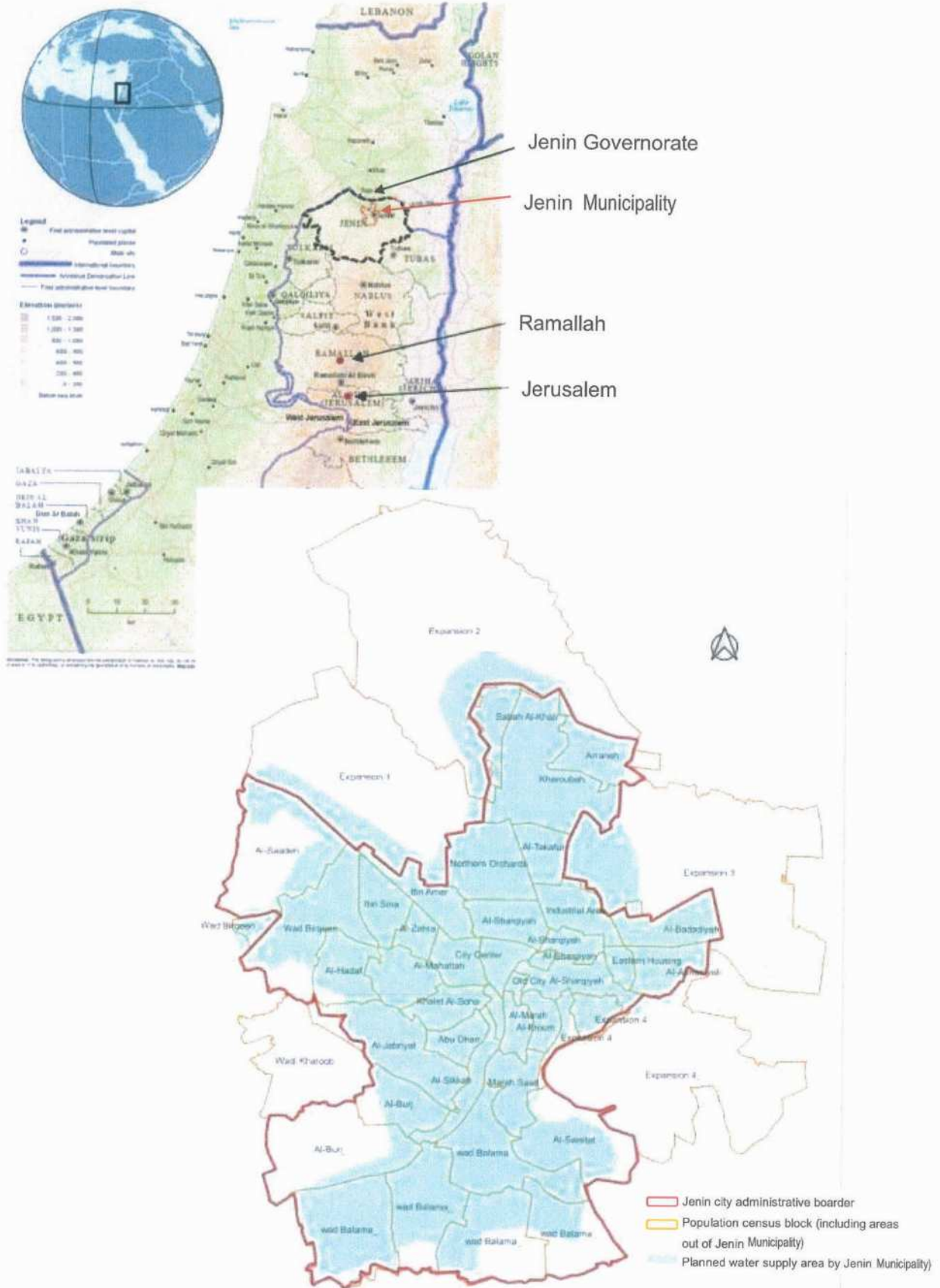
Annex 9 Environmental and Social Monitoring Form

Annex 10 Meeting Minutes of the stakeholder meeting

Annex 11 Local scenario based on JICA Global Agenda

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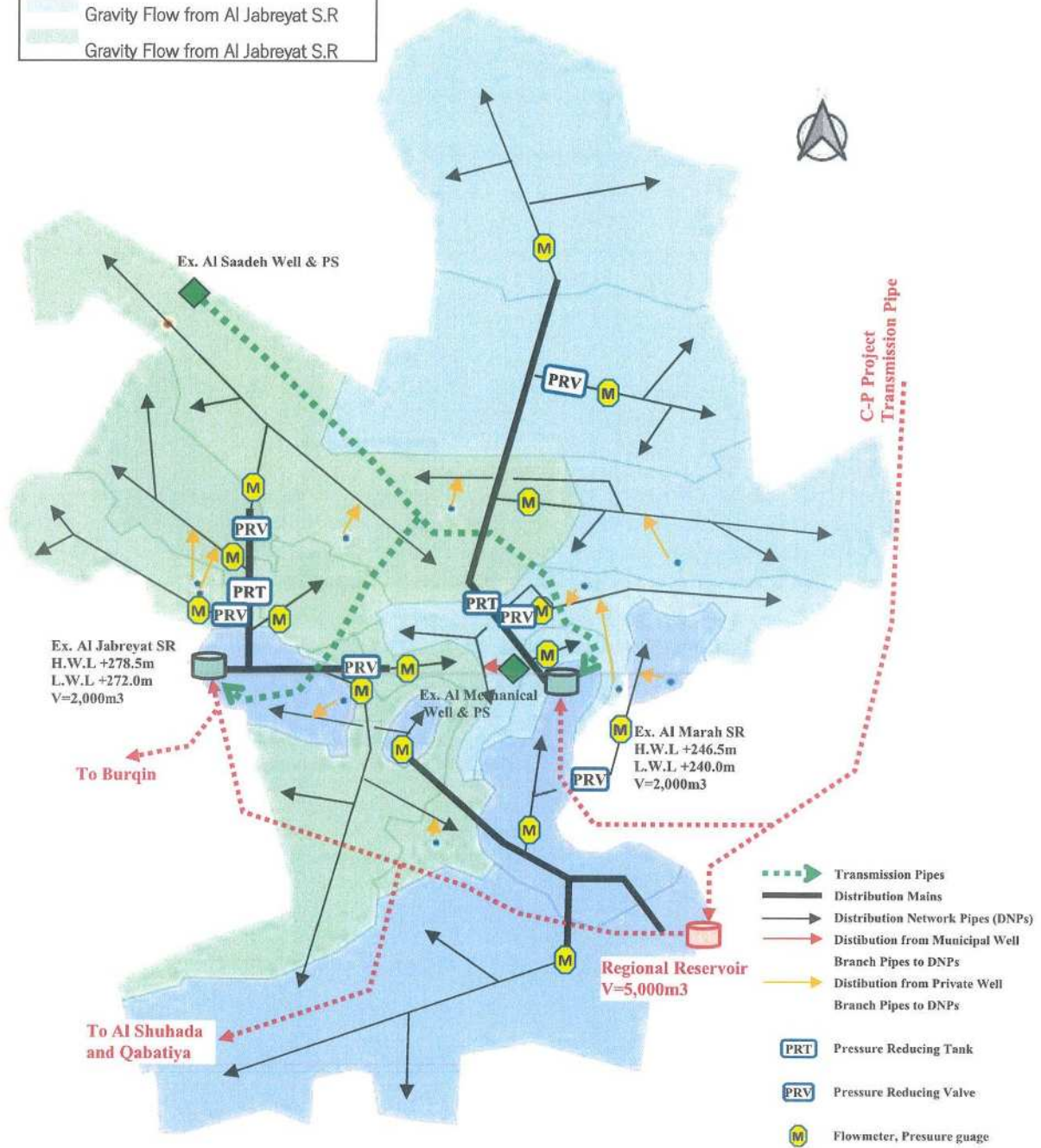
Annex 1 Project Site



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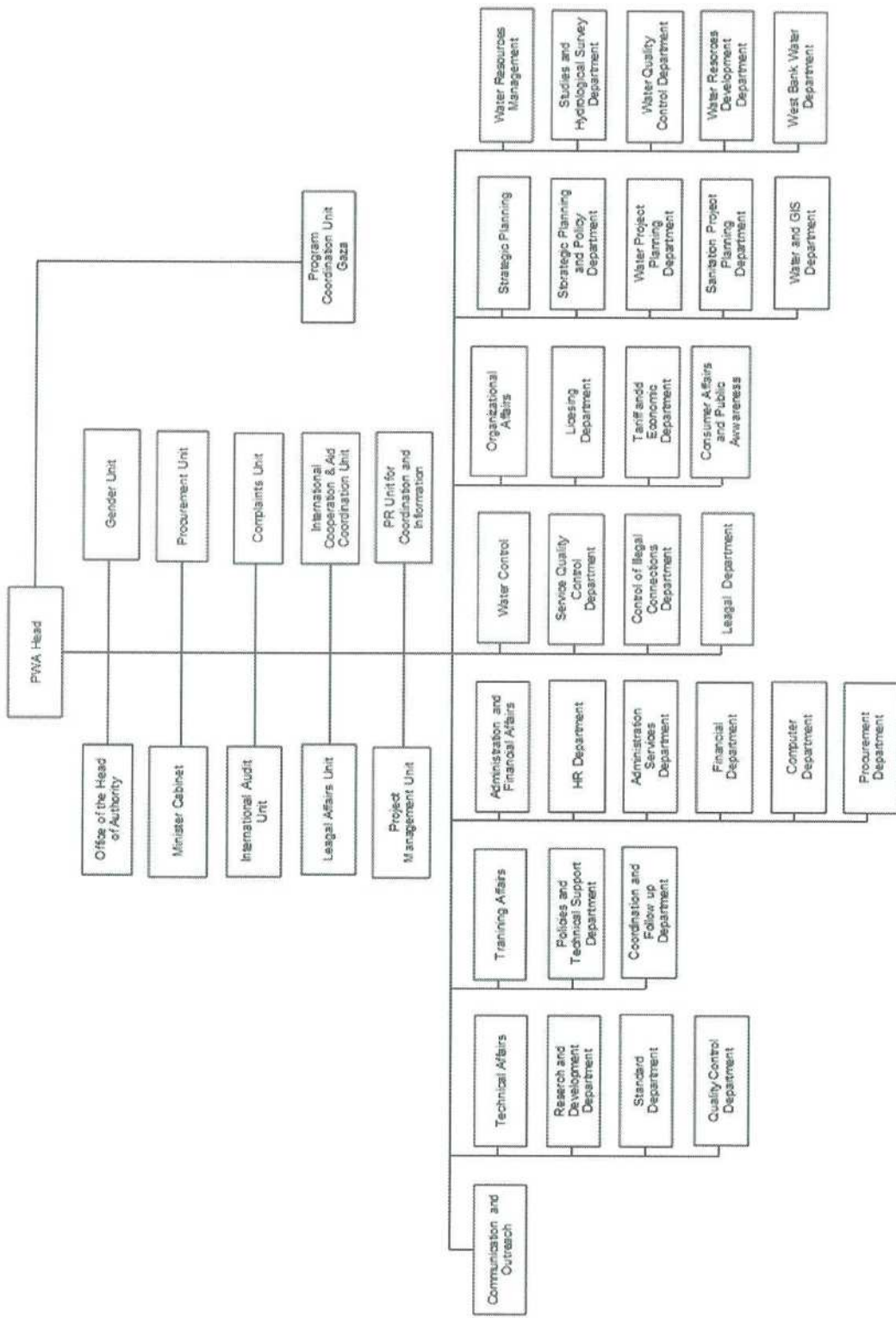
classification

- Direct Distribution from Regional S.R.
- Gravity Flow from Al Jabreyat S.R
- Gravity Flow from Al Jabreyat S.R



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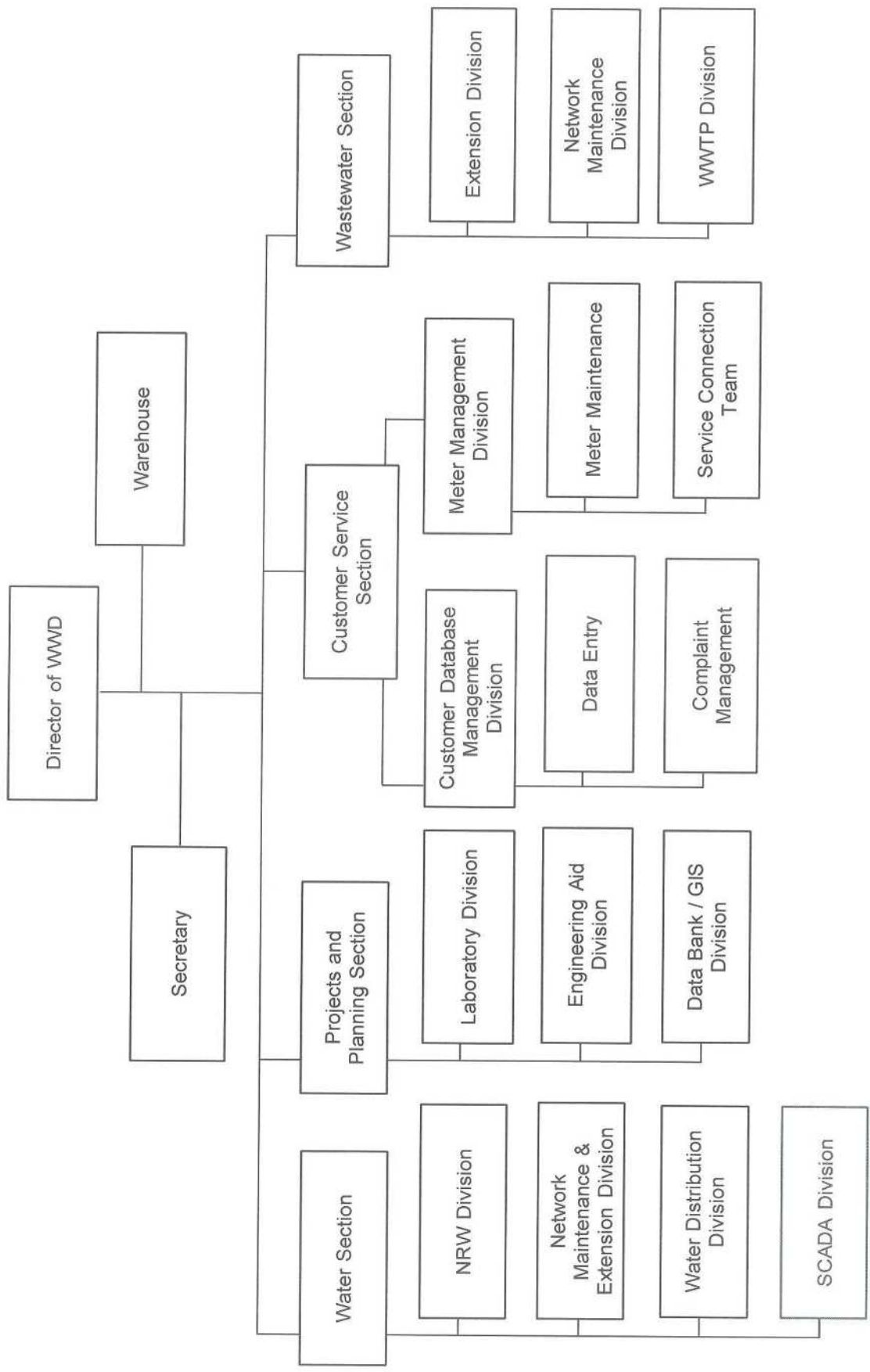
Annex 2 Organization Chart



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## 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

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relevant agencies of the Recipient necessary for the implementation of the Project.

- 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).”

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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 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

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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 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) Measures to ensure more efficient implementation of the Grant

- i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

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ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

#### 4) 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.

#### 5) Export and Re-export

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

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PROCEDURES OF JAPANESE GRANT

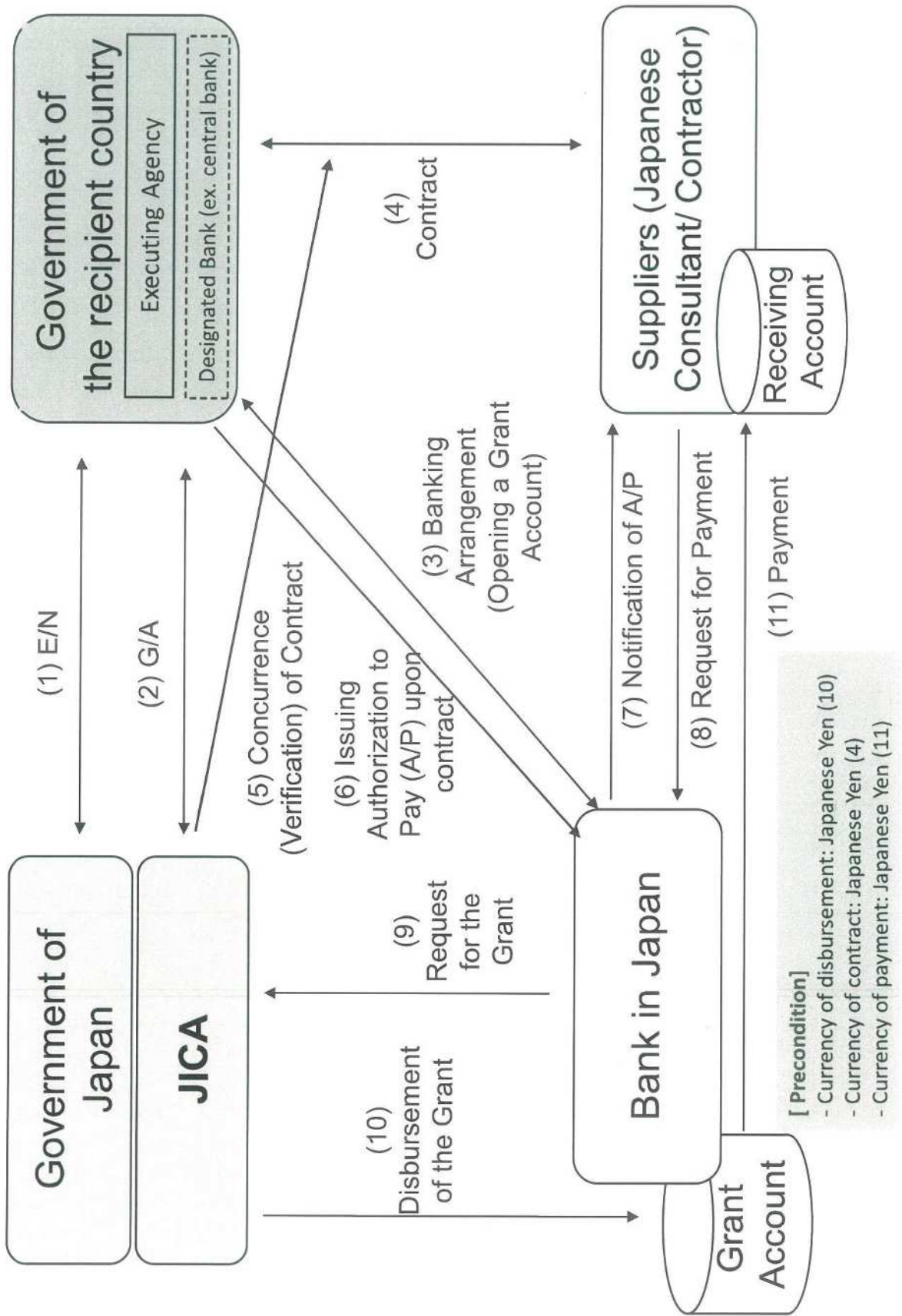
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

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# Financial Flow of Japanese Grant (A/P Type)



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## Major Undertakings to be taken by the Palestinian Authority

## 1. Specific obligations of the Palestinian Authority which will not be funded with the Grant

## (1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost (NIS)	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	MoF /PWA		
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)	PWA		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	PWA	6,000	
	2) Payment commission for A/P	every payment	PWA		
4	To approve IEE/EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	PWA		
5	To secure and clear the following lands 1) temporary construction yard and stock yard near the Project area 2) borrow pit and disposal site near the Project area	before notice of the bidding documents	JM	383,000	
6	To obtain the planning, zoning, building permit	before notice of the bidding documents	JM		
7	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	PWA		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

  
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## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (NIS)	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier(s) and the contractor(s)	within 1 month after the signing of the contract(s)	MoF /PWA		
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)	PWA	70,000	
	2) Payment commission for A/P	every payment	PWA		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in Palestine.	during the Project	MoF /PWA		
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	PWA		
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	during the Project	MoF /PWA		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project	PWA/ JM		
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	PWA		
8	1) To submit Project Monitoring Report	every month	PWA		
	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)	PWA		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	PWA		
10	Cooperation during the connection of newly installed or replaced pipes with the existing water network, and during the coordination of water distribution and explanation to the residents when connecting the water service pipes to the new pipes.	During the construction	JM		
11	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)				
	1) Electricity The distributing line to the site	before start of the construction	JM	51,000	
	2) Water Supply The city water distribution main to the site for flushing and pressure test.	before start of the construction	JM		

  
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	3) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the construction	JM		
	4) To install communication line to the sites	6 months before completion of the construction	JM		
12	To provide equipment, furniture, facilities necessary for the implementation of the Project in the site(s) such as general furniture for operation room of Pumping Station	during the construction	JM	5,000	
13	To take measure necessary for security and safety of the Project - timely security information sharing and coordination with Palestine security authority - coordinating the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident - coordinating traffic control around the site(s) and on transportation routes of construction materials - installation of permanent fences around the site(s)	during the construction	JM		
14	To implement EMP and EMoP	during the construction	PWA/ JM		
15	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	PWA		
16	To allocate appropriate trainees including a manager and operators for SCADA system to implement Soft Component	before start of Soft Component	JM	42,310 /year	
17	To provide a room for SCADA within Water and Wastewater Department building	during the construction	JM		
18	To conduct service pipe connection work including installation of water meter during the project implementation	during the construction	JM		
19	To secure alternative water source in case the progress of C-P project delays.	during the construction	PWA		
20	To secure additional necessary budget, if any delay of the Project occurred by reasons related to PA procedure.	during the construction	PWA		
21	To conduct monthly meetings with PWA, Jenin Municipality and the consultant of the Grand Aid Project to share the latest update and discuss issues if any in the earliest time. The consultants of C-P project will be invited, if needed.	during the construction	PWA		

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(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (NIS)	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	PWA/JM		
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 PWA and JICA.	for 3 years after the Project	PWA		
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	JM		
4	To conduct service pipe connection work including installation of water meter after the project completion continuously	Up to 2030	JM		
5	To continuously review water tariff and collect billed amount	Continuously	JM		

2. Other obligations of the PA funded with the Grant

Non-disclosure until the approval of the construction contracts

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Date:  
Ref. No.

