Environmental & Social Impact Assessment (ESIA) for Drilling New Wells and Associated Infrastructure Works – DUBAYDIB Well Field / Disi

Final Terms of Reference (ToR)

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amsl	Above Mean Sea Level
DIWACO	Disi Water Company
DAOM	DISI Amman Operation & Maintenance
DoA	Department of Antiquities
DP	Drilled Priority
ESIA	Environmental and Social Impact Assessment
EIB	European Investment Bank
ESSs	Environmental and Social Standards
ESMP	Environmental and Social Management Plan
EHS	Environmental, Health, and Safety
EPSG	European Petroleum Survey Group
GOJ	The Government of Jordan
GIF	Global Infrastructure Fund
IFC	International Finance Corporation
ILO	International Labor Organization
JSMO	Jordan Institution for Standards and Metrology
MoEnv	Ministry of Environment
MCM	Million Cubic Meters
MWI	Ministry of Water and Irrigation
MoPIC	Ministry of Planning and International Cooperation
MoH	Ministry of Health
MoL	Ministry of Labor
MoLA	Ministry of Local Administration
MoTA	Ministry of Tourism and Antiquities
NGO	Non-Governmental Organization
US DFC	United States International Development Finance Corporation
RSCN	Royal Society for the Conservation of Nature
ToR	Term of References
TNB	Tenaga Nasional Berhad
WAJ	Water Authority of Jordan
WGS84	World Geodetic System 1984

1 INTRODUCTION

1.1 Overview of the Project

The Disi Mudawarra to Amman water conveyance system is supplying potable water to the Greater Amman Area from the Disi aquifer in the south of Jordan. Water is abstracted from the 'fossil' aquifer and carried approximately 325km to Amman via a pipeline. The system is conveying an annual flow of 100 million cubic meters (MCM); 40MCM to a new tank in Abu Alanda and 60MCM to an existing tank in Dabuk.

Five emergency turnouts from the conveyance pipeline are suggested to supply demand centers along the conveyance route (Ma'an, Tafila, Karak, and Madaba city and Madaba bridge pump station), following the construction of the infrastructure, these turnouts can only be used temporarily and in an emergency situation when the demand center in question cannot be supplied with enough water supply from the current source.

The project is considered as part of the Government of Jordan's (GOJ's) larger regional framework of water management and development of new resources. The project started operation in 2014 and it comprises of 55 production wells (46 operational and 9 standbys). Recently the Disi project activated 4 of the standby wells to be 50 abstraction wells and 5 standby wells, and in 2023, the Al-Mudawara pumping capacity was expanded, resulting in an annual rise in the amount of water pumped from wells to 111 MCM and since 2024, production has been increased to 115 MCM. Water is collected from each of the wells via a 'dendritic' collector network and delivered to a collector tank north of the well field by a main spinal collector.

An Environmental and Social Impact Assessment (ESIA) for the project was completed in 2004 by Consolidated Consultants Group. In 2007 Dar Al-Handasah Consultants were assigned by GAMA Enerji A.S. to conduct a review of project ESIA to determine:

- If the changes to the project design since 2004 were sufficient to invalidate all or part of the ESIA
- If there were any changes to the national framework since 2004 that would necessitate revision of all or part of the ESIA.

As a result of the ESIA review, an Addendum to the ESIA was submitted and approved in 2008 by the MWI and Ministry of Environment (MoEnv).

Recently, Disi Water Company (DIWACO) plans to increase the annual output of the wellfield to 120 MCM/year, which will require the construction of additional production wells. Twelve (12) new well locations have been identified and confirmed within the Dubaydib wellfield.

These locations result from the most appropriate trade-off between geoscientific criteria and stakeholders' requirements. Out of the 12 proposed well locations, two require clearance from the MWI due to their positions outside the current Land Lease Agreement, with one situated at the border of a designated 'no-drill' zone. DIWACO is not planning to utilize the two uncleared locations until the other 10 wells are either fully operational or abandoned. DIWACO will start soon working with the consultant for the network design to use several locations out of 12 proposed. Ultimate plan of DIWACO is to drill wells for holding redundancy at the level of 3-4 wells at any point in time. The following section represents the project's main components:

- Drilling new groundwater wells.

