

## Hashemite Kingdom of Jordan

### Ministry of Water and Irrigation

Water Authority of Jordan

# **Energy Efficiency in the Water Sector II – Jordan**

# **Environmental and Social Impact Assessment Study Report**

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# 1. Executive Summary

In the framework of the German Financial Cooperation with the Hashemite Kingdom of Jordan, financing was decided for the Project "Energy Efficiency in the Water Sector II - Jordan". The Project is a continuation of the "Energy Efficiency in the Water Sector / Energy Efficiency I" (BMZ NR. 2010 66 398) and will focus on improving energy efficiency in the water sector in Jordan. Within the framework of a countrywide program in Jordan, additional selected energy efficiency measures (i.e. energy-efficient rehabilitation of pumping stations and restructuring of water distribution networks) shall be accomplished. The Project will include two parts:

- Part 1 shall focus on additional measures to improve energy efficiency for remaining wells and pumping stations.
- Part 2 shall focus on energy efficient restructuring / rehabilitation of parts of the water supply network in Balqa Governorate.

## **1.1. Project Proponents**

Different entities are involved in the planning and implementation of the Project. The responsibilities of each key entity, which is of relevance to the Preliminary EIA are listed in Table 1-1 below along with a general description of their roles.

Entity	Role
Ministry of Water and Irrigation\ Water Authority of Jordan	Water authority of Jordan considered to be the owner of the project.
German Financial Cooperation	The donor of the cost of the Consulting Services for the Project.
Ministry of Environment	The Regulator and the official governmental entity responsible for the protection of the environment in Jordan. The MoEnv is responsible for the approval of the Environmental Impact Assessment (EIA) Study and making sure it complies with the "Environmental Classification and Licensing Regulations No. 69 for 2020 and its amended regulation No. 97 for 2020" and responsible for granting the environmental clearance for the Project
Engicon and ILF	Hereafter referred to as the 'Study Team' or 'the Consaltunt' who is the Designer and EIA Practitioner and the consultant commissioned by the Ministry of Water and Irrigation/Water Authority of Jordan to prepare the Study project including the Preliminary EIA study for the Project in accordance with the requirements of the MoEnv

Table 1-1: Project Proponents

## **1.2.** Background

Without knowing yet the exact measure to be taken for restructuring the As-Salt water network, it can be assumed that the NRW losses can be reduced to below the national average of around 72%. Maximum reduction in NRW (about 20%) entails a combination of restructuring and rehabilitation of the entire existing water network. Since the focus of this Project will be on restructuring and creating proper District Metering Areas (DMA) in As Salt Regional Operating Unit (ROU) rather than rehabilitation, energy efficiency is expected to increase and NRW is expected to be reduced, however the goal of NRW reduction cannot be determined at this stage.

Wherever main water lines shall be replaced to eliminate water losses (physical losses), adequate pressure zones to reduce the network pressure and DMAs will be established to monitor the network professionally, reduce NRW and to improve supply by either by direct pumping or change from pumped supply to gravity supply.

Furthermore, the restructuring of the water network will lead to significant reductions in power demand by eliminating the need for pumping of water. When planned and executed properly, it will also lead to a more reliable supply of water and availability of water to more customers.

Lastly, the training of staff and operational strengthening will have a lasting impact beyond the boundaries of this Project as strategies developed for the project area may also be adapted elsewhere in the network and the developed training material can be used for years to come.

The expected results and outcome extracted from the Terms of Reference (TOR) is the general project target. To establish a "Data Baseline Energy Measurement" for 2019 and comparing these data with the results of the "Improvement of Energy Efficiency Report 2009" (IEE), a set of field measurements is necessary. It is required to carry out flow measurements, pressure logging and energy consumption measurement of each pump separately and operational in combination to verify the current situation of flow (Q), Head (H) and power consumption Kilo Watt (kW) at all pump stations selected for As Salt water supply system and their related pump mains.

The Consultant will be in the position to project an actually possible target and scope of works for this Project after establishment of an accurate actual new hydraulic model for the primary and secondary water network of the entire As Salt Water System. Only the establishment of a new hydraulic model, will enable the Consultant to elaborate a Conceptual Design for replacing pumps and restructure the primary and secondary water network. For the existing primary and secondary network, the Consultant relies of flow data availed by WAJ.

The Conceptual Design will include the possible reconstruction of the water system, e.g. where parts of the currently pumped supply can be switched to gravity supply, introduction of new pressure zones / supply zones, or parts of the current network which shall be supplied in future from a lower located reservoir.

## **1.3.** Project Area

The Project Area covers Qasabet As Salt District in Al Balqa Governorate. It includes about 230 km<sup>2</sup>. The administration of the water supply system in Balqa Governorate is divided into five (5) main ROUs; As Salt, Ain Al Basha, Al Fuhais, Deir Alla and Al-Shouneh with a total of about 90,000 (ninety thousand) customers of which about 36,000 (thirty-six thousand) are within As Salt ROU. The project area is shown in Figure 1-3.

As the total construction costs estimated to implement the measures associated with restructuring and rezoning the As Salt water network and pumping stations exceeded the allocated investment cost under Energy Efficiency II Project, a hierarchy for implementation of the various project parts was established and three different zones for the As-Salt ROU were created.

The recommended implementation priority is shown in Figure 1-1, such that the middle zone with 45,765 projected customers, rehabilitation of five pumping stations and construction of one new booster station, needs to be given priority. This split of priority is agreed with by both WAJ and KfW, who are considering allocating extra finance for the Project to implement all energy saving measures within As Salt city to include the upper and lower zones.



Figure 1-1: Priority Zones for implementation. Red rectangles indicate priority 1 pumping stations, yellow rectangle indicated priority booster station

## **1.4.** Project Components

The project includes the following components:

- Rehabilitation of 5 Pumping Stations (Shray'a, Nageb El Dabour, Buheira, Yazedeyyeh and Zai Paumping Stations) to increase the Energy efficiency of these pumps, rehabilitation works will include replacements of electromechanical components and adding extra spaces within the existing site boundary.
- b. Construction of a new Booster Pumping Station as shown in Figure 1-2 that aims to boost the pressure in order to deliver water from Zai-Douq 1200 mm pipeline to Al Buhaira and Sawada reservoirs. The new booster pumping station will not include a water tank.

c. Restructuring of around 180 km length of the water supply network within the project served area to improve the water supply system through enhancing energy efficiency and reducing non-revenue water within the project boundary.



Figure 1-2: Location of the new Booster Pumping Station

## **1.5.** Project Activities during Construction

In general, construction activities constitute the following:

- Mobilization of machineries, equipment's and staff
- Land preparation, excavation, backfilling, reinstating and removal/disposal/management of excavated material, conventional open cut, etc.
- Rehabilitation of mechanical equipment and Pumps
- Materials and stock pilling
- Connection to power supply

# **1.6.** Restructuring / rehabilitation of pipelinesProject Activities During Operation Phase

Operation phase: which is the operation process including the workers' activities, which include:

- Operation and maintenance of the booster pumping station and 5 pumping stations;
- Maintenance of the water network;
- Monitoring of the facilities.

## **1.7.** Area of Influence

The proposed Project is expected to have a physical impact directly on those areas that will be used for constructing the various Project technical components, as described in Chapter 5.1 of this Report, including the social related impacts.

More specifically, the Project will directly influence a strip of land adjacent to the proposed pipeline route and the proposed booster Pumping Station where it is located at 32° 3'56.70"N 35°44'43.68"E on a non-developed land. **Appendix 3** of the report presents the land registration and plan of the proposed pumping station. Figure 1-3 depicts the anticipated area of influence and shows the specific area of the proposed project including existing networks to be rehabilitated and the 5 existing pumping stations that will be rehabilitated. The new booster Pumping Station will be only for water boosting purposes and no tanks will be included within the proposed facilities.



Figure 1-3: Area of Influence of the Project

### **1.8. Legal Framework**

- Ministries, Authorities and Institutions
  - Ministry of Water and Irrigation / WAJ
  - Ministry of Environment
  - Ministry of Tourism and Antiquities / Department of Antiquities
  - o Municipalities of Greater Salt, Al Arda and Ain Al Basha
  - Ministry of Public Works and Housing
  - Ministry of Planning and International Cooperation
  - Ministry of Labor
  - Ministry of Agriculture
  - Public Security Directorate
- National Legislation
  - Environmental Protection Law No. 6 of 2017
  - Agricultural Law No. 13 of 2015
  - Water Authority Law No. 18 of 1988
  - Antiquities Law No. 23 of 2004
  - Public Health Law No. 47 of 2008
  - Labor Law No. 8 of 1996 and its Amendments
  - Social Security Law No. 1 of 2014
  - Prevention of Human Trafficking Law No.9 of 2009
  - Traffic Law No. 49 of 2008
  - Protection of Cultural Heritage and Sites Law No. 5 of 2005
  - Land Acquisition Law No. 12 of 1987 and its Amendments
  - Environmental Classification and Licensing Regulation No. 69 for 2020 and its amended Regulation No. 97 for 2020
  - Regulation on Protecting the Environment from Pollution in Emergency Situations No. 26 of 2005
  - Air Protection Regulation No. 28 of 2005
  - Soil Protection Regulation No. 25 of 2005
  - Groundwater Control Regulation No. 85 of 2002
  - Regulation on the Management of Solid Waste No. 27 of 2005
  - Management, Transportation and Handling of Harmful and Hazardous Substances Regulation No. 24 of 2005
  - Regulation for Obligatory Employment of Jordanian Workforce from Surrounding Communities in Development Projects No. 131 of 2016

- Ministry of Labour Instructions on Safety Measures to Prevent the Spread of Coronavirus at construction sites (07/04/2020)
- Instruction for Site Selection of Development Projects of 2018
- Instructions for Noise Prevention for 2007
- Ambient Air Quality Standards (JS 1140/2006)
- KfW guidelines and IFC Performance Standards
  - KfW Development Bank Sustainability Guidelines, 2019
  - World Bank Environmental and Social Standards ESS, 2018
  - World Bank Environmental, Health and Safety (EHS) Guidelines
- International Agreements and Conventions
  - African-Eurasian Waterbird Agreement (AEWA)
  - Convention on Biological Diversity (CBD), Nairobi, 1992
  - Convention on the Conservation of Migratory Species of Wild Animals, (CMS), Bonn, 1979
  - Convention on the International Trade in Endangered Species of Wild Flora and Fauna, (CITES), Washington DC, 1973
  - Framework Convention on Climate Change (UNFCCC), New York, 1992
  - Paris Agreement (2016)
  - Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia
  - Ramsar Convention on Wetlands of International Importance, Ramsar, 1971
  - UNESCO World Heritage Convention
  - United Nations Convention to Combat Desertification (UNCCD)

### **1.9.** Environmental and Social Baseline Identification Approach

The baseline environmental and social conditions were established for the project through literature review and site visits to cover the following topics:

- Physical environment: prevailing climatic conditions, geological, hydrological, and topographical conditions, air quality, and noise levels
- Biological environment: existing flora and fauna species as well as sensitive habitats and protected areas
- Socio-economic conditions: population, economic activities, land ownership, existing water lines, land use and archaeology and cultural heritage.

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## **1.10.** Environmental and Social Management Plans

The following tables summarize project potential impacts and mitigations measures during the project phases. For definition of assessment see chapter 7.

The report also describes the following:

- Monitoring measures required, institutional set up for implementation of the mitigation and monitoring measures and training needed for the project staff.
- Framework of project stakeholders;
- Stakeholders engagement activities;
- Stakeholders grievance mechanism.

#### Table 1-2: Environmental and Social Mitigation during Construction

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
Soil and Groundwater	Accidental spills during construction can lead to pollution of both soil and groundwater near the construction site. Spills might originate from accidental or structural spillage of fuels, lubricant chemicals, sanitary wastewater, as well as from leakage from inadequately protected solid waste storage facilities and sites. If not dealt with appropriately, the spills can cause health and safety issues of the local population, and even long- term damage to agriculture and water supply in the area.	-M1	<ul> <li>Regular vehicle maintenance;</li> <li>Storage of hazardous, sanitary and cleaning wastes in secure facilities approved by the relevant Municipality;</li> <li>Installation of leak-proof fuel storages on concrete platforms with gutters and grease separators, which are monitored periodically and repaired or replaced when required;</li> <li>Parking vehicles on paved platforms whenever possible;</li> <li>Isolating contaminated soil and treating /disposing it off in a way that will depend on the contaminant type.</li> </ul>	-L1	Contractor
Air Quality	Dust during construction work will originate from activities such as earth movement, from traffic to and from the construction site, from drilling, boring and digging. Air quality will also be impacted due to exhaust fumes when old and not regularly serviced trucks are used. The amount of dust generated will depend on construction activities, soil type, and moisture content, and wind speed, frequency of precipitation, vehicle traffic, vehicle type, and	-M1	<ul> <li>Sprinkling of water to prevent dust generation;</li> <li>Keeping the construction areas to a minimum;</li> <li>Regularly maintain all vehicles and construction machinery.</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	roadway characteristics. Fugitive dust will be greater during drier period in areas of fine textured soils. As air in general is dry, and the construction site is located in close vicinity to residential areas, the nuisance effect of both impacts can be temporarily medium to high.				
Noise	Noise will typically be produced by the working of excavators, earth moving equipment, pile drivers, traffic from supplying building materials, generators and other typical construction related activities (Welding and grinding, pneumatic hammering, drilling etc.). The impact type is temporary, as it concerns the construction phase only in this intensity. It will be locally contained and there will be no larger area affected from this impact.	-M1	<ul> <li>Strictly adhering to working hours (day time) from 6am to 8pm;</li> <li>Sensitizing construction truck drivers and equipment operators to switch off idle engines;</li> <li>Provision of earmuffs and ear protection to workers and employees in high noise areas;</li> <li>Using modern, well-maintained and regularly serviced vehicles;</li> <li>Ensuring that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels;</li> <li>Adhere to the Environmental Management and Coordination regulations.</li> </ul>	-L1	Contractor
Terrestrial Environment	For the construction of the new booster pump, currently undeveloped land will be used. Part of the land is currently used for random construction waste dumping . Therefore, it can be assumed that the habitat found is not sensitive, i.e. the	-L1	<ul> <li>Measures to protect vegetation and Wildlife in the Project area are as follows:</li> <li>Limit construction of access roads and avoid them on vegetated land and close roads that will not be needed after construction;</li> </ul>	-N1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
Local Economy and Livelihood	impact is low. On the other hand, rehabilitation of networks are planned to be in existing roads, and no potential impacts are considered on the biological sensitive receptors. Employment opportunities through the creation of temporary jobs for	+M1	<ul> <li>Avoid tree cutting and when unavoidable, contact Ministry of Agriculture and MoEnv for approval and replanting procedure;</li> <li>Replace soil cover after completing trunk line to restore vegetation cover naturally;</li> <li>Abide by measures for proper disposal of wastewater ;</li> <li>Prohibit hunting by construction workers;</li> <li>Minimize machinery movement on natural land.</li> <li>The negative impact is considered negligible. However, the possibility of livelihood loss for street vendors during</li> </ul>	+M1	Contractor
	both professional staff, and workers as well as semi-skilled workforce. During Construction, there is a potential of improvement of the local economy (food supply to workers, accommodation etc) and no land acquisition are expected.		construction works will need to be addressed. WAJ in collaboration with the contractor shall address street vendors prior to Construction Phase to make sure that temporary relocation will be safe. Also, priority of employment shall be given to the local community		
	In case, street vendors are found on the streets along construction, measures need to be taken that temporary relocation is conducted safely.				
Transportation and Traffic	Pipes will be laid into the trenches where pipes are located currently. These roads must be opened up and traffic is not possible and needs to be diverted. This means, there will be	-M1	<ul> <li>Install temporary structures from the road where pipe laying is being done to local businesses;</li> <li>Inform local businesses owner about construction activities and schedule;</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	restricted access to some areas (mostly residential areas) during construction.		<ul> <li>Proper communication and coordination with affected owners.</li> </ul>		
	Construction materials for earthwork will be sourced offsite. This will increase traffic flow along site access roads during construction from vehicles ferrying construction materials. Also, the access of the workforce will result in increased traffic, especially in the morning and evening hours.	-M1	<ul> <li>Appropriate community liaison management, e.g. enough beforehand information;</li> <li>During construction, clear signing and channeling of construction traffic along designated access routes.</li> </ul>	-L1	Contractor
Community health and safety	Moderate adverse impacts on health and safety of the population are expected as a result of construction works of the rehabilitation of the water supply system. There is potential hazard risk from open trenches in the populated areas during the construction. Another aspect of community health and safety is the increased construction traffic, which, if not mitigated can result in accidents. Covid-19 aspects: An increase in workforce will mean an additional risk to the population, especially in shops / markets and canteens / street	-M1	<ul> <li>Appropriate community liaison management, e.g. enough beforehand information</li> <li>During construction, clear signing and access restrictions to construction site for construction personal only.</li> <li>Install adequate fencing around construction sites</li> <li>Organize stock piling scheduling works to minimize the construction area.</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	kitchens, as more people will be present				
Occupational Health and Safety	During construction, the impacts on health and safety are related to hygiene and safety risks, excavation works, working with heavy machinery, working in very noisy environments (noise-producing machines), lifting or loading heavy loads, and accidents. One important aspect is the risk of open and unsecured trenches. Covid-19 aspects: The workforce will need to work in close vicinity to each other, often without being able to keep the minimum distance required. This applies also to the journey to and from the construction site in construction vehicles and the break times, that are spent together in markets, street kitchens, canteens or shops.	-M1	<ul> <li>Provision of adequate construction equipment (personal protective equipment);</li> <li>regular onsite inspections in terms of compliance with regulations and standards;</li> <li>provision of medical assistance to workers;</li> <li>information to workers about possible risks and measures of prevention and elimination.</li> <li>Refer to Table 8-1.</li> </ul>	-L1	Contractor
Archaeology and Cultural Heritage	No excavation or construction activities are anticipated for the implementation of this project within any archaeological sites or sites of cultural heritage importance. Since construction activities will be within	-M1	• The Contractor shall recognize the Heritage Law and its articles issued in 2005, as well as the Antiquities Law No. 21 of 1988 and its articles, instructions and amendments, in order to facilitate dealing with cultural heritage in the event of the appearance of any heritage or archaeological sites. In case of archaeological findings during construction,	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	existing roads, if required while on undeveloped land for the booster pumping station. As such no adverse impacts on such cultural heritage and archaeological sites and resources are expected to occur during the installation of the Booster pumping station. However, unknown artifacts may be uncovered during the excavation activities for the laying of sewer networks network.		works should be halted immediately, and the Ministry of Tourism and Antiquities must be informed accordingly.		
Waste	Waste will be generated during construction. This includes all kinds of construction waste, solid waste, greywater, temporary installations, equipment like fences and signs.	-M1	<ul> <li>Implementation of Waste Management Plan during construction;</li> <li>Proper waste management facilities and emergency preparedness/response measures;</li> <li>Organize stock piling scheduling works to minimize the construction area.</li> </ul>	-L1	Contractor