JAPAN INTERNATIONAL COOPERATION AGENCY  
JICA Palestine 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 the Project for Improvement of Water Supply in Jenin Municipality

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:

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

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

**Organizational Information**

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

**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 (_____): _____

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<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).

(PMR)
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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)

**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.				

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- 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)

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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:

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	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.

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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)
  12. Report on the Management of Safety for Construction Works

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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	
					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)

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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%)	

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Report on the Management of Safety for Construction Works

Month/Year 2022 年 × 月	Cumulative number of labor 労働延人数	Cumulative number of public accident 公衆災害件数	Cumulative hours worked 延べ実労働時 間数	Number of deaths and injuries due to industrial accidents 労働災害による死傷者				Frequency rate 度数率	Severity rate 強度率
				Death and injuries 死傷者数	Aggregated number of calendar days absent 延べ休業日数	Aggregated number of work- days lost 延べ労働損失日数			
This Month 当月				Death 死者					
				More than 4 calendar days absent 休業 4 日以上					
				1 to 3 calendar days absent 休業 1~3 日					
				Total 計					
Total including this month 当月迄累計				Death 死者					
				More than 4 calendar days absent 休業 4 日以上					
				1 to 3 calendar days absent 休業 1~3 日					
				Total 計					
				Note 注)					

1. Frequency rate is the frequency of occurrence of industrial accidents.  
度数率 = (Number of deaths and injuries due to industrial accidents ÷ Cumulative hours worked) × 1,000,000  
度数率 = (労働災害による死傷者数 ÷ 延べ実労働時間数) × 100 万時間
2. Severity rate is degree of seriousness of the industrial accident.  
強度率 = (Aggregated number of work-days lost ÷ Cumulative hours worked) × 1,000  
強度率 = (延べ労働損失日数 ÷ 延べ実労働時間数) 1000 時間
3. Aggregated number of work-days lost = Aggregated number of calendar days absent × (300 ÷ 365)  
Death (7,500 days) : death as a result of an industrial accident includes not only instantaneous death but also death as a result of occupational injury or disease.  
延べ労働損失日数 = 延べ休業日数 × (300 ÷ 365) . . . 死亡 7500 日 (即死のほか負傷が原因で死亡したものを含む)
4. Frequency rate and severity rate are rounding off the third decimal place.  
度数率・強度率は小数点第 3 位以下四捨五入

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**Annex 7 Environmental Checklist**

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) IEE and Environmental Permits	(a) Have IEE reports been already prepared in official process? (b) Have IEE reports been approved by authorities of the host country's government? (c) Have IEE reports been unconditionally approved? If conditions are imposed on the approval of IEE 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) Y (b) N (c) N (d) N	(a) The IEE study is completed as a part of JICA preparatory study. (b)-(d) EIA is not requested in the Environmental legislations of Palestine since this is a water supply project. When the project scope is finalized, PWA will submit application to EQA (Environmental Quality Authority) for determination on necessity of IEE in the Project.
	(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) Y (b) Y	(a) On June 25, 2023, a stakeholder consultation has been organized by the Jenin Municipality where representatives of the affected residents were explained about the Project overview, environmental and social impacts, and mitigation measures. There were some comments from the affected residents and after a question and answer session, agreement was reached on the Project implementation. (b) Comments obtained through the above consultations were reflected into the Project.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) A Comparative Analysis of Alternatives has been done as part of the IEE report.
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/A (b)N/A	(a) Construction of chlorine storage facilities is not fixed in the plan. (b) ditto
	(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD, pH contained in effluents discharged by the facility operations comply with the country's effluent standards?	(a) Y	(a) According to a periodic sampling and testing of the existing water supply facilities by PWA and PMOH, the results comply with the standards.
	(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) Wastes (mainly excavation remains which are unsuitable for backfilling) will be disposed of at places designated by Jenin municipality.

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(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) The low humming noises from pumps during the operation would comply with the Palestinian standards for noise.
	(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) The land nature will not cause land subsidence, and groundwater exploitation is within the allowable range.
	(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) No protected areas within the project area
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (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? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (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?	(a) N (b) N (c) N (d) N	(a) The project area doesn't encompass such areas. (b) No endangered species observed in the project area. (c) No significant ecological impacts are anticipated. (d) No aquatic environments in the project area.
	(3) Hydrology	(a) 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?	(a) Y	(a) The project will increase amount of exploitation from the groundwater in Jenin, and the groundwater level / capacity of aquifer would be affected by the Project.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by the Project implementation? If so, are efforts made to minimize the impacts of relocation? (b) Are appropriate explanations provided to the residents being relocated regarding compensation and measures for livelihood restoration prior to their relocation? (c) Are investigations conducted for the purpose of resident relocation, and is a relocation plan developed that includes compensation based on the fair market value and restoration of the relocated residents' living infrastructure?	(a) N (b) N/A (c) N/A (d) N/A (e) N/A (f) N/A (g) N/A (h) N/A (i) N/A (j) N/A	(a) No involuntary resettlement is included since the Project implementation area is a public land.

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(d) Is the payment of compensation made prior to the relocation?            (e) Is the compensation policy established in written form?            (f) Is a plan implemented that appropriately considers socially vulnerable groups such as women, children, the elderly, the impoverished, ethnic minorities, and indigenous peoples among the relocated residents?            (g) Is consent obtained from the relocated residents prior to the relocation?            (h) Is a framework established to effectively implement resident relocation? Are sufficient implementation capacity and budgetary measures taken?            (i) Is monitoring of the impacts resulting from relocation planned?            (j) Is a mechanism for handling grievances established?</p>		
	(2) Living and Livelihood	<p>(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?</p>	(a) Y (b) Y	<p>(a) There will be a slight nuisance during the construction phase, and can be mitigated by:            - wetting of soil to arrest dust generation.            - disposal of the unsuitable material of Road pavement Structure at designated source            - Provide barricading/security personnel at the site to prevent entry/trespassing of pedestrian/vehicles into the work zone.            (b) This project is planned to improve existing water use. There will be no adverse impact.</p>
	(3) Heritage	<p>(a) Is there a possibility that the project will damage the local archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?</p>	(a) N	<p>(a) There are many archaeological sites in and around Jenin. However, the working locations are far enough to cause any effect on archaeological, historical, cultural, and religious heritage.</p>
	(4) Landscape	<p>(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	(a) N	<p>(a) A temporary negligible landscape effect caused by excavation and construction works, and a slight permanent effect on the forest where the new reservoir will be located, however these effects can be mitigated by following the best practices for excavation and construction works, and by planting trees around the new reservoir.</p>

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(5) Ethnic minorities, indigenous peoples	(a) Are considerations made to mitigate the impacts on the culture and way of life of ethnic minorities and indigenous peoples in the country? (b) Are the rights concerning land and resources of ethnic minorities and indigenous peoples respected?	(a) N/A (b) N/A	No ethnic minorities or indigenous peoples are identified in the Project area. No involuntary resettlement will occur.
	(6) Working Conditions	(a) Are the relevant labour laws of the country, which should be complied with in the project, being followed? (b) Are measures in place to ensure the physical safety of project personnel, such as the installation of safety equipment and management of hazardous substances, with regards to preventing occupational accidents? (c) Are plans and implementation in place to address the soft aspects of safety for project personnel, such as the development of safety and health plans and the provision of safety education (including traffic safety and public health) for workers? (d) Are appropriate measures taken to ensure that security personnel involved in the project do not compromise the safety of project personnel and local residents?	(a) Y (b) Y (c) Y (d) Y	(a) To comply with chapter No.5 of the Palestinian Labour Law No. (7) of 2000. (b) To comply with section 4 of chapter No.5 of the Palestinian Labour Law No. (7) of 2000. (c) They will be planned and implemented under the responsibility of the Contractor. (d) Appropriate measures are planned and implemented by the Contractor.
5 Others	(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) Y (c) Y (d) Y	(a) (b) (c) and (d) - Avoid night and early morning work as much as possible, use mufflers and noise dampers, utilize soundproof walls, and ensure that all construction machinery used in the construction strictly adheres to Palestine's noise standards, and verify that noise is not generated whenever possible. Apply construction methods that do not involve the use of machinery to reduce machine usage if feasible. - Provide appropriate and adequate personal protective equipment to workers, such as helmets and dust masks. - Provide appropriate warning and directional signs. - Provide temporary access to residences and businesses as necessary during construction. - Schedule construction to minimize soil exposure during the rainy season.

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				<ul style="list-style-type: none"> <li>- Perform proper watering on the site and ensure appropriate transportation and storage of construction materials.</li> <li>- Cover vehicles involved in the removal of construction soil and waste.</li> <li>- Use relatively new construction vehicles and transport vehicles with low exhaust emissions.</li> <li>- Collect all waste and construction debris from the site and dispose of them in specifically designated areas.</li> <li>- Plan the construction schedule according to the daily traffic volume at the site and avoid peak traffic hours.</li> </ul>
	(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(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?</p>	<p>(a) Y</p> <p>(b) N/A</p> <p>(c) Y</p> <p>(d) N/A</p>	<p>(a) An environmental monitoring plan will be developed, and the contractor is obliged to implement it.</p> <p>(b), (c) included in the monitoring plan.</p> <p>(d) Will be requested by EQA in the project approval if necessary.</p>
6 Note	Reference to other environmental checklist	(a) If necessary, to evaluate the relevant checklist items related to dams and rivers and include them in the assessment.	(a) N/A	(a) N/A
	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) Y	(a) Mitigation measures to climate change were planned applying JICA Climate-FIT.

## Annex 8 Environmental Management Plan/Environmental Monitoring Plan

### Environmental Management Plan (EMP)

Pre-Construction phase:

Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
Air Quality	Gas and particulate matter emission	Laws and regulations review	Jenin Municipality	Jenin Municipality
Land Use	Tree cutting	Obtain a permit from ministry of Agriculture	Jenin Municipality	Jenin Municipality

Construction and Operation Phase:

Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
Air Quality	Emissions from vehicles	<ul style="list-style-type: none"> <li>- Implement the manufacturer recommended engine maintenance programs</li> <li>- Drive within safe speed limits and choose appropriate route and time.</li> </ul>	Contractor	Included in construction cost
	Dust caused by asphalt cutting, excavations and backfilling, and construction works	<ul style="list-style-type: none"> <li>- Dust suppressants, watering the site, and proper transporting and storage of excavation materials.</li> <li>- Separation of stockpiles areas with workers/vehicle movement paths to avoid disturbing the stockpiled material.</li> <li>- Covering of stored spoil material and vehicles removing waste.</li> <li>- Choose a relatively new construction and transportation vehicles with lower emissions.</li> <li>- Avoid windy days.</li> <li>- Identification of disposal sites for unsuitable excavated material</li> </ul>	Contractor Jenin Municipality	Included in construction cost
Water Pollution	Turbidity	Best management practices during the construction or repair of water mains	Contractor	<ul style="list-style-type: none"> <li>- Included in construction cost (construction)</li> <li>- Jenin Municipality (operation)</li> </ul>
Water pollution (groundwater) during operation phase	Sewage and agricultural based pollution	- Control of harvest of groundwater and its amount according to monitoring result of pollution	Jenin Municipality	Jenin Municipality
Noise and vibration	- Asphalt cutting, excavation works, construction, paving and vehicle movement.	Proper activity scheduling and working hours and days and limit the activities to day times and prevent any construction activities at weekends.	Contractor	Included in construction cost
Wastes/Hazardous Materials	<ul style="list-style-type: none"> <li>- Surplus soil and construction debris.</li> <li>- Oil spills.</li> </ul>	<ul style="list-style-type: none"> <li>- Identification of disposal sites.</li> <li>- substitution, or elimination of hazardous substances.</li> </ul>	<ul style="list-style-type: none"> <li>- Jenin Municipality</li> <li>- Contractor</li> </ul>	Included in construction cost

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Subject	Potential Impact/Issue	Mitigation Measure	Responsibility	Responsible for expenses
Groundwater level during operation phase	Lowering groundwater level	- Control of harvest of groundwater and its amount according to monitoring result	Jenin Municipality	Jenin Municipality
Landscape	Excavation and construction work	- Following all mitigation measures that minimize and/or control the dust, and aesthetic features.	- Jenin Municipality - Contractor	Included in construction cost
Unequal Distribution of Benefit and Damage	Nuisance for some people during project implementation	Compensate by ensuring service improvement in water and other issues.	Jenin Municipality	Jenin Municipality
Local Conflicts of Interests	while Some residents who live near Al Saadeh well will not benefit from the Improvement of water supply (no distribution network), other residents who live far from water source will receive the improved water supply service.	Put this area on top priority to provide it with a distribution network.	Jenin municipality	Jenin Municipality
Public Health (sanitation and infectious diseases)	Covid 19 infection possibility among workers	- Provide Masks for workers. - Healthcare education for workers and inhabitants.	- Contractor - Jenin municipality and ministry of health	Included in construction cost
Occupational Health and Safety (OHS)	Accidents and injuries associated with, or occurring during the course of the construction and operation phase.	- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Providing appropriate equipment to minimize risks - Provide first aid facilities in all the work sites. - Provide safe drinking water, clean eating and resting areas.	Contractor	Included in construction cost
Accidents	Accidents associated with construction, operation and maintenance work	- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances. - Provide first aid facilities in all the work sites.	Contractor	Included in construction cost
General	Complaint	Response to Complaints	Contractor (construction) Jenin Municipality (operation)	Included in construction cost (construction) Jenin Municipality (operation)

Source: Preparatory Survey Team

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Environmental Monitoring Plan

Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency	
Air Quality	<ul style="list-style-type: none"> <li>- Implement the manufacturer recommended engine maintenance programs</li> <li>- Drive within safe speed limits and choose appropriate route and time.</li> <li>- Dust suppressants, watering the site, and proper transporting and storage of excavation materials.</li> <li>- Separation of stockpiles areas with workers/vehicle movement paths to avoid disturbing the stockpiled material.</li> <li>- Covering of stored spoil material and vehicles removing waste.</li> <li>- Choose a relatively new construction and transportation vehicles with lower emissions.</li> <li>- Avoid windy days.</li> <li>- Identification of disposal sites for unsuitable excavated material</li> </ul>	Odor (observation by sense of smell)	No abnormal odor is generated.	Construction site	Contractor Jenin Municipality (Health and Environment Department), EQA	Every day In the event of an abnormality	
		Dust (visual, respiratory and other sensory observations)	No abnormal dust is generated.	Construction site	Contractor	Every day	
		Sample test (PM <sub>2.5</sub> , PM <sub>10</sub> , NO <sub>2</sub> , SO <sub>2</sub> )	Domestic Standards	WHO (2021)	Construction site (sampling)	Jenin Municipality (Health and Environment Department), EQA	In the event of an abnormality
		PM <sub>2.5</sub> (µg/m <sup>3</sup> )	N/A	5 (annual), 15 (24-hour)			
		PM <sub>10</sub> (µg/m <sup>3</sup> )	N/A	15 (annual), 45 (24-hour)			
NO <sub>2</sub> (ppm)	N/A	10 (annual), 25 (24-hour)					
SO <sub>2</sub> (ppm)	N/A	40 (24-hour)					
Water Pollution	<ul style="list-style-type: none"> <li>- Best management practices during the construction or repair of water mains</li> </ul>	Water temperature, appearance, odor, color, and transparency (sensory observation)	No abnormalities.	Construction site	Contractor	every day	
		Sample test (pH, EC, Total coliforms, Faecal coliforms, Nitrate, Turbidity)	Domestic Standards	WHO	Jenin Municipality (Health and Environment Department), EQA	In the event of an abnormality	
		pH (measure of acidity)	6.5-8.5	6.5-8.5	Construction site (sampling)		
		EC(µScm <sup>-1</sup> )	Less than 2000	Less than 2000			
		Coliform group count (CFU/100 mL)	0-3	0			

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Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency	
Water pollution (ground water) during operation phase	<ul style="list-style-type: none"> <li>- Control of harvest of groundwater and its amount according to monitoring result of pollution</li> </ul>	Sample test	Fecal coliforms (CFU/100 mL)	0	WHO	Wells to rehabilitate under the Project, Connection Point Project	Follow the regular water quality monitoring (every 4-6 months).
			Nitrate nitrogen value (mg-NO <sub>3</sub> -N/L)	less than 10	less than 10		
			Turbidity (NTU)	Less than 5.0	Less than 5.0		
			Chloride (mg/l)	N/A	250		
			Hardness/Calcium carbonate (CaCO <sub>3</sub> ) (mg/l)	N/A	500		
			Electrical conductivity (µS)	Less than 2000	N/A		
			Total dissolved solids (mg/l)	N/A	1000		
			Nitrate (mg/l)	N/A	50		
			Turbidity (NTU)	Less than 5.0	Less than 5.0		
			Faecal coliform bacteria (CFU/100ml)	0	0		
Total coliform bacteria (CFU/100ml)	0-3	0					
Noise and Vibration	<ul style="list-style-type: none"> <li>- Proper activity scheduling and working hours and days and limit the activities to day times and prevent any construction activities at weekends.</li> </ul>	Noise and vibration (observation by hearing, etc.)	No abnormal noise or vibration is generated.	Construction site	Contractor	Every day	
Wastes/hazardous materials	<ul style="list-style-type: none"> <li>- Identification of disposal sites.</li> <li>- substitution, or elimination of hazardous substances.</li> </ul>	Construction waste and debris (visual inspection)	Instrumental noise measurement (dB) *National standards not identified; WHO standards are <30 dB (community noise), <35 dB (bedroom at night), and <40 dB (night, annual average). There is no improper dumping of leftover soil and construction waste.	Construction site	Jenin Municipality (Health and Environment Department), EQA	In the event of an abnormality	
Groundwater level during operation	<ul style="list-style-type: none"> <li>- Control of harvest of groundwater and its amount according to monitoring result</li> </ul>	Groundwater level (visual)	No abnormal groundwater level fluctuations	Project wells and existing wells in the vicinity	Jenin Municipality	Follow the regular groundwater level monitoring.	