- Constructing the relevant infrastructure to collect and transfer water to the existing wellfield collector tank.
- Establish the internal road network to connect the new wells with the existing parts of the project in the Mudawarra area.
- Expansion of the overhead power line system to connect the new wells.

Thus, in compliance with the Jordanian Environmental Classification and Licensing Regulation Number (No.) 69 for the year 2020 and its amendment, MWI/WAJ has submitted letter No.12306/2/7 on 22/6/2023 to MoEnv requesting the classification and the requirements to implement the additional project activities (the new wells). The MoEnv confirmed its need for ESIA prior to the drilling of new wells and classified the project as Category 1, requiring a comprehensive ESIA. The MoEnv classification letter No.6116/7/4 dated August 31st, 2023, is attached in **Appendix 1.**

As part of the project scope, AJi for Water and Environment has been requested to conduct a comprehensive ESIA for the new project phase. Accordingly, this project's Final Term of Reference (ToR) is prepared as an initial requirement of the Ministry of Environment and the lenders (European Investment bank (EIB), United States International Development Finance Corporation (US DFC) and Proparco (France)), and Lenders' Independent Engineer environmental approvals.

1.2 Objective of this Report

The Jordanian Environmental Protection Law has introduced a system of an environmental "pre-emptive" assessment of all economic and developmental projects to be established in Jordan. This process is known as the Environmental and Social Impact Assessment (ESIA) where any development or economic project should carry out a detailed assessment of the potential environmental impacts arising from the implementation of the project, and how to address these impacts through remedial action at the technical, legislative, and public level. According to the Environmental Protection Law, the ESIA study should be done before the project is initiated and submitted to the MoEnv for review and approval. The Environmental Classification and Licensing Regulation No. 69 of the year 2020 and its amendments, classify projects into four categories according to their expected environmental impacts:

- **Class 1:** Projects of high risk that require a comprehensive environmental impact assessment.
- **Class 2:** Projects of medium risk and potential damage that require an initial environmental impact assessment.
- **Class 3:** Projects of low risk that require environmental approval.
- **Class 4:** Projects of low risk that don't need to apply for environmental approval or any other permits.

In accordance with MoEnv's requirements, the ESIA assignment will consist of the following phases:

- Prepare project description and submit it to the MoEnv for the project classification.
- Prepare a preliminary ToR.
- Conduct and document scoping session with stakeholders.
- Submit final ToR following input from MoEnv along with a scoping statement. (This Report)
- Perform ESIA study and prepare ESIA report – including the Environmental and Social Management Plan (ESMP).
- Finalize and submit the ESIA study following input from stakeholders.

The ESIA approval is required to obtain the proper license and to start implementation of the proposed new wells while adhering to the environmental and social mitigation and management plan specified and approved in the study. Any deviation from those guidelines would lead to the project to violation of laws and regulations.
This final ToR is prepared to provide the necessary information to the parties, institutions, and individuals related to the project and to document the consultative work for the ESIA study of the project. This final ToR outlines the requirements of conducting a comprehensive ESIA and requirements for environmental approvals in accordance with the Jordanian Environmental Classification and Licensing Regulation No. 69 of the year 2020 and its amendment No.97 issued by the Jordanian MoEnv.

The ESIA study will be conducted by AJi Water & Environment based on MoEnv's decision on the final ToR which is now submitted after conducting the scoping session and documenting its outcomes. The study will be conducted in accordance with the national Jordanian requirements and in line with the International Finance Corporation (IFC) and lenders requirements and guidelines.

1.3 Project Description and Background

1.3.1 General Overview & Project's Justification

The Disi Water Company (DIWACO) is contracted to MWI/WAJ, and subcontracted the operation of the Dubaydib wellfield to Disi Amman Operation and Maintenance (DAOM). The principal objective of this project is to facilitate the resolution of the water supply problem experienced at Amman, the capital city of Jordan, and the surrounding area. Thus, increasing the supplied water to Amman and accordingly improving public health conditions.