#### Table 1-3: Environmental and Social Mitigation during Operation

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
Noise	Noise during operation will typically result only from generators of the new booster pumping station. Typical pump noise is about 75 dB directly at the source. When incorporating the building surrounding the pump and the distance to the fence (typically about 50m), the noise at the fence will be negligible. It will be locally contained and there will be no larger area affected from this impact.	-M1	<ul> <li>The operator shall conduct regular maintenance for the booster pumping station and ensure that the pump is installed in a closed building.</li> </ul>	-L1	Operator
Terrestrial Environment	Project operation is not expected to have a significant impact on fauna species as the project will have minimal operation activities.	N	<ul> <li>The Operator of the booster pumping station should ensure that noise abatement measures are implemented. However, the operator shall raise the awareness of workers on the respect and preservation of wildlife.</li> </ul>	N	Operator
Local Economy and Livelihood	Impacts on local economy and livelihood will be positive, as the water supply will be reliable. Employment opportunities through the creation of permanent jobs for both professional staff, and workers as well as semi- skilled workforce will also have a positive impact. However, there will not be a large number of jobs created, as the workforce already maintaining the	+L1	<ul> <li>The impact is considered low, no mitigation measures are needed. However, priority of employment shall be given to local community.</li> </ul>	+L1	Operator

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	water supply network will be sufficient and might not increase in numbers. Therefore, the impact is considered positive, direct, but low and permanent.				
Community health and safety	In the operation phase, overall community health and wellbeing might improve slightly, as the water supply will be more reliable. Also, it will be less costly than the alternative of buying bottled water. The water supply to date is good in terms of health, therefore there will be no change regarding this aspect. Covid-19 aspects: An increase in workforce will mean an additional risk to the population, especially in shops / markets and canteens / street kitchens, as more people will be present	+M1	<ul> <li>Apply maintenance of adequate pressure to protect water quality by ensuring construction meets applicable standards and industry practices;</li> <li>Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas);</li> <li>Review the results of the water quality provided as part of the national comprehensive water-quality monitoring program carried by WAJ using its own laboratories.</li> </ul>	+M1	Operator
Occupational Health and Safety	A potential for worker exposure to risks of accidents, injuries and health impacts associated with operating the booster pumping station or maintenance activities.	-M1	<ul> <li>In order to protect workers from exposure to health and safety risks, a Health and Safety Plan should be developed and implemented.</li> </ul>	-L1	Operator

# 2. Introduction

Improving energy efficiency is crucial to reduce energy consumption and contribute to climate change mitigation. The water sector in Jordan consumes 14% of the generated electricity (approximately 2000 GWh/year). Between 2008 and 2014, GIZ and the Water Authority of Jordan surveyed various pumping stations, assessed the key processes where energy efficiency measures could take place and identified the energy saving potential in the country. This exercise revealed that the annual energy saving potential from 25 pumping facilities would be 42 GWh/year, which means a 33.5% reduction, equivalent to 3.3 million Euro – based on 2013 electricity tariffs. The power saved will result in reducing CO2 emissions by 30,637 ton/year. [1]

In the framework of the German Financial Cooperation with the Hashemite Kingdom of Jordan, financing was decided for the Project "Energy Efficiency in the Water Sector II - Jordan". The Project is a continuation of the "Energy Efficiency in the Water Sector / Energy Efficiency I" (BMZ NR. 2010 66 398) and will focus on improving energy efficiency in the water sector in Jordan. Within the framework of a countrywide program in Jordan, additional selected energy efficiency measures (i.e. energy-efficient rehabilitation of pumping stations and restructuring of water distribution networks) shall be accomplished. The Project will include two parts:

- Part 1 shall focus on additional measures to improve energy efficiency for remaining wells and pumping stations.
- Part 2 shall focus on energy efficient restructuring / rehabilitation of parts of the water supply network in Balqa Governorate.

## 2.1. Project Proponents

Different entities are involved in the planning and implementation of the Project. The responsibilities of each key entity, which is of relevance to the Preliminary EIA are listed in Table 2-1 below along with a general description of their roles.

Entity	Role
Ministry of Water and Irrigation\ Water Authority of Jordan	Water authority of Jordan considered to be the owner of the project.
German Financial Cooperation	The donor of the cost of the Consulting Services for the Project.
Ministry of Environment	The Regulator and the official governmental entity responsible for the protection of the environment in Jordan. The MoEnv is responsible for the approval of the Environmental Impact Assessment (EIA) Study and making sure it complies with the "Environmental Classification and Licensing Regulations No. 69 for 2020 and its amended

Table 2-1: Project Proponents

Entity	Role
	regulation No. 97 for 2020" and responsible for granting the environmental clearance for the Project
Engicon and ILF	Hereafter referred to as the 'Study Team' or 'the Consaltunt' who is the Designer and EIA Practitioner and the consultant commissioned by the Ministry of Water and Irrigation/Water Authority of Jordan to prepare the Study project including the Preliminary EIA study for the Project in accordance with the requirements of the MoEnv

## 2.2. Background

Without knowing yet the exact measure to be taken for restructuring the As-Salt water network, it can be assumed that the NRW losses can be reduced to below the national average of around 72%. Maximum reduction in NRW (about 20%) entails a combination of restructuring and rehabilitation of the entire existing water network. Since the focus of this Project will be on restructuring and creating proper District Metering Areas (DMA) in As Salt Regional Operating Unit (ROU) rather than rehabilitation, energy efficiency is expected to increase and NRW is expected to be reduced, however the goal of NRW reduction cannot be determined at this stage.

Wherever main water lines shall be replaced to eliminate water losses (physical losses), adequate pressure zones to reduce the network pressure and DMAs will be established to monitor the network professionally, reduce NRW and to improve supply by either by direct pumping or change from pumped supply to gravity supply.

Furthermore, the restructuring of the water network will lead to significant reductions in power demand by eliminating the need for pumping of water. When planned and executed properly, it will also lead to a more reliable supply of water and availability of water to more customers.

Lastly, the training of staff and operational strengthening will have a lasting impact beyond the boundaries of this Project as strategies developed for the project area may also be adapted elsewhere in the network and the developed training material can be used for years to come.

The expected results and outcome extracted from the Terms of Reference (TOR) is the general project target. To establish a "Data Baseline Energy Measurement" for 2019 and comparing these data with the results of the "Improvement of Energy Efficiency Report 2009" (IEE), a set of field measurements is necessary. It is required to carry out flow measurements, pressure logging and energy consumption measurement of each pump separately and operational in combination to verify the current situation of flow (Q), Head (H) and power consumption Kilo Watt (kW) at all pump stations selected for As Salt water supply system and their related pump mains.

The Consultant will be in the position to project an actually possible target and scope of works for this Project after establishment of an accurate actual new hydraulic model for the primary and secondary water network of the entire As Salt Water System. Only the establishment of a new hydraulic model, will enable the Consultant to elaborate a Conceptual Design for replacing pumps and restructure the primary and secondary water network. For the existing primary and secondary network, the Consultant relies of flow data availed by WAJ.

The Conceptual Design will include the possible reconstruction of the water system, e.g. where parts of the currently pumped supply can be switched to gravity supply, introduction of new pressure zones / supply zones, or parts of the current network which shall be supplied in future from a lower located reservoir.

# 2.3. Objectives

The general scope of the Project is the improvement of the energy efficiency in the water sector through rehabilitation of pumping stations, water network restructuring of the primary and secondary network as well as some required rehabilitation of the tertiary water network in the Balqa Governorate in Jordan.

The services to be provided encompass:

- Concept study / review;
- Preliminary / conceptual design;
- Elaboration of detailed designs;
- Environmental and Social Impact Assessment (ESIA);
- Elaboration of tender documents;
- Support to WAJ during tendering; and
- Construction supervision services.

Support for training and organizational strengthening may be provided as additional services under a provisional sum included in the contract.

The aim is to increase energy efficiency in the water sector through a multi-prong approach:

- Reducing energy consumption of old or inefficient equipment through rehabilitation;
- Restructuring water networks to achieve an increase in operating efficiency;
- Reducing the total potable water demand by eliminating non-revenue water (NRW) losses; and
- Improving operation of the water networks through training and operational strengthening.

In the Kick-Off Meeting on 16th May 2019 in Amman, the Consultant Joint Venture (JV) -ILF & Engicon - and the Water Authority of Jordan have mutually agreed to concentrate the project area for investigations and measures to the Greater As-Salt Area. This approach will allow for a systematic investigation of the As-Salt network and should allow a more effective use of the investment to improve overall energy efficiency in that area.

## 2.4. Report Structure

The structure of this report is presented in Table 2-2.

#### Table 2-2: ESIA Report Structure

Section	Contents				
1. Executive Summary	Presents a non-technical summary of the ESIA report				
2. Introduction	Presents the Project's proponent, background as well as ESIA objectives				
3. Legal and Administrative Framework	Identifies the pertinent regulations and standards governing the environmental and social performance of the Project.				
4. Analysis of Alternatives	Presents the alternatives considered for the project and the various advantages and disadvantages of each				
5. Project Description	Provides a description of the Project and Project components				
6. Environmental and Social Baseline Identification	Presents information about the conditions in the project area related to all environmental and social components at the time of the study				
7. Assessment of Impacts	Describes the approach to be used in evaluating the potential positive and negative environmental and social impacts likely to result from the Project and presents the results of this assessment				
8. Mitigation Measures	Sets forth the mitigation measures proposed to address all identified impacts in the study				
9. Framework of Project Stakeholders	Presents the stakeholder of the project and grievance mechanisms.				
10. Environmental and Social Management and Monitoring Plan	Presents the mitigation and monitoring management plans required to ensure that the project's environmental and social impacts are avoided, minimized or, if necessary, offset. It also presents the required institutional arrangements for implementation of these plans.				
11. References	Lists the references used in the preparation of the ESIA study.				
12. Appendices	Represents all related mentioned appendices.				

# 3. Legal Framework

This Chapter discusses the legal and administrative framework of environmental and social issues relevant to the Project. The Chapter provides a description of relevant national institutions, legislation, KfW guidelines, IFC Performance Standards, World Bank Environmental and Social Standards ESS, 2018 and regional/international agreements to the project.

## **3.1.** Ministries, Authorities and Institutions

### 3.1.1. Ministry of Water and Irrigation / WAJ

These organizations work collectively in determining the national water policy, monitoring and protecting water against pollution, in addition to studying water, irrigation and sewerage. Groundwater, aquifer management, and extraction monitoring and licensing are the responsibility of the Water Authority of Jordan.

### **3.1.2.** Ministry of Environment

The MoEnv was established in 2003 with a mandate to maintain and improve the quality of the Jordanian environment by sustaining and conserving Jordan's environmental resources and contributing to sustainable development. MOE is in charge of the development of policies, strategies and legislation and enhancing the integration of environmental concepts into national development plans.

MoEnv also undertakes monitoring and inspection to ensure that legislation is properly enforced and information management programs are developed in order to facilitate the decision-making and analysis process of environmental data. MoEnv also undertakes work on raising public awareness, strengthening its capacity and promoting co-operation with relevant national, regional and international parties. All projects which might impact the environment as scheduled in Environmental Classification and Licensing Regulation must undertake an EIA that should be approved by the Ministry.

### 3.1.3. Ministry of Tourism and Antiquities / Department of Antiquities

The Jordanian Department of Antiquities was established in 1923 as part of the Department of Palestinian Antiquities. The Department was also responsible for tourism. The Jordanian Department of Antiquities became independent from the Palestinian Department of Antiquities following the Primary Law of 1928.

The objective of the establishment of the Jordanian Department of Antiquities in 1923 was to protect the antiquities of the country and to collect antiquities that were scattered all over the country and those in the hand of civilians. This was in accordance with the law by which the Department was created.

### 3.1.4. Municipalities of Greater Salt, Al Arda and Ain Al Basha

Municipalities in Jordan are financially independent institutions with administrative autonomy. Each municipality is managed by a municipal council that consists of a Mayor and a Town Council. The municipality is in charge of strategic planning and has a wide range of responsibilities encompassing various essential public services such as water distribution, sanitation services, public health issues and solid waste management as prescribed in the Municipalities Law No. 41 for 2015.

### 3.1.5. Ministry of Public Works and Housing

The Ministry of Public Works and Housing (MPWH), operating under the "Regulation of Organization and Management of the MPWH No. 55 of 1996", is the governmental authority responsible for the construction and development of the public road network in Jordan. The Ministry is also responsible for connecting cities, villages, and communities together in addition to maintaining the network in good technical conditions. It has the following main responsibilities:

- to complete and upgrade the infrastructure required for economic development and social activities and to improve the quality of public buildings;
- to ensure the use of high-quality construction materials to improve safety standards;
- to address issues that have a direct impact on the environment such as air pollution and wastewater treatment and disposal.

### **3.1.6.** Ministry of Planning and International Cooperation

The objectives of Ministry of Planning and International Cooperation are the coordination and formulation of social and economic development plans; and the implementation thereof, in coordination with other stakeholders. The Ministry is also responsible for enhancing cooperation with international partners including maximising the benefits from foreign assistance (grants, soft loans, and technical assistance) to finance developmental programmes and projects.

### 3.1.7. Ministry of Labor

Since its establishment in 1976, the Ministry undertakes to implement its tasks and duties, which were re-defined in accordance with Regulation no. (53) for the year 1992, amended by the Regulation no. (38) for the year 1994. It is the governmental body responsible for health and safety of workers and labour in Jordan.

### 3.1.8. Ministry of Agriculture

The Ministry of Agriculture is responsible for managing public rangelands and forests, protecting soil resources, pastureland and flora, permitting pesticides, protecting and managing wildlife, issuing hunting licenses, determining capacity and setting 'take' limits.
### 3.1.9. Public Security Directorate

Section Four of Public Security Law (38) for 1965 specified the duties of the Public Security Directorate, such as:

- Prevention of crimes and endeavor to discover and pursue them, to arrest and apprehend their perpetrators and deliver them to justice;
- Administration of prisons and guarding of prisoners;
- Supervising and organizing traffic on roads through the Traffic Department;
- Controlling public meetings and processions on roads and in public places.

# 3.2. National Legislation

### 3.2.1. Environmental Protection Law No. 6 of 2017

In 2017, an Environmental Protection Law (EPL) was decreed in Jordan. Article 4 of this law states that the Ministry of Environment (MoEnv) will cooperate and coordinate with the authorities concerned with environmental affairs at the local, regional, and international level. The MoEnv will endeavor to preserve the environment and prevent contamination.

### 3.2.2. Agricultural Law No. 13 of 2015

The Agricultural Law states that the MOA is the responsible entity for agricultural consultation and research. As stated in Article 7-c of the law, the Ministry is assigned the role of protecting human life from any risks related to agricultural products or the spread of any related disease.

### 3.2.3. Water Authority Law No. 18 of 1988

The Water Authority Law and its amendments established the WAJ as an autonomous agency responsible for all water and wastewater issues in the country. WAJ's mandate includes connecting the public to the water and sewer networks, as well as maintaining, operating, and managing these networks.