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Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency
phase						
Landscape	<ul style="list-style-type: none"> <li>- Following all mitigation measures that minimize and/or control the dust, and aesthetic features.</li> </ul>	Landscape (visual)	No loss of landscape.	Included in construction cost	Jenin Municipality and Environment Department, EQA	every day
Unequal Distribution of Benefit and Damage	Compensate by ensuring service improvement in water and other issues.	Complaint	There have been no complaints regarding the distribution of profits from this project.	Project area	Jenin Municipality and Environment Department)	As needed (when confirming complaints, etc.)
Local Conflicts of Interests	Put this area on top priority to provide it with a distribution network.	Complaint	No complaints about conflicts of interest.	Project area	Jenin Municipality (Water Department)	As needed (when confirming complaints, etc.)
Public Health (sanitation and infectious diseases)	<ul style="list-style-type: none"> <li>- Provide Masks for workers.</li> <li>- Healthcare education for workers and inhabitants.</li> </ul>	Mask usage	Masks are being used appropriately.		Contractor	Every day
Occupational Health and Safety (OHS)	<ul style="list-style-type: none"> <li>- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.</li> <li>- Providing appropriate equipment to minimize risks</li> <li>- Provide first aid facilities in all the work sites.</li> <li>- Provide safe drinking water, clean eating and resting areas.</li> <li>- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.</li> </ul>	Health Care Education	Health care education is being implemented.	Construction site	Contractor Jenin Municipality and Environment Department)	Every week
		Implementation status of mitigation measures	Mitigation measures are being implemented as planned.	Construction site	Contractor Jenin Municipality and Environment Department)	Every day
Accidents		Same as above	Same as above	Construction site	Jenin Municipality and Environment Department)	Every day

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Item	Mitigation Measures	Monitoring Item	Criteria	Location	Monitoring Organization (Cost Sharing)	Monitoring Frequency
	<ul style="list-style-type: none"> <li>- Providing appropriate equipment to minimize risks</li> <li>- Provide first aid facilities in all the work sites.</li> <li>- Provide safe drinking water, clean eating and resting areas.</li> </ul>					
<b>General</b>	Response to Complaints	Existence, nature, and status of complaints handled	Appropriate handling grievances	Construction office and Jenin Municipality (during construction) Jenin Municipality (operation)	Contractor (during construction)  Jenin Municipality (Water Department) (during construction and operation)	As needed (hearing complaints)

Source: Preparatory Survey Team

Annex 9 Environmental and Social Monitoring Form

DRAFT Monitoring Form (During construction)

Construction site (Daily monitoring)

Monitoring Item		Procedure	Result	Measures to be taken	Reference standard		Frequency
Air quality/dust		Visual inspection, monitoring of odor			Acceptable or not		Daily
Air quality		Laboratory test			WHO (2021)		In case of abnormal status detected by daily monitoring
	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )				5 (annual), 15 (24-hour)		
	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )				15 (annual), 45 (24-hour)		
	NO <sub>2</sub> (ppm)				10 (annual), 25 (24 hour)		
	SO <sub>2</sub> (ppm)				40 (24-hour)		
Noise		Sensory inspection			Acceptable or not		Daily
		Instrumental measurement			No national standards. WHO standards: 30 dB (community area), 35 dB (bedroom at night), 40 dB (at night, annual average)		In case of abnormal status detected by daily monitoring
Water quality in pipes and wells		Visual inspection			Acceptable or not		Daily
Water quality in pipes and wells		Laboratory test			National standard	WHO	In case of abnormal status detected by daily monitoring
	pH				6.5-8.5	6.5-8.5	
	EC( $\mu\text{Scm}^{-1}$ )				Up to 2000	Up to 2000	
	Total coliforms (CFU/100 mL)				0-3	0	
	Faecal coliforms (CFU/100 mL)				0	0	
	Nitrate (mg·NO <sub>3</sub> -N/L)				Up to 10	Up to 10	
Turbidity (NTU)	Up to 5.0	Up to 5.0					

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Landscape	Visual inspection			Acceptable or not	Daily
Public Health (sanitation and infectious diseases)	Monitoring of workers and sanitary facilities			If any infectious diseases or sanitation problem observed	Daily
Occupational Health, Safety (OHS) and accident	Observation of the construction site, reporting from workers			If any accident or abnormal incident for OHS happened	Daily
Grievance (including those on unequal distribution of benefit and damage, Local Conflicts of Interests, etc.)	Receipt of grievance			If the grievance is caused by the project	Daily

Construction site (Weekly monitoring)

Monitoring Item	Procedure	Result	Measures to be taken	Reference standard	Frequency
Waste (Domestic)	Patrol			Acceptable or not	Weekly
Labor's awareness on health care, infectious disease, public health and safety	Lecture and monitoring			Implemented or not	Weekly

DRAFT Monitoring Form (During operation)

Monitoring Item	Procedure	Result	Measures to be taken	Reference standard	Frequency
Water quality of wells and connection points	Visual and sensory inspection			Normal condition or not	Daily
	Sampling and laboratory analysis			National/international standards of drinking water	Following the standard procedure of Jenin City
Water quality in	Laboratory test			National standard	Following the regular monitorin
				WHO	
	Chloride (mg/l)			N/A	

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wells and connection points	Hardness as CaCO <sub>3</sub> (mg/l)			N/A	500	g set by Jenin city (every 6 months)
	Conductivity (µS)			2000	N/A	
	Total dissolved solid (mg/l)			N/A	1000	
	Nitrate (mg/l)			N/A	50	
	Turbidity (NTU)			5.0	5.0	
	Faecal coliforms (CFU/100 mL)			0	0	
	Total coliforms (CFU/100 mL)			0-3	0	
Ground water level of the wells	Visual observation			Any change or not	Daily	
Noise and vibration	Patrol and maintenance			Normal condition or not	Daily	

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## Meeting Minutes

Project Name	THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY IN JENIN MUNICIPALITY
Date	25/06/2023
Time	11:00 am
Location	Child Cultural Center-Jenin

**ENGINEERS**  
Consultants & Project Managers


**ENGINEERS**  
Consultants & Project Managers

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Participants Information:

<p>Participant 1 :</p>	<p>1-Name:<u>Eman Silway</u></p> <p>2-Gender</p> <p><input type="radio"/> Male</p> <p><input checked="" type="radio"/> Female</p> <p>3- Position: Press</p> <p>4-Types Of Groups</p> <p><input type="radio"/> socially vulnerable group</p> <p><input type="radio"/> stakeholder group</p> <p><input checked="" type="radio"/> Others</p> <p>5-Notes: : journalism</p>
<p>Participant 2</p>	<p>1-Name:Ibtisam Jalamneh</p> <p>2-Gender</p> <p><input type="radio"/> Male</p> <p><input checked="" type="radio"/> Female</p> <p>3- Position: Volunteer</p> <p>4-Types Of Groups</p> <p><input type="radio"/> socially vulnerable group</p> <p><input checked="" type="radio"/> stakeholder group</p> <p><input type="radio"/> Others</p> <p>5-Notes: : Head of Eastern Neighborhood Women's Center in Jenin</p>
<p>Participant 3 :</p> 	<p>1-Name:Khairia Soquya</p> <p>2-Gender</p> <p><input type="radio"/> Male</p> <p><input checked="" type="radio"/> Female</p> <p>3- Position: Water Engineer</p> <p>4-Types Of Groups</p> <p><input type="radio"/> socially vulnerable group</p> <p><input checked="" type="radio"/> stakeholder group</p> <p><input type="radio"/> Others</p> <p>5-Notes: Jenin Municipality-WWD</p>

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<p>Participant 4 :</p>	<p>1-Name:Haya Foqha</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li><input checked="" type="radio"/> Female</li> </ul> <p>3- Position: Civil Engineer</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Engineers Consultants and Project Managers (ECPM)</p>
<p>Participant 5 :</p>	<p>1-Name:Rama Abbadi</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li><input checked="" type="radio"/> Female</li> </ul> <p>3- Position: Electrical Engineer</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Engineers Consultants and Project Managers (ECPM)</p>
<p>Participant 6 :</p>	<p>1-Name:Lama jarrad</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li><input checked="" type="radio"/> Female</li> </ul> <p>3- Position: Director</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes:Enviroment Quality Authority (EQA)</p>
<p>Participant 7 :</p> 	<p>1-Name:Serren Rabaya</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li><input checked="" type="radio"/> Female</li> </ul> <p>3- Position: Assistant</p>

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	<p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes:Environment Quality Authority (EQA)</p>
<p>Participant 8 :</p>	<p>1-Name:Raghib Malhis</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Engineer</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: JET</p>
<p>Participant 9 :</p>	<p>1-Name:Hasan Abahry</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Council Member</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li><input checked="" type="radio"/> Others</li> </ul> <p>5-Notes: Citizen from Jenin</p>
<p>Participant 10 :</p> 	<p>1-Name:Alaa Turkman</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Advisor</p> <p>4-Types Of Groups</p>

	<ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li><input checked="" type="radio"/> Others</li> </ul> <p>5-Notes: JICA Advisory Team</p>
Participant 11 :	<p>1-Name:Amin Nasri</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Council Member</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li><input checked="" type="radio"/> Others</li> </ul> <p>5-Notes: Citizen from Jenin</p>
Participant 12 :	<p>1-Name:Abed ALrahman Hantouly</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Council Member</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li><input checked="" type="radio"/> Others</li> </ul> <p>5-Notes: Jenin Municipality council member</p>
Participant 13 :	<p>1-Name:Mohammed Sabaneh</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Public Relation</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Jenin Municipality council member</p>

Participant 14 :	<p>1-Name: Basheer Matahen</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Public Relation</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Jenin Municipality PR Director</p>
Participant 15 :	<p>1-Name: Naser Ghazal</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Public Relation</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Jenin Municipality</p>
Participant 16 :	<p>1-Name: Ahmad Mahmoud</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Public Relation</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input checked="" type="radio"/> stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Citizen from Jenin</p>
Participant 16 :	<p>1-Name: Heyam Alqerm</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> </ul>

	<ul style="list-style-type: none"> <li>• Female</li> </ul> <p>3- Position: Public Relation Manager</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li>• Others</li> </ul> <p>5-Notes: Gardenia Association</p>
Participant 17 :	<p>1-Name: Mayson Dawood</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li>• Female</li> </ul> <p>3- Position: Manager</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li>• Others</li> </ul> <p>5-Notes: Child Cultural Center</p>
Participant 18 :	<p>1-Name: Zahra Alakhras</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li><input type="radio"/> Male</li> <li>• Female</li> </ul> <p>3- Position: Trainee</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li><input type="radio"/> stakeholder group</li> <li>• Others</li> </ul> <p>5-Notes: Citizen from Jenin</p>
Participant 19 :	<p>1-Name: Abdallah Ruziyeh</p> <p>2-Gender</p> <ul style="list-style-type: none"> <li>• Male</li> <li><input type="radio"/> Female</li> </ul> <p>3- Position: Executive Manager</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"> <li><input type="radio"/> socially vulnerable group</li> <li>• stakeholder group</li> <li><input type="radio"/> Others</li> </ul> <p>5-Notes: Engineers Consultants and Project Managers (ECPM)</p>



Participant 20 :	<p>1-Name: Mohammed Zoub</p> <p>2-Gender</p> <ul style="list-style-type: none"><li><input checked="" type="radio"/> Male</li><li><input type="radio"/> Female</li></ul> <p>3- Position: P.R</p> <p>4-Types Of Groups</p> <ul style="list-style-type: none"><li><input type="radio"/> socially vulnerable group</li><li><input type="radio"/> stakeholder group</li><li><input checked="" type="radio"/> Others</li></ul> <p>5-Notes: Jenin Municipality</p>
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*man N.O. MG*


Questions:

Question	Answer
1. Is There any Traffic Plan for the project to prevent congestion and apply the safety plan ?	There is no project without alternative plans for execution to prevent any emergency and off course there is a plan for switching the streets and the contractors should submitted the traffic plan before start the consruction and should be approved by the supervision consultant
2. What is the possible way to apply the safety plan before start the implementation the project?	Traffic signals will be put in place and alternative routes will be found or work during the night hours to achieve the necessary traffic safety
3. The quality of ground water is more better than the quality of Artesian wells how will be balanced?	Water extracted from artesian wells will be treated in appropriate ways to meet approved health and international standards
4. There is a project with Plaestinian water authority (PWA) in Jenin Area which is similar to the JICA project (Connection point project) Is there any coordination between two projects?	There is no conflict between the two proposed projects and there is full coordination between them to ensure the necessary coverage of all regions and achieve the objectives of each project.
5. Is there any restrictions on the Jenin Munciplity artesian wells ?	The restrictions on artesian wells themselves have not changed from the 1995 Oslo Convention, which we have not reached the maximum permissible quantity as a result of the occupation policy.
6. Should I restricted by the licenses of artesian wells?is there any nessacary liscense?	Yes, there are restrictions governing artesian wells and there is a constant need to obtain the necessary licenses so that we do not reach the stage of unsafe use of underground stock
7. How will be the construction process of the project? In parallel or one by one	The project will be implemented in phases within the necessary time period of 3 years so that it does not affect the day-to-day life and provides alternative plans in case of urgent need for water interruption for maintenance or replacement of necessary lines

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*mm* *N.O.* *MG* *SB*



<p>8. Has it been take into consideration that the areas will be distributed in the nearest reservoir?</p>	<p>Areas will be distributed according to the spatial map of the area based on its proximity to the target reservoir and pressure breakers will be installed to reduce damage and break lines and floats, reduce loss and compensate for shortages in some areas</p>
<p>9. What is the project implementation schedule ?</p>	<p>The actual time for the execturion the project will be 3 years this means at the end of 2027 should the project finish</p>
<p>10. What is the maximum quantity will provide to the areas?</p>	<p>Depend on the study,from 14800-15000 m<sup>3</sup> will cover the whole area</p>
<p>11. Have the contractor's working time been taken into consideration to suite the nature of the site and avoid peak hours</p>	<p>The contractor's working times will be approved with the traffic plan so as to take into account alternative routes or convert working hours to night as needed</p>
<p>12. During the construction .there will be an air pollution and dust in the working area how will you dealing with this problem?</p> <p></p>	<ul style="list-style-type: none"> <li>• Implement the manufacturer recommended engine maintenance programs</li> <li>• Drive within safe speed limits and choose appropriate route and time.</li> <li>• Dust suppressants, watering the site, and proper transporting and storage of excavation materials.</li> <li>• Covering of stored spoil material and vehicles removing waste.</li> <li>• Avoid windy days.</li> <li>• Identification of disposal sites for unsuitable excavated material</li> <li>• Wearing PPE</li> <li>• Risk analysis for each task to be performed</li> <li>• Staff training</li> </ul>

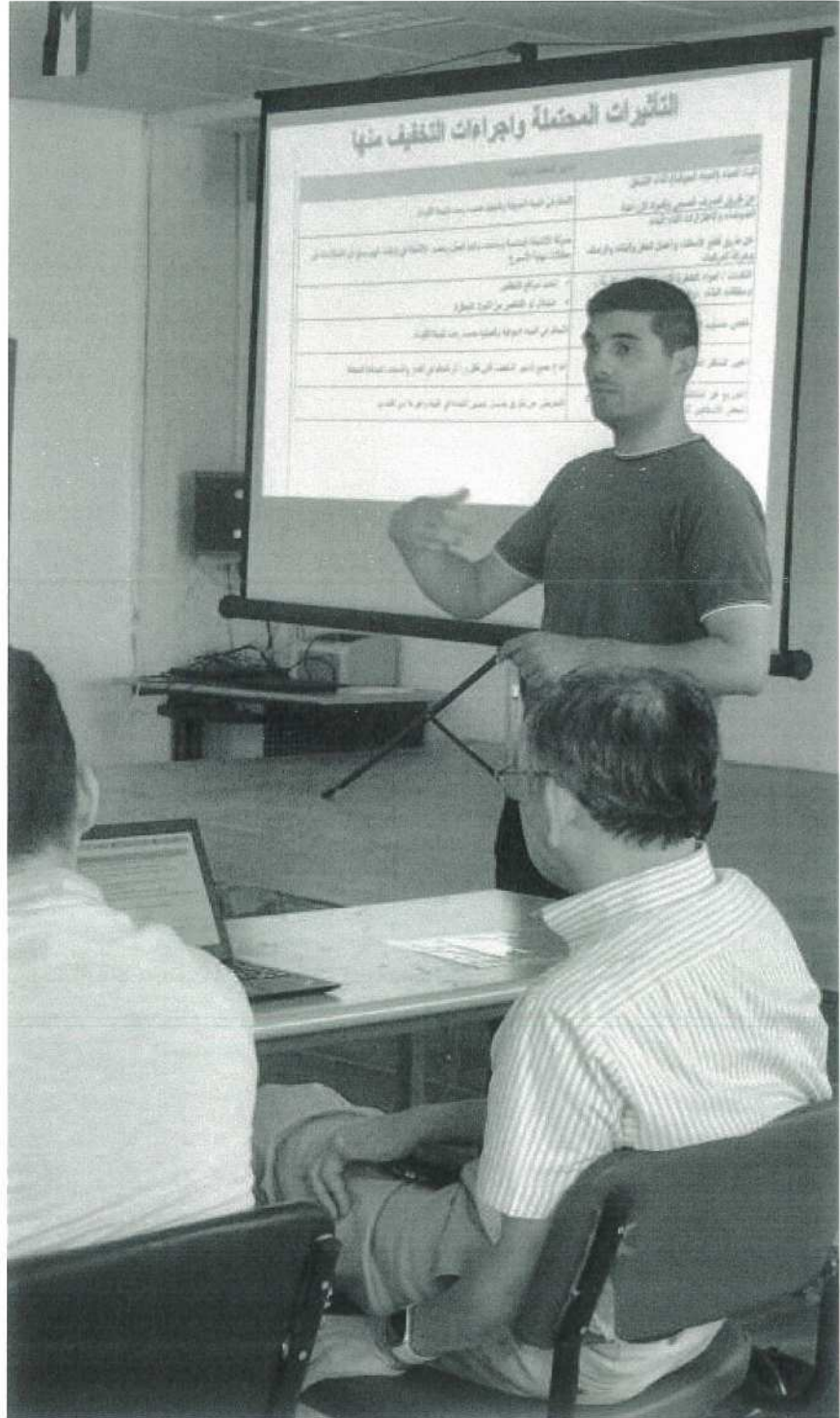
13. Depend on the presentation and increase number of customers or services connections, who is the responsible about the new meters? the customer or the municipality?	Old subscriptions will remain the same. For new subscriptions they will be provided by the municipality
14. Enquiry about the solid waste disposal mechanism and proposed disposal premises	Waste disposal mechanism must be compliant with the environmental and health conditions set by the authority concerned It will be agreed with the stakeholders and provide the contractor with the permitted places for the deportation of solid waste, drilling product and backfill
15. Private well water is used or not after the project	The goal is to permanently dispense with private wells but they will be connected to the network to be used in future emergency conditions
16. New pipeline from Israel side or existing one?	The new lines will be by the Israeli side and the old will stop working when the new water security project is fully completed

Discussion :

The discussion was supportive of the project and the attendees showed a great interest in its consequences to achieve the desired goals and look forward to it as the best solution to solve the problem of water scarcity in Jenin and provide it for the future.



Some Photos from the presentation





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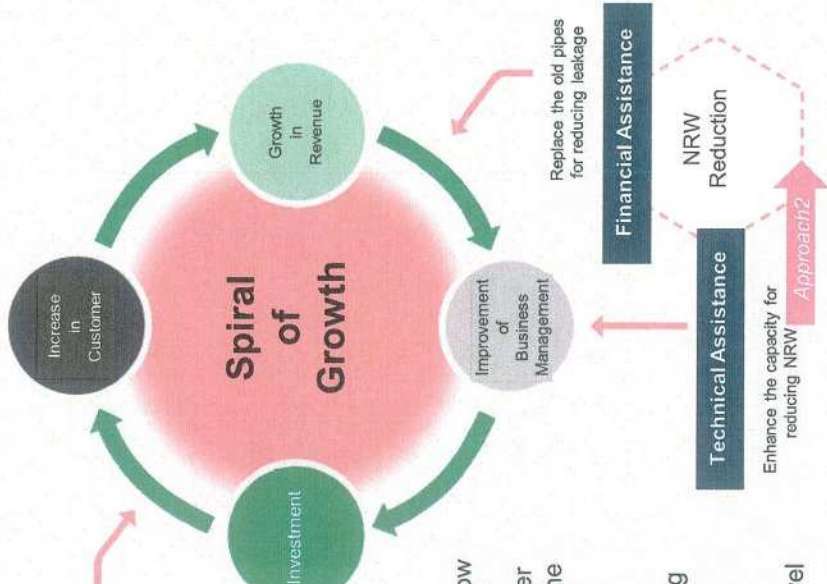


# ENGINEERS

Consultants & Project Managers

# 1. JICA's Cooperation Policy in Water Sector (Assistance for Growth of Water Utilities)

Annex 11



## Cooperation Policy JICA assists growth of Water Utilities

In developing countries, the level of water supply services is low due to insufficient maintenance and inefficient management or so. Therefore, satisfaction of customers is low as well and water utilities are unable to increase revenue to expand or improve the facilities.

In order to cut off this vicious cycle and shift to virtuous cycle, JICA provides both of Technical/Assistances and Financial Assistances with water utilities in developing countries, creating spiral of growth.

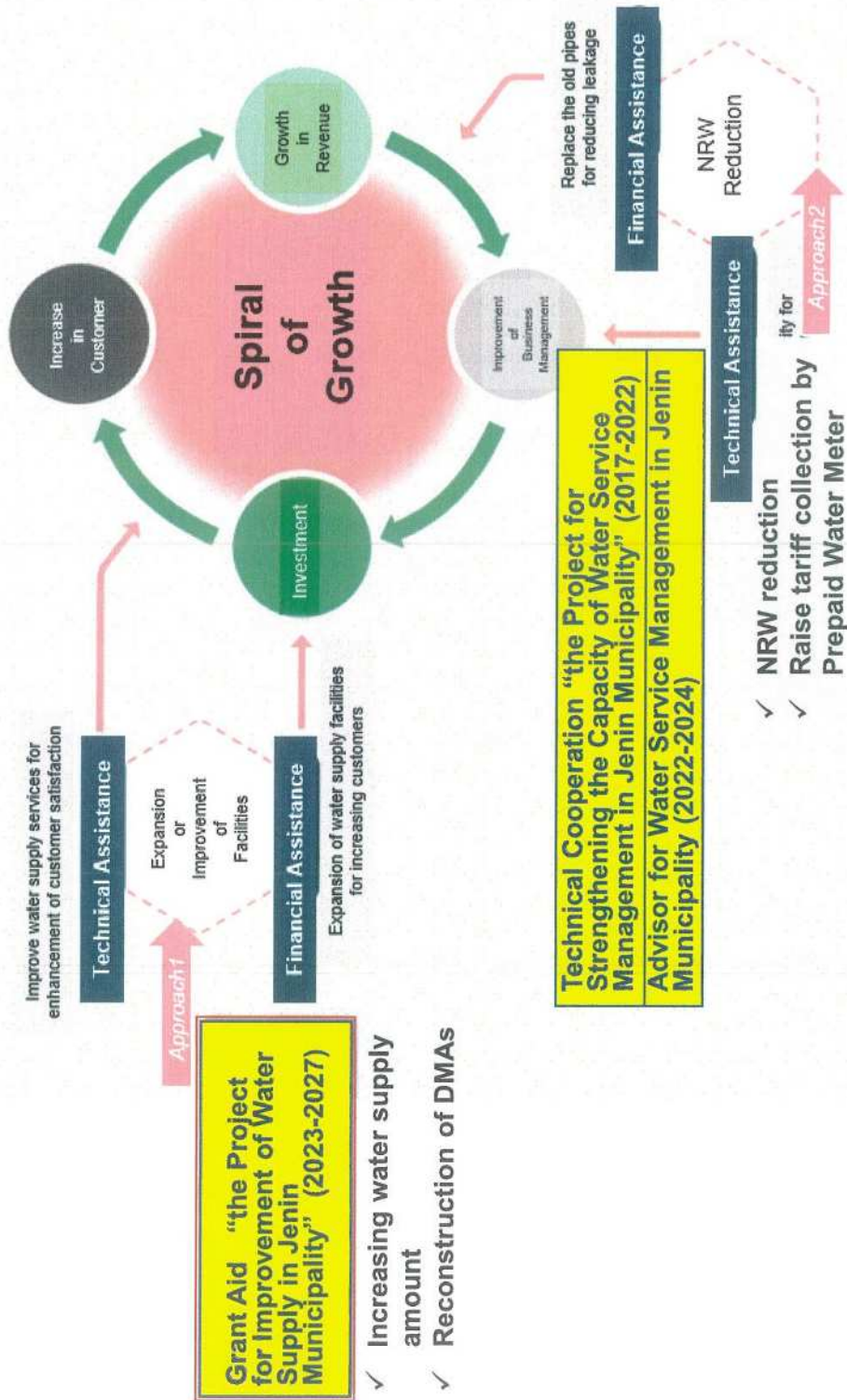
Approach 1: Expansion or improvement of Facilities for increasing customers and enhancing water supply services level  
Approach 2: NRW reduction for growing revenues



- **Increase the population used safe water by 30million or more**
- **Improve water supply services in more than 40 cities**

*mm N.O. MG SB*

## 2. Growth Spiral of Jenin WWD



Jenin WWD and JICA are in the process of creating "Spiral of Growth" in Jenin Municipality.

mm N.O. MG 53





## **Appendix 5 Technical Notes**



**Technical Notes (1)**  
**on the Preparatory Survey on the Project for**  
**Improvement of Water Supply in Jenin Municipality**

Based on the Minutes of Discussions (hereinafter referred to as "M/D") on the Preparatory Survey on the Project For Improvement of Water Supply in Jenin Municipality (hereinafter referred to as "the Project") signed on 29<sup>th</sup> March, 2021 between Japan International Cooperation Agency (hereinafter referred to as "JICA") and Palestinian Water Authority of the Palestinian Authority (hereinafter referred to as "PA"), the Consultant members of the JICA Preparatory Survey Team (hereinafter referred to as the "Team") had a series of discussions and conducted field surveys from 2nd September 2021.