As per the existing project agreement terms, DIWACO is required to deliver up to 100 MCM of water per year to Abu Alanda and Dabuk in Amman from the Dubaydib well field.

However, MWI asked DIWACO to raise the water delivery quantities to 120 MCM for the longer term (2025 onwards) due to the high demand, particularly in the summer. After conducting an infrastructure evaluation, DIWACO verified that the project could accommodate the addition of new wells to meet the quantity need of 120 MCM/year.

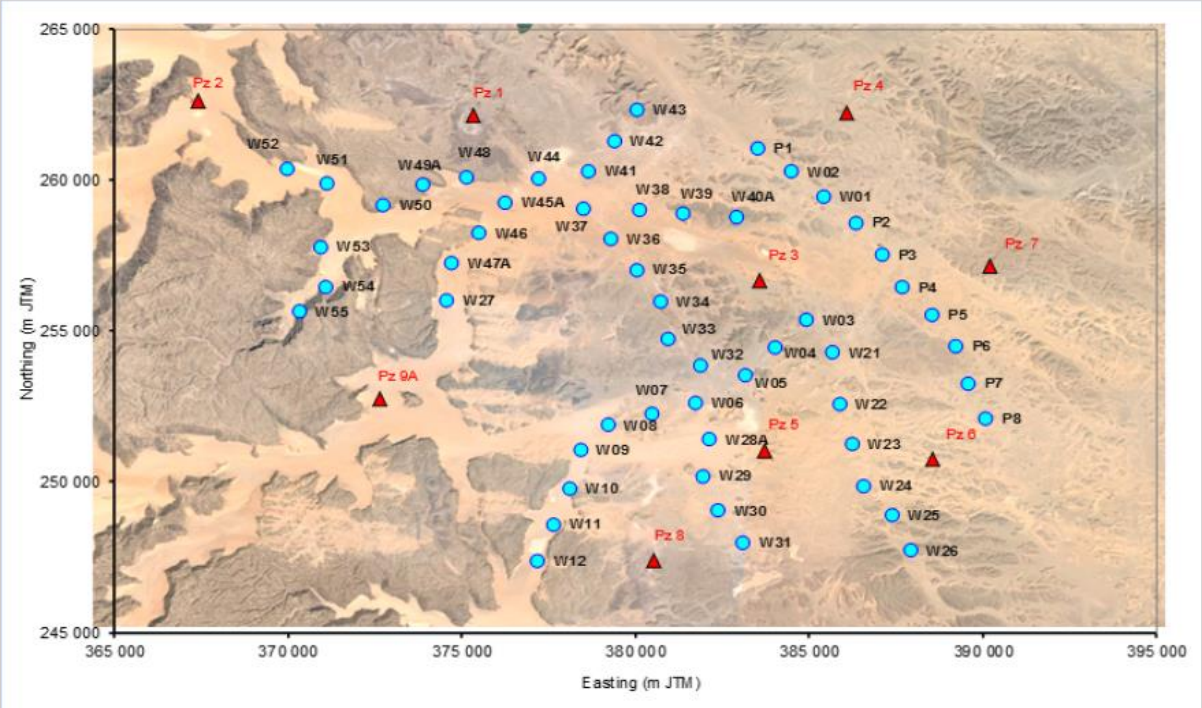
To reliably meet the increased water quantity requested by MWI/WAJ (up to a total of 120 MCM/yr) , DIWACO is planning to conduct additional activities described in the following subsection. These additional activities are herein referred to as "The Proposed wells "which will be covered in the ESIA.

1.3.2 Project Description

1.3.2.1 Existing Disi–Amman Project

The existing Disi-Amman System involves 55 production wells (46 abstraction wells and 9 standby wells) to abstract water from the fossil aquifer in southern Jordan. (Wells map is presented in **Figure 1**). In addition, the project includes 9 piezometer wells and operational facilities including water tanks and pump stations conveying the water for a distance of approximately 325 km to supply 100 MCM per year of water to Amman. The water is received at two tanks, at Dabuk and Abu Alanda in western and eastern Amman respectively. Recently the Disi project activated 4 of the standby wells to be 50

abstraction wells and 5 standby wells, and in 2023, the Al-Mudawara pumping capacity was expanded, resulting in an annual rise in the amount of water pumped from wells to 111 MCM.
Disi is a fossil aquifer extending from the southern edge of the Dead Sea in Jordan to Tabuk in northwest Saudi Arabia. Significant exploitation of the Jordanian part of the aquifer started in 1980.