### 3.2.4. Antiquities Law No. 23 of 2004

The Antiquities Law is the key legal act for the protection of antiquities in Jordan. Article 13 requires that significant archaeological sites should be documented and protected by a buffer zone of 5 m to 25 m. In addition, it states: "it is prohibited to set up any dangerous industry, lime furnaces and stone quarries at a distance less than 1 km from the location of the antique site". The Department of Antiquities gives permits for any fieldwork necessary to identify archaeological sites that may be impacted by a development, beginning with the archaeological survey of the project land.

### 3.2.5. Public Health Law No. 47 of 2008

The Ministry of Health (MoH) is responsible for enforcing the laws concerning public health in Jordan. In Article 21, Clause 5, the law states that: "Ministry of Health must report any case of contagious disease in the area of a wastewater treatment plant and take the necessary measures to prevent an outbreak of disease." Article 11 addresses wastewater issues and Article 51 gives a mandate to the Ministry of Health to monitor water networks and internal installations to protect public health.

### 3.2.6. Labor Law No. 8 of 1996 and its Amendments

Jordanian Labour Law No. (8) of 1996 is the primary piece of legislation governing the relationship between employers and employees in Jordan. In mid-May 2019, this law was amended by Law No. (14) of 2019, which was issued in the Official Gazette. The amended law introduces new provisions that impact 40 articles of the Labour Law. However, the amended law's most significant impacts on the employment relationship include amendments to wages, overtime, paternity leave, annual leave (e.g., vacation), childcare, retirement, and the resolution of wage disputes.

### 3.2.7. Social Security Law No. 1 of 2014

This Law provides for the establishment of the General Social Security Institution which should provide social insurance for all workers under sixteen with certain exceptions (seafarers, domestic servants, agricultural workers). The major chapters in the Law are the following: Labour Injuries and Occupational Diseases, Old Age, Disability and Death Benefits. Four lists are appended to the text: List of Occupational Diseases, List of Labour Injuries, List of sums due for the inclusion of past services, and List of shares in pensions or compensations.

### 3.2.8. Prevention of Human Trafficking Law No.9 of 2009

An Act to provide for the prohibition of trafficking in persons, creation of offences, prosecution and punishment of offenders, prevention of the vice of trafficking in persons, protection of victims of trafficking in persons, and other related matters

### 3.2.9. Traffic Law No. 49 of 2008

Under the Traffic Law No. 14 for 1984, the Ministry of Interior was given full responsibility for traffic in Jordan such that coordination is made with the Ministry of Public Works & Housing regarding main highways and with municipalities for roads with municipality boundaries. The related articles regarding the environmental impacts / air and noise are Articles 66, 68, 77 and 79.

### 3.2.10. Protection of Cultural Heritage and Sites Law No. 5 of 2005

Issued by the Ministry of Tourism & Antiquities (MOTA), the Law for Protection of Cultural Heritage & Sites aims to conserve, protect, and maintain Jordanian heritage sites. According to Article 11 of the law, destruction or damage of any heritage site is strictly forbidden.

### 3.2.11. Land Acquisition Law No. 12 of 1987 and its Amendments

Jordanian law allows for the appropriation of land for the public benefit conditional on fair and just compensation. Any potential land acquisition is undertaken in accordance with Decree (12) of 1987, commonly referred to as the Land Acquisition Law (LAL) and its amendments and must be approved by the Council of Ministers. The Department of Lands and Surveys (DLS) has been established to oversee the acquisition, compensation payment and ultimate registration of the land.

# **3.2.12.** Environmental Classification and Licensing Regulation No. 69 for 2020 and its amended Regulation No. 97 for 2020

The regulation was issued to ensure that the anticipated impacts any development project may have on the social, economic, and natural environment in Jordan are identified. Its aim is to limit these impacts in order to achieve sustainable development in the country. The bylaw applies to all industrial, agricultural, commercial, construction, residential, and tourism projects.

# **3.2.13.** Regulation on Protecting the Environment from Pollution in Emergency Situations No. 26 of 2005

This regulation specifies tasks and duties of the Ministry of Environment in cooperation with the concerned authorities in case of Emergency, as follows: (a) laying down plans for the protection of the environment and fighting pollution in case of emergency; (b) managing and following the execution of the Emergency Plans; (c) defining needs of the Emergency Plan; and, (d) taking necessary measures

### 3.2.14. Air Protection Regulation No. 28 of 2005

The aim of the Air Protection Regulation is to protect public health and the environment from pollution resulting from human activities by controlling air pollutants emitted from stationary and mobile sources.

### 3.2.15. Soil Protection Regulation No. 25 of 2005

Article 3e of the Soil Protection Regulation states that: "the MoEnv, in coordination with the Ministry of Agriculture, is responsible for studying the sites of development projects and their impact on land and natural resources." Environmental considerations should be taken into account when developing these projects.

### 3.2.16. Groundwater Control Regulation No. 85 of 2002

This Regulation was issued pursuant to Articles 6 and 32 of Water Authority Law No. 18 of 1988. The general premise of the Groundwater Control Regulation is that the groundwater is state owned and thus it is subject to governmental control. The regulation emphasizes other licensing rules and fees for drilling wells and any pumping activities as well as water prices, pollution control, and requirements from private well owners.

### 3.2.17. Regulation on the Management of Solid Waste No. 27 of 2005

The Solid Waste Management Regulation aims to establish a solid waste management system that would protect the environment and public health. It also strives to benefit from material found in or resulting from this waste in an environmentally safe manner. Article 9 stipulates that it is forbidden to leave any construction or excavation debris after completion of works.

### 3.2.18. Management, Transportation and Handling of Harmful and Hazardous Substances Regulation No. 24 of 2005

This Regulation is composed of 11 articles. Article 3 provides for the establishment of the Technical Committee formed by 12 members. Article 4 deals with competences and duties of the Committee, as follows: (a) classification of hazardous and dangerous substances; (b) preparation of directives and instructions for defining technical and scientific requirements and methods necessary for transporting, gathering, storing and treating hazardous.

# 3.2.19. Regulation for Obligatory Employment of Jordanian Workforce from Surrounding Communities in Development Projects No. 131 of 2016

The Regulation requires the obligatory employment of local communities within development projects to include fresh graduate engineers, technicians, labourers, etc. and specifies requirements for training as well as giving priority for local contractors. The number of job opportunities is specified based on the investment amount of the development projects.

# **3.2.20.** Ministry of Labour Instructions on Safety Measures to Prevent the Spread of Coronavirus at construction sites (07/04/2020)

It mentions the requested measures of the contractor regarding Corona Virus prevention procedures during construction projects.

### 3.2.21. Instruction for Site Selection of Development Projects of 2018

The instructions are to choose the sites of developmental activities, in which it sets the minimum distance for developmental activity that includes agricultural, commercial, industrial, housing, and mining projects, and others, from residential areas.

### 3.2.22. Instructions for Noise Prevention for 2007

Issued by MoEnv, these instructions specify the maximum allowable level of noise for the different types of areas, both during the daytime and at night. The instructions prohibit construction activities that use noisy equipment like mixers and shakers and any other similar equipment between the hours of 8 pm and 6 am except for the cases approved by the Minister (Table 3-1). The applicable area for this project is the "Industrial Areas (heavy industries)".

#### Table 3-1: Maximum Allowable Noise Levels

Type of Area	Limit for Equivalent Sound Level (decibel A)		
	Day	Night	
Residential areas in cities	60	50	
Residential areas in suburbs	55	45	
Residential areas in villages	50	40	
Residential areas that have some workshops or simple vocations or business and commercial and administrative areas and downtown	65	55	
Industrial areas (heavy industries)	75	65	
Tuition, worshipping and treatment places and hospitals	45	35	

### 3.2.23. Ambient Air Quality Standards (JS 1140/2006)

JS 1140/2006 provides definitions of ambient air pollutants and the maximum allowable concentration for each of those pollutants. The standards specify the maximum allowable limits of concentration of ambient air pollutants, beyond which, responsible parties should take action (Table 3-2). These standards also describe the methods to be used for measuring these parameters.

Pollutant	Duration	Maximum Allowable Limits	Allowable Number of Times for Exceeding Limits
	1 hour	0.135 ppm	3 times during a year
SO <sub>2</sub>	24 hours	0.13 ppm	Once a year
	Annual	0.03 ppm	-
со	1 hour	26 ppm	3 times a year
	8 hours	9 ppm	3 times a year
	1 hour	0.21 ppm	3 times a year
NO <sub>2</sub>	24 hours	0.08 ppm	3 times a year
	Annual	0.05 ppm	-
H <sub>2</sub> S	1 hour	0.030 ppm	3 times a year
	24 hours	0.01 ppm	3 times a year
03	8 hours	0.08 mg/kg	-
	1 hour	0.12 mg/kg	-
NH₂	24 hours	270 mg/kg	3 times a year
	Annual	8 mg/kg	-
TSP	24 hours	260 mg/m <sup>3</sup>	3 times a year
131	Annual	75 mg/m <sup>3</sup>	-

#### Table 3-2: Allowable Emission Limits for Air Pollutants (JS 1140/2006)

Pollutant	Duration	Maximum Allowable Limits	Allowable Number of Times for Exceeding Limits
PM10	24 hours	120 mg/m <sup>3</sup>	3 times a year
1 1010	Annual	70 mg/m <sup>3</sup>	-
PM2 5	24 hours	65 mg/kg	3 times a year
1 101213	Annual	15 mg/kg	-
Pb	Seasonal	1 mg/m <sup>3</sup>	-
	Annual	0.5 mg/m <sup>3</sup>	-
Ρ2Ο5	24 hours	100 mg/kg	3 times a year
. 205	Annual	40 mg/kg	-
Cd	Annual	0.005 mg/kg	-

## **3.3. Jordanian Environmental Approval Process**

The environmental assessment of works and activities in Jordan stems from the national Environmental Protection Law No. 6/2017. The MoEnv is the agency responsible for implementing the EIA system, as described in the Environmental Classification and Licensing Regulations No. 69 for 2020 and its amended regulation No. 97 for 2020. According to this regulation, developers in Jordan must submit an application to obtain an Environmental Approval from the MoEnv as part of their licensing process.

As a first step, the Project is screened and classified as one of the following categories, on the basis of the recommendations of the CLC, as follows:

- Category 1: The project requires a Comprehensive EIA. In case of Category 1, the MoEnv shall advise the project owner in writing, requesting a full comprehensive EIA for the project.
- Category 2: The project requires a Preliminary EIA, based on which the need to conduct a Comprehensive EIA will be determined accordingly.
- Category 3: The project requires an Environmental approval.
- Category 4: The project does not require any kind of environmental assessment.

The decision on which category the Project belongs to therefore rests with the MoEnv based on the recommendation of the CLC.

A screening process was conducted through the MoEnv who concluded, on 30/01/2020 in their letter No. 4/7/1101 (Appendix 1), that the activities associated with the Project require conducting a **Preliminary EIA study** for the Project (Category 2).

Three (3) successive phases of activities are involved in the completion of a Preliminary EIA study in Jordan:

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- <u>Scoping Phase</u>: This provides the MoEnv with all available information about the Project as well as the nature of impacts expected to result from the project. The report will also include a detailed Terms of Reference (TOR) that will present the methodology that will be adopted for the EIA study. This report must be approved by MoEnv, prior to undertaking the EIA study. In accordance with the above, this report considered to be the TOR report. On 04/06/2020, MoEnv approved the submitted TOR for the study as per letter No. 4/7/3136 presented in **(Appendix 2).**
- <u>Assessment Phase</u>: The assessment phase is carried out in accordance with the approved TOR by the MoEnv and involves undertaking the baseline studies, impact assessment, development of an environmental and social management plan (ESMP) and required management plans for various components that are expected to be impacted by the project and its activities commensurate to national standards. The EIA, represented by this document, is the output of the assessment, prepared in accordance with the approved TOR.
- <u>Approval of EIA</u>: Upon submission of the EIA document to the MoEnv, the CLC reviews the report and either approves the study and grants the environmental clearance for the Project or requests a Comprehensive EIA study.

# **3.4.** KfW guidelines and IFC Performance Standards

### 3.4.1. Overview

Projects are classified into one of three categories ("A", "B" or "C"), according to the relevance of their potentially adverse environmental and social impacts:

- Category A: Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented. These projects may affect an area broader than the sites or facilities subject to physical works. For a 'Category A' Project, the Employer is responsible for preparing an Environmental Impact Assessment (ESIA) and for preparing and updating an Environmental and Social Action Plans; under the umbrella of an Environmental and Social Management Plan (ESMP);
- Category B: Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures; and
- Category C: Business activities with minimal or no adverse environmental or social risks and/or impacts.

Despite the positive impacts on the social environment, the Energy Efficiency for the Water Sector II will include civil works and is therefore classified as 'Category B' project.

### 3.4.2. KfW Development Bank Sustainability Guidelines, 2019

With the aim of achieving sustainability and avoiding adverse environmental, social and climate impacts and risks, KfW Development Bank pusues the following principles for its

Financial Cooperation (FC) measures that are financed:

- To avoid, reduce or limit environmental pollution and environmental damage including climate-damaging emissions and pollution;
- To preserve and protect biodiversity and tropical rainforests and to sustainably manage natural resources;
- To consider probable and foreseeable impacts of climate change including utilizing the potential to adapt to climate change. In this context climate change is understood as climate variability and long-term climate change;
- To avoid adverse impacts upon the living conditions of communities, in particular indigenous people and other vulnerable groups, as well as to ensure the rights, living conditions and values of indigenous people;
- To avoid and minimise involuntary resettlement and forced eviction of people and their living space as well as to mitigate adverse social and economic impacts through changes in land use by reinstating the previous living conditions of the affected population;
- To ensure and support occupational health and safety as well as health protection in the workplace;
- To condemn forced labour and child labour, ban discrimination in respect of employment as well as occupation and support the freedom of association and the right to collective bargaining;
- To avoid all forms of discriminations;
- To avoid negatively influencing existing conflict dynamics;
- To protect and preserve cultural heritage; and
- To support the executing agency in the management and monitoring of possible adverse environmental, social and climate impacts as well as risks within the framework of the implement FC measure.

### 3.4.3. World Bank Environmental and Social Standards ESS, 2018

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The ten standards are outlined in the following pages.

### Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

ESS1 sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project. Its key objectives are tabulated below:

#### ESS1 Key Objectives

To identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs .

To adopt a mitigation hierarchy approach to:

(a) Anticipate and avoid risks and impacts;

(b) Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels;

(c) Once risks and impacts have been minimized or reduced, mitigate; and

(d) Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible .

To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project.

To utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate .

To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity .

#### Environmental and Social Standard 2: Labour and Working Conditions

ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Its key objectives are tabulated below:

**ESS2 Key Objectives** 

To promote safety and health at work

To promote the fair treatment, nondiscrimination and equal opportunity of project workers

To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate

To prevent the use of all forms of forced labor and child labor

To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law

To provide project workers with accessible means to raise workplace concerns

Environmental and Social Standard 3:

Resource efficiency and pollution prevention and management

ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. It's main objectives are tabulated below:

#### **ESS3 Key Objectives**

To promote the sustainable use of resources, including energy, water and raw materials

To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities

To avoid or minimize project-related emissions of short and long-lived climate pollutants

To avoid or minimize generation of hazardous and non-hazardous waste

To minimize and manage the risks and impacts associated with pesticide use

### Environmental and Social Standard 4: Community health and safety

ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. Its main objectives are tabulated below:

#### **ESS4 Key Objectives**

To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances

To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams

To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials

To have in place effective measures to address emergency events

To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities

#### **Environmental and Social Standard 5:**

land Acquisition, restrictions on land Use and involuntary resettlement

ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. It's main objectives are tabulated below:

#### ESS5 Key Objectives

To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives

To avoid forced eviction

To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by:

(a) providing timely compensation for loss of assets at replacement cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure

To conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant

To ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected

#### Environmental and Social Standard 6:

#### Biodiversity Conservation and sustainable management of living natural resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Its main objectives are tabulated below:

#### ESS6 Key Objectives

To protect and conserve biodiversity and habitats

To apply the mitigation hierarchy4 and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity

To promote the sustainable management of living natural resources

To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities

#### **Environmental and Social Standard 7: Indigenous peoples**

ESS7 recognizes that indigenous peoples have identities and aspirations that are distinct from mainstream groups in national societies and often are disadvantaged by traditional models of development. Its main objectives are tabulated below:

#### **ESS7 Key Objectives**

To ensure that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples.