As a result of the discussions and the surveys, both sides (PA and the Team) confirmed the technical conditions described in the attached sheets. Notwithstanding the confirmation hereunder, this Technical Note does not make a commitment of the project scope, project implementation, design and method to be implemented. The final project scope, project implementation, designs, etc. will be decided by the Government of Japan.

22nd October, 2021



Mr. Adel Yasin  
Director of Planning Administrative  
Palestinian Water Authority  
The Palestinian Authority



Mr. Naoto Tohda  
Chief Consultant  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

Witness



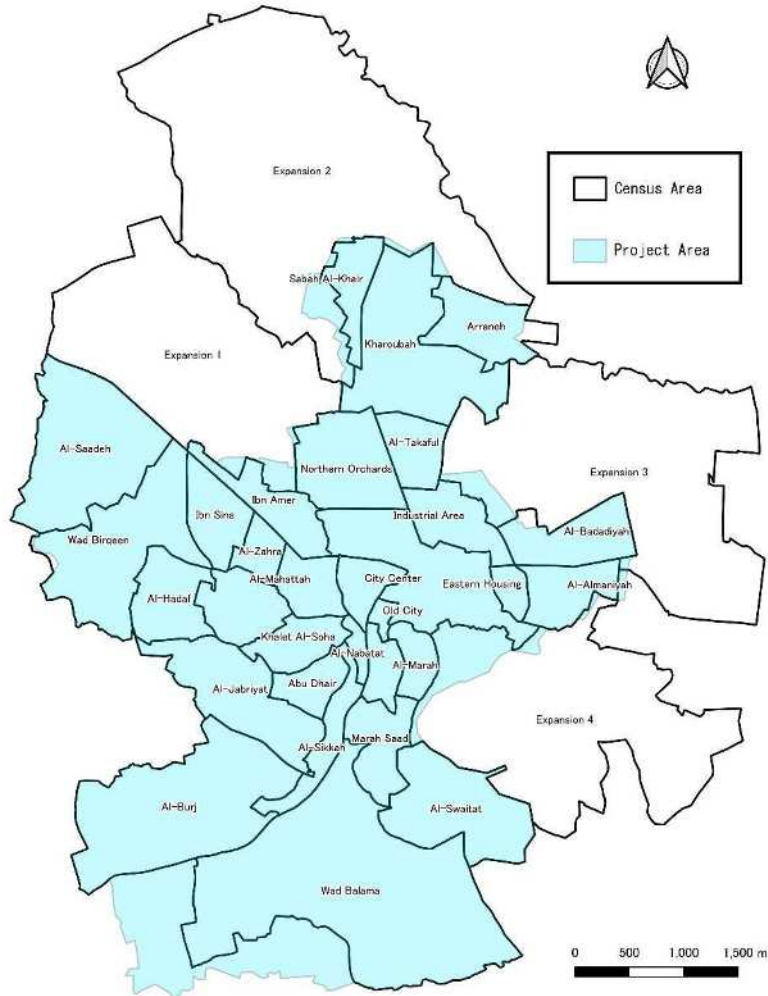
Mr. Abd Al Hadi Himran  
Director of Water and Wastewater Department  
Jenin Municipality  
The Palestinian Authority

# ATTACHMENT

## 1. Project Area and Census Area

While the Project Area remains unchanged to be Jenin Municipality, the Team identified that administrative boundary of the Municipality is not consistent with the area of the census units. Accordingly, the census area is composed of the entire Jenin Municipality, Jenin Camp and four (4) expansion areas as shown in Figure 1.

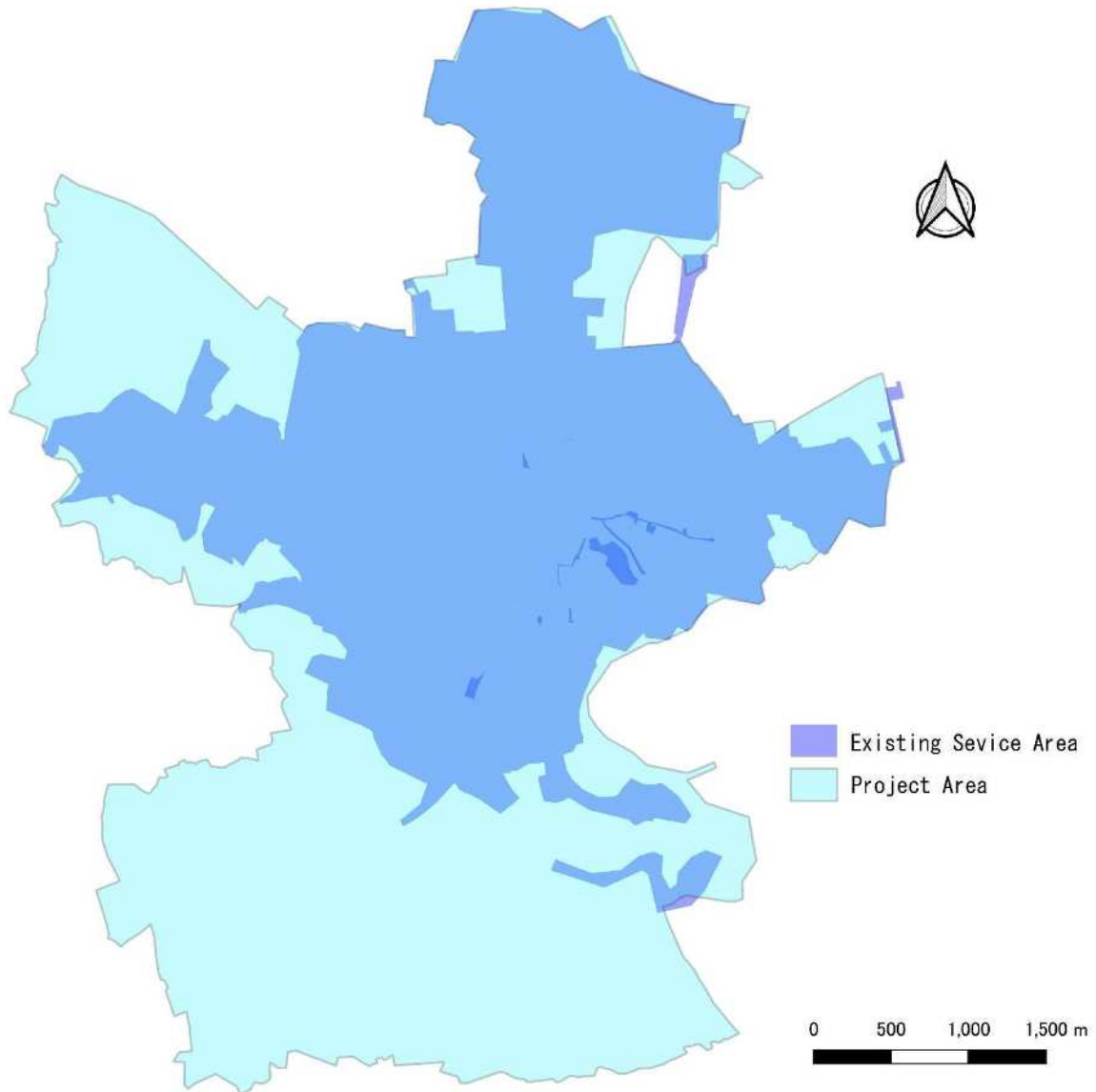
Reportedly, Ministry of Local Governorate instructed include those expansion areas into the Municipality administrative area. And the Municipality council are discussing on this issue. Taking into account that some parts of those four expansion areas are currently supplied with the public water supply from Jenin Municipality and to be supplied in future, the Parties agreed to consider those service area into the facility design.



**Figure 1 Project Area and Census Area**

## 2. Service Area

The Parties confirmed the existing service area as well as the future plan in the Master Plan (2014) as shown in the Figure 2.



**Figure 2 Existing Service Area and Future Plan in M/P(2014)**

## 3. Population Forecast

The Parties agreed the population forecast as shown in Table 1. Consequently, the total population of the Jenin Municipality including expansion areas and Jenin camp is estimated to be 78,736 persons in 2030.

**Table 1 Population Forecast**

Year	Jenin (city)		Jenin camp		Jenin Total	
2017	49,908		10,417		60,325	
2018	51,133	2.45%	10,441	0.23%	61,574	2.07%
2019	52,384	2.45%	10,465	0.23%	62,849	2.07%
2020	53,661	2.44%	10,489	0.23%	64,150	2.07%
2021	54,965	2.43%	10,513	0.23%	65,478	2.07%
2022	56,296	2.42%	10,537	0.23%	66,833	2.07%
2023	57,655	2.41%	10,561	0.23%	68,216	2.07%
2024	59,043	2.41%	10,585	0.23%	69,628	2.07%
2025	60,460	2.40%	10,609	0.23%	71,069	2.07%
2026	61,907	2.39%	10,633	0.23%	72,540	2.07%
2027	63,385	2.39%	10,657	0.23%	74,042	2.07%
2028	64,893	2.38%	10,682	0.23%	75,575	2.07%
2029	66,432	2.37%	10,707	0.23%	77,139	2.07%
2030	68,004	2.37%	10,732	0.23%	78,736	2.07%

- (i) Census Population ("Population, Housing and Establishments Census 2017", PCBS 2019) is used.
- (ii) With reference to "Projected Mid-Year Population for Jenin Governorate by Locality 2017-2021" (PCBS) annual growth rate of 2.07 is employed for forecasting Jenin total population.
- (iii) With reference to PCBS population forecast (2017-2021), annual growth rate of 2.07% is employed for forecasting Jenin Total population.
- (iv) Taking into account that the annual growth rate of Jenin camp is +0.23% during 2007 and 2017, annual growth rate of 0.23% for Jenin Camp is applied in consideration of saturation.
- (v) Population of Jenin (city) is estimated by difference between the total population and camp.

#### 4. Water Demand Forecast

The Parties agreed the water demand forecast as shown in Table 2. Accordingly, maximum daily water demand of 18,000 m<sup>3</sup>/day will be considered for facility planning.

**Table 2 Water Demand Forecast**

[1]	Population Served (Year 2030)	74,878 persons	Estimated by Municipality population (Census 2017, PCBS) excluding population in expansion areas, Annual growth rate +2.07%
[2]	Rate of population served	100 %	
[3]	Average domestic water consumption per person per day	120 l/c/day	National Water Policy
[4]	Industrial Demand per person per day	12 l/c/day	10% of [3] domestic consumption
[5]	Water consumption per person per day	132 l/c/day	[5] = [3] + [4]
[6]	Daily Average Water Consumption	9,754 m <sup>3</sup> /day	[6] = [1] x [2] x [5]
[7]	Physical Loss	3,251 m <sup>3</sup> /day	[7] = ([6] / 75%) x [Leakage ratio (25%)]

[8]	Maximum Daily Flow Coefficient	1.375	[Max. monthly flow (1.25)] x [Max. daily flow (1.10)] (“Checklist for reviewing design and specifications for water transmission lines”, PWA)
[9]	Daily Maximum Water Demand	17,882 m <sup>3</sup> /day	[9] = ([6] + [7]) x [8]

## 5. Water Source Plan

### 5.1 Municipality Wells

Use of the existing municipality wells is planned as Table 3.

**Table 3 Plan of the Existing Municipality Wells**

Name	Current	After the Project
Al Saadeh Well	Production capacity (2020): 2,437 m <sup>3</sup> /day	The well be rehabilitated by acid cleaning and air lifting to produce 3,500 m <sup>3</sup> /day (150 m <sup>3</sup> /hr)
Al Mechanic Well	Production capacity (2020): 350 m <sup>3</sup> /day to network and 23 m <sup>3</sup> /day to water tanker trucks	The well will be used as it is to produce 500 m <sup>3</sup> /day (20m <sup>3</sup> /hr). Replacement of submersible pumps, pipes, valves, fittings, electrical equipment
Balama Well	Production capacity (2020): 30 m <sup>3</sup> /day	To be abolished.

### 5.2 Private Wells

The Municipality has been dependent on the private wells to supplement deficiency of water production capacity. However, in terms of stability and reliability of service, Municipality intends to be independent from those private wells. On the other hand, PWA does not consider those wells as the water source for public water supply unless it is a licensed well. Taking into account that all these wells are known as unlicensed, they will not be used after the Project. But pipe connections with the private wells for emergency situation will be considered in the facility plan.

### 5.3 Bulk Water Supply from WBWD (PWA)

#### (1) Current Bulk Water Supply

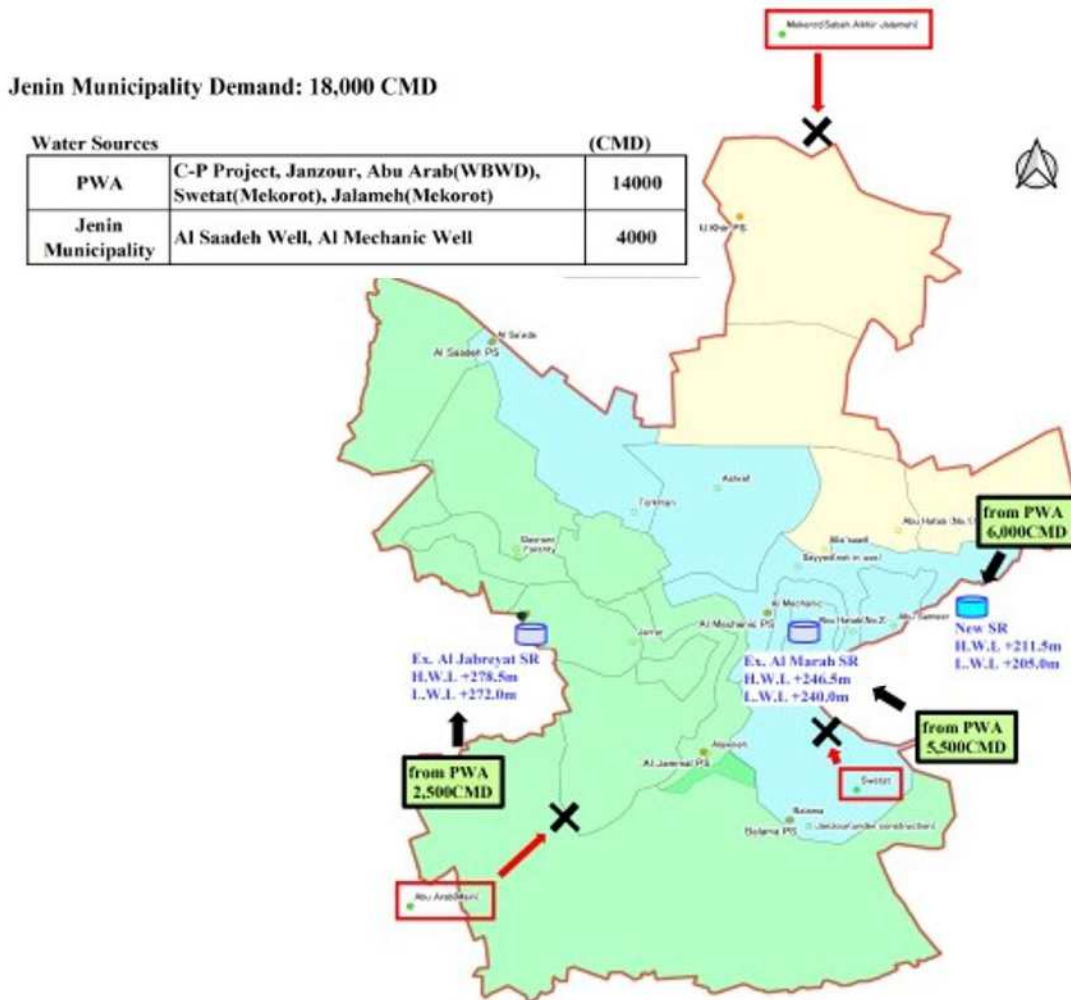
The Parties confirmed the current bulk water supply to Jenin Municipality as the table 4 below.

**Table 4 Current Situation of the Bulk Water Supply**

Name	Supplying Entity	Purchasing Volume
Al Jalameh Connection	Mekorot (Israel)	Ave. 933 m <sup>3</sup> /day (2020)
Al Swetat Connection	Mekorot (Israel)	Ave. 1,800 m <sup>3</sup> /day (2020)
Abu Arab Well	WBWD (PWA)	Ave. 921 m <sup>3</sup> /day (2020)

(2) Connection Point Project

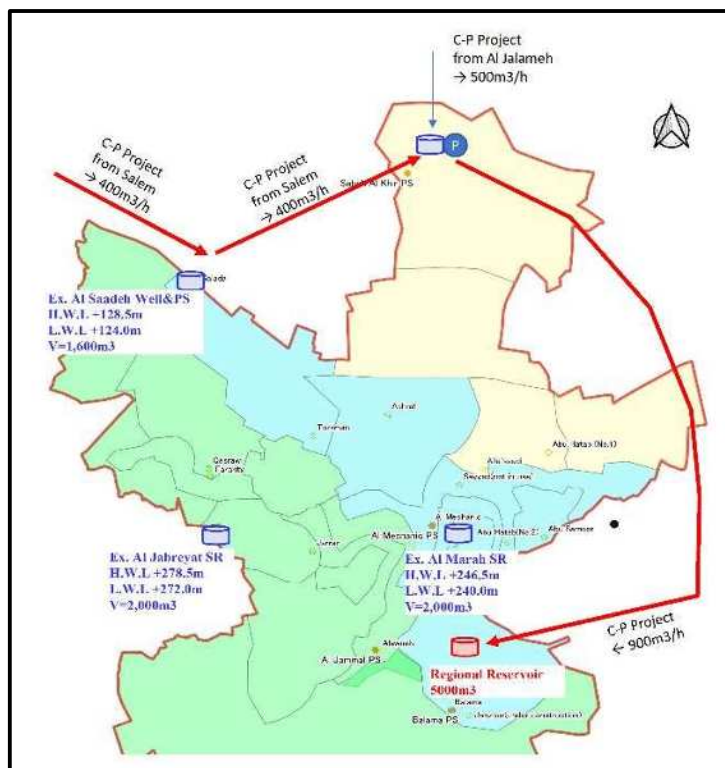
The Parties confirmed that the 14,000 m<sup>3</sup>/day as the daily maximum water demand will be provided by PWA for water supply system of Jenin Municipality where 4,000 m<sup>3</sup>/day will be produced from the Municipality wells. The Team suggested general layout plan in which locations and quantities to be supplied from PWA are illustrated as below.



**Figure 3 Proposed General Layout Plan (Location and Quantity to each SR)**



PWA explained that 400m<sup>3</sup>/hr will be supplied from Salem Point and 500m<sup>3</sup>/hr will be supplied from Al Jalameh Point after the Connection Point Project will complete. As the C-P project originally planned to install a new transmission pipeline from the Salem Point to Main Pumping Station around Sabah Al Khir through the Al Saadeh Pumping Station (Figure 4.1), PWA suggested technical alternatives as shown in Figure 4.3 and 4.4 where water from Salem Point will be supplied at the Al Saadeh PS as and the rest amount will be supplied from the Al Jalameh Point. The Parties agreed to continue further technical discussions among the relevant parties of PWA, Jenin Municipality, the Team and the design consultant of C-P project in order to find the optimum solution.