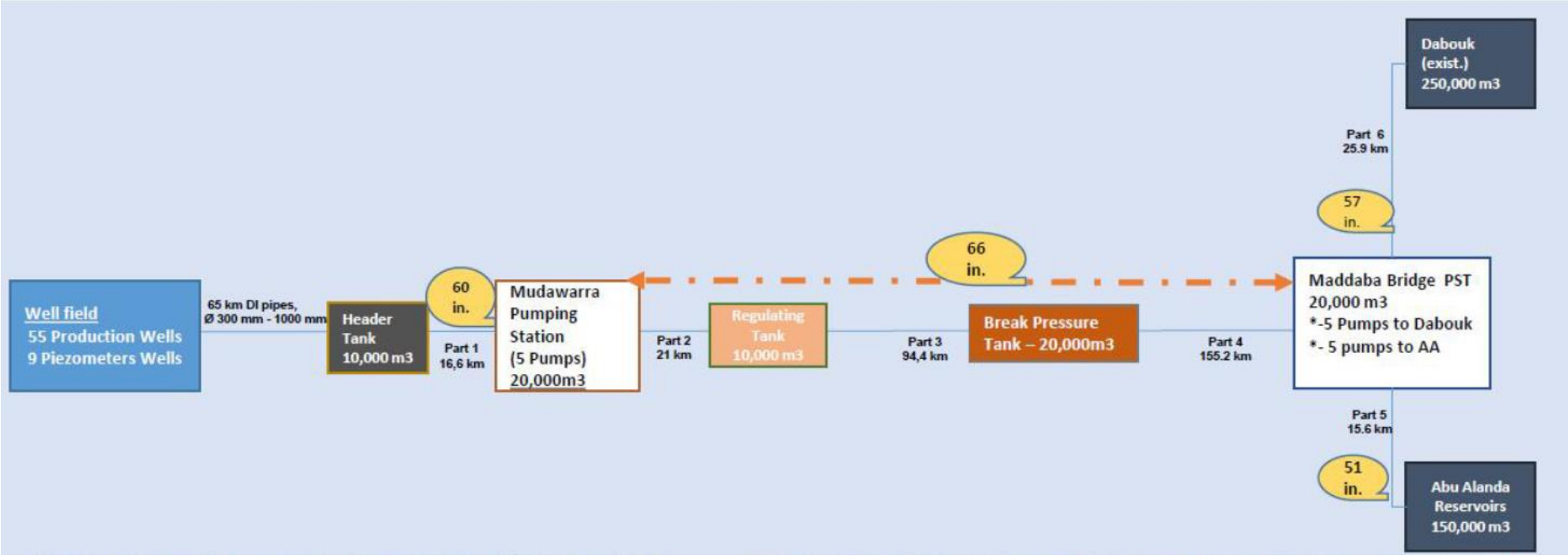


Source: DIWACO

Figure 1: Well-field Map

The Major existing components of the Disi-Amman Project include the following:

- Well field consisting of 46 abstraction wells and 9 standby wells. (Recently the Disi project activated 4 of the standby wells to be 50 abstraction wells and 5 standby wells), and in 2023, the Al-Mudawara pumping capacity was expanded, resulting in an annual rise in the amount of water pumped from wells to 111 MCM.
- Well field collection network
- Main pipeline
- Break pressure and regulating tanks
- Two Pumping stations
- Tanks (Abu Alanda and Dabouk tanks)
- Associated ancillary buildings
- Power supply and communications infrastructure
- Access and Service Roads