To avoid adverse impacts of projects on Indigenous Peoples, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts

To promote sustainable development benefits and opportunities for Indigenous Peoples in a manner that is accessible, culturally appropriate and inclusive

To improve project design and promote local support by establishing and maintaining an ongoing relationship based on meaningful consultation with the Indigenous Peoples affected by a project throughout the project's life cycle

To obtain the Free, Prior, and Informed Consent (FPIC)3 of affected Indigenous Peoples in the three circumstances described in this ESS

To recognize, respect and preserve the culture, knowledge, and practices of Indigenous Peoples, and to provide them with an opportunity to adapt to changing conditions in a manner and in a time-frame acceptable to them

#### **Environmental and Social Standard 8: Cultual Heritage**

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. Its main objectives are tabulated below:

ESS8 Key Objectives

To protect cultural heritage from the adverse impacts of project activities and support its preservation

To address cultural heritage as an integral aspect of sustainable development

To promote meaningful consultation with stakeholders regarding cultural heritage

To promote the equitable sharing of benefits from the use of cultural heritage

**Environmental and Social Standard 9: Financial Intermediaries** 

ESS9 recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. Its main objectives are tabulated below:

**ESS9 Key Objectives** 

To set out how the FI will assess and manage environmental and social risks and impacts associated with the subprojects it finances

To promote good environmental and social management practices in the subprojects the FI finances.

To promote good environmental and sound human resources management within the FI

Environmental and Social Standard 10: Stakeholder Engagement and Information Ddisclosure

ESS10 recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Its main objectives are tabulated below:

#### ESS10 Key Objectives

To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties

To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance

To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them

To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format

To provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances

### 3.4.4. World Bank Environmental, Health and Safety (EHS) Guidelines

These guidelines establish that employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers and examples are given. Although the focus is on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities. Companies should hire Contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.

Preventive and protective measures should be introduced according to the following order of priority:

- Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc.;
- Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc.;
- Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.; and
- Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

### **3.4.5.** International Agreements and Conventions

In the following table, are international agreements and conventions which Jordan is signatory to.

Convention Name	Geographic Scope	National Parties / Signatories	Convention Party / Signatory	Range State
<u>African-Eurasian Waterbird Agreement (AEWA)</u>	Regional	75	yes	yes
<u>Convention on Biological Diversity (CBD).</u> <u>Nairobi, 1992</u>	Global	195	yes	yes
<u>Convention on the Conservation of Migratory</u> <u>Species of Wild Animals, (CMS), Bonn, 1979</u>	Global	123	yes	yes

Table 3-3: International Agreements and Conventions Jordan has signed (Source: BirdLife 2019c) [2]

Convention Name	Geographic Scope	National Parties / Signatories	Convention Party / Signatory	Range State
Convention on the International Trade in Endangered Species of Wild Flora and Fauna, (CITES), Washington DC, 1973	Global	182	yes	yes
<u>Framework Convention on Climate Change</u> (UNFCCC), New York, 1992	Global	197	yes	yes
Paris Agreement (2016)	Global	196	yes	yes
Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia	Regional	55		yes
Ramsar Convention on Wetlands of International Importance, Ramsar, 1971	Global	169	yes	yes
UNESCO World Heritage Convention	Global	192	yes	Yes
<u>United Nations Convention to Combat</u> <u>Desertification (UNCCD)</u>	Global	195	Yes	yes

# 4. Project Description

## 4.1. Project Area

The Project Area covers Qasabet As Salt District in Al Balqa Governorate. It includes about 230 km<sup>2</sup>. The administration of the water supply system in Balqa Governorate is divided into five (5) main ROUs; As Salt, Ain Al Basha, Al Fuhais, Deir Alla and Al-Shouneh with a total of about 90,000 (ninety thousand) customers of which about 36,000 (thirty-six thousand) are within As Salt ROU. The project area is shown in Figure 4-3

As the total construction costs estimated to implement the measures associated with restructuring and rezoning the As Salt water network and pumping stations exceeded the allocated investment cost under Energy Efficiency II Project, a hierarchy for implementation of the various project parts was established and three different zones for the As-Salt ROU were created.

The recommended implementation priority is shown in Figure 4-1, such that the middle zone with 45,765 projected customers, rehabilitation of five pumping stations and construction of one new booster station, needs to be given priority. This split of priority is agreed with by both WAJ and KfW, who are considering allocating extra finance for the Project to implement all energy saving measures within As Salt city to include the upper and lower zones.



Figure 4-1: Priority Zones for implementation. Red rectangles indicate priority 1 pumping stations, yellow rectangle indicated priority booster station

# 4.2. Project Components

The project includes the following components:

- a. Rehabilitation of 5 Pumping Stations (Shray'a, Nageb El Dabour, Buheira, Yazedeyyeh and Zai Paumping Stations) to increase the Energy efficiency of these pumps, rehabilitation works will include replacements of electromechanical components and adding extra spaces within the existing site boundary.
- b. Construction of a new Booster Pumping Station as shown in Figure 4-2 that aims to boost the pressure in order to deliver water from Zai-Douq 1200 mm pipeline to Al Buhaira and Sawada reservoirs. The new booster pumping station will not include a water tank.

c. Restructuring of around 180 km length of the water supply network within the project served area to improve the water supply system through enhancing energy efficiency and reducing non-revenue water within the project boundary.



Figure 4-2: Location of the new Booster Pumping Station

# 4.3. Project Activities during Construction

In general, construction activities constitute the following:

- Mobilization of machineries, equipment's and staff
- Land preparation, excavation, backfilling, reinstating and removal/disposal/management of excavated material, conventional open cut, etc.
- Rehabilitation of mechanical equipment and Pumps
- Materials and stock pilling
- Connection to power supply
- Restructuring / rehabilitation of pipelines

# 4.4. Project Activities During Operation Phase

Operation phase: which is the operation process including the workers' activities, which include:

- Operation and maintenance of the booster pumping station and five rehabilitated pumping stations;
- Maintenance of the water network;
- Monitoring of the facilities.

# 4.5. Area of Influence

The proposed Project is expected to have a physical impact directly on those areas that will be used for constructing the various Project technical components, as described in Chapter 5.1 of this Report, including the social related impacts.

More specifically, the Project will directly influence a strip of land adjacent to the proposed pipeline route and the proposed booster Pumping Station where it is located at 32° 3'56.70"N 35°44'43.68"E on a non-developed land. **Appendix 3** of the report presents the land registration and plan of the proposed pumping station. Figure 4-3 depicts the anticipated area of influence and shows the specific area of the proposed project including existing networks to be rehabilitated and the existing pumping stations that will be rehabilitated. The new booster Pumping Station will be only for water boosting purposes, and no tanks will be included within the proposed facilities.



Figure 4-3: Area of Influence of the Project

# 5. Analysis of Alternatives

This chapter discusses the proposed project alternatives.

## 5.1. No Project Alternative

The current drinking water supply situation shows that present and future drinking water needs are likely to be compromised because of the vulnerability of water resources to the efficiency loss which affects most of the region.

The "without project" scenario would mean leaving areas and regions characterised by continuous demographic development in a state of water deficit. The situation is exacerbated by the depletion of groundwater resources, the decline in groundwater levels, the diminished flows, and the deterioration of water quality (increasingly salty groundwater).

This option will condemn thousands of people and families living in these areas to a situation where, as a result of being unable to meet their needs, they would be compelled to over consume groundwater resources (which would be detrimental to the water quality).

No alternative was explored for the programme as a whole. However, and at the sub-project level, technical alternatives were studied (see Section 5.2).

# 5.2. Design Alternatives

For all alternatives, the newly built pipe routes will follow existing roads, land acquisition is reduced to a minimum, and gravity supply is preferred to pumped water supply. The main water supply is from Zai WTP, the largest reservoir to store and deliver the water is Al Bohairah Reservoir at 1065 masl, while the highest point with a smaller reservoir is Zai Reservoir at 1,110 masl.

Alternative 1, depicted in Figure 5-1 involves pumping the water from the main supply line to the highest existing facility (Zai Reservoir at an elevation of 1,110 masl) and distribution by gravity from this point.

### 5.2.1. Alternative 1



Figure 5-1: Alternative 1A, and Alternative 1B and C Supply from Zai WTP (885 masl) to Zai Existing Tank (@ 1,110 masl) with Booster

Alternative 1A suggests pumping the water from the WTP to a point near Prince Talal Bin Mohammad street via the existing main supply line, then using a newly built booster to pump the water up to the Zai Reservoir. This alternative involves land acquisition, because a new booster needs to be built along the main supply line.

Alternative 1B suggests pumping the water from the WTP directly up to the Zai Reservoir along newly built pipes. It involves building new pumps at Zai WTP, which does not involve land acquisition, as the new booster pump will be installed on the area of Zai WTP.

### 5.2.2. Alternative 2

This alternative deals with the water being pumped from the main supply at Zai WTP to the largest reservoir, Al Boheirah, at an elevation of 1,065 masl. From there it is pumped to Zai Reservoir (the highest elevation at 1,110 masl), so it can be delivered by gravity. The additional pump at Al Boheirah requires land acquisition. The variations are depicted in Figure 5-2.



Figure 5-2: Alternative 2A, 2B and 2C : Supply from Zai WTP (885 masl) to Al Boheirah Reservoir (1,065 masl)

Alternative 2A uses a new branch off the main transmission line deliver the water to Al Boheirah reservoir from a point at around 950 masl. Apart from the additional pump at Al Boheirah reservoir, which is common to all Alternative 2 options, no further land acquisition is required. Also, with this alternative, no other pumps or boosters are installed, but has the disadvantage of a very low residual pressure at Al Boheira reservoir.

Alternative 2B uses a new booster and a new branch off the main transmission line starting at Zai WTP and following the main transmission line in parallel until about the same place as Alternative 2A. From there the new pipe will deliver the water upwards to Al Bohairah Reservoir, from where it will be pumped up to Zai Reservoir. As the new booster pump will be installed on the site of Zai WTP, no land acquisition is necessary.

Alternative 2C is similar to Alternative 2A, the difference is a booster at the branching off point from the main transmission line, which will reduce the risk of water pressure being too low when arriving at Al Boheirah Reservoir. Land acquisition may be needed for this alternative.

In consultation with the Client different options of alternative 2C have been studied to provide the required water quantities to Sawadah reservoirs. A new pipeline from the Dabouq transmission main to Sawadah reservoir should be installed in addition for any future supply.

### 5.2.3. Alternative 3

Alternative 3, which is depicted in Figure 5-3 delivers water from the main transmission line to a third reservoir, namely Sawada Reservoir at 1,035 masl. This option requires a new branch off from the main transmission line where 2A and 2C also branch off at 950 masl. The newly built pipe will deliver the water without a booster to Sawada Reservoir, from where a newly built pump will deliver it to Al Boheirah Reservoir, where it will also need an additional pump to pump it up to Zai Reservoir. In this case, land acquisition is required for two new pumps, at Sawadah and Al Boheirah Reservoir. However, the water pressure will be higher when reaching Sawadah in comparison to Alternative 2A.



Figure 5-3: Alternative 3A Supply from Zai WTP (885 masl) to Sawadah Reservoir (1,035 masl) and on to Al Boheirah (1,065 masl)

### 5.2.4. Preferred Alternative: Alternative 4

The alternative that was found to be the most efficient one is a variation of Alternative 2C, depicted in Figure 5-4. It uses a new branch off the main transmission line deliver the water to Al Boheirah reservoir from a point at around 950 masl using a new booster pump, which will require land acquisition. The location for this booster pump has been identified by the design team at 32° 3'56.70"N 35°44'43.68"E on a non-developed land, **Appendix 3** of the report shows presents the land registration and plan of the proposed pumping station . The Al Boheirah reservoir has the largest capacity for water storage. Another pump delivers the water to the highest elevation reservoir, Zai Reservoir, from where it is delivered by gravity in order to reduce energy use.

To also provide the required water quantities to Sawadah reservoir, this alternative includes a new pipeline from the Dabouq transmission main to Sawadah reservoir.



Figure 5-4: Alternative 4 to provide direct pipes to Sawadah Reservoir : Supply from Zai WTP (885 masl) to Al Boheirah Reservoir (1,065 masl) using a new booster at branching off point.

#### Table 5-1 shows a Summary of Alternatives.

Table 5-1: Summary of Alternatives advantages and disadvantages

Alternative	Advantages	Disadvantages
Alternative 1	Utilization of highest elevation reservoir (Zai Reservoir) Utilization of gravity for distribution (energy cost reduction)	Zai reservoir capacity is limited 1a: Land acquisition for booster pump
Alternative 2	Utilization of largest reservoir (Al Boheirah) and consecutively highest reservoir (Zai Reservoir), then distribution by gravity	Land acquisition for additional pump at Al Boheirah Low residual pressure at Al Boheirah

Alternative 3	Utilization of Sawada Reservoir without additional booster Higher water pressure at Sawadah Reservoir	Land acquisition for booster pumps at Sawadah and Al Boheirah
Alternative 4	Largest reservoir used (Al Boheirah Reservoir)	Low energy consumption Booster Pumping Station to be installed to guarantee delivering water to Al Boheriah reservoir

# 6. Environmental and Social Baseline Identification Approach

This Chapter discusses the environmental and social baseline conditions within the Project Area, Environmental aspects considered mainly cover the physical and biological environments, as well as the socio-economic contexts. Available documents were collected, reviewed and analysed in order to define the characteristics of the existing environment.

# 6.1. Physical Environment

### 6.1.1. Climate and Meterology

Figure 6-1 shows average monthly temperatures (mean daily minimum and maximum) and precipitation for As-Salt. for the last 30 years.



Figure 6-1: Average Weather and Precipitation in As-Salt [3]

Figure 6-2 presents a modelled wind rose for Balqa, showing how many hours per year the wind blows from the indicated direction. According to the figure, wind in the area mostly blows from the West (westerly winds).



Figure 6-2: Al Balqa Wind Rose [3]

### 6.1.2. Topography, Geology and Soil

The Project area is within the Governorate's of Balqa. Elevation within project area varies as shown in Figure 6-3 to reach around 1109 above sea level (absl) to the eastern side.On the other hand, it goes down 340m below sea level to the western side.



Figure 6-3: Topography of the Project Area

Salt ROU, where the Project is located, belongs to A1-A6 Formations as shown in Figure 6-4. This hydrogeological unit belongs to the Upper Cretaceous age and the geological units of Balqa and Ajloun.



Figure 6-4: Geological Map of Jordan [4]

A brief description of the formations and its material composition is provided below:

**Na'ur Limestone Formation (A1-2):** The name of this formation is taken from the town of Na'ur, located 15km southwest of Amman. The exposed part of this formation form a cliff of limestone, mainly micritic, nodular, dolomitic, fossiliferous, medium to thick-bedded including chert nodules and intercalated with marly limestone and soft marl.

**Shu'ayb Formation (A5-6):** The formation consists mainly of yellow to yellowish grey, thin to medium-bedded marly limestone, nodular, fossiliferous to coquina, alternating with marls and limestone beds. It is characterized by yellowish colour and micritic limestone nodules.

**Wadi As Sir Limestone Formation (A7):** This formation is of Late Turonian – Coniacian age and is predominantly composed of limestone and dolomitic limestone with thin intercalations of marl and calcareous siltstone. The sequence comprises a massive limestone unit towards the top. Dolomite is more common in the lower and middle part of the section.

It is exposed on to the north of the project area with thickness varies between 80 and 150 m and generally increases towards northwest. At its base finely laminated gypsi-ferrous beds are encountered.

### 6.1.3. Air Quality and Noise Level

In terms of potential sources of air pollution or noise, As Salt industrial area is located 5 km south of As Salt city (Figure 6-5), within the served area and close to some of the pipeline rehabilitation/construction locations. The industrial zone covers an area of 238,000 m<sup>2</sup> and targets technical and engineering industries, pharmaceutical, chemical, plastic, food and textile industries, paper, printing and packaging, which may be a source of dust, noise and

other emissions. Moreover, the project area includes 5 main highways shows in below map that is considered as a source of noise.



#### Figure 6-5: As Salt industrial area and main highways

### 6.1.4. Water Resources

The Project area lies within Jordan Valley, North Jordan Valley and Zarqa groundwater basin as shown in Figure 6-6 while it lies within Zarqa, Southern Jordan Valley side wadis and Jordan Valley Surface water basins (Figure 6-7).



Figure 6-6: Groundwater Basins in Jordan



Figure 6-7: Surface water Basins in Jordan

# 6.2. Biological Environment

Al Balqa Governorate, where the Project is located, is characterized by natural pine tree *(Pinus halepensis)* forests that are predominantly found in in Zai and Dibeen in As-Salt area. deciduous Oak forests with species of *Quercus ithaburensis* and *Pistacia atlantican* are found in As-Baihi near As-Salt [5].

As for faunal species, Balqa Governorate is home to the ldfinch (*Carduelis carduelis*), Black bird (*Turdus merula*) and Chucker (*Alectoris chukar*) very common resident, birds that are all common residents of the area. Reptiles such as the *Cyrtopodium kotschi* that are associated with Oak trees, the Badger (*Meles meles*), Arabian wolf, (*Canis lupus*) and Striped Hyena (*Hyaena hyaena*) are all common species to the area.

#### Protected Areas and Key Biodiversity Areas

The Key Biodiversity Areas (KBAs) closest to the project area are Dibeen Forest Protected Area (PA), Dibeen Forest Important Birds Area (IBA) and Madaba Husban IBA and can be found in Figure 6-8.