**Figure 4.1 C-P Project (Original, April 2021)**

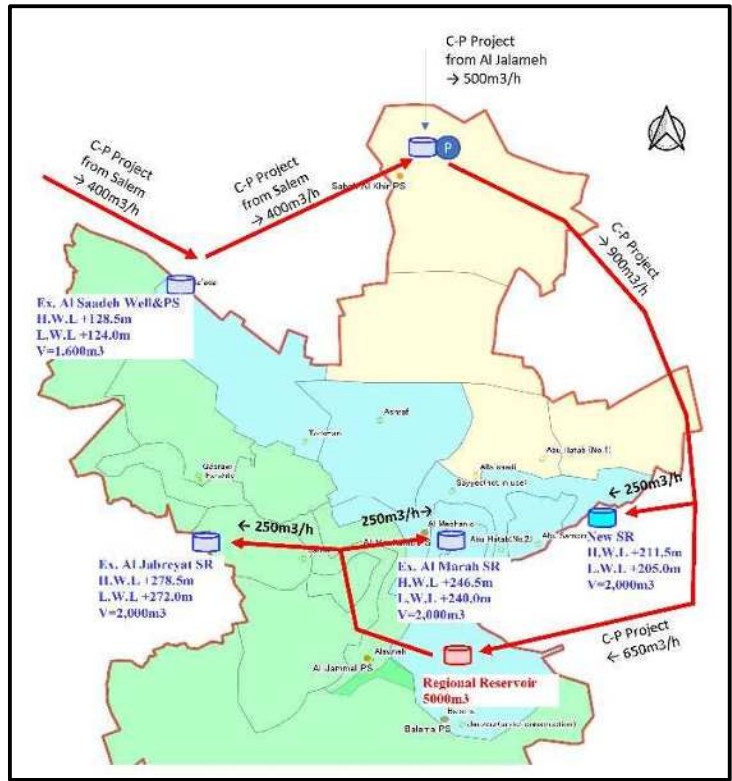


Figure 4.2 Alternative 1 (Proposal by the Team), based on Original Plan

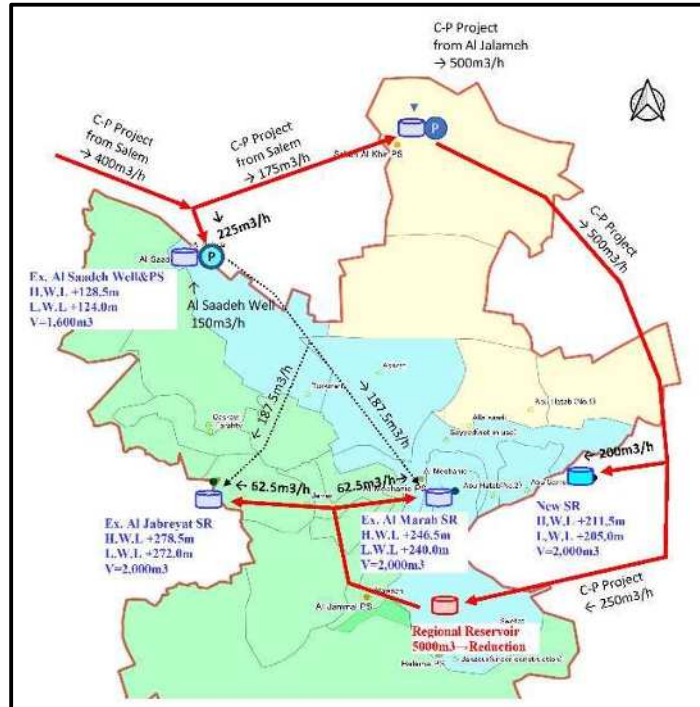
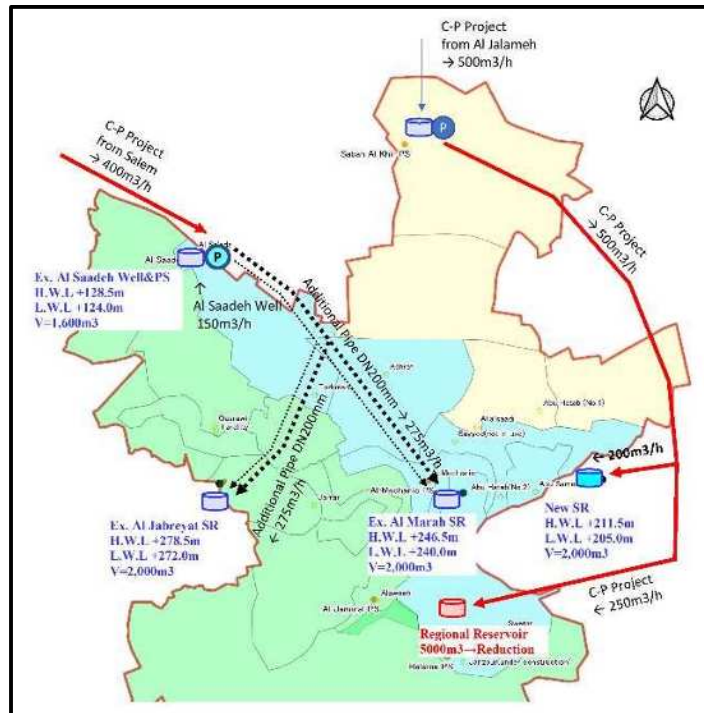


Figure 4.3 Alternative 2 (Receive 225 m³/hr from Salem Point at Al Saadeh to use existing transmission line)



**Figure 4.4 Alternative 3 (Receive 400 m<sup>3</sup>/hr from Salem Point at Al Saadeh and construct new transmission line)**

Since the implementation of the C-P Project is prerequisite for improvement of water supply system in Jenin, the Team pointed out that the following risks would undermine project effect of the Japanese Grant Project.

- Design change which would affect design modification of the JICA project
- Delay or cancellation of project implementation

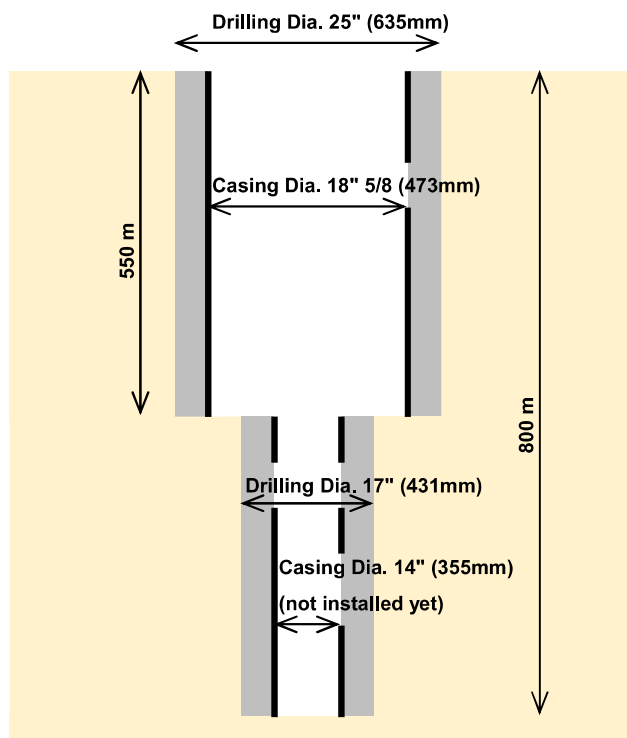
The Parties confirmed that the followings are necessary for appraisal of the project by the Government of Japan.

- Completion of design of the Connection Project
- Securing budget for implementation of the Connection Project
- Necessary land acquisition for the project sites is completed
- Procurement of the Works (bidding) will be implemented
- Construction of the Works will complete by the completion date of JICA project

### (3) Janzour Well Construction

Progress of the Janzour well construction as of October 2021 is approx. 850 m in depth, while the planned total depth is 1000m. PWA assumes to complete by the end of

December 2021. Upon completion, PWA will provide to the Team the relevant information, such as pumping test result, as-built drawings, hydrogeological report, etc.



**Figure 5 Progress of Janzour Well Construction**

## 6. Water Facility Plan

### 6.1 Water Distribution Zones and Service Reservoirs

The Team presented the concept of the facility plan where the service area is divided into three distribution zones to be supplied by the following service reservoirs.

**Table 5 Plan of the Service Reservoirs**

Name	Description	Proposed project component
Al Jabreyat Service Reservoir	Existing facility GL: 271.5m HWL:278.5m LWL:272.0m	Replacement of pipes, valves, fittings, water level sensor, flowmeter, etc. New construction of pumping station for high elevation area
Al Marah Service Reservoir	Existing facility GL: 239.5m HWL:246.5m LWL:240.0m	Replacement of pipes, valves, fittings, water level sensor, flowmeter, etc. New construction of pumping station for high elevation area
New Service Reservoir	New construction GL:209.5m HWL:216.5m LWL:210.0m	New construction of RC water tank, piping, control valves, fittings, water level sensor, flowmeter, etc. New construction of pumping station for

		high elevation area
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## 6.2 Water Transmission System

The following transmission facilities are envisaged to be implemented by the Project.

**Table 6 Plan of the Transmission Facilities**

Name	Description	Proposed project component
Al Saadeh Pumping Station	Existing facility	Replacement of pump, motor, pipes, valves, fittings, flowmeter, and other mechanical and electrical equipment and instrumentation Control system
Transmission pipeline from Al Saadeh PS to Al Jabreyat and Al Marah SR	Existing pipeline Steel pipe 14" x 560m, 10" x 2.1km to Al Jabreyat SR, and 10" x 4km to Al Marah SR	To be decided by PWA according to technical examination of the C-P project.
Al Mechanic Pumping Station	Existing facility (distribution pumps)	Replacement of pump, motor, pipes, valves, fittings, flowmeter, and other mechanical and electrical equipment and instrumentation Control system
Transmission pipeline from Al Mechanic PS to Al Marah SR	New construction	New construction of pipeline

## 6.3 Water Distribution System

In principle, water supply will be performed by gravity from the service reservoirs. Exceptionally for the high elevation area will be supplied by distribution pumps. In order to regulate water pressure appropriately, DMAs will be constructed in the distribution networks. Each DMA will be equipped with a DMA point which is composed of a stop valve, water flow meter, pressure gauge and transmitter to be integrated into the monitoring system. Seven (7) pressure reducing tanks (PRT) and one (1) pressure reducing valve (PRV) will be constructed in the distribution system.

**Table 7 Concept of the Distribution System**

Facility	Description	Proposed project component
Al Jabreyat Distribution Pumping Station	New construction	New construction of distribution pumping station for high elevation area
Al Malah Distribution Pumping Station	New construction	New construction of distribution pumping station

Facility	Description	Proposed project component
		for high elevation area
Pumping Station of New Service Reservoir	New construction	New construction of distribution pumping station for high elevation area
Pressure Reducing Tanks (PRT)	New construction	New construction (7 nos.)
Pressure Reducing Valve (PRV)	New construction	New construction (1 no.)
DMA point	New construction	New construction (15 nos.) having a valve, flowmeter, pressure gauge and transmitter.
Distribution main pipe	New construction from each SR to DMA point	New construction
Distribution sub-main pipe	New construction from DMA point to distribute water inside the DMA uniformly.	New construction
Network pipe	Existing pipe DN50mm	Use existing pipe of DN50mm or larger where possible, otherwise new construction. (To be studied further)
Service pipe	a) Existing inside the existing service area  b) New installation in the expansion area	a) Use existing service connection where possible, otherwise new construction (To be studied further) b) New construction
Fire hydrant	Existing	New construction according to PA code, location and type will be decided upon instruction by Fire Department

#### 6.4 Distribution Monitoring System

Flow rate and pressure at the DMAs will be monitored at the control room to be equipped in the administration building of Water and Wastewater Department of Jenin Municipality. Monitoring system of water flow, water level of SRs, operating status of pumps and valves is also planned. Control system of pumping stations is suggested.

**Table 8 Concept of Monitoring System**

Facility	Monitoring	Control
Al Saadeh Well/ SR		
- Al Saadeh Well	- Running status, flow rate	- Pump ON/OFF
- Al Saadeh Pumping Station	- Running status, flow rate	- Pump ON/OFF
- Service Reservoir	- Water level, valve status, flow	- Valve

Facility	Monitoring	Control
	rate	Open/Close
Al Mechanic Well - Al Mechanic Well - Al Mechanic Pumping Station - Balancing tank	- Running status, flow rate - Running status, flow rate - Water level, valve status	- Pump ON/OFF - Pump ON/OFF - Valve Open/Close
Al Jabreyat SR, PS - Service Reservoir - Pumping Station	- Water level, valve status, flow rate - Running status, flow rate	- Valve Open/Close - Pump ON/OFF
Al Marah SR, PS - Service Reservoir - Pumping Station	- Water level, valve status, flow rate - Running status, flow rate	- Valve Open/Close - Pump ON/OFF
New SR, PS - Service Reservoir - Pumping Station	- Water level, valve status, flow rate - Running status, flow rate	- Valve Open/Close - Pump ON/OFF
DMA point	- Flow rate, pressure	(Not Applicable, monitoring only)

## 7. Schedule

The Team explained that the members of other expertise will mobilize in the upcoming months to continue the field survey as shown in the schedule below. The Team emphasized necessity of input from PWA regarding the Connection Point Project and Janzour Well by January 2022 in order that the Project Scope will be finalized in February 2022.

Whereas design of the Connection Point Project is supposed to complete around April 2022, PWA will coordinate with the C-P Project so the Preparatory Survey will proceed on the said schedule.

The Team also put stress on necessity of further field surveys on facility design to confirm the project site conditions and examine optimum system according to the final plan of the C-P Project as well as the Janzour Well.

**Table 9 Upcoming Schedule (presented in the Technical Meeting 06.10.2021)**

	Year 2021												Year 2022											
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12		
Preparation Work																								
Inception Report (1)	▲																							
Analysis in Japan																								
Inception Report (2)																								
Field Survey																								
Analysis in Japan																								
<b>Finalize Project Scope</b>																								
Draft Survey Report																								
Final Report																								
<b>Connection Point Project Design</b>																								
<b>Janzour well taking over</b>																								

## 8. Official Request to the Government of Japan

### 8.1 Official Request

The PA shall submit an official request to the Government of Japan through a diplomatic channel before the appraisal of the Project, when the Project Scope is finalized in February 2022.

### 8.2 Project Scope

In this respect, the Project Scope is provisionally envisaged as table below which is subject to modification through further examination and discussion in the course of the Preparatory Survey.

#### (1) Facilities

Facility	Description
<b>Rehabilitation of existing municipality wells</b>	
- Al Saadeh Well	- Rehabilitation of the well
<b>Rehabilitation and construction of pumping station</b>	
- Al Saadeh Pumping Station	- Rehabilitation of pumps, pipes, valves, fittings, flowmeter, chlorine dosing system and control panel
- Al Mechanic Pumping Station	- Rehabilitation of pumps, pipes, valves, fittings, flowmeter, chlorine dosing system and control panel
- Al Jabreyat Pumping Station	- Construction of distribution pumping station for high elevation area
- Al Marah Pumping Station	- Construction of distribution pumping station for high elevation area
- New Service Reservoir Pumping Station	- Construction of distribution pumping station for high elevation area
<b>Rehabilitation of the intake pumps</b>	



Facility	Description
<b>(replacement of pumps, pipes and fittings) of the above wells</b> <ul style="list-style-type: none"> <li>- Al Saadeh Well</li> <li>- Al Mechanic Well</li> </ul>	<ul style="list-style-type: none"> <li>- Replacement of submersible pump, pipe, fittings flowmeter, cable and control panel</li> <li>- Replacement of submersible pump, pipe, fittings flowmeter, cable and control panel</li> </ul>
<b>Rehabilitation of existing reservoirs and/or new construction of reservoir</b> <ul style="list-style-type: none"> <li>- Al Jabreyat Service Reservoir (2000 m<sup>3</sup>)</li> <li>- Al Marah Service Reservoir (2000 m<sup>3</sup>)</li> <li>- New Service Reservoir (2000 m<sup>3</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>- Rehabilitation of piping system, installation of water level sensor, flow meter</li> <li>- Rehabilitation of piping system, installation of water level sensor, flow meter</li> <li>- New construction</li> </ul>
<b>Construction and rehabilitation of the transmission pipes</b>	<ul style="list-style-type: none"> <li>- Rehabilitation of transmission line between Al Saadeh PS and Al Jabreyat SR</li> <li>- New construction of transmission line between Al Mechanic PS and Al Marah SR</li> </ul>
<b>Replacement of distribution mains and distribution network pipes</b>	<ul style="list-style-type: none"> <li>- Construction of distribution main and sub-main, use of the existing pipes (DN 50mm or more)</li> <li>- Expansion of service area towards current unserved area</li> </ul>
<b>Construction of DMAs (District Metered Areas)</b>	<ul style="list-style-type: none"> <li>- 15 DMAs</li> <li>- 7 Pressure Reducing Tanks (PRT)</li> <li>- 1 Pressure Reducing Valve (PRV)</li> </ul>
<b>Introduction of distribution monitoring system</b>	<ul style="list-style-type: none"> <li>- Water level and flow rate of each SR and PS</li> <li>- Flow rate, pressure of each DMA</li> </ul>

(2) Soft (Non-Physical) Components

- O&M of constructed facilities
- Water distribution management
- Customer's adaptation to improved water supply such as 24/7 water supply

(3) Detailed Design, Tendering support and Construction Supervision

**9. Scope of Works to be Carried out by PA (Provisional)**

With regard to major undertakings by PA as per the M/D (March 2021), the Team explained that the followings are envisaged as the Scope of Works to be carried out by PA which is subject to further study and discussion.

(1) Before the Bidding

Item	Description
5. To secure necessary budget and implement land acquisition	Land acquisition for the new service reservoir site
7. To secure and clear the lands	1) Site for the new service reservoir 2) Temporary construction yard and stock yard (to be decided) 3) borrow pit and disposal site (to be decided)
8. To obtain the planning, zoning, building permit	
9. To demolish and remove the existing facilities and utilities	(exact scope will be examined and decided)

### (2) During Project Implementation

Item	Description
10. To construct access road	Access road to the new SR site (exact scope will be examined and decided)
11. To provide utilities to the site	1) Electric distribution line to each Well, SR, PS, DMA chamber
To construct distribution networks (if required)	In case that the project budget may not allow to construct all the designed water networks, some parts shall be constructed by PA (to be discussed further)

### (3) After the Project

Item	Description
Installation of service pipes and PPWM to the new service areas	In case that the Project may not include service connections for new service areas, new installation of service pipes and PPWM will be carried out by PA
Leakage control	Some existing pipes will remain after the Project, leakage control by using DMAs shall be enhanced

## 10. Design License

According to new legislation, all infrastructure projects shall be designed by the consultant having a license of the relevant engineering field. PWA explained that the legislation is applicable to the JICA Project when it will be implemented. The Team will assess the legislation in terms of principles of the Japanese Grant.

As for license for construction, PWA assured that construction license will not be required for the Japanese Contractor who will execute the construction work for Japanese Grant.

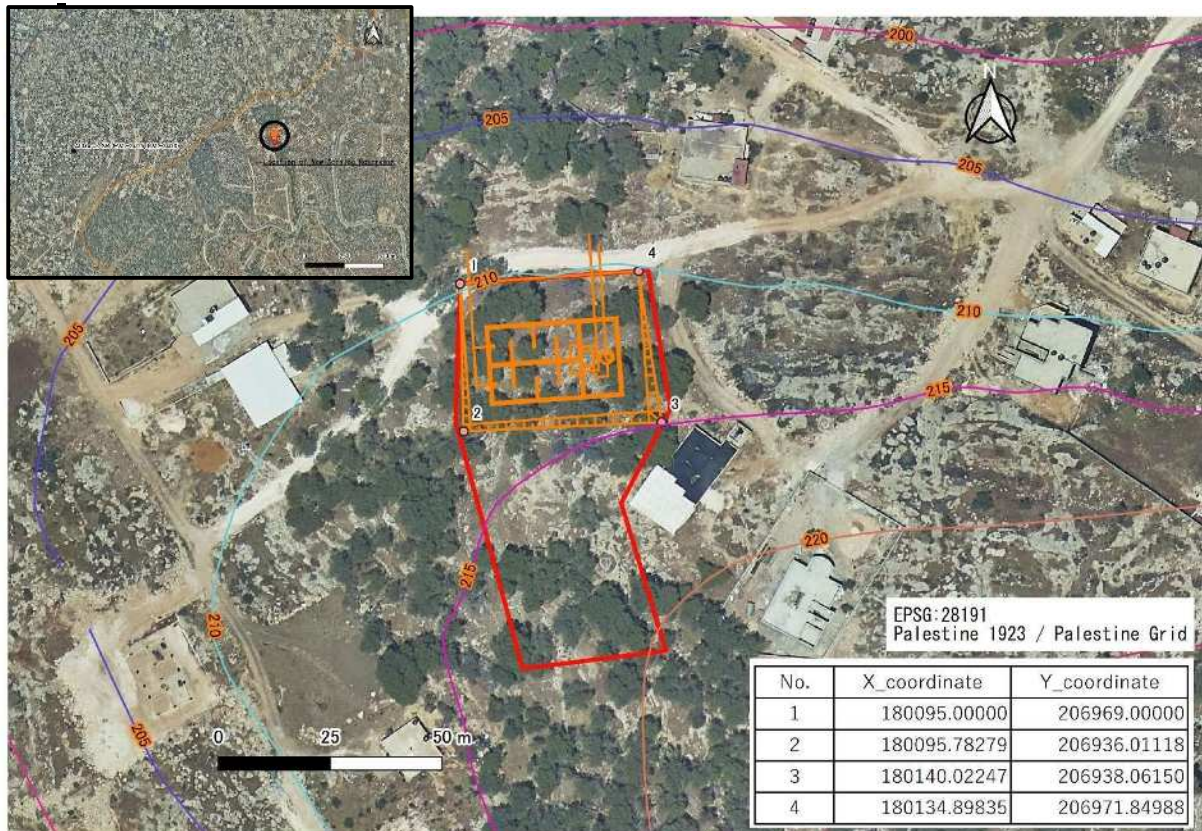
## 11. Land Acquisition

A site for the New Service Reservoir was suggested by the Jenin Municipality as shown in the Figure. The location, elevation and area is suitable from the hydraulic and construction points of view. Reportedly, the proposed site belongs to the Palestinian

Government. PWA will start necessary procedures for land acquisition.