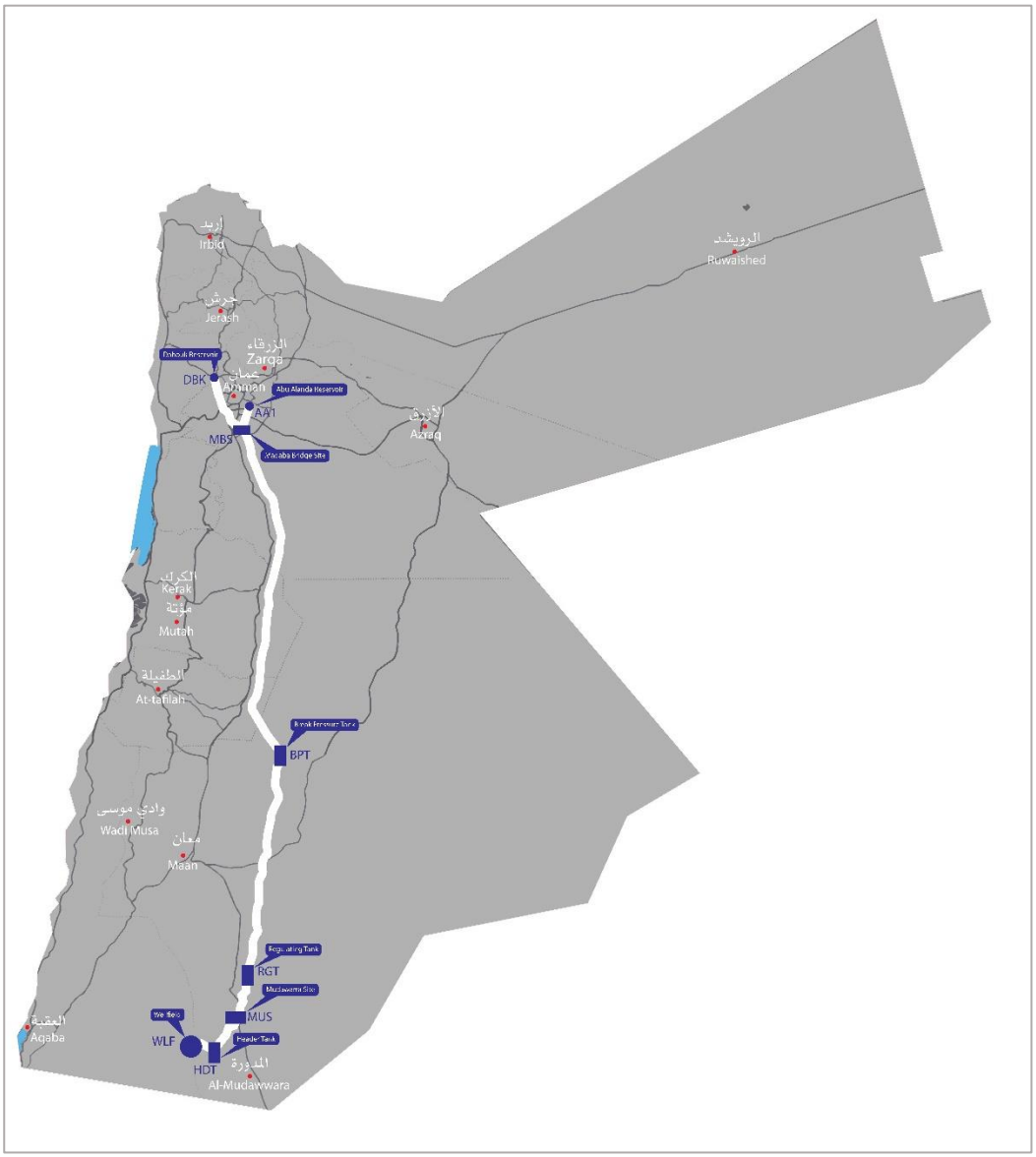
Source: DIWACO

Figure 2: Layout for the major components of the Disi–Amman Project

The Existing Project Location

The project area is the area between the Disi wellfields and Greater Amman and passes through Governorates of Greater Amman, Madaba, Karak, Tafileh, Ma'an, and Aqaba.

Figure 3 shows the constructed alignment of the conveyor to Amman.