Figure 6-8: PAs and IBAs around Salt ROU

The Project does not overlap with any KBA, such that the distance between the construction area of networks and Dibeen Forests PA and Dibeen Forest IBA is around 7.5 km. Similarly, construction area of networks is 9.8 km away from Madaba Husban IBA.

Dibeen Forest covers an area of over 60 km<sup>2</sup> with altitudes varying between 100 and 500m above sea level. As for Dibeen Forest PA, it was established by RSCN in 2004 with an area over 8.5 km<sup>2</sup> of mountainous terrain covered by some of the oldest and largest pristine pine-oak habitat (predominantly *Pinus halipensis* and *Quercus calliprinos*) in Jordan. Additionally, it is a shelter for at least 17 threatened species, like the Persian Squirrel and other globally significant biodiversity.

Aleppo pine (*Pinus halepensis*) is dominant in the lower elevation of the core area where there are some pure stands with large mature trees. In the middle elevations, a pine-oak (*Pinus halepensis/Quercus calliprinos*) association is dominant and this extends over the majority of the area. The oak succeeds as the dominant species with small stands of deciduous oak (*Quercus infectoria*) on the uppermost slopes of the PA. Additionally, other trees present in the forest include Strawberry tree (*Arbutus andrachine*), pistachio (*Pistachia palestina*) and wild olive (*Olea europea*); while the ground flora is exceptionally rich and includes several orchid species and other forest related plant species [6]. Dibben IBA is a representative bird assemblage of Mediterranean pine woodland, a rare and diminishing habitat in Jordan. It also contains breeding species such as *Dendrocopos syriacus*, *Phylloscopus bonelli* and *Parus caeruleus*. In fact, this IBA is the only known breeding site in Jordan for the latter two species. Other species observed during the breeding season include *Circaetus gallicus*, *Accipiter nisus*, *Falco Subbuteo* and *Nectarinia osea*. The birds species *Lullula arborea* visits the site during winter in small numbers. Large numbers of migrating raptors have been reported in spring, but no details are known [7].

# 6.3. Socio-economic Conditions

### 6.3.1. Demographic Conditions

The demographic data of the project area, Qasab As Salt, is shown in Table 6-1 by locality, gender, nationality and household size according to the general census of population and housing results of 2014. The projected population for the project area in 2018 (using a growth rate of 2.6%) is approximately 166,000. This number is in line with the Department of Statistics (DoS) projections of 2018 for the same area. Balqa Governorate has one of the highest poverty rates in Jordan. At 20.9%, it is well above the national average of 14.4%<sup>1</sup>.

District	Sub- District	Locality	House-holds	Total	Others	Syrians	Jordanians
		Yazeediyyeh	259	1,444	24	37	1,383
		Wadi Ennaqah	137	546	109	29	408
		Um Karubah	129	702	25	0	677
hah		Wadi Essahn	15	73	15	0	58
		Wadi Elhoor	630	3,232	85	44	3,103
Qasi		Salt	21,531	99,890	8,726	6,472	84,692
Salt	Salt	Sub Total	22,701	105,887	8,984	6,582	90,321
ab	u La	As Subeihi	1,458	7,434	1,335	241	5,858
Salt Qas	Al- Ard	Bayyoodah Sharqiyyeh	199	971	10	67	894

Table 6-1: Demographic Data of As-Salt District for 2014

<sup>1</sup> DOS (2012), Poverty Conditions in Jordan (based on data from the Household Expenditures and Income Survey of 2010) Environmental and Social Impact Assessment Study Report | v3.0

District	Sub- District	Locality	House-holds	Total	Others	Syrians	Jordanians
		Siehan	318	1,564	114	104	1,346
		Elaiqoon	73	405	10	0	395
		Bayyoodah Gharbiyyeh	94	461	8	0	453
		Bayyoodah Shamaliyyeh	70	351	0	0	351
		Khashfeh	116	576	9	0	567
		Jarriesh	159	781	39	10	732
		Azab	33	185	40	0	145
		Qsaib	81	452	7	0	445
		Bwaib	62	324	5	0	319
		Haqawah	217	969	0	31	938
		Maisarah	233	1,074	29	44	1,001
		Dhraissat	22	97	0	0	97
		Sub Total	3,135	15,644	1,606	497	13,541
		Allan	1,411	6,652	298	512	5,842
		Zaiy	903	4,214	269	55	3,890
		Rmemen	759	3,487	885	138	2,464
		Um Jauzeh	863	4,071	187	110	3,774
		Waseah	95	467	145	24	298
abah	Zaiy	Soomia	50	288	5	0	283
Qasa	an &	Msherfah	58	273	74	0	199
Salt	Alla	Sub Total	4,139	19,452	1,863	839	16,750
		Yarqa	1,493	7,068	238	234	6,596
abah	sha Sha	Ira	821	4,071	32	58	3,981
Salt Qas	lra Yarg	Sub Total	2,314	11,139	270	292	10,577
	e	Sahlooliyyeh	191	944	38	36	870
	Bas	Sub Total	191	944	38	36	870
Grand Total			32,480	153,066	12,761	8,246	132,059

### 6.3.2. Employment Conditions

In 2019, Al Balqa has an unemployment rate of 20.8%, slightly higher than a national rate of 19% [8]. As for employed persons, Table 6-2 provides an overview of rates by employment activities in Al Balqa governorate compared to the overall national rates. It shows that the majority of males in Al Balqa work in Public Administration, Defence and Compulsory Social
Security with a percentage of 24.8% while 33.8% of employed females work in the Education sector. This is slightly higher than the national rates, at 20.5% and 29.7%, respectively.

Reto Para ante Antoina	Al Balqa	Governorat	rate Jordan			
iviain Economic Activity	Male	Female	Total	Male	Female	Total
Percentage	100	100	100	100	100	100
Agriculture, forestry and fishing	12.6	2.7	10.6	3.8	0.8	3.3
Mining and quarrying	0.6	0.0	0.5	0.7	0.1	0.5
Manufacturing	7.7	4.2	7.0	11.9	6.5	10.9
Electricity, gas, steam and air conditioning supply	1.0	0.3	0.9	0.6	0.2	0.6
Water supply, sewerage, waste management and remediation activities	0.1	0.0	0.1	0.3	0.0	0.3
Construction	8.2	0.2	6.6	9.6	0.3	7.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	15.6	4.8	13.5	17.6	5.7	15.4
Transportation and storage	4.9	0.9	4.2	6.5	0.9	5.5
Accommodation and food service activities	4.2	0.8	3.5	4.0	0.8	3.4
Information and communication	0.8	0.9	0.8	1.1	1.6	1.2
Financial and insurance activities	1.2	3.2	1.6	1.1	2.1	1.3
Real estate activities	0.6	0.0	0.5	0.5	0.2	0.5
Professional, scientific and technical activities	1.7	2.4	1.8	2.5	2.7	2.5
Administrative and support service activities	3.3	2.7	3.2	2.9	2.2	2.8
Public Administration, Defence, and Compulsory Social Security	24.8	16.5	23.1	20.5	9.0	18.4
Education	5.5	33.8	11.1	4.9	29.7	9.4
Human health and social work activities	3.5	15.5	5.9	2.2	11.0	3.8
Arts, entertainment and recreation	0.3	0.4	0.3	0.4	0.5	0.5
Other service activities	2.3	1.1	2.0	2.8	2.1	2.7
Activities of households as employers; undifferentiated goods and services- producing activities of households for own use	0.9	9.4	2.6	4.8	21.8	7.9
Activities of extraterritorial organizations and bodies	0.3	0.1	0.3	1.2	1.9	1.3

Table 6-2: Employment Conditions in Balqa Governorate and on the National Level by Economic Sectors<sup>2</sup>

<sup>&</sup>lt;sup>2</sup> Source: DOS (2017), Employment and Unemployment survey, 2017 Environmental and Social Impact Assessment Study Report | v3.0

Ministry of Water and Irrigation

# 6.3.3. Water Supply Services

The current supply zones of As Salt ROU are supplied by internal sources (groundwater wells) operated by Balqa Water Administration and by imported amounts from the Zai-Dabouq Transmission pipeline with a nominal diameter of 1,200mm, operated by Miyahuna. The internal sources of water supply in As Salt are associated with the following groups of groundwater wells: Al Yazeediyya wells, Bqoureyeh, Shray'a, Ain Hazeer, Um Ateih wells, Allan wells and Subeihi wells as depicted in Figure 6-9.



Figure 6-9: Internal Groundwater Resources of As Salt

The source from the Zai-Dabouq transmission main, operated and managed by Miyahuna, supplies As Salt via the existing DN 1,200 mm transmission main at seven (7) take-off points (branches) through which water is delivered via four (4) direct connections (Zai 1, Zai 2, As Sero, and Um Jozeh) to the network and three (3) indirect connections (Naqb Al Dabour and Al Yazeediyya 1 & 2) to existing reservoirs, namely Naqb Al Dabour and Al Yazeediyya reservoirs as depicted in Figure 6-10.



Figure 6-10: As Salt Branches along the Zai-Dabouq DN 1,200 mm Pipeline (Transmission Main)

## 6.3.4. Land-use

As Salt ROU area is considered as mainly residential with some rural and agricultural areas as shown in Figure 6-11.



Figure 6-11: Land Use of As Salt ROU area

The land use of new Booster Pumping Station site is relatively undeveloped (virgin lands) and owned by WAJ. However, part of the proposed land is currently used for construction waste dumping as shown in Figure 6-12 taken in December 2020 during a site visit.



Figure 6-12: Photo of the proposed booster pumping station during the site visit

The total area of the required land for the booster pumping station is 2,938 m<sup>2</sup> which meets the design need, and it is fully owned by WAJ (Appendix 3). It is worth noting that no land acquisition will be required through this project and all pipes will be laid within the right-of-way of existing roads or in governmental owned lands such that the total lengths of new constructed pipes will be around 160 km.

# 6.3.5. Archaeology and Cultural Heritage

A letter was submitted to Department of Antiquities on 02/03/2020 (Appendix 4) in order to identify registered Archaeological sites within ROU and no response has received yet.

As per available data, some cultural heritage buildings were identified in the project area as shown in Figure 6-13.



Figure 6-13: Archaeological and Cultural Heritage Sites

Figure 6-14 below represents archaeological sites still under review based on MEGA Jordan website (dashed line represents the construction area of networks).



Figure 6-14: Archaeological sites under review by MEGA Jordan website.

# 7. Assessment of Impacts

This chapter describes the identified potential environmental and social impacts that may result from construction and operation of the proposed project on the physical, biological and socioeconomic environment.

# 7.1. Criteria

The ESIA considers the impacts of the 'Energy Efficiency in the Water Sector II Project' on the physical, biological and social environment, for the Construction and Operation Phases respectively. For the impact assessment, the approach was to:

- Assess the medium and above negative impacts; and
- Assess the positive impacts.

Based on the outcome of the assessment, mitigation measures to prevent, reduce or offset impacts were defined. The objective was to reduce all negative impacts to low, with mitigation measures applied.

To assess impacts, the preliminary ESIA required:

- 1) Impact identification;
- 2) Area of Influence identification;
- 3) Application of relevant legislation requirements and standards; and
- 4) A transparent impact assessment matrix.

Impact categorization derives first an unmitigated and thereafter mitigated impact significance from defining and combining the:

- Characterisation of the impact (negative / positive)
- Magnitude rating (high, medium, low, negligible)
- Consequence of the impact (direct or indirect) and
- Duration (temporal, permanent, in special cases only).

Table 7-1 summarizes these factors.

#### Table 7-1: Impact Assessment Matrix

Characteriz	ation	Magnitude	rating	Consequen	ce rating
Negative	-	High	н	Indirect	0
Positive +		Moderate	Μ	Direct	
	+	Low	L	Direct	1
		Negligible	N		
		No Impacts			
		are			
		expected			
				_	
		Duration			
		Temporal			
		Permanent			
		In special			
		Cases only			

# 7.2. Impacts during Construction

# 7.2.1. Physical Environment

## 7.2.1.1. Soil and Groundwater

Accidental spills during rehabilitation activities of the existing pumping stations, restructuring of the existing water supply network and construction of the new booster pumping station can lead to pollution of both soil and groundwater near the construction site. Spills might originate from accidental or structural spillage of fuels, lubricant chemicals, sanitary wastewater, as well as from leakage from inadequately protected solid waste storage facilities and sites. If not dealt with appropriately, the spills can cause health and safety issues of the local population, and even long-term damage to agriculture and water supply in the area.

The unmitigated impact for both soil and groundwater is considered negative, moderate, direct and temporary during the construction period.

### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	М	1		-M1

### 7.2.1.2. Air quality

Dust generated during rehabilitation of the existing water supply network and construction of the new booster pumping station will originate from activities such as earth movement, from traffic to and from the construction site, from drilling, boring and digging.

Air quality will also be impacted due to exhaust fumes when old and not regularly serviced trucks are used.

The amount of dust generated will depend on construction activities, soil type, and moisture content, and wind speed, frequency of precipitation, vehicle traffic, vehicle type, and roadway characteristics. Fugitive dust will be greater during drier period in areas of fine textured soils. As air in general is dry, and the construction site is located in close vicinity to residential areas, the nuisance effect of both impacts can be temporarily medium to high.

The unmitigated impact for air quality is considered negative, moderate, direct and temporary during the construction period.

Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	Μ	1		-M1

### 7.2.1.3. Noise

Noise will typically be produced by the working of excavators, earth moving equipment, pile drivers, traffic from supplying building materials, generators and other typical construction

related activities (Welding and grinding, pneumatic hammering, drilling etc.). Those activities can be resulted during the rehabilitation activities of the existing pumping stations, restructuring of the existing water supply network and construction of the new booster pumping station.

The impact type is temporary, as it concerns the construction phase only in this intensity. It will be locally contained and there will be no larger area affected from this impact.

The unmitigated impact for noise is considered negative, moderate, direct and temporary during the construction period.

Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	Μ	1		-M1

# 7.2.2. Biological Environment

For construction of the new booster pump, currently undeveloped land will be used. Part of the land is currently used for random construction waste dumping. Therefore, it can be assumed that the habitat found is not sensitive, i.e. the impact is low. Rehabilitation of the existing pumping stations is planned to be done within an existing facility while the networks to be rehabilitated are within existing roads, and therefore no potential impacts are considered on the biological sensitive receptors.

This impact is rated negative, low, direct and temporary during construction.

#### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	L	1		-L1

## 7.2.3. Social Environment

### 7.2.3.1. Local Economy and Livelihood

Employment opportunities through the creation of temporary jobs for both professional staff, and workers as well as semi-skilled workforce.

During construction of all project components, there is a potential of improvement of the local economy (food supply to workers, accommodation etc) and no land acquisition are expected.

In case, street vendors are found on the streets along the construction site (Restructuring / rehabilitation of the water supply network), measures need to be taken that temporary relocation is conducted safely.

The impact is rated as positive, moderate and direct and is considered temporary during the construction phase.

#### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
+	Μ	1		+M1

#### 7.2.3.2. Transportation and Traffic

Construction materials for earthwork will be sourced offsite. This will increase traffic flow along site access roads during construction from vehicles ferrying construction materials. Also, the access of the workforce will result in increased traffic, especially in the morning and evening hours.

Pipes will be laid into the trenches where existing pipes are currently located. These roads must be opened up and traffic would need to be diverted. This means, there will be restricted access to some areas (mostly residential areas) during construction.

The impact is rated negative, moderate and direct, but it will be temporary only during construction.

Character	Magnitude	Consequence	Duration	Assessment
-	М	1		-M1

#### 7.2.3.3. Community Health and Safety

Moderate adverse impacts on health and safety of the population are expected as a result of construction works of the rehabilitation of the water supply system and the construction of the new booster pumping station. There is potential hazard risk from open trenches in the populated areas during the construction. Another aspect of community health and safety is the increased construction traffic, which, if not mitigated can result in accidents.

Covid-19 aspects: An increase in workforce will mean an additional risk to the population, especially in shops / markets and canteens / street kitchens, as more people will be present.

The impact is considered negative, direct and moderate. As it only involves the construction phase, it is considered temporary.

Character	Magnitude	Consequence	Duration	Assessment
-	М	1		-M1

#### 7.2.3.4. Occupational Health and Safety

During construction phase of all project components, the impacts on health and safety are related to hygiene and safety risks, excavation works, working with heavy machinery, working in very noisy environments (noise-producing machines), lifting or loading heavy loads, and accidents. One important aspect is the risk of open and unsecured trenches.

Covid-19 aspects: The workforce will need to work in close vicinity to each other, often without being able to keep the minimum distance required. This applies also to the journey to and from the construction site in construction vehicles and the break times, that are spent together in markets, street kitchens, canteens or shops.

The impact is considered negative, direct and moderate. As it is in effect only during the construction phase, it is considered temporary.

#### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	М	1		-M1

#### 7.2.3.5. Archaeology and Cultural Heritage

No excavation or construction activities are anticipated for the implementation of this project within any archaeological sites or sites of cultural heritage importance. Since construction activities will be within existing roads, if required while on undeveloped land for the booster pumping station. As such no adverse impacts on such cultural heritage and archaeological sites and resources are expected to occur during the installation of the Booster pumping station. However, unknown artifacts may be uncovered during the excavation activities for the laying of sewer networks network.

Therefore, this impact is considered negative, moderate and direct, but only temporary during construction.

Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	Μ	1		-M1

#### 7.2.3.6. Waste

Waste will be generated during construction phase. This includes all kinds of construction waste, solid waste, greywater, temporary installations, equipment like fences and signs.

This impact is considered negative, direct and moderate. It will last throughout the construction period and is therefore temporary.

**Summary of Impact:** 

Character	Magnitude	Consequence	Duration	Assessment
-	М	1		-M1

# 7.3. Impacts During Operation

## 7.3.1. Physical Environment

#### 7.3.1.1. Noise

Noise during operation will typically result only from the generators of the new booster pumping station. Typical pump noise is about 75 dB directly at the source. When incorporating the building surrounding the pump and the distance to the fence (typically about 50m), the noise at the fence will be negligible.

It will be locally contained and there will be no larger area affected from this impact.

This impact is therefore rated negative, negligible, direct and permanent.

#### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	Ν	1		-N1

### 7.3.2. Biological Environment

Project operation is not expected to have any significant impacts on fauna species as the project will have minimal operational activities that are disruptive to the terrestrial environment.

This impact is rated negligible.

#### Summary of Impact:

Character	Magnitude	Consequence	Duration	Assessment
-	Ν	1		-N1

### 7.3.3. Social Environment

#### 7.3.3.1. Local Economy and Livelihood

Impacts on local economy and livelihood will be positive, as the water supply will become more reliable and less costly than the alternative of buying water from private entities. Employment opportunities through the creation of permanent jobs for both professional staff, and workers as well as semi-skilled workforce will also have a positive impact. However, there will not be a large number of jobs created, as the workforce already maintaining the water supply network will be sufficient and might not increase in numbers. Overall, the impact on livelihoods is considered positive, direct, medium and permanent.

Character	Magnitude	Consequence	Duration	Assessment
+	Μ	1		+M1

#### 7.3.3.2. Community Health and Safety

During the operation phase, overall community health and sanitation will likely improve slightly as the water supply will be more reliable. The water supply to date is good in terms of health, therefore there will be no major change regarding this aspect.

Overall, this impact is considered positive, low, direct and permanent.

Character	Magnitude	Consequence	Duration	Assessment
+	L	1		+L1

#### 7.3.3.3. Waste

During operation, waste, solid waste and greywater will be generated in the facilities by operational staff. The number of maintenance staff will most probably only increase slightly, so there will be no major change to the present condition.

That is why the impact is considered negligible and neither positive nor negative.

# 8. Mitigation Measures

Where negative impacts are anticipated, the mitigation measures are described below. Low impacts do not call for mitigation measures. The recommended mitigation measures may be provided either by engineering solutions or by management procedures.

# 8.1. Mitigation Measures During Construction Phase

## 8.1.1. Physical Environment

### 8.1.1.1. Soil and Groundwater

Mitigation measures suggested for the impacts on soil and groundwater during construction activities include the following:

- Regular vehicle maintenance;
- Storage of hazardous, sanitary and cleaning wastes in secure facilities approved by the relevant Municipality;
- Installation of leak-proof fuel storage on concrete platforms with gutters and grease separators, which are monitored periodically and repaired or replaced when required;
- Parking vehicles on paved platforms whenever possible;
- Isolating contaminated soil and treating /disposing it off in a way that will depend on the contaminant type.

This will reduce the impact rating from moderate to low.

### 8.1.1.2. Air quality

Mitigation measures suggested for the impacts on air quality during construction include the following:

- Sprinkling of water to prevent dust generation;
- Keeping the construction areas to a minimum;
- Regularly maintain all vehicles and construction machinery.

This will reduce the impact rating from moderate to low.

#### 8.1.1.3. Noise

Mitigation measures suggested for the impacts on noise during construction include the following:

- Strictly adhering to working hours (daytime) from 6am to 8pm;
- Sensitizing construction truck drivers and equipment operators to switch off idle engines;

- Provision of earmuffs and ear protection to workers and employees in high noise areas;
- Using modern, well-maintained and regularly serviced vehicles;
- Ensuring that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels;
- Adhere to the Environmental Management and Coordination regulations.

This will reduce the impact rating from moderate to low.

# 8.1.2. Biological Environment

Measures to protect vegetation and wildlife in the Project area are as follows:

- Limit construction of access roads and avoid them on vegetated land and close roads that will not be needed after construction;
- Avoid tree cutting and when unavoidable, contact Ministry of Agriculture and MoEnv for approval and replanting procedure;
- Replace soil cover after completing trunk line to restore vegetation cover naturally;
- Abide by measures for proper disposal of wastewater ;
- Prohibit hunting by construction workers;
- Minimize machinery movement on natural land.

This will reduce the impact rating from low to negligible.

# 8.1.3. Social Environment

### 8.1.3.1. Local Economy and Livelihood

The negative impact is considered negligible, however, the possibility of livelihood loss for street vendors during construction works will need to be addressed. WAJ in collaboration with the contractor will address the issue of street vendors prior to commencement of the Construction Phase to make sure that temporary relocation is safe. In addition, priority of employment shall be given to the local community.

## 8.1.3.2. Transportation and Traffic

As a mentioned earlier, surrounding businesses and visitors using common roads may be disrupted during construction phase. As such the Contractor must ensure that excavation works and pipe laying in the concerned towns are not blocking access to local businesses by owners and visitors. This can be done by:

- Install temporary structures from the road where pipe laying is being done to local businesses;
- Inform local businesses owner about construction activities and schedule;

• Proper communication and coordination with affected owners.

This will reduce the impact rating from moderate to low.

Mitigation measures suggested for the impacts on transportation and traffic during construction include the following:

- Appropriate community liaison management, e.g. enough beforehand information;
- During construction, clear signing and channeling of construction traffic along designated access routes.

This will reduce the impact rating from moderate to low.

#### 8.1.3.3. Community health and safety

Mitigation measures suggested for the impacts on community health and safety during construction include the following:

- Appropriate community liaison management, e.g. enough beforehand information
- During construction, clear signing and access restrictions to construction site for construction personal only.
- Install adequate fencing around construction sites
- Organize stock piling scheduling works to minimize the construction area

This will reduce the impact rating from moderate to low.

#### 8.1.3.4. Occupational health and safety

Mitigation measures suggested for the impacts on occupational health and safety during construction include the following:

- Provision of adequate construction equipment (personal protective equipment);
- regular onsite inspections in terms of compliance with regulations and standards;
- provision of medical assistance to workers;
- information to workers about possible risks and measures of prevention and elimination.

Further Occupational Health and Safety mitigation measures during construction phase are shown in Table 8-1 below.

Table 8-1: Further	<b>Occupational Healt</b>	n and Safety mitigation	measures during construct	ion phase
	<b>.</b>	<b>,</b> 0	0	

OHS Aspect	Recommended Mitigation Measure
Training and Competency	<ul> <li>Carry out suitable training programs on occupational health and safety for workers prior to commencement of construction.</li> </ul>
	<ul> <li>Ensure only experienced and well-trained workers are used for the handling of machinery, equipment and material processing plants</li> </ul>

OHS Aspect	Recommended Mitigation Measure
	• Ensure all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves, other workers or the public.
	• Ensure appropriate safety equipment, tools and protective clothing are provided to workers and that safe working methods are applied. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored.
	<ul> <li>Any person who works or operates in an area where there is a risk of flying objects, such as splinters, should wear safety goggles at all time. These should be securely fitted to the face. Welders should protect the entire face from hot sparks and bright rays by using a welding mask.</li> </ul>
	<ul> <li>Any person exposed to high levels of dust or hazardous gases (when working in tunnels) should wear respiratory protection in the form of disposal masks or respiratory masks which fit more snugly around the nose and mouth.</li> </ul>
Personal Protective Equipment (PPE)	• Any person working in an area where there is the risk of being struck on the head by a falling or flying object should wear a hard hat at all times. These should be well maintained in order to be fully effective, and any helmets or hard hats that are damaged or cracked should immediately be replaced.
	<ul> <li>All workers will be required to wear shoes or strong boots to prevent sharp objects from penetrating or crushing the foot. Those working in muddy conditions and in canals with polluted water should avoid hand/foot contact with water and should never wear slippers.</li> </ul>
	<ul> <li>Road workers should wear reflective vests to avoid being hit by moving vehicular traffic.</li> </ul>
	<ul> <li>Adopt the following measures, as per guideline (12) published by Ministry of Labour of Jordan regarding Corona Virus prevention procedures during construction projects:</li> </ul>
	<ul> <li>Raising awareness of the recommended measures to prevent the spread of COVID-19 by providing easily available educational materials</li> </ul>
	<ul> <li>Cleaning and sterlising work sites, housing, bathrooms, kitchens, buses, and others frequently used locations daily</li> </ul>
	<ul> <li>Distributing masks to all employees/ workers</li> </ul>
	<ul> <li>Temperature tests for all workers before site entrance, during work and upon leaving</li> </ul>
	<ul> <li>Ensure delineation devices such as cones, lights, tubular markers, orange and white strips and barricades are erected to inform oncoming vehicular traffic and pedestrians in the area about work zones.</li> </ul>
Site Delineation	<ul> <li>Ensure all digging and installing work items that are not accomplished are isolated and warned of by signposts and flash lamps in nighttime.</li> </ul>
and Warning Signs	<ul> <li>Ensure dangerous warning signs are raised to inform public of particular dangers and to keep the public away from such hazards.</li> </ul>
	Ensure rehabilitation of trenches progressively once work is completed.
	• The safety inspection checklist must look to see that the delineation de-vices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective.

OHS Aspect	Recommended Mitigation Measure
	<ul> <li>Ensure traffic control plans and procedures are in place when work zone is set up and how to handle full or partial road closure, blocked intersections, sidewalk closure etc.</li> </ul>
Traffic Management	• Ensure installation of transport signs and lighting systems in conspicuous places to assure transport safety. Transport signs should be installed at places where accidents may be easily happened (populated centers, schools, hospitals, commercial areas etc.).
	<ul> <li>Presence of flagman at the entrance and exit of the project site in order to control vehicles and truck movement.</li> </ul>
	• Warning signs and adequate physical barricades or protective covers must be provided for all trenches and pits. Physical barriers must be erected around all excavation.
	• Excavations or trenches that exceed 1.2 m (4 ft) in depth require a protective system (i.e. Hydraulic Shoring). It is obligatory for trenches which are 6 m (20 ft) or more deep to have a protective system which is specifically designed for that trench by a certified engineer and approved by the HSE department. While designing the protective system, the soil classification, water content of the soil, the depth of the cut, changes brought about by the weather or climate, the surcharge loads, and the other operations being carried out nearby should be kept in mind.
Excavation Activities	• A stairway, ladder, ramp or other safe means of access or egress shall be provided in all trenches that are 4 feet (1.2 m) or more in depth and shall be positioned at adequate intervals of lateral travel for employees, and as constructed by contractor. In addition, two access and egress points should be established if possible.
	<ul> <li>Standard guardrails shall be provided on all walkways, ramps or bridges where employees are required or permitted to cross over excavation or trenches.</li> </ul>
	• Workers shall be protected from excavated or other materials, or equipment that could fall or roll into the excavation by placing and storing such material or equipment a minimum distance of 4 feet (1.2 m) from the edge of the excavation.
	• Prior to the start of work, the competent person shall make daily inspections of excavations, trenches, adjacent areas, and protective systems and as required throughout the shift. Inspections shall be made after every rainstorm, or unusual work activities e.g. excess heavy equipment travel or vibration.
	• Workers will not be permitted to work in excavations or trenches if the competent person finds evidence of a situation that could result in a possible cave-in, failure of a protective system, or other hazardous condition.
	• The contactor should ensure that the emergency aid service is in place in the work zone.
Emergency Procedures	• All workers should be properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble for a head count. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site.

This will reduce the impact rating from moderate to low.

## 8.1.3.5. Archaeology and Cultural Heritage

Mitigation measures suggested for the impacts on archaeology and cultural heritage during construction include the following:

- Adopt proper precautionary measures and work plan so as not to cause any harm to existing cultural heritage sites in case any of the pipeline laying construction activities take place in close vicinity of such sites.
- Ensure all chance finds of cultural heritage (e.g. graves, old ceramic, old building fragments) are reported immediately to DoA, excavation stopped, and contractor awaits instructions from DoA.

This will reduce the impact rating from moderate to low.

### 8.1.3.6. Waste

Mitigation measures suggested for the impacts related to waste during construction include the following:

- Implementation of Waste Management Plan during construction;
- Proper waste management facilities and emergency preparedness/response measures;
- Organize stock piling scheduling works to minimize the construction area.

This will reduce the impact rating from moderate to low.

# 8.2. Mitigation Measures During Operation Phase

# 8.2.1. Physical Environment

### 8.2.1.1. Noise

The operator shall conduct regular maintenance for the booster pumping station and ensure that the pump is installed in a closed building and operating properly.

## 8.2.2. Biological Environment

The Operator of the booster pumping station should ensure that noise abatement measures are implemented. However, the operator shall raise the awareness of workers on the respect and preservation of wildlife.

# 8.2.3. Social Environment

### 8.2.3.1. Local Economy and Livelihood

The impact is considered positive, therefore no mitigation measures are needed. However, the operator shall give priority of employment to local community.

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#### 8.2.3.2. Community Health and Safety

The impact is considered positive, therefore no mitigation measures are needed. However, the operator shall:

- Apply maintenance of adequate pressure to protect water quality by ensuring construction meets applicable standards and industry practices;
- Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas);
- Review the results of the water quality provided as part of the national comprehensive water-quality monitoring program carried by WAJ using its own laboratories.

#### 8.2.3.3. Waste

The impact is considered negligible, therefore, no mitigation measures are needed.

# 9. Framework of Project Stakeholders

According to the national regulations and KfW Sustainability guideline, involving affected communities and keeping them informed during the project stages is an important element that helps the executing agency to avoid adverse environmental and social impacts and risks. This chapter identifies stakeholder categories and proposed engagement activities related to the Project implementation along with their grievance mechanism.

# 9.1. Stakeholder Identification

Stakeholders are categorized into internal stakeholders who are directly affected by the project activities or external stakeholders who are indirectly affected during the project implementation. The list of internal and external stakeholders is presented in Table 9-1.

Stakeholder Category	Stakeholders			
Internal Stakeholde	Internal Stakeholders			
WAJ Employees	This includes relevant WAJ female and male employees such as managers, engineers, maintenance and operations staff, etc.			
Contractors and Sub-contractors	Contractors and sub-contractors engaged in the construction activities (Construction Phase).			
Operators	Operators responsible for the daily operation and maintenance (Operation Phase).			
External Stakehold	ers			
Governmental Authorities	Ministry of Environment, Ministry of Local Administration, Ministry of Public Works and Housing, Ministry of Health, Ministry of Labor, Ministry of Transport, Ministry of Agriculture, etc.			
Municipalities	Greater Salt Municipality / Municipality of Al Arda / Municipality of Ain Al Basha			
Community Members	Community leaders, employed men and women, herders and farmers, male and female household heads, employed and unemployed labor force, youth and students.			
Civil Society Organizations (CSOs)	Local CSOs, local women organizations, local cooperation societies, etc.			
International Agencies	This includes international funding agencies that are funding projects in the area such as the German Development Agency (GIZ), JICA, United Nations Development Programme (UNDP), AFD, and EU.			

Table 9-1: Internal and External Stakeholders

# 9.2. Stakeholder Engagement Activities

Stakeholder engagement is an inclusive process conducted throughout the Project lifecycle. It helps WAJ to have constructive and responsive relationships that are important for the successful management of the Project's environmental and social risks.

Accordingly, stakeholder engagement activities shall be carried out internally and externally during the Project implementation. Table 9-2 summarizes the proposed engagement activities.