As the land acquisition is one of requisite conditions for project appraisal by the Japanese Government, the Team requested the following to be ensured by PWA. The Team added that land acquisition process shall be carried out with due care since delay of land acquisition process or change of site would significantly affect project implementation schedule.

- To clarify ownership of the land, administration entity, current land user, current land use
- To obtain permission for land use and/or taking over the land ownership
- To clarify necessary procedure, time schedule, decision making system to obtain permission and taking over the land from the Government



**Figure 6 Location Map of Proposed New Service Reservoir**

The Team explained that land acquisition is not necessary for other facilities, because construction of Pipes, Pressure Reducing Tanks (PRT), Pressure Reducing Valve (PRV), Hydrants, DMA chambers, valve box, and such will be constructed within Right of Way

of the Road Department of Jenin Municipality.

## **12. Environmental and Social Consideration**

The Parties confirmed that IEE/EIA is not requested in the Environmental legislations of Palestine, since this is a water supply project. When the project scope will be finalized, PWA will submit application to EQA (Environmental Quality Authority) for determination on necessity of IEE/EIA in the Project.

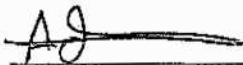
The Parties also confirmed that there will not be involuntary resettlement because the all the facilities are planned and constructed in the public land and no illegal occupations, etc. exist in the sites.

**Technical Notes (2)**  
**on the Preparatory Survey on the Project for**  
**Improvement of Water Supply in Jenin Municipality**

Based on the Minutes of Discussions on the Preparatory Survey on the Project For Improvement of Water Supply in Jenin Municipality (hereinafter referred to as "the Project") signed on 29<sup>th</sup> March, 2021 between Japan International Cooperation Agency (hereinafter referred to as "JICA") and Palestinian Water Authority of the Palestinian Authority (hereinafter referred to as "PA"), the Consultant members of the JICA Preparatory Survey Team (hereinafter referred to as the "Team") had a series of discussions and conducted field surveys from 2nd September 2021.

The Team has conducted the 2<sup>nd</sup> field survey from 26 May 2022. The 2<sup>nd</sup> Minutes of Discussions (hereinafter referred to as "MD") on the Preparatory Survey was signed on 7<sup>th</sup> July 2022 between JICA and PA. As a result of the discussions and the surveys, both sides confirmed the technical conditions described in the attached sheets. Notwithstanding the confirmation hereunder, this Technical Note does not make a commitment of the project scope, project implementation, design and method to be implemented. The final project scope, project implementation, designs, etc. will be decided by the Government of Japan.

31 August, 2022



Mr. Adel Yasin  
Director of Planning Administrative  
Palestinian Water Authority  
The Palestinian Authority



Mr. Naoto Tohda  
Chief Consultant  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

Witness



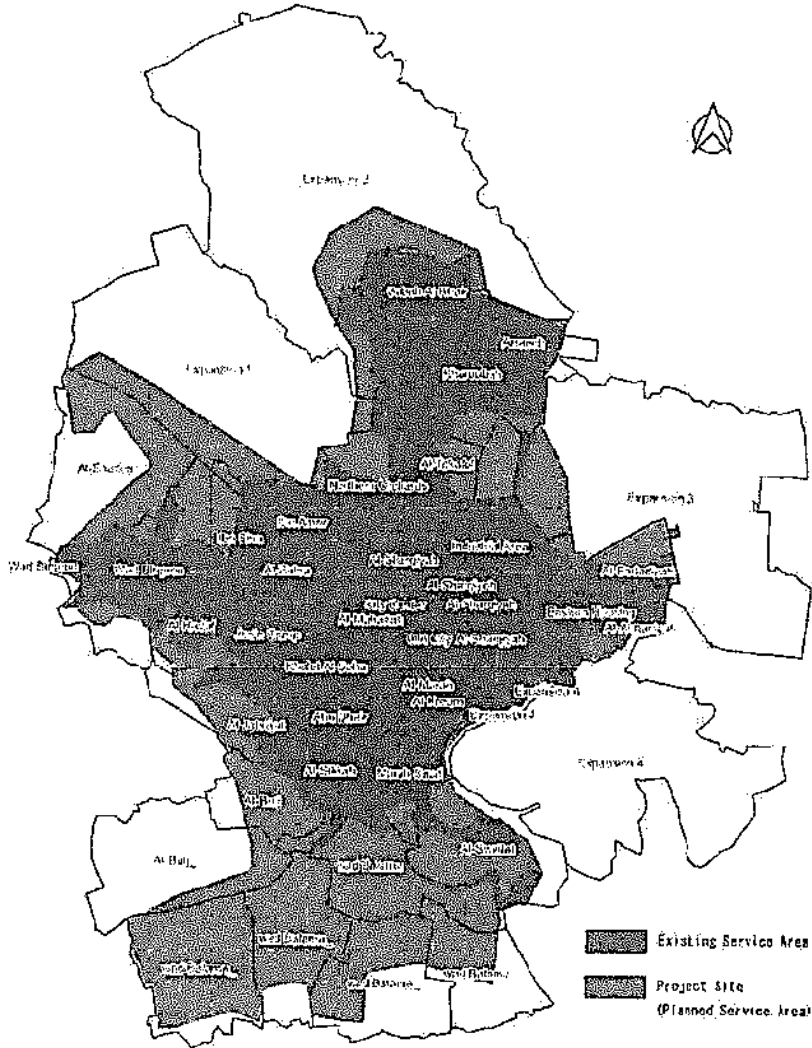
Ms. Kharyia Souqeha,  
Acting Director of Water and Wastewater Department  
and Head of Study and Planning Unit of Water and Wastewater Department  
Jenin Municipality  
The Palestinian Authority

ATTACHMENT

1. Water Supply Plan

(1) Project Area

Project Area is shown as Figure 1 which was confirmed in the M/D.



0 500 1,000 m

Project Site

(Source) Annex 1 of MD, 07 July 2022

Figure 1 Project Area

*EH*

*AS*

*[Handwritten signature]*

## (2) Population Forecast

Based on population census (2017, PCBS), population in 2030 is forecast by using annual growth rate of 2.07% as per "Projected Mid-Year Population for Jenin Governorate by Locality 2017-2017" (PCBS). Taking into account that the annual growth rate of Jenin camp is +0.23% during 2007-2017, annual growth rate of 0.23% for Jenin Camp is applied in consideration of saturation. Consequently, population of Jenin (city) is estimated as the difference between the total population and camp.

With reference to Figure 1, rate of population served in 2030 is estimated by each census block as shown in Table 1. As the result, the population served of the Project is estimated as 77,080 persons in 2030.

Table 1 Population Forecast and Population Served in 2030

Sub-Block	2017 (Census)	2030 Forecast	Rate of Population Served	Population Served
Abu Dhair	1,572	2,146	100%	2,146
Al-Almaniyah	2,116	2,887	100%	2,887
Al-Badadiyah	849	1,158	100%	1,158
Al-Burj 1	157	214	80%	171
Al-Burj 2	343	468	100%	468
Al-Hadaf	2,525	3,446	100%	3,446
Al-Jabriya	1,240	1,692	100%	1,692
Al-Kroum	1,448	1,977	100%	1,977
Al-Mahattah	684	934	100%	934
Al-Marah	1,870	2,551	100%	2,551
Al-Nabatat	354	484	100%	484
Al-Saadeh	630	861	100%	861
Al-Sharqiyah 1	3,146	4,296	100%	4,296
Al-Sharqiyah 2	701	956	100%	956
Al-Sharqiyah 3	4,430	6,046	100%	6,046
Al-Sharqiyah 4	529	722	100%	722
Al-Sikkah	1,339	1,826	100%	1,826
Al-Swaitat	865	1,180	100%	1,180
Al-Takaful	231	315	100%	315
Al-Zahra	1,386	1,892	100%	1,892
Arraueh	891	1,215	100%	1,215
City Center	424	578	100%	578
Eastern Housing	1,205	1,644	100%	1,644
Expansion 1	248	338	90%	304
Expansion 2	650	887	80%	710
Expansion 3	274	374	90%	336
Expansion 4 1	681	930	0%	0
Expansion 4 2	270	369	100%	369
Expansion 4 3	1,303	1,778	100%	1,778

Sub-Block	2017 (Census)	2030 Forecast	Rate of Population Served	Population Served
Ibn Amer	1,265	1,726	100%	1,726
Ibn Sina	891	1,215	100%	1,215
Industrial Area	362	493	100%	493
Khalet Al-Soha	2,691	3,672	100%	3,672
Kharoubah	260	355	100%	355
Kharoubah	2,746	3,747	100%	3,747
Marah Saad	1,851	2,528	100%	2,528
Northern Orchards	1,752	2,390	100%	2,390
Old City	756	1,032	100%	1,032
Sabah Al-Khair	1,322	1,805	100%	1,805
wad Balama1	330	449	80%	359
wad Balama2	130	177	80%	142
wad Balama3	720	983	100%	983
wad Balama4	665	907	80%	726
wad Balama5	230	314	80%	251
Wad Birqeen1	1,294	1,767	100%	1,767
Wad Birqeen2	158	215	100%	215
<b>Jenin Total</b>	<b>49,784</b>	<b>67,941</b>	<b>98%</b>	<b>66,348</b>
<b>Jenin Camp</b>	<b>10,417</b>	<b>10,732</b>	<b>100%</b>	<b>10,732</b>
<b>Jenin + Camp</b>	<b>60,201</b>	<b>78,673</b>	<b>98%</b>	<b>77,080</b>

### (3) Water Demand Forecast

Taking into account of available water quantities of the Connection Point Project, water demand forecast has been reviewed as Table 2. Accordingly, water demand in 2030 of the Project is estimated to be 14,800 m<sup>3</sup>/day.

**Table 2 Water Demand Forecast**

[1]	Population served	77,080 persons	See Table 1
[2]	Average domestic water consumption per capita per day	120 lcd	
[3]	Industrial water demand	8 lcd	[3] = 7% of [2]
[4]	Water consumption per person per day	128 lcd	[4] = [2] + [3]
[5]	Daily average water consumption	9,866 m <sup>3</sup> /day	[5] = [1] x [4]
[6]	Physical loss	3,289 m <sup>3</sup> /day	est. 25%
[7]	Daily average water demand	13,155 m <sup>3</sup> /day	[7] = [5] + [6]
[8]	Maximum daily flow coefficient	1.12	Est.
[9]	Maximum daily flow coefficient	14,734 m <sup>3</sup> /day	[9] = [7] x [8]



## 2. Water Source Plan

Both sides confirmed the water source plan of the Project as shown in Table 3. Accordingly, 4,000 m<sup>3</sup>/day will be produced by the municipality wells whereas 10,800 m<sup>3</sup>/day will be provided from WBWD after the Connection Point Project.

Table 3 Water Source Plan

Type of Source	Water Source	Production capacity	Remarks
Municipality sources	Al Saadch well	3,500 m <sup>3</sup> /day	Rehabilitation
	Al Mechanic well	500 m <sup>3</sup> /day	Rehabilitation
	Al Barama	-	To be abolished
Private well		-	To be cancelled
WBWD	Connection Point Project	10,800 m <sup>3</sup> /day	
	Existing Al Jalameh	-	To be closed
	Existing Al Swetat	-	To be closed
	Abo Arab Well	-	To be closed
Total		14,800 m <sup>3</sup> /day	

## 3. Basic Policy of Facility Planning

The followings are taken into account as the basic policy of facility planning.

### (1) General

To optimize water distribution amount and pressure in the entire service area

### (2) Water Source Plan

Municipality wells and bulk water supply from the Connection Point Project (to be implemented) will be used as the water source for Jenin municipality.

### (3) Use of Private Wells

Private wells will not be used as the permanent water source. However pipe connections with the proposed facility will be considered for use of emergency cases as the supplementary water source.

### (4) Restructuring of Distribution Facilities

In principle, water supply will be distributed from the service reservoirs by gravity flow.

The current 81 nos. of distribution sub-zones will be integrated into two or three distribution zones which consist of about 15 sub-zones (DMAs).

**(5) Use of Existing Pipe Network**

Taking into consideration of efficient use of the Project budget, the Team proposed that the existing pipes will be used as much as possible but existing pipes of 40 years or older will be replaced with new pipes. On the other hand, PWA explained that lifetime of pipe is prescribed to be 25 years, according to PWA Guideline. The criteria of pipe replacement will be further examined in consultation with PWA and JICA. The Team will propose an optimal option in order to maximize the project impact by using the limited financial resources.

**(6) Expansion of Service Area**

In order to increase number of beneficiaries, expansion of service area to the current non-service areas will be considered.

**(7) Water Supply to Jenin Camp**

Water supply to Jenin camp will be performed by using the existing water networks. For the purposes of pressure control and flow monitoring, the network will be isolated to have two water inlets with bulk water meter.

**(8) Monitoring System**

In order to ensure effective and reliable operation of water supply system, a monitoring and control system will be considered for main facilities, such as transmission pumps, water level and flow of each service reservoir, pressure and flow of each DMA.

**(9) House Connection and Customer Water Meter**

The Team presented the idea that new installation of house connections and customer water meters will be carried out by Palestinian side. On the other hand, PWA suggested that the house connection pipes (between distribution pipe to house) should be constructed by the Contractor of the JICA Project, because construction of house connection pipe after taking over will require extra costs of re-excavation of pavement and pipe trench. The Team will discuss with JICA for optimal solution.

**4. Facility Plan**

The following components are envisaged as the facility plan, which is subject to further review by the Team. Final scope will be examined in due consideration of improvement

effects, priority, appropriate project scale, etc.

**(1) Rehabilitation of existing municipality wells**

- Rehabilitation of the existing Al Saadeh Well

**(2) Rehabilitation of pumping station**

- Replacement of mechanical and electrical equipment including the pumps, pipes, valves, fittings, flowmeter and control panels for the transmission pumps of the existing Al Saadeh pumping station

**(3) Rehabilitation of existing reservoirs and/or new construction of reservoir**

- Rehabilitation of piping system, installation of water level sensor, flow meter of both existing Al Jabreyat and Al Marah service reservoirs
- Construction of New Service Reservoir

**(4) Replacement of distribution mains and distribution network pipes**

- Construction of distribution main and sub-main, use of the existing pipes
- Expansion of service area towards current unserved area
- Installation of PRT (pressure reducing tank) and PRV (pressure reducing valve)

**(5) Construction of DMAs (District Metered Areas)**

- Construction of DMAs by dividing existing pipes by valves and caps.
- Installation of flowmeter, pressure sensor and transmitter

**(6) Introduction of monitoring system**

- Water level and flow rate of each SR
- Operation status and flow rate of transmission pumps of Al Saadeh
- Flow rate and pressure of each DMA
- Main hardware of the monitoring system will be installed in a room of existing administration building of the Water and Wastewater Department of Jenin Municipality and established as the central station.

**5. Design Criteria**

**(1) Service Reservoir**

The design criteria of service reservoir shall be as follows.

Design criteria applied to the project		Reference	
		Japanese guideline	Example of similar projects And Palestine Water Authority (PWA) guideline
Structure and type	RC	RC, PC, SS, SUS	Almarah : RC, Round Jabreyat: RC, Round
Capacity	The capacity of the service reservoir shall be 8 hours equivalent of the maximum daily supply of the service area. The firefighting water to be added to the above capacity (if necessary)	The capacity of the service reservoir shall be 12 hours equivalent of the maximum daily supply of the service area. The firefighting water to be added to the above capacity.	Secured for 8.7 hours in both Almarah and Jabreyat SR.
Water depth	3 - 6m	3 - 6m	Almarah : 6.5m Jabreyat: 6.5m

## (2) Design Criteria of Distribution Pipes

The design criteria of distribution pipes shall be as follows.

Design criteria applied to the project		Reference	
		Japanese guideline	Example of similar projects And Palestine Water Authority (PWA) guideline
Design distribution flow	The design maximum hourly distribution flow in the service area	The design maximum hourly distribution flow in the service area	
	The ratio (K) of the design maximum hourly distribution flow to the average hourly flow shall be determined with reference to the experiences or the condition in the region with similar characteristics. K=1.3 However, for lines positioned as main pipes. "K=2.0" is used to allow for future expansion and lifestyle improvement.	The ratio (K) of the design maximum hourly distribution flow to the average hourly flow shall be determined with reference to the experiences or the condition in the region with similar characteristics. K=1.5-2.0	PWA: Peak hourly flow 1:10
Water pressure	The minimum dynamic water pressure More than 100 kPa (0.10 MPa) This value is limited to some special exception sites. Normally, 0.2 MPa should be ensured.	More than 150 kPa (0.15 MPa)	PWA: Lowest 2 bars above highest tapping point (for Transmission pipe)
	The maximum static water pressure Less than 1000 kPa (1.0 MPa)	Less than 740 kPa (0.74 MPa)	PWA: Highest 30 bars (for Transmission pipe)
	Proper dynamic water pressure 0.20 - 0.60 MPa		PWA: 0.20 - 0.60 MPa
Pipe diameter	Based on pipe network analysis H-W equation Existing Pipes and New Ductile iron pipes for main pipe C=110 New HDPE pipes C=130		PWA: • PE, PVC, and GRP 140 • Ductile iron cement lined 130 • Steel cement lined 130 • Steel without lining

Design criteria applied to the project	Reference	
	Japanese guideline	Example of similar projects And Palestine Water Authority (PWA) guideline
Pipe material	In case of Distribution Main Pipe, the pipe shall be DIP and the ISO standard (push-on joint excellent in workability even in narrow excavation width) shall be adopted. In case of Distribution Network Pipe, it shall be HDPE pipe of PN 16 class.	120

[Reference]

Checklist for Reviewing Design and Specifications for Water Transmission Lines

1.2 Design Parameters

Design Parameter	Criteria
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Average daily flow 1.00</li> <li><input type="checkbox"/> Maximum monthly flow 1.25</li> <li><input type="checkbox"/> Maximum daily flow 1.10</li> <li><input type="checkbox"/> Peak hourly flow 1.10</li> </ul>
1.2.9 Velocity Limits	Velocity of water should not exceed 2.0 m/s
1.2.10 Friction Loss Factor	<ul style="list-style-type: none"> <li><input type="checkbox"/> The friction coefficients "C" used in "Hazen-Williams" for different kinds of pipes are as follows (Average values): <ul style="list-style-type: none"> <li>- PE, PVC and GRP 140</li> <li>- Ductile iron cement lined 130</li> <li>- Steel cement lined 130</li> <li>- Steel without lining 120</li> </ul> </li> <li><input type="checkbox"/> The friction coefficients "e" used in "Darcy-Weisbach" for different kinds of pipes are as follows (Average values): <ul style="list-style-type: none"> <li>- PE, PVC and GRP 0.0015mm</li> <li>- Ductile iron cement lined 0.26mm</li> <li>- Steel cement lined 0.26mm</li> <li>- Steel without lining 0.046mm</li> </ul> </li> <li><input type="checkbox"/> Additional fittings friction losses should be considered</li> </ul>
1.2.11 System Pressure Limits	<ul style="list-style-type: none"> <li><input type="checkbox"/> Pressure limits: <ul style="list-style-type: none"> <li>- Highest: No limit but not to exceed 30 bars to minimize water losses</li> <li>- Lowest: 2 bars above highest tapping point</li> </ul> </li> </ul>
1.2.12 Selection of Pipe Material	<ul style="list-style-type: none"> <li><input type="checkbox"/> The following should be considered when selecting pipe material: <ul style="list-style-type: none"> <li>- Loading (dead and live loads)</li> <li>- Chemical attack (from soil, groundwater and water in pipe)</li> <li>- Lifetime</li> <li>- Water tightness</li> <li>- Cost, laying, O&amp;M, storage of spare parts</li> </ul> </li> </ul>
1.2.13 Pipe Size	<input type="checkbox"/> Minimum recommended diameter is 100mm.

(3) Crossing River and Other Water Channel

The pipe installation method for each crossing shall be as follows.

Culvert (centrifugal reinforced)	Crossing of culverts shall be carried out by the invert siphon with the concrete protection.
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concrete pipe and others)	
National road	Crossing of the national road shall be carried out by the open cut method. The pipes to be laid inside are centrifugally cast reinforced concrete pipes.

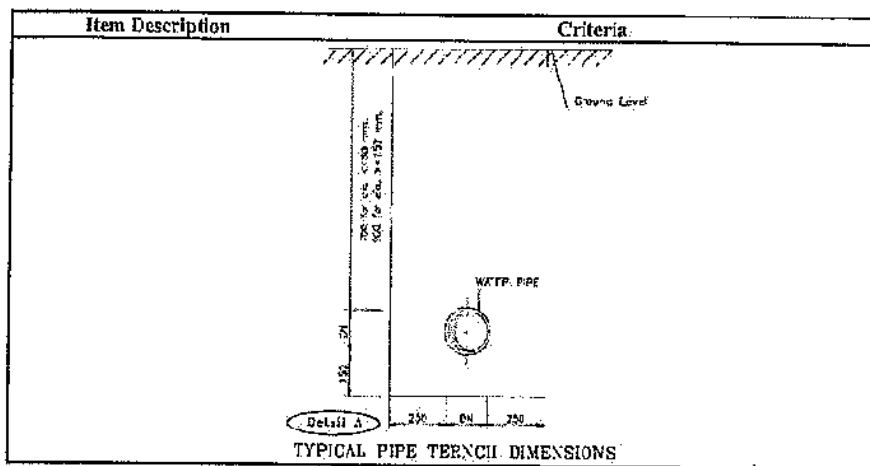
(4) Earth work

The design criteria for earth work shall be as follows.