Source: DIWACO

Figure 3: Constructed alignment of the Disi-Mudawarra to Amman water conveyance system

1.3.2.2 The Proposed wells

The Dubaydib wellfield, has been producing about 97 to 100 MCM/year. It comprises 55 production wells (initially started with 46 wells in operation and 9 standby wells, recently the Disi project activated 4 of the standby wells to be 50 abstraction wells and 5 standby wells), and in 2023, the Al-Mudawara pumping capacity was expanded, resulting in an annual rise in the amount of water pumped from wells to 111 MCM in 2023 and since 2024, production increased to 115 MCM). The wells have a total depth ranging from 394 to 600 m.

The production target for each new production well has an average of 70 L/s, with a maximum of 80 L/s, with the aim of increasing the current wellfield production up to about 120 MCM/year. Thus, new

additional production wells are required. The identification of the most suitable location and design for these wells have been identified based on the Bureau de Recherches Géologiques et Minières (BRGM) report, published in 2023 [1]

Project components:

The proposed project includes the following activities which will be covered in the ESIA:

- Drilling new groundwater wells (will involve drilling of the well shafts, installation of well casing, screens and pump head).
- Drilling activities are tentatively scheduled to commence in October 2025, and continue through July 2026 for the completion of the first three additional wells (Contingent upon financial security conditions, the approval of study results by all relevant parties, and the GoJ approval of the ESIA). Additional wells will be drilled as required to ensure the continuous availability of three redundant wells at all times. Constructing the relevant infrastructure including wellheads, compounds, pipelines and electricity networks to collect and transfer water to the existing collection tank.
- Extend the internal road network to connect the new wells with the existing parts of the project.
- Expansion of the overhead power line system to connect the new wells.

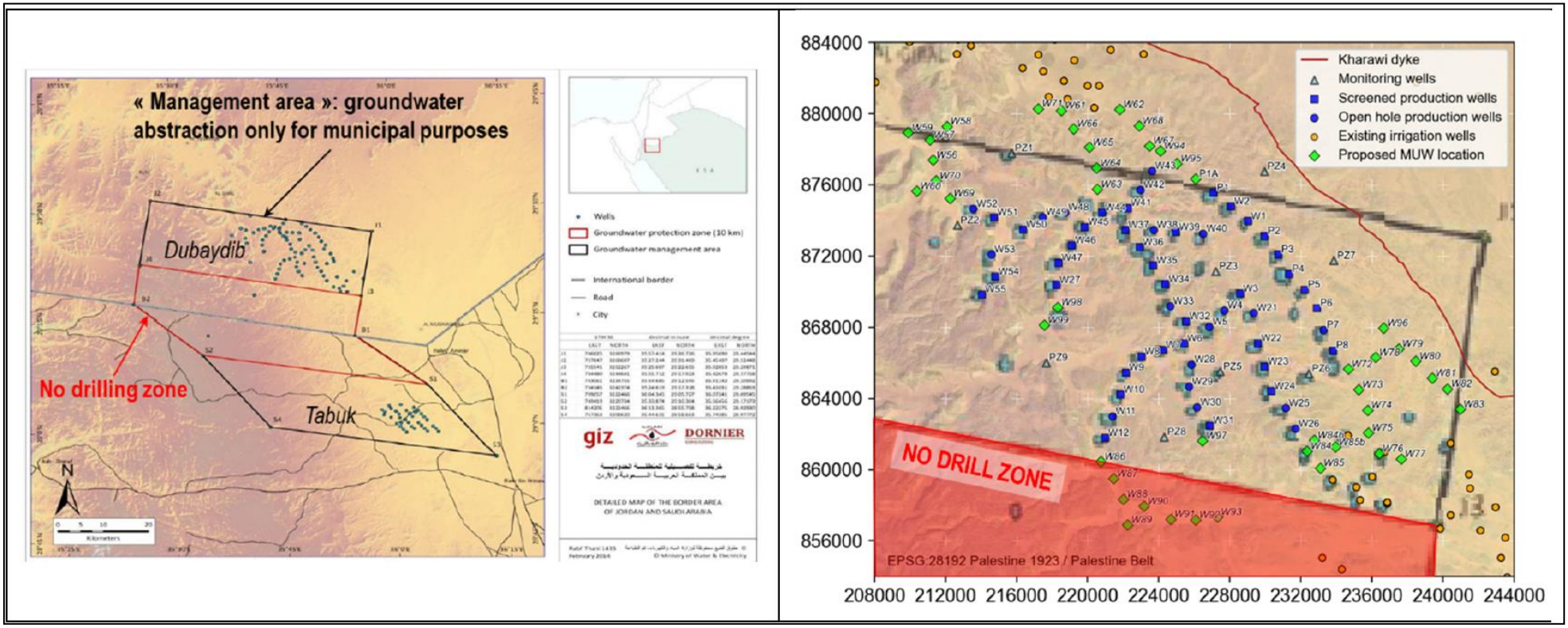
Jordan/KSA agreement for managing of the Disi/Saq groundwater