Table 9-2: Stakeholde	r Engagement Activities
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Stakeholder Engagement Activity	Type of Information Provided	Potential Venue	Stakeholder Groups to be Involved	Responsibility
Prior to Construction Ph	ase Commencement			
Consultation with relevant governmental institutions	Discussion of permits required and other monitoring requirements that will be needed for construction.	To Be Determined (TBD)	Relevant ministries and municipalities (Greater Salt Municipality and Arda Municipality)	WAJ
Kick-off meeting for: Contractors/sub- contractors and temporary workers/operators	Agree of grievance management to be practiced during construction, inform all stakeholders, code of conduct for workers, and conduct relevant training.	At contractor's premises	Contractors and temporary outsourced workers	Contractor
<b>Construction Phase</b>				
Communication with local community members	Maintain an open communication channel throughout the construction phase with local community members in case of complaints / grievances.	On-site Throughout the construction phase.	Local community members	Contractor
Meetings with WAJ and other relevant governmental ministries/institutions	Implementation of the ESMP and monitoring requirements.	WAJ or contractor premises / any other location agreed between WAJ and governmental institutions. Throughout the construction phase.	Relevant employees / senior managers and decision makers within, WAJ and other relevant governmental authority	Contractor under WAJ supervision
Employment Opportunities	Information on employment opportunities, skills required, training and support provided and access to information.	Website, social media, newspapers.	Local and regional community	Contractor
<b>Operation Phase</b>				
Meetings with employees specially who are involved in operation and	Inform them of the available grievance mechanism and how they can access it.	At operator premises.	Employees and workers	Operator

Stakeholder Engagement Activity	Type of Information Provided	Potential Venue	Stakeholder Groups to be Involved	Responsibility
maintenance activities				
Employment Opportunities	Information on employment opportunities, skills required, training and support provided and access to information.	Website, social media, newspapers.	Local and regional community	Operator

# 9.3. Stakeholders Grievance Mechanisms

A formalized grievance mechanism is to be adopted to monitor and promptly resolve potential conflicts with stakeholders whose interests may be affected, and to ensure that all comments and complaints from any stakeholder are considered and addressed in an appropriate and timely manner.

## 9.3.1. Public Grievance Mechanism

The public grievance mechanism must include the following steps:

- Responsibility for dealing with community grievances must be assigned to a specific Community Liaison Officer during project construction and operation phases. Each complaint whether from an individual or a community will be considered and a response to each specific complaint will be directly communicated to the party that raised it.
- The comments of complaints must be summarized and listed in a formal logbook/register containing the name and contact of the person or group who made the complaint, and the date of response sent to the complainant. However, individuals have the right to request that their name to be kept confidential.
- Any person or entity may send comments and/or complaints in person, via the call center, post, email or fax to the contact information announced by WAJ or its implementing parties (i.e. the contractor / the operator).
- All comments and complaints will be responded to either verbally or in writing as specified by the person or entity that made the complaint, as per the grievance form.
- Grievances must be acknowledged within 5 days, and then responded to within 20 days.

Grievances related to construction activities will be managed by the contractor(s) and supervised by WAJ with support from the supervision engineer who will be responsible for managing and supervising the works and activities of the contractors, ensuring that construction activities are carried out in compliance with the project's requirements set forth by the ESMP. The contractors' contact information must be announced for public prior to the commencement of construction activities through local media (e.g. newspapers) or through project signboards in public places.

During the operation phase, the Operator (i.e. WAJ) will be responsible to dealing with public grievances through the concerned department responsible for community liaison.

Grievance mechanisms can also be through MWI forms as per the following contact information:

- The complaints center on the number 117166
- WhatsApp application on the number: 0791500686

Complaints form on the Ministry of Water and Irrigation website (Figure 9-1)

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ختم مكتب خدمة الجمهور	معكم في الأرب وقت ممكن	فدامكم هذا الثموذج وسنقواصل	إسم و توقيع الستلم نثقدم بجزيل الشكر لكم على استة
ختم مكتب خدمة الجمهور	معكم في اقرب وقت ممكن	فنامكم هذا الثموذج وسنتواصل	إسم و توقيع الستلم نتقدم بجزيل الشكر لكم على استه

#### Figure 9-1: MWI grievance form

Functional organization of the grievance management lies under four main levels, which are Grievance Receiving, Grievance Processing, Grievance Solving Decision, and Decision Implementation. Table 9-3 presents the main tasks and the responsible entities for each level.

Table 9-3: Functional Organization of t	the Grievance Management
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Level	Tasks	Phase	Responsible Entity	
Grievance	Receipt, handling, screening and	Construction	The Contractor	
Receiving	documenting of grievance	Operation	The Operator	
	Inspection for causality/relevance to the	Construction	The contractor, WAJ / the Supervision Engineer	
Grievance Processing	<ul> <li>Project</li> <li>Inspection for causality link Assessment</li> <li>Valuation suggesting measures / recommendations</li> </ul>	Operation	The Operator / WAJ	
Grievance	Making respective decisions	Construction		
	Discussing decision with respective ag-grieved person/entity	Operation	WAJ / the Supervision Engineer	
	Investigating satisfaction	Operation		
	Signing grievance resolution/agreement			
Decision	Decision Restoration Measures	Construction	The Contractor	
Implementation	Monitoring of implementation Supervision	Operation	WAJ / the Supervision Engineer	

## 9.3.2. Employee Grievance Mechanism

The employee/worker grievance mechanism will allow employees to address workplace disputes or concerns in a fair, easily accessible and transparent manner. Although an employee grievance mechanism must be in accordance with the Human Resources (HR) policy, the following is a standardized procedure for employee grievance applicable to all employees/workers involved in the project.

A brief procedure for filing a grievance is listed below and shall be used as a guidance throughout the project:

- When a concern or an action has occurred the employee/worker must file a written grievance to his or her supervisor.
- The direct manager must respond back. If the employee/worker was not satisfied with the supervisors' response, he/she can direct the grievance to the HR Department.
- The HR must respond back. If the employee/worker was not satisfied with the response and wishes to appeal, he or she can direct the grievance to higher level or management.
- If the employee was not satisfied with the response of top management, then he or she can approach the workers organization (that he or she belongs to) where applicable for further advice and assistance.

If an employee is not satisfied with the final determination of the internal grievance procedure, the employee can still hire a lawyer and resolve the issue at court.

# **10.** Environmental and Social Management Plan

# **10.1. Objectives of the ESMP**

The Environmental and Social Management Plan (ESMP) consists of a set of mitigation and monitoring measures to be taken into consideration to eliminate adverse environmental impacts, offset them or reduce them to acceptable levels. The plan also includes the actions needed to be taken to implement these measures.

The Plan is considered an operational document that will be frequently updated to reflect the activities on site and needs to be approved by the Client. As activities commence, the plan will be reviewed and revised according to various project activities.

The Contractor responsible for the construction and the detailed design phase will develop the ESMP during construction activities to address all environmental and social risks identified in this document, and provide a detailed description of the proposed mitigation measures, as well as the monitoring activities that will be conducted by them.

The Contractor shall identify the objectives and targets in his Plan and shall detail the means by which these objectives and targets are to be met. This shall include financial, human and material resources.

This Framework Environmental Management Plan identified the measures required to eliminate, reduce or offset the identified environmental and social impacts and proposes the following:

- Mitigation measures to be implemented during the project's construction and operation;
- References to control guidelines and standards;
- Responsibilities for the implementation of the plan;
- Verification, monitoring and training requirements;
- Reporting requirements

The monitoring component is of particular importance in assessing the success of mitigation measures formulated for the significant impacts identified. Construction and Operation Monitoring Plans shall thus be developed to include parameters to be monitored, frequency of monitoring, and responsibilities.

# **10.2. Framework for Construction ESMP**

Table 10-1 presents the mitigation measures to be implemented by the Contractor in order to eliminate or minimize potential environmental and social impacts associated with the construction activities of the Project. Several plans and procedures need to be developed by the Contractor for that purpose and tailored to the work site. The ESMP framework for the construction phase should be included in the contractor's tender documents to ensure that all requirements have been taken into consideration by them and will be developed and implemented during the construction phase.

#### Table 10-1: Environmental and Social Mitigation during Construction

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
Soil and Groundwater	Accidental spills during construction can lead to pollution of both soil and groundwater near the construction site. Spills might originate from accidental or structural spillage of fuels, lubricant chemicals, sanitary wastewater, as well as from leakage from inadequately protected solid waste storage facilities and sites. If not dealt with appropriately, the spills can cause health and safety issues of the local population, and even long- term damage to agriculture and water supply in the area.	-M1	<ul> <li>Regular vehicle maintenance;</li> <li>Storage of hazardous, sanitary and cleaning wastes in secure facilities approved by the relevant Municipality;</li> <li>Installation of leak-proof fuel storages on concrete platforms with gutters and grease separators, which are monitored periodically and repaired or replaced when required;</li> <li>Parking vehicles on paved platforms whenever possible;</li> <li>Isolating contaminated soil and treating /disposing it off in a way that will depend on the contaminant type.</li> </ul>	-L1	Contractor
Air Quality	Dust during construction work will originate from activities such as earth movement, from traffic to and from the construction site, from drilling, boring and digging. Air quality will also be impacted due to exhaust fumes when old and not regularly serviced trucks are used. The amount of dust generated will depend on construction activities, soil type, and moisture content, and wind speed, frequency of precipitation, vehicle traffic, vehicle type, and	-M1	<ul> <li>Sprinkling of water to prevent dust generation;</li> <li>Keeping the construction areas to a minimum;</li> <li>Regularly maintain all vehicles and construction machinery.</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	roadway characteristics. Fugitive dust will be greater during drier period in areas of fine textured soils. As air in general is dry, and the construction site is located in close vicinity to residential areas, the nuisance effect of both impacts can be temporarily medium to high.				
Noise	Noise will typically be produced by the working of excavators, earth moving equipment, pile drivers, traffic from supplying building materials, generators and other typical construction related activities (Welding and grinding, pneumatic hammering, drilling etc.). The impact type is temporary, as it concerns the construction phase only in this intensity. It will be locally contained and there will be no larger area affected from this impact.	-M1	<ul> <li>Strictly adhering to working hours (day time) from 6am to 8pm;</li> <li>Sensitizing construction truck drivers and equipment operators to switch off idle engines;</li> <li>Provision of earmuffs and ear protection to workers and employees in high noise areas;</li> <li>Using modern, well-maintained and regularly serviced vehicles;</li> <li>Ensuring that all generators and heavy-duty equipment be insulated or placed in enclosures to minimize ambient noise levels;</li> <li>Adhere to the Environmental Management and Coordination regulations.</li> </ul>	-L1	Contractor
Terrestrial Environment	For the construction of the new booster pump, currently undeveloped land will be used. Part of the land is currently used for random construction waste dumping . Therefore, it can be assumed that the habitat found is not sensitive, i.e. the	-L1	<ul> <li>Measures to protect vegetation and Wildlife in the Project area are as follows:</li> <li>Limit construction of access roads and avoid them on vegetated land and close roads that will not be needed after construction;</li> </ul>	-N1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	impact is low. On the other hand, rehabilitation of networks are planned to be in existing roads, and no potential impacts are considered on the biological sensitive receptors.		<ul> <li>Avoid tree cutting and when unavoidable, contact Ministry of Agriculture and MoEnv for approval and replanting procedure;</li> <li>Replace soil cover after completing trunk line to restore vegetation cover naturally;</li> <li>Abide by measures for proper disposal of wastewater ;</li> <li>Prohibit hunting by construction workers;</li> <li>Minimize machinery movement on natural land.</li> </ul>		
Local Economy and Livelihood	Employment opportunities through the creation of temporary jobs for both professional staff, and workers as well as semi-skilled workforce. During Construction, there is a potential of improvement of the local economy (food supply to workers, accommodation etc) and no land acquisition are expected. Livelihood loss for street vendors during construction works.	+M1	<ul> <li>WAJ in collaboration with the contractor ensure that temporary relocation is safe.</li> <li>Priority of employment shall be given to the local community</li> </ul>	+M1	Contractor
Transportation and Traffic	Pipes will be laid into the trenches where pipes are located currently. These roads must be opened up and traffic is not possible and needs to be diverted. This means, there will be restricted access to some areas	-M1	<ul> <li>Install temporary structures from the road where pipe laying is being done to local businesses;</li> <li>Inform local businesses owner about construction activities and schedule;</li> <li>Proper communication and coordination with affected owners.</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	(mostly residential areas) during construction. Construction materials for earthwork will be sourced offsite. This will increase traffic flow along site access roads during construction from vehicles ferrying construction materials. Also, the access of the workforce will result in increased traffic, especially in the morning and evening hours.	-M1	<ul> <li>Appropriate community liaison management, e.g. enough beforehand information;</li> <li>During construction, clear signing and channeling of construction traffic along designated access routes.</li> </ul>	-L1	Contractor
Community health and safety	Moderate adverse impacts on health and safety of the population are expected as a result of construction works of the rehabilitation of the water supply system. There is potential hazard risk from open trenches in the populated areas during the construction. Another aspect of community health and safety is the increased construction traffic, which, if not mitigated can result in accidents. Covid-19 aspects: An increase in workforce will mean an additional risk to the population, especially in shops / markets and canteens / street	-M1	<ul> <li>Appropriate community liaison management, e.g. enough beforehand information</li> <li>During construction, clear signing and access restrictions to construction site for construction personal only.</li> <li>Install adequate fencing around construction sites</li> <li>Organize stock piling scheduling works to minimize the construction area.</li> </ul>	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	kitchens, as more people will be present				
Occupational Health and Safety	During construction, the impacts on health and safety are related to hygiene and safety risks, excavation works, working with heavy machinery, working in very noisy environments (noise-producing machines), lifting or loading heavy loads, and accidents. One important aspect is the risk of open and unsecured trenches. Covid-19 aspects: The workforce will need to work in close vicinity to each other, often without being able to keep the minimum distance required. This applies also to the journey to and from the construction site in construction vehicles and the break times, that are spent together in markets, street kitchens, canteens or shops.	-M1	<ul> <li>Provision of adequate construction equipment (personal protective equipment);</li> <li>regular onsite inspections in terms of compliance with regulations and standards;</li> <li>provision of medical assistance to workers;</li> <li>information to workers about possible risks and measures of prevention and elimination.</li> <li>Refer to Table 8-1.</li> </ul>	-L1	Contractor
Archaeology and Cultural Heritage	No excavation or construction activities are anticipated for the implementation of this project within any archaeological sites or sites of cultural heritage importance. Since construction activities will be within	-M1	• The Contractor shall recognize the Heritage Law and its articles issued in 2005, as well as the Antiquities Law No. 21 of 1988 and its articles, instructions and amendments, in order to facilitate dealing with cultural heritage in the event of the appearance of any heritage or archaeological sites. In case of archaeological findings during construction,	-L1	Contractor

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	existing roads, if required while on undeveloped land for the booster pumping station. As such no adverse impacts on such cultural heritage and archaeological sites and resources are expected to occur during the installation of the Booster pumping station. However, unknown artifacts may be uncovered during the excavation activities for the laying of sewer networks network.		works should be halted immediately, and the Ministry of Tourism and Antiquities must be informed accordingly.		
Waste	Waste will be generated during construction. This includes all kinds of construction waste, solid waste, greywater, temporary installations, equipment like fences and signs.	-M1	<ul> <li>Implementation of Waste Management Plan during construction;</li> <li>Proper waste management facilities and emergency preparedness/response measures;</li> <li>Organize stock piling scheduling works to minimize the construction area.</li> </ul>	-L1	Contractor

Table 10-2 presents the monitoring activities during construction including the frequency of monitoring, location and institutional responsibility.

#### Table 10-2: Monitoring during Construction

Environmental / Social Component	Monitoring Actions	Frequency	Location	Institutional Responsibility
Soil and Groundwater	<ul> <li>Visual inspection of disturbed areas in and around construction sites for erosion.</li> <li>Visual inspection of vehicles, machinery and equipment for leaks of oils, grease, etc</li> <li>Ensure that collection tanks are emptied on a regular basis.</li> <li>Visual inspection of waste storage area, chemical storage area and fuel storage area for spills and leaks.</li> <li>Keep records of Waste and hazardous waste disposal in coordination with Ministry of Environment</li> <li>Visual inspection of vehicles, machinery and equipment for leaks of oils, grease, etc.</li> </ul>	Monthly	Construction Sites	MWI / MoEnv / Supervision Consultant
Air Quality	<ul> <li>Ensure that stored materials are covered.</li> <li>Regular visual inspection and monitoring of used machinery and equipment.</li> <li>Keep a record of maintenance activities.</li> <li>Monitoring of water spraying.</li> </ul>	Weekly	Construction Sites	MWI / MoEnv / Supervision Consultant
Noise Level	<ul> <li>Monitor compliance.</li> <li>Monitor the use and efficiency of noise suppressors used.</li> <li>Keep a record of maintenance activities.</li> </ul>	Weekly	Construction Sites	MWI / MoEnv / Supervision Consultant
Terrestrial ecosystem	<ul> <li>Observation and recording of removed trees if any</li> <li>Monitor construction site for evidence of hunting</li> <li>Take Ministry of Agriculture approval in case of trees cutting</li> </ul>	During excavation works	Construction Sites	MWI / Ministry of Agriculture / Supervision Consultant

Environmental / Social Component	Monitoring Actions	Frequency	Location	Institutional Responsibility
Local Economy and Livelihood	<ul><li>Ensure equal job opportunities for both genders.</li><li>Priority shall be given to locals.</li></ul>	At the beginning of construction work and once needed	Construction Sites	MWI / Supervision Consultant
Traffic and Transportation	<ul><li>Monitor road condition and signage and traffic calming needs.</li><li>Check compliance records</li></ul>	Monthly	Construction Sites	MWI / Supervision Consultant / Traffic Department
Community health and safety	<ul> <li>Ensure a decent condition of supplier vehicles (tires, loading, etc.) and general driving behavior.</li> </ul>	Monthly	Construction Sites	MWI / Supervision Consultant
	Maintain vehicle and resident safety.			
	Completed mobility and access facilitation procedures.			
	Regular check of compliance records			
Occupational health and safety	<ul><li>Site supervisor daily reports.</li><li>Ensure the availability and proper use of PPE.</li></ul>	Weekly	Construction Sites	MWI / Supervision Consultant

# **10.3. Framework for Operation ESMMP**

Table 10-3 presents the mitigation measures to be implemented by the Operator of the Project in order to eliminate or minimize potential environmental and social impacts associated with operation of the Project. Several plans need to be developed by the Operator for that purpose and incorporated into the overall management system.