Classification	Design Criteria
Location of pipe laying	· The pipes shall be laid outside the pavement and under the road shoulder as far as possible.
Earth covering	· 0.9m for diameters 150mm and above · 0.7m for diameters less than 150mm
Excavation width	· The following checklist shall be followed
Excavation depth	· If the excavation depth is deeper than 1.5 m, lightweight steel sheet pile (Type 3) shall be constructed.
Backfilling	· The following checklist shall be followed
Pavement	· To provide 150mm extra wide at both edge of trench excavation for reinstatement of road asphalt pavement is to be acceptable. · Reinstatement of road asphalt pavement after pipe laying shall be minimum 100mm thick in 2 layers e.g. 60mm thick of binder course and 40mm thick of wearing course for main road, and minimum 60mm thick in 1 layer for normal road. · Temporary reinstatement of road asphalt pavement shall be carried out first and then provide permanent reinstatement for main road but not required for normal road. · Definition of main road is to be more than 10m wide road and two-lane in both way road subject to referred urban planning road map prepared by Jenin Municipality regardless width of existing road. · Road department of Jenin Municipality agreed to provide typical road section drawing to the Team.

Checklist for Reviewing Design and Specifications for Water Transmission Lines.

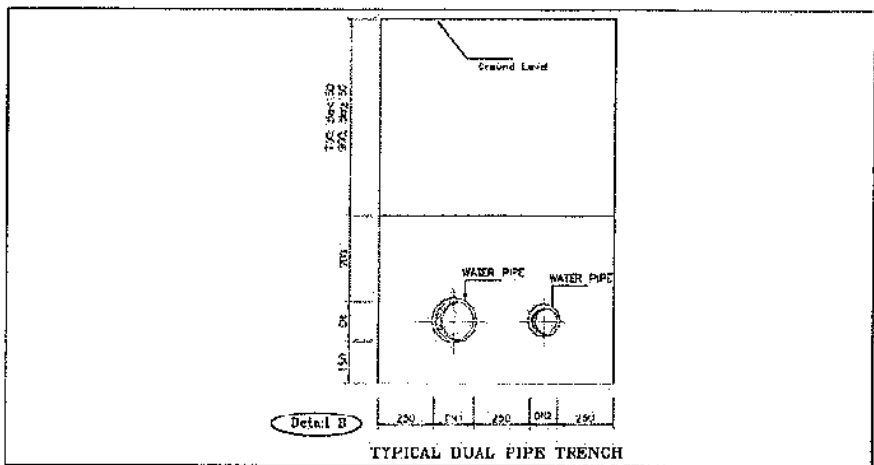
Item Description	Criteria																																													
<b>2.2.7 Details</b>																																														
<b>2.2.7.1 Trenching \ a-Dimensions (Minimum Values) \ Single Pipe Trench:</b>	<ul style="list-style-type: none"> <li>- Along Street</li> <li>- At Skew or Right Angle</li> <li>- Along Natural Ground</li> </ul>																																													
<i>See Details (A)</i>	<ul style="list-style-type: none"> <li>• Min. Width = DN + 500</li> <li>• Cover over Pipe Crown <math>\geq 900</math>, dia <math>\geq 150</math></li> <li>• <math>\geq 700</math>, dia <math>&lt; 150</math></li> </ul>																																													
	<table border="1"> <thead> <tr> <th>Pipe Diameter (inch)</th> <th>Trench Width (inch)</th> <th>Cover Over Pipe (mm) **</th> </tr> </thead> <tbody> <tr><td>2</td><td>550</td><td>700</td></tr> <tr><td>4</td><td>600</td><td>700</td></tr> <tr><td>6</td><td>650</td><td>900</td></tr> <tr><td>8</td><td>700</td><td>900</td></tr> <tr><td>10</td><td>750</td><td>900</td></tr> <tr><td>12</td><td>800</td><td>900</td></tr> <tr><td>14</td><td>850</td><td>900</td></tr> <tr><td>16</td><td>900</td><td>900</td></tr> <tr><td>18</td><td>950</td><td>900</td></tr> <tr><td>20</td><td>1000</td><td>900</td></tr> <tr><td>22</td><td>1050</td><td>900</td></tr> <tr><td>24</td><td>1100</td><td>900</td></tr> <tr><td>26</td><td>1150</td><td>900</td></tr> <tr><td>28</td><td>1200</td><td>900</td></tr> </tbody> </table>	Pipe Diameter (inch)	Trench Width (inch)	Cover Over Pipe (mm) **	2	550	700	4	600	700	6	650	900	8	700	900	10	750	900	12	800	900	14	850	900	16	900	900	18	950	900	20	1000	900	22	1050	900	24	1100	900	26	1150	900	28	1200	900
Pipe Diameter (inch)	Trench Width (inch)	Cover Over Pipe (mm) **																																												
2	550	700																																												
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8	700	900																																												
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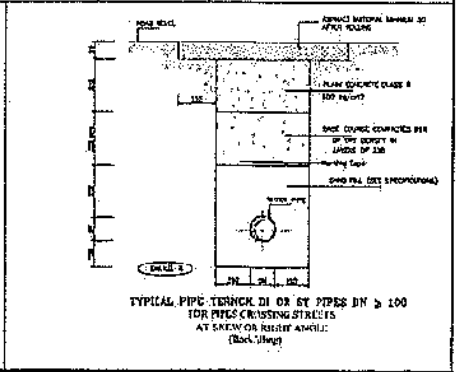
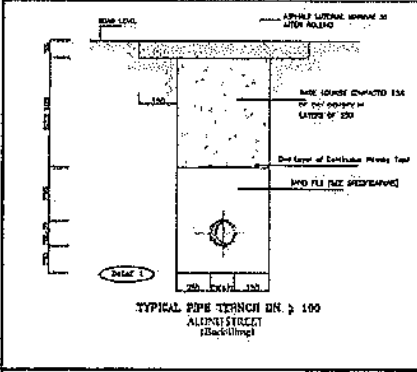
Item Description	Criteria
<b>2.2.7 Details</b>	
<b>2.2.7.2 Trenching \ a-Dimensions (Minimum Values) \ Dual Pipe Trench:</b>	<ul style="list-style-type: none"> <li>• In Asphalted Roads</li> <li>• In Natural Ground</li> <li>• In Side Walks or Concrete Tiles</li> <li>• Along Street</li> <li>• At Skew or right angle</li> </ul>
<i>See Details (B)</i>	<ul style="list-style-type: none"> <li>• Min. Width = DN<sub>1</sub> + DN<sub>2</sub> + 750</li> <li>• Clearance between pipes is 250mm</li> <li>• Cover over Pipe Crown <math>\geq 900</math>, dia <math>\geq 150</math></li> <li>• <math>\geq 700</math>, dia <math>&lt; 150</math></li> </ul>

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Item Description	Criteria
<b>2.2.7 Details</b>	
<b>2.2.7.3 Trenching \ Backfilling \ Single Pipe Trench: - Along Street, - At Skew or Right Angle, - Along Natural Ground, - In Asphalted Roads, - In Side Walks or Concrete Tile.</b>	
<b>2.2.7.3.1 Soft Backfill</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> 150mm under pipe</li> <li><input type="checkbox"/> 200mm above crown of pipe</li> <li><input type="checkbox"/> Material is either sand or fine aggregates</li> </ul>
<b>2.2.7.3.2 Final Backfill</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Suitable excavated material, natural or processed mineral soils, or graded crushed stones or gravel of 250mm layer thickness</li> </ul>
<b>2.2.7.3.3 Warning Tape</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Existence and specifications</li> </ul>
<b>2.2.7.3.4 Restatement Layer</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Along street:</b> 200mm thick base course overlaid by 50mm thick asphalt mix</li> <li><input type="checkbox"/> <b>Crossing streets:</b> Plain concrete class B (B200) 300 mm thick over the Base Course followed by 50mm thick asphalt mix.</li> </ul>

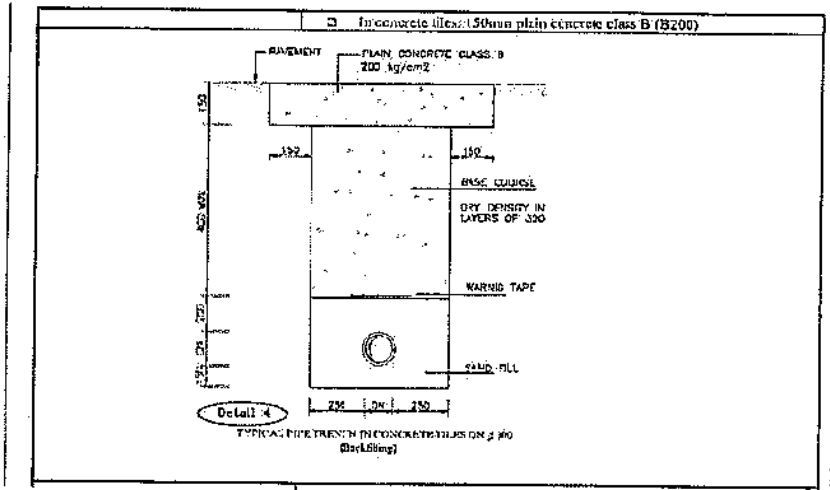
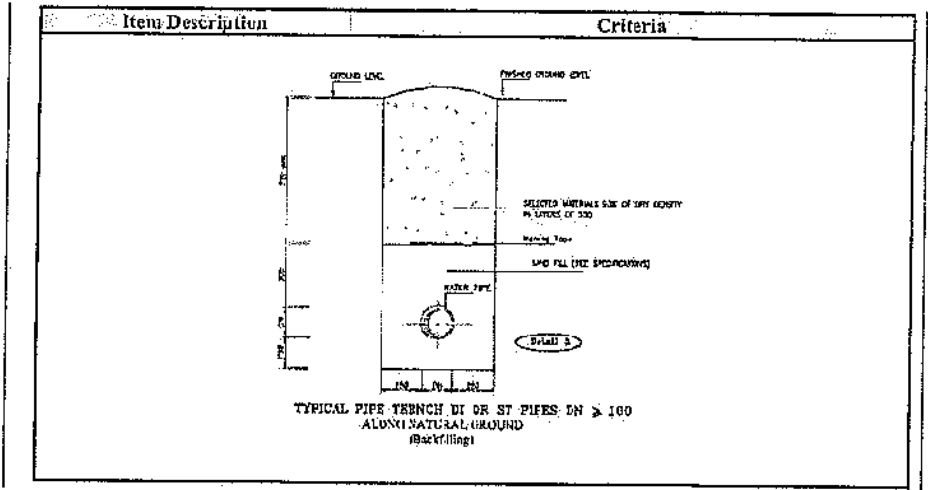


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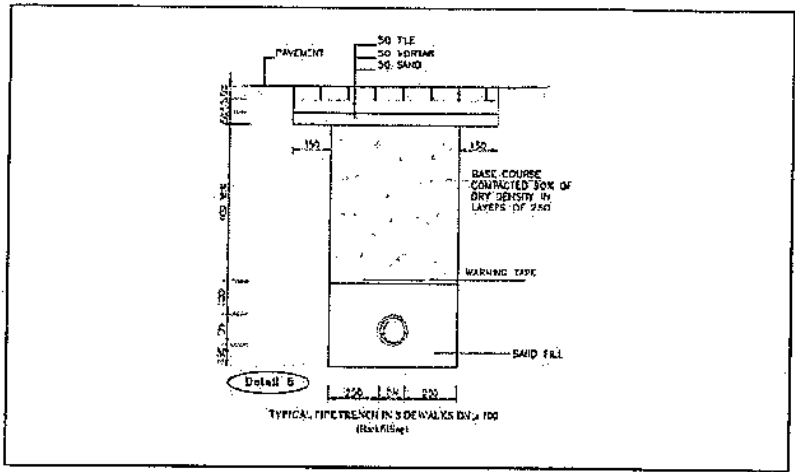
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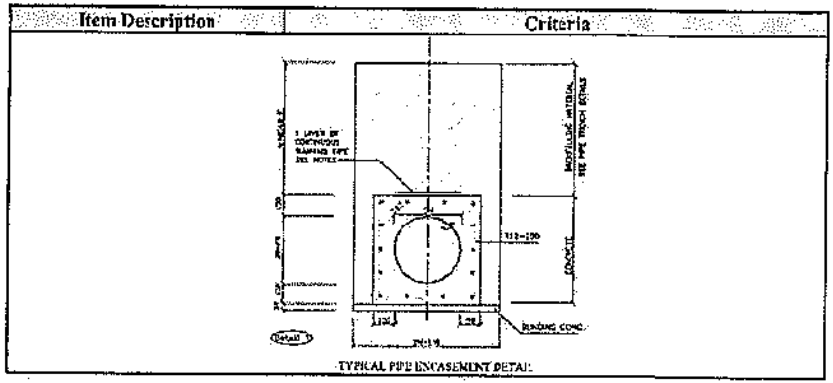


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Item Description	Criteria
	1.1 Wall crossing: 300mm gabion layer
	<p>Detail 7</p> <p>TYPICAL PIPE ENCLOSURE FOR WALL CROSSING WITH 300mm GABION (R&amp;P/15/04)</p>
2.2.7.4 Pipe Encasement (See Detail 7)	<ul style="list-style-type: none"> <li>□ 150mm reinforced concrete B-200 encasement around pipe</li> <li>□ 50mm plain concrete B-150 under reinforced concrete</li> <li>□ Main reinforcement bars of 12mm diameter spaced at 200mm with stirrups of 8mm spaced at 200mm</li> <li>□ Warning tape over the reinforced concrete</li> </ul>



- (5) Ancillary facilities
- (a) Pressure Reducing Tank and Valve

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Pressure reducing water tanks or pressure reducing valves should be installed in the distribution mains or before the DMA branches to ensure adequate water pressure for each DMA. Both should be of the **above-ground type**, as shown in the diagram and photos below. Jenin Municipality will need to secure road right-of-way for these facilities after planning.

**Stainless-steel Tank Type for above ground installation**

Operation at Okaya City

size	Length (mm)	Width (mm)	Hight (mm)	Weight (Kg)
A	2,400	1,180	1,625	450
B	2,500	2,180	2,125	770
C	3,500	2,180	2,125	1,030

**Pressure Reducing Tank (Ready-made, made in Japan)**



**Pressure Reducing Valve (photos in JSC, Jenin)**

**(b) Flowmeter**

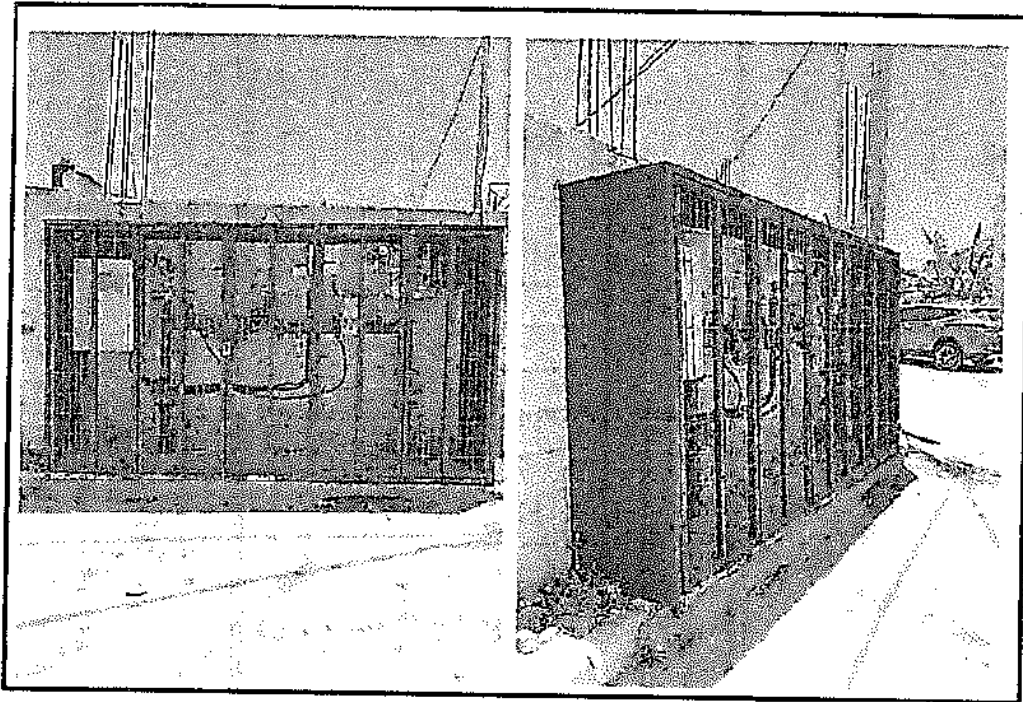
Flowmeter should be installed at each DMA branch. they should be of the **above-ground**

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type, as shown in the photos below. Jenin Municipality will need to secure road right-of-way for these facilities after planning.



Flowmeter (photos in JSC, Jenin)

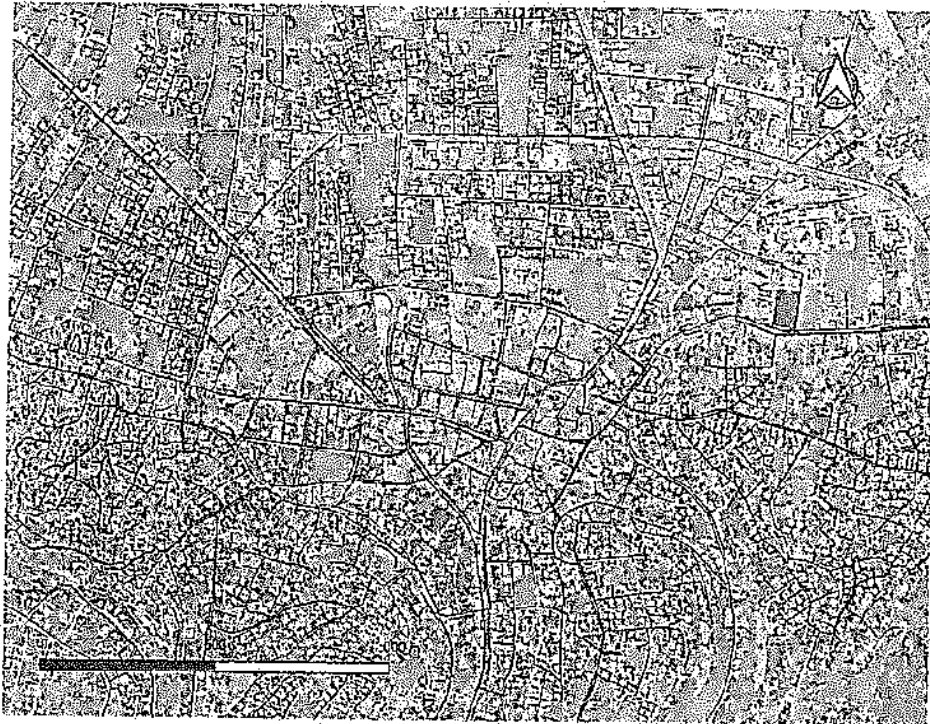
**(c) Fire Hydrant**

Ten (10) existing fire hydrants were identified as shown in the below. New ones will be installed on new routes where available. They shall be above-ground type.

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Location of Existing Fire Hydrant

(d) Others

The design criteria for others shall be as follows.

Classification	Design Criteria
Closure valves	<ul style="list-style-type: none"> <li>Closure valves shall be installed at locations, such as start points, end points, branches, inverted siphons, bridge-piggybacked water mains, water main bridges and others.</li> <li>The Gate valve and the round valve box shall be adopted.</li> </ul>
Air valves	<ul style="list-style-type: none"> <li>For <math>\phi</math> 150 or more, the air valves shall be installed at locations, such as topographical convex parts, inverted siphons and others.</li> </ul>
Drainage facilities	<ul style="list-style-type: none"> <li>The drainage facilities shall be installed at pipe concave sections and/or near rivers and irrigation canal etc.</li> </ul>
Protection of special fittings	<ul style="list-style-type: none"> <li>The anti-escapement fixture shall be adopted. (This is a countermeasure to suppress the damage of the pipe due to the imbalanced forces generated by the bent parts, the branch parts, the gate valves and others. The protection by concrete blocks as another method requires curing period of concrete. Therefore, it shall not be adopted considering the workability based on road conditions.)</li> </ul>

6. Outstanding Issues

(1) Confirmation of Land Acquisition for the New Service Reservoir

According to Article II of MD2 (07.07.2022), evidential documents for land use of the proposed new service reservoir will be submitted to JICA by the end of August 2022. The

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results will be reflected into the facility planning. The following will be discussed and confirmed.

- Necessity of construction of new service reservoir
- Required storage capacity
- Design water flow from the Connection Point Project to each service reservoir
- Technical details of interface between the C-P Project and JICA Project, such as location, connection method, size, specification, pressure, etc.
- Proposed location of pipe branch for direct distribution to high elevation areas

**(2) Undertakings to be taken by the Palestinian side**

Among the specific obligations to be taken by the Palestinian side, the followings are important for project implementation. They shall be confirmed in the course of facility planning.