In 2015, Jordan and Saudi Arabia signed an "Agreement for the Management and Utilization of the Groundwater in the Disi-Saq aquifer" (Disi Agreement, 2015). Amongst several articles, this agreement includes the definition of a "Management area", where groundwater abstractions should be dedicated for municipal purposes only, and a "No drill zone" area, where drilling for groundwater abstractions should be prohibited.

The no-drill zone (**Figure 4**) encompasses the south-western area of the Dubaydib wellfield, thus preventing to consider any new production wells in this area.

Appendix 2 illustrates the agreement between the Government of Jordan and the government of Saudi Arabia in order to manage and investing groundwater in the Al-Saq layer Disi. **Appendix 3** illustrates the agreement map while **Appendix 4** and **Appendix 5**, present the official signed approval of Jordan and Saudi Arabia for this agreement. respectively.

[1] Additional production well targeting and well design for the Dubaydib wellfield -Jordan, BRGM Final Report, June 2023



Source: BRGM Final Report 2023 [1]

Figure 4: "No drill zone" defined in the 2015 Jordan-KSA agreement and close-up view of the Dubaydib wellfield

Criteria and Selection of Wells Locations

The identification of the most suitable location of the new wells has been studied and identified in 2023 by BRGM[2] based on the topography and a mean distance between wells of 1,250 m as illustrated in the following three stages.

First Stage:

In the first phase, all available geoscientific data from the Dubaydib wellfield have been reviewed to build a robust conceptual model of the groundwater tank. The information included well reports, geological and geophysical logs, production data to date, groundwater levels in production and observation wells, historical consultancy reports, and site-specific constraints. Following this analysis, eleven (11) criteria of relevance for well-siting have been retained, corresponding to five (5) main risks including groundwater quantity, groundwater quality, well completion, pipeline costs, and external factor related to a specific agreement between Jordan and Saudi Arabia, which prohibits drilling in the southern edge of the wellfield). Each new well location was given a rating with respect to each criteria.

Second Stage:

In the second stage, a total rating of all the criteria was calculated for each well, as the weighted sum of each criteria. This weighted approach indicates a risk management perspective and whether stakeholders are more or less comfortable with a specific risk.

Third Stage:

In the third stage, a collective workshop was held in Amman with the Dubaydib wellfield's main stakeholders. Twelve locations were decided upon, to be further assessed in the field. Locations were confirmed and/or appropriately adjusted during the field visit (June 2023).

Proposed Wells Locations

The new well locations have been identified and confirmed within the Dubaydib wellfield. These locations result in the most appropriate trade-off between geoscientific criteria and requirements of the stakeholders. **Table 1** presents the coordinates of the new wells and the drilling priority which proposes drilling the first nine wells, while **Figure 5** illustrates the wells' locations.

[2] Additional production well targeting and well design for the Dubaydib wellfield -Jordan, BRGM Final Report, June 2023

Table 1: Locations of The New Wells and Recommended Drilled Priority (DP)

Recommended DP	Original Wells Name	Wells Name	GPS Elevation (m amsl)*	Coordinates in decimal World Geodetic System 1984 (WGS84) system (European Petroleum Survey Group (EPSG) 4326)	
				X	Y
1	W97 GT	$W_{DP\ 1}$	892.13	29.339564	35.790387
2	W63 GT	$W_{DP\