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
Noise	Noise during operation will typically result only from generators of the new booster pumping station. Typical pump noise is about 75 dB directly at the source. When incorporating the building surrounding the pump and the distance to the fence (typically about 50m), the noise at the fence will be negligible. It will be locally contained and there will be no larger area affected from this impact.	-M1	<ul> <li>The operator shall conduct regular maintenance for the booster pumping station and ensure that the pump is installed in a closed building.</li> </ul>	-L1	Operator
Terrestrial Environment	Project operation is not expected to have a significant impact on fauna species as the project will have minimal operation activities.	N	<ul> <li>The Operator of the booster pumping station should ensure that noise abatement measures are implemented. However, the operator shall raise the awareness of workers on the respect and preservation of wildlife.</li> </ul>	N	Operator
Local Economy and Livelihood	Impacts on local economy and livelihood will be positive, as the water supply will be reliable. Employment opportunities through the creation of	+L1	• The impact is considered low, no mitigation measures are needed. However, priority of employment shall be given to local community.	+L1	Operator
Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
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	permanent jobs for both professional staff, and workers as well as semi- skilled workforce will also have a positive impact. However, there will not be a large number of jobs created, as the workforce already maintaining the water supply network will be sufficient and might not increase in numbers. Therefore, the impact is considered positive, direct, but low and permanent.				
Community health and safety	In the operation phase, overall community health and wellbeing might improve slightly, as the water supply will be more reliable. Also, it will be less costly than the alternative of buying bottled water. The water supply to date is good in terms of health, therefore there will be no change regarding this aspect. Covid-19 aspects: An increase in workforce will mean an additional risk to the population, especially in shops / markets and canteens / street kitchens, as more people will be present	+M1	<ul> <li>Apply maintenance of adequate pressure to protect water quality by ensuring construction meets applicable standards and industry practices;</li> <li>Implement a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas);</li> <li>Review the results of the water quality provided as part of the national comprehensive water-quality monitoring program carried by WAJ using its own laboratories.</li> </ul>	+M1	Operator
Occupational Health and Safety	A potential for worker exposure to risks of accidents, injuries and health impacts associated with operating the	-M1	<ul> <li>In order to protect workers from exposure to health and safety risks, a Health and Safety Plan should be developed and implemented.</li> </ul>	-L1	Operator

Environmental / Social Component	Potential Impact	Assessment	Mitigation Measures	Assessment after Mitigation	Institutional Responsibility
	booster pumping station or maintenance activities.				

Table 10-4 presents the monitoring activities during operation including the frequency of monitoring, location and institutional responsibility.

#### Table 10-4: Monitoring Activities during Operation

Environmental / Social Component	Monitoring Actions	Frequency	Location	Institutional Responsibility
Noise Level	<ul><li>Monitor compliance.</li><li>Keep a record of maintenance activities.</li></ul>	Weekly	Booster Pumping Station Site	Operator / MoEnv
	<ul> <li>Conduct a 72-hour noise monitoring through an accredited agency in order to monitor noise level compliance with Jordanian regulation</li> </ul>	Once a year	Booster Pumping Station Site	Operator / MoEnv
Terrestrial ecosystem	<ul> <li>Inspect area around booster pumping station for evidence of hunting or killing of wildlife</li> </ul>	Monthly	Booster Pumping Station Site	Operator
Local Economy and Livelihood	<ul><li>Ensure equal job opportunities for both genders.</li><li>Priority shall be given to locals.</li></ul>	At the beginning of operation work and once needed	-	Operator
Community health and safety	<ul><li>Regular check of compliance records</li><li>Regular check of maintenance records</li></ul>	Monthly	Booster Pumping Station Site	Operator
Occupational health and safety	<ul><li>Site supervisor daily reports.</li><li>Ensure the availability and proper use of PPE.</li></ul>	Monthly	Booster Pumping Station Site	Operator

### **10.4. ESMP Roles and Responsibilities**

This sub-section outlines the main roles and responsibilities during the Project implementation.

### **10.4.1.** The Project Implementing Agency (PIA)

The Project Implementing Agency (PIA), which is WAJ for this Project, with support from the Supervision Engineer, has the overall responsibility for environmental and social management for the Project implementation. Specifically, the PIA roles are as follows:

- Ensure that the implementation of construction activities is conducted in a manner that protects the environmental and social components;
- Formally review and approve Construction Environmental and Social Management Plan (CESMP) that will be prepared by the contractor prior to commencement of the construction activities;
- Ensure compliance with all relevant national and international legislation and requirements;
- Ensure compliance with ESMP during the construction period and maintain close coordination with the site engineer and the Environmental focal point of the contractor;
- Ensure stakeholder grievance mechanisms are followed and that public complaints relating to nuisance and inconvenience caused by the Project implementation are addressed with corrective action and adequately documented;
- Conduct periodic site Environmental, Social, Health and Safety (ESHS) supervision. The purpose of the supervision is to verify that the ESMP is being effectively implemented; and
- Ensure that the ESMP for the operation phase of the Project is implemented.

### **10.4.2.** The Contractor

The Contractor is fully responsible to comply with the commitments as set out in this ESMMP and to ensure that all involved sub-contractors comply with the provisions of the ESMMP. For this purpose, the contractor must prepare a CESMP prior commencement of the construction activities containing plans and procedures to protect public health, safety and security. The Contractor shall define in the CESMP the number, the locations and the type of project area and establish site specific management strategies and implementation and monitoring plans to manage and monitor ESHS risks. The CESMP shall include the following sub-plans:

- Health and Safety Plan;
- Traffic Management Plan (to ensure safety of local communities from construction traffic and maintain access for commercial establishments);
- Boundary Marking and Protection Strategy (for mobilization and construction to prevent offsite adverse impacts);

- Worksite Management Plan which includes i) mechanisms for work in narrow/crowded street(s) with markets/shops, and ii) mechanisms for work next to a school and/or a hospital;
- Site Emergency and Evacuation Plan; and
- Waste Management Measures.

The E&S roles and responsibilities of the contractor personnel, at a minimum, are outlined below.

#### 10.4.2.1. Project Manager (PM)

- Ultimate responsibility for the implementation of the CESMP and the contractor's HS policies and rules on site;
- Ensure all required resources including manpower are in place to maintain full compliance with ESHS requirements of the project are in place;
- Ensure compliance with applicable national and international legislation and requirements; and
- Ensure that all levels of staff receive adequate and appropriate training.

#### 10.4.2.2. ESHS Manager

- Implement the CESMP during construction activities;
- Review sub-contractors environmental protection/mitigating measures to verify compliance with the CESMP;
- Complete regular checks of impact mitigation measures;
- Report any CESMP non-compliances to the PM;
- Carry out environmental awareness and training sessions;
- Conduct environmental surveying and monitoring programs and periodic ESHS audits and reviews; and
- Issue to the PIA a Monthly ESHS report containing a description of ongoing activities and details of ESHS inspection, control and monitoring programs.

#### 10.4.2.3. ESHS Supervisors

The ESHS supervisors will provide technical support and work with the ESHS Manager to identify potential activities, which may not be adequately addressed by proposed mitigating measures by subcontractors. The ESHS supervisors will conduct regular field inspections, monitoring and participate in audits to ensure compliance with ESHS requirements and shall notify any deviation or incident to the management and call for rectification. The ESHS supervisors will supervise regularly ESHS training sessions and shall assist any third party that would audit the construction site.

#### 10.4.2.4. Sub-Contractors

The 'Sub-contractor' is any company hired directly or indirectly by 'The Contractor' to carry out project related tasks including the construction works.

All Sub-contractors that have at least one interface activity with identified key environmental aspects are responsible to comply with the requirements of this ESMP. The Sub-contractors are called to demonstrate a proactive behavior towards environmental and social concerns. It is their responsibility to provide information requested by 'The Contractor' with regard to their scope of activities and to demonstrate compliance with the applicable environmental and social requirements and particularities.

### 10.4.3. Supervision Engineer / Consultant

The Supervision Consultant team will include an Occupational Health and Safety (OHS) Expert during construction activities.

During Construction, the Consultant will monitor the Contractor's health, safety and environmental compliance in accordance with the guidelines and parameters established in the tender documents and the ESMP.

### **10.5. Training Requirements**

The ESMP will not be effectively implemented unless all staff are aware of their specific responsibilities and required actions, as specified by this ESMP. Therefore, the PIA shall provide an induction training to its employees and Contractor personnel working on the project prior commencement of the construction activities. At a minimum, the induction training shall cover:

- ESMP objectives and approach;
- Roles and responsibilities for ESMP implementation;
- Committed impact mitigation and environmental monitoring program; and
- ESMP procedures including the environmental and social monitoring, incident reporting and corrective actions.

The ESMP training shall be carried in the presence of WAJ engineers and shall be provided for at least 3 of WAJ engineers.

The Contractor shall prepare a detailed training plan for all construction workers and this plan needs to be approved by the PIA / WAJ /Supervision Engineer. The ESHS manager shall provide an overview level of training to all staff. The objective will be to highlight the environmental sensitivity of the working area and ensure that all staff are aware of environmental and social mitigation commitments. The training will be based on project environmental and social standards / requirements, the environmental and social management commitments and procedures. It will include:

• Occupational Health and Safety rules at the construction site;

- Dust control efforts;
- Sensitive areas protection (e.g., working only within approved limits, maintaining buffers zones around sensitive resources such as cultural sites);
- Spill prevention and response;
- Project's Grievance Mechanism and the basic worker's rights; and
- Interaction rules with the people living close to the construction site and how to deal with unauthorized visitors to the site.

In addition to all staff, all temporary visitors to the site will be required to undergo an abbreviated version of environmental awareness training/induction to ensure they too are aware of environmental requirements.

The ESHS Manager shall maintain records of trainings properly; these records should be reviewed periodically by the PIA and the Contractor.

# **11. References**

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# **12.** Appendices



الرقم كم لالم الم الم 5.c. 1112 التار

معالي وزير المياه و الري

تحية طيبة وبعد ،،

اشارة لكتاب معاليكم رقم 10213/2/7 تاريخ 2019/7/11 و كتاب شركة المستشار للهندسة رقم DW1853/342/2020 تاريخ 2020/1/29 بخصوص مشروع تحسين كفاءة استهلاك الطاقة في قطاع المياه 2 (إعادة تأهيل محطات الضخ بكفاءة استخدام الطاقة و إعادة هيكلة شبكات توزيع المياه) في منطقة قصبة السلط.

أرجو معاليكم التكرم بالعلم بأن المشروع أعلاه يتطلب اجراء دراسة تقييم اثر بيئي مبدئي.

وتفضلوا بقبول فانق الإحترام ...

وزيـــر البيئــــ مهم

د. صالــــح الخرابشــــه المندس أحمد القطارف

ويبياش احجب المعدارات. الأميين العسام



2020-06-09 13:07

۲ 1/1 File: - 688-09-06-2020 Action: من زيد المروف Sign : من تي ذريقات الرقم عاري المسير التاريخ الموافق ع مراح عدي

وتدلتوالت تتنا

len 5527909 >>

السادة شركة المستشار للهندسة

تحية طيبة وبعد ،،

إشارة لكتابكم رقم DW1853/915/2020 تاريخ 2020/5/26 ومرفقه الاسس المرجعيـة لمشروع تحسين كفاءة استهلاك الطاقة في قطاع المياه 2 في منطقة قصية السلط/ محافظة البلقاء و العائد للسادة وزارة المياه و الري.

أوافق على الأسس المرجعية المقترحة للدراسة أعلاه وذلك استناداً إلى توصية اللجنة الفنية لمراجعة دراسات تقييم الأثر البيئي للمشاريع.

وتفضلوا بقبول فانق الإحترام ،..

وزيمسر البينية ووزير الزراعة المكلف

د. صاليح الخراية

الباطنين المعطينية المتينا والساد



ن المذان المعنيا ريم مير محكوميا فقط DLS-R 683	ن المن المن المن المن المن المن المن الم	لاغد ان دین ریخ دین کرین مین کرد المناکی الاکن نیز	لأغداف لاختراب المشاريع المحكومية فقط
2020-SL-1 ب الغانه	) غير المنقولة : 1980 اسم العون : عرقو	صورة قيد الأمواز	المديريـة : اراضي السلط القريـــة : السلط
	نــوع الأرض : ملك		اسـم الـحي :
م العجيني؛ 0 م العجيني؛ 12 ع العماضي:1 س الـرسم: 1/2500	1 (منعة) <u>و مر</u> ( <sup>6</sup> ) <u>و مر</u> رقب رقب مجدو مقيا	يحتوي هذا القيد على الأنحد <sup>اقبل</sup> المحتوي المحتوي في المحتوي	<ul> <li>49 : رقبم التطعينة : 49</li> <li>رقبم الحجيوم : 38</li> <li>رقبم الشقيقة : 000</li> <li>رقبم الشقيلية : 4.691</li> </ul>
WI JAN Yang Yang Yang Yang Yang Yang Yang Yang	دونیم (میر 2) و ثلاثون مترفقط	متر مربع لمساحة رقما : 938.000 دونمان و تسعمانة و ثمانية	رقم بيان التغيير: لأغلر أش لأغلر أش المحصاحة كتابة :
الحصفن	الجنسيــــه	_م المالك	رقم وطني/متسلسل اس
		لاغد الله المعادية المحقولة فيظ	* * * * * * * * * * * * * * * * * * *
مدا السند شهادة بذلك بت 2019/06/17	الىكىن الىدكورين و تى اعطر والري رتم 1403/169/4 ت	المبينة أعلاه مسجلة بأسماء الد م بموجب كتاب وزارة الميا	ان الأموال غين المنقولة 06/07/2020 ، أسترونية الرس
ير تسعيــل : اراضي السلط بينهانيرار تنجم عن استعماله مستقلم مستقلم	مدیس مدیس مدین اللواند عین اللواند مدین الواند مدین اللواند مدین الواند مدین اللواند مدین اللواند مدین اللواند مدین اللواند مدین اللواند مدین اللواند مدین اللواند مدین اللواند مدین الواند مدین اللواند مدین الواند مدین	م يتحد على الملكية فقط ولا <del>يتسام لإجراء ال</del> *) هو المعنى بهذا السند ولا يجرز استخدا سين عبد المكريم الموهزيم-اراض الس B/A63134SLDLS386 119	يعتبر هذا السند وثيقة رسمية بيتبر هذا السند وثيقة رسمية المالك المشار اليه باشاره ( منظم مند التحميل: معن يا المرمز المعميز: R=06/07/2020 المرمز المعميز: R=06/07/2020

Un-official translation of above document		
Document title:	Land deed	
Directorrate	As Salt lands	
Village	As salt	
Basin	Arqoub Alkhakha	
Basin Number	38	
Plot Number	49	
Figure Number	12	
Area	2,938.00 m2	
Owner	Water Authority of Jordan (WAJ)	



Un-official translation of above document		
Document title:	Land plan	
Govronrate	Balqa	
Directorrate	As Salt lands	
Village	As salt	
Basin	Arqoub Alkhakha	
Basin Number	38	
Plot Number	49	



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### **ENERGY EFFICIENCY IN THE WATER SECTOR II**

2020/02/25	التاريخ:
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الرقم: DW1853/606/2020 عطوفة مدير عام دائرة الآثار العامة المحترم،

وزارة السياحة والآثار

عمان - المملكة الأردنية الهاشمية

المشروع: تحسين كفاءة استهلاك الطاقة في قطاع المياه 2 الموضوع معلومات ومواقع الآثار المسجلة ضمن منطقة المشروع

تحية وبعد ،،

إشارة لكتاب عطوفة أمين عام سلطة المياه رقم 8477/2/7 بتاريخ 2019/06/03 بخصوص تسهيل مهمة الاستشاري. بناءً على ذلك، نرفق طياً:

كتاب عطوفة أمين عام سلطة المياه رقم 8477/2/7 بتاريخ 2019/06/03 بخصوص تسهيل مهمة الاستشاري

نسخة الكترونية بصيغة Shapefile & kmz لحدود منطقة المشروع

لإجراءاتكم لطفاً بتزويدنا بمعلومات ومواقع (احداثيات) الآثار المسجلة لدى دائرة الأثار العامة لاستكمال إجراءات الدراسة.

وتفضلوا بقبول فائق الإحترام ،،

جيرنوت باب

مدير المشروع

Eng quet Por

المرفقات:

- نسخة الكترونية بصيغة Shapefile & kmz لحدود منطقة المشروع

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