- Provision of temporary construction yard and stock yard near the Project site
- Provision of borrow pit and disposal site near the Project site. Reportedly, it is very difficult to find such site, more than 7000 m<sup>3</sup>, inside Jenin, as it is usually obligation of the Contractor. Jenin Municipality is trying to find suitable site outside of the municipality which is 15-20km far from Jenin.
- Permission of land use for the above ground Pressure Reducing Tanks and the above-ground flowmeter of each DMA.

(end)

## **Appendix 6 Population Forecast, Water Consumption**





## (1) Population Forecast / Population Served

Sub-Block	2017 (Census)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Rate of Population Served	Population Served
Abu Dhair	1,572	1,611	1,651	<b>1,691</b>	1,732	1,774	1,817	1,861	1,906	1,952	1,999	2,047	2,096	<b>2,146</b>	100%	<b>2,146</b>
Al-Almaniyah	2,116	2,168	2,221	<b>2,275</b>	2,331	2,388	2,446	2,505	2,565	2,627	2,690	2,754	2,820	<b>2,887</b>	100%	<b>2,887</b>
Al-Badadiyah	849	870	891	<b>913</b>	935	958	981	1,005	1,029	1,054	1,079	1,105	1,131	<b>1,158</b>	100%	<b>1,158</b>
Al-Burj_1	157	161	165	<b>169</b>	173	177	181	185	189	194	199	204	209	<b>214</b>	80%	<b>171</b>
Al-Burj_2	343	351	360	<b>369</b>	378	387	396	406	416	426	436	446	457	<b>468</b>	100%	<b>468</b>
Al-Hadaf	2,525	2,587	2,651	<b>2,716</b>	2,782	2,850	2,919	2,990	3,062	3,136	3,211	3,288	3,366	<b>3,446</b>	100%	<b>3,446</b>
Al-Jabriyat	1,240	1,271	1,302	<b>1,334</b>	1,367	1,400	1,434	1,469	1,504	1,540	1,577	1,615	1,653	<b>1,692</b>	100%	<b>1,692</b>
Al-Kroum	1,448	1,484	1,521	<b>1,558</b>	1,596	1,635	1,675	1,716	1,757	1,799	1,842	1,886	1,931	<b>1,977</b>	100%	<b>1,977</b>
Al-Mahattah	684	701	718	<b>736</b>	754	772	791	810	830	850	870	891	912	<b>934</b>	100%	<b>934</b>
Al-Marah	1,870	1,916	1,963	<b>2,011</b>	2,060	2,110	2,161	2,213	2,266	2,321	2,377	2,434	2,492	<b>2,551</b>	100%	<b>2,551</b>
Al-Nabatat	354	363	372	<b>381</b>	390	400	410	420	430	440	451	462	473	<b>484</b>	100%	<b>484</b>
Al-Saadeh	630	646	662	<b>678</b>	695	712	729	747	765	783	802	821	841	<b>861</b>	100%	<b>861</b>
Al-Sharqiyah_1	3,146	3,224	3,303	<b>3,384</b>	3,467	3,552	3,638	3,726	3,816	3,908	4,002	4,098	4,196	<b>4,296</b>	100%	<b>4,296</b>
Al-Sharqiyah_2	701	718	736	<b>754</b>	772	791	810	830	850	870	891	912	934	<b>956</b>	100%	<b>956</b>
Al-Sharqiyah_3	4,430	4,539	4,651	<b>4,765</b>	4,881	5,000	5,122	5,246	5,372	5,501	5,633	5,768	5,905	<b>6,046</b>	100%	<b>6,046</b>
Al-Sharqiyah_4	529	542	555	<b>569</b>	583	597	612	627	642	657	673	689	705	<b>722</b>	100%	<b>722</b>
Al-Sikkah	1,339	1,372	1,406	<b>1,440</b>	1,475	1,511	1,548	1,585	1,623	1,662	1,702	1,743	1,784	<b>1,826</b>	100%	<b>1,826</b>
Al-Swaitat	865	886	908	<b>930</b>	953	976	1,000	1,024	1,049	1,074	1,100	1,126	1,153	<b>1,180</b>	100%	<b>1,180</b>
Al-Takaful	231	237	243	<b>249</b>	255	261	267	273	280	287	294	301	308	<b>315</b>	100%	<b>315</b>
Al-Zahra	1,386	1,420	1,455	<b>1,491</b>	1,527	1,564	1,602	1,641	1,681	1,722	1,763	1,805	1,848	<b>1,892</b>	100%	<b>1,892</b>
Arraneh	891	913	935	<b>958</b>	981	1,005	1,029	1,054	1,079	1,105	1,132	1,159	1,187	<b>1,215</b>	100%	<b>1,215</b>
City Center	424	434	445	<b>456</b>	467	478	490	502	514	526	539	552	565	<b>578</b>	100%	<b>578</b>
Eastern Housing	1,205	1,235	1,265	<b>1,296</b>	1,328	1,360	1,393	1,427	1,461	1,496	1,532	1,569	1,606	<b>1,644</b>	100%	<b>1,644</b>
Expansion 1	248	254	260	<b>266</b>	272	279	286	293	300	307	314	322	330	<b>338</b>	90%	<b>304</b>
Expansion 2	650	666	682	<b>699</b>	716	733	751	769	788	807	826	846	866	<b>887</b>	80%	<b>710</b>
Expansion 3	274	281	288	<b>295</b>	302	309	317	325	333	341	349	357	365	<b>374</b>	90%	<b>336</b>
Expansion 4_1	681	698	715	<b>733</b>	751	769	788	807	826	846	866	887	908	<b>930</b>	0%	<b>0</b>
Expansion 4_2	270	277	284	<b>291</b>	298	305	312	320	328	336	344	352	360	<b>369</b>	100%	<b>369</b>
Expansion 4_3	1,303	1,335	1,368	<b>1,402</b>	1,436	1,471	1,507	1,543	1,580	1,618	1,657	1,697	1,737	<b>1,778</b>	100%	<b>1,778</b>
Ibn Amer	1,265	1,296	1,328	<b>1,361</b>	1,394	1,428	1,463	1,498	1,534	1,571	1,609	1,647	1,686	<b>1,726</b>	100%	<b>1,726</b>
Ibn Sina	891	913	935	<b>958</b>	981	1,005	1,029	1,054	1,079	1,105	1,132	1,159	1,187	<b>1,215</b>	100%	<b>1,215</b>
Industrial Area	362	371	380	<b>389</b>	398	408	418	428	438	449	460	471	482	<b>493</b>	100%	<b>493</b>
Khalet Al-Soha	2,691	2,757	2,825	<b>2,894</b>	2,965	3,037	3,111	3,186	3,263	3,342	3,422	3,504	3,587	<b>3,672</b>	100%	<b>3,672</b>
Kharoubah	260	266	273	<b>280</b>	287	294	301	308	315	323	331	339	347	<b>355</b>	100%	<b>355</b>
Kharoubah	2,746	2,814	2,883	<b>2,954</b>	3,026	3,100	3,175	3,252	3,330	3,410	3,492	3,575	3,660	<b>3,747</b>	100%	<b>3,747</b>
Marah Saad	1,851	1,897	1,944	<b>1,992</b>	2,041	2,091	2,142	2,194	2,247	2,301	2,356	2,412	2,469	<b>2,528</b>	100%	<b>2,528</b>
Northern Orchards	1,752	1,795	1,839	<b>1,884</b>	1,930	1,977	2,025	2,074	2,124	2,175	2,227	2,280	2,334	<b>2,390</b>	100%	<b>2,390</b>
Old City	756	775	794	<b>813</b>	833	853	874	895	917	939	962	985	1,008	<b>1,032</b>	100%	<b>1,032</b>
Sabah Al-Khair	1,322	1,355	1,388	<b>1,422</b>	1,457	1,493	1,529	1,566	1,604	1,643	1,682	1,722	1,763	<b>1,805</b>	100%	<b>1,805</b>
wad Balama1	330	338	346	<b>354</b>	363	372	381	390	399	409	419	429	439	<b>449</b>	80%	<b>359</b>
wad Balama2	130	133	136	<b>139</b>	142	145	149	153	157	161	165	169	173	<b>177</b>	80%	<b>142</b>
wad Balama3	720	738	756	<b>775</b>	794	813	833	853	874	895	916	938	960	<b>983</b>	100%	<b>983</b>
wad Balama4	665	681	698	<b>715</b>	732	750	768	787	806	825	845	865	886	<b>907</b>	80%	<b>726</b>
wad Balama5	230	236	242	<b>248</b>	254	260	266	272	279	286	293	300	307	<b>314</b>	80%	<b>251</b>
Wad Birqeen1	1,294	1,326	1,359	<b>1,392</b>	1,426	1,461	1,497	1,533	1,570	1,608	1,647	1,686	1,726	<b>1,767</b>	100%	<b>1,767</b>
Wad Birqeen2	158	162	166	<b>170</b>	174	178	182	186	190	195	200	205	210	<b>215</b>	100%	<b>215</b>
Jenin Total	49,784	51,012	52,266	<b>53,547</b>	54,855	56,191	57,555	58,948	60,370	61,822	63,305	64,818	66,363	<b>67,941</b>	98%	<b>66,348</b>
Jenin Camp	10,417	10,441	10,465	<b>10,489</b>	10,513	10,537	10,561	10,585	10,609	10,633	10,657	10,682	10,707	<b>10,732</b>	100%	<b>10,732</b>
Jenin + Camp	60,201	61,453	62,731	<b>64,036</b>	65,368	66,728	68,116	69,533	70,979	72,455	73,962	75,500	77,070	<b>78,673</b>	98%	<b>77,080</b>

- (i) Cencus Population ("Population, Housing and Establishments Census 2017", PCBS 2019) is used.
- (ii) With reference to "Projected Mid-Year Population for Jenin Governorate by Locality 2017-2021" (PCBS) annual growth rate of 2.08 is employed for forecasting Jenin total population.
- (iii) Taking into account that the annual growth rate of Jenin camp is +0.23% during 2007 and 2017, annual growth rate of 0.23% for Jenin Camp is applied in consideration of saturation.
- (iv) Population of Jenin (city) is estimated by difference between the total population and camp.

## (2) Current Water Consumption

No.	Item	Unit	2018	2018	2020	Remarks
[1]	Population (Census)	persons	61,453	62,731	64,036	Table A1
[2]	Population Served	persons	46,784	49,727	51,680	Table A3
[3]	Rate of Population Served	%	76.1	79.3	80.7	[3] = [2] / [1]
[4]	Daily Average Distribution	m <sup>3</sup> /d	8,638	9,383	10,134	Record of WWD (2021)
[5]	NRW Ratio	%	60	60	59.58	Record of WWD (2021)
[6.1]	NRW Volume	m <sup>3</sup> /d	5,183	5,630	6,038	[6.1] = [4] x [5]
[6.2]	Revenue Water Volume	m <sup>3</sup> /d	3,455	3,753	4,096	[6.2] = [4] - [6.1]
[7]	Leakage Ratio	%	52	51	50	Estimation by the Survey Team
[8.1]	Leakage Volume	m <sup>3</sup> /d	4,474	4,757	5,067	[8.1] = [4] x [7]
[8.2]	Daily Average Water Consumption (Effective water)	m <sup>3</sup> /d	4,164	4,626	5,067	[8.2] = [4] - [8.1]
[9]	Per Capita Water Consumption	LCPD	89	93	98	[9] = [8.2] / [2]
[9.1]	Per Capita Domestic Water Consumption	LCPD	75	78	82	[9.1] = [9] x 84% (assumed by A4)
[9.2]	Per Capita Other Water Use	LCPD	14	15	16	[9.2] = [9] - [9.2]

**Table A1 Population Forecast**

(Unit: person)

		2017	2018	2019	2020	Remarks
A1.1	Administration of Jenin Municipality	56,775	57,943	59,136	60,352	Including Jenin Camp
A1.2	Expansion Area	3,426	3,510	3,595	3,684	Expansion 1, 2, 3, 4
	<b>Jenin Municipality + Expansion Area</b>	<b>60,201</b>	<b>61,453</b>	<b>62,731</b>	<b>64,036</b>	

(Note) Forecast by Study Team

**Table A2 Estimation of Population Served**

(Unit: person)

		2017	2018	2019	2020	Remarks
A2.1	No. of household (Jenin)	10,525				
A2.2	No. of household (Camp)	2,209				
A2.3	Population (Jenin)	48,821				
A2.4	Population (Camp)	10,214				
A2.5	Ave. family size (Jenin)	4.64				
A2.6	Ave. family size (Camp)	4.62				
A2.7	Ave. family size (Total)	4.64	4.64	4.64	4.64	
A2.8	Number of customers		8,581	9,121	9,479	Table A3
A2.9	Est. population served (registered)		39,816	42,321	43,983	[A2.9] = [A2.7] x [A2.8]
A2.10	Est. population served (non-registered, 17.5%)		6,968	7,406	7,697	Est. from social survey result
A2.11	<b>Est. population served (total)</b>		<b>46,784</b>	<b>49,727</b>	<b>51,680</b>	[A2.11] = [A2.9] + [A2.10]

(Source) 2017 Census (PCBS)

**Table A3 Number of Customers**

(Unit: connection)

		2018	2019	2020	Remarks
A3.1	Mechanical Water Meter	8,581	8,328	6,568	
A3.2	Prepaid Water Meter (PPWM)	0	793	2,911	
	<b>Total</b>	<b>8,581</b>	<b>9,121</b>	<b>9,479</b>	

(Source) WWD, Jenin Municipality (2021)

**Table A4 Revenue Water Volume by Category (data as of year 2017)**

A4.1	Domestic	1,114,736	m3/year 84% of total
A4.2	Commercial	100,821	m3/year 8% of total
A4.3	Industrial	6,682	m3/year 1% of total
A4.4	Governmental	73,936	m3/year 6% of total
A4.5	Municipality	14,070	m3/year 1% of total
A4.6	Institutional	10,540	m3/year 1% of total
A4.7	<b>Total Revenue Water</b>	<b>1,320,785</b>	<b>m3/year</b>

(Source) Table 6-20, Water Service Management Plan 2018-2027 (2019)

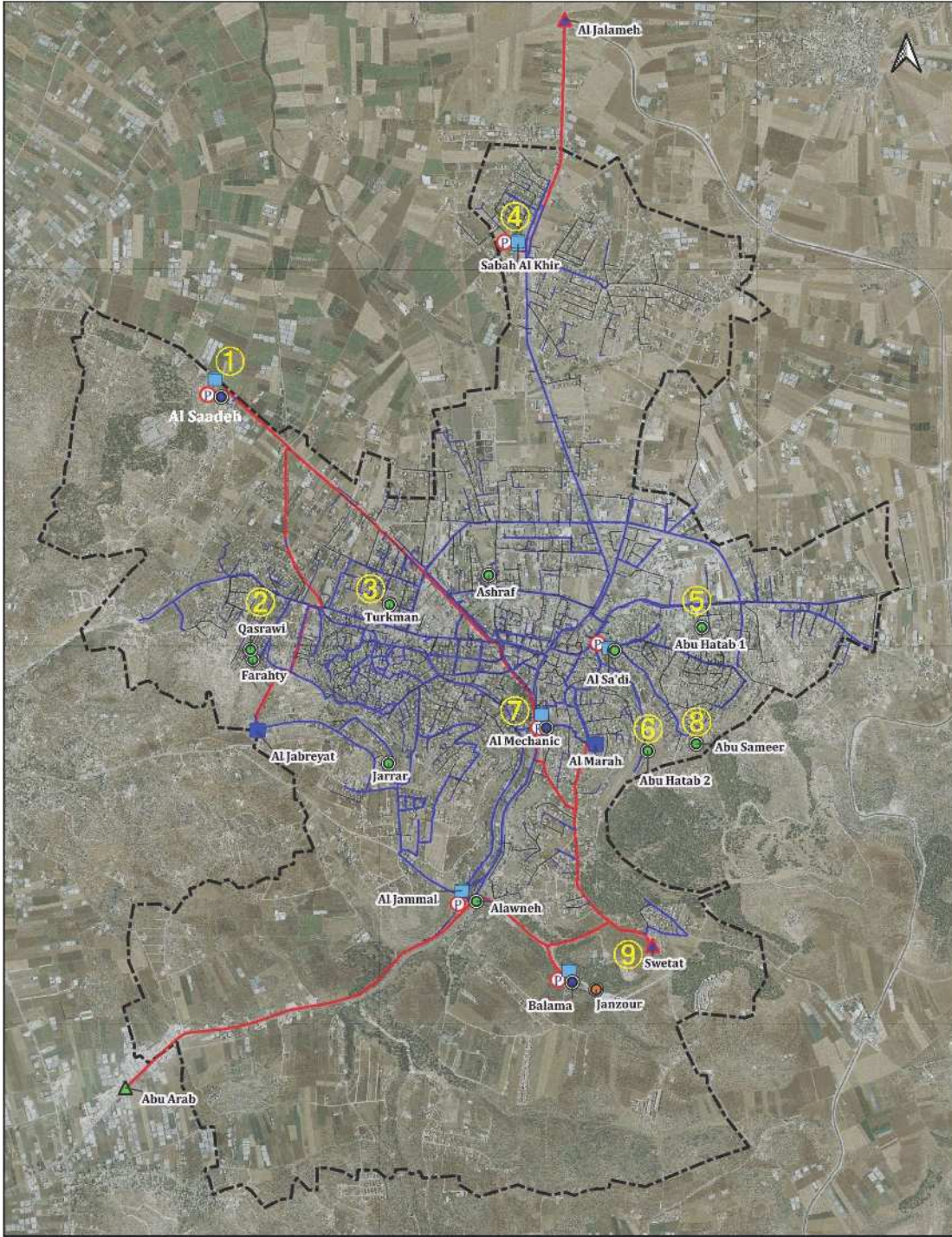
## **Appendix 7 Water Quality Analysis**



# Appendix 7 Water Quality Analysis

## 1. Water Quality Analysis

### (1) Sampling Point



**1 Al Saaedh Well (Municipality)**



09.10.2021

**2 Al Wasrawi Well (Private)**



09.10.2021

**3 Waled Turkman Well (Private)**



09.10.2021

**4 Sabah Al-Khir Point (WBWD)**



15.10.2021

**5 Abo Habab 1 Well (Private)**



15.10.2021

**6 Abo Habab 2 Well (Private)**



15.10.2021

**7 Al Mechanic Well (Municipality)**



15.10.2021

**8 Abo Sameer Well (Private)**



15.10.2021

**9 Swetat Point**



15.10.2021

## (2) Water Quality Analysis Results

Parameter	Unit	WHO Guideline Value	1 AI Saadeh Well	2 AI Qasrawi Well	3 Waled Turkman Well	4 Sabah Alkhair Station	5 Abo Hattab 1 Well
Electrical conductivity	µS	-	1107	770	957	1122	884
TDS	mg/L	1000	642	380	478	562	455
Turbidity	NTU	5	0.32	0.32	0.16	1.3	0.97
pH	-	6.5-8.5	7.45	7.13	7.03	7.4	7.02
Feacal coliform	Number/100ml	0	0	0	0	0	0
Total coliform	Number/100ml	0	0	0	0	0	0
Barium	mg/L	2	1.2	2	1.01	1.25	0.96
Flouride	mg/L	1.5	0.39	0.57	0.28	0.49	0.34
Magnesium	mg/L	100	47.52	32.7	43.98	52.7	39.77
Sulfate	mg/L	400	35.7	15	32.4	44.1	25.33
Sulfide	mg/L	-	0.0	0.0	0.0	0.0	0
Chloride	mg/L	250	123	100	112	146	97
Hardness	mg/L as CaCO <sub>3</sub>	500	499	250	395	510	399
Nitrate	mg/L as NO <sub>3</sub>	50	13.8	4.2	12.4	27.5	15.3
Nitrite	mg/L as NO <sub>2</sub>	3	0	0	0	0	0
Calcium	mg/L as Ca	100	121.6	98.6	105	150.3	97.6
Sodium	mg/L as Na	200	62.99	52.9	59.3	75.6	78.6
Potassium	mg/L as K	10	3.148	0.4	2.9	4.287	0.42
Ammonia	mg/L	-	0	0	0	0	0

Parameter	Unit	WHO Guideline Value	6 Abo Hattab 2 Well	7 AI Mechanic Well	8 Abo Sameer Well	9 AI Swetat Point
Electrical conductivity	µS	-	961	1228	920	995
TDS	mg/L	1000	470	711	460	485
Turbidity	NTU	5	0.61	0.34	0.11	1.5
pH	-	6.5-8.5	7.2	7.42	7.11	7.33
Feacal coliform	Number/100ml	0	0	0	0	0
Total coliform	Number/100ml	0	0	0	0	0
Barium	mg/L	2	1.3	1.3	0.98	1.2
Flouride	mg/L	1.5	0.511	0.34	0.388	0.41
Magnesium	mg/L	100	44.63	27.09	39.11	43.25
Sulfate	mg/L	400	34.12	52.9	29.7	30.7
Sulfide	mg/L	-	0	0	0	0
Chloride	mg/L	250	147	152.6	90.7	98
Hardness	mg/L as CaCO <sub>3</sub>	500	486	470	413	420
Nitrate	mg/L as NO <sub>3</sub>	50	16.8	67.2	14.6	17.5
Nitrite	mg/L as NO <sub>2</sub>	3	0	0	0	0
Calcium	mg/L as Ca	100	99.32	143.8	104	121.6
Sodium	mg/L as Na	200	34.78	90.32	49.39	66.4
Potassium	mg/L as K	10	3.31	5.129	2.7	3.4
Ammonia	mg/L	-	0	0	0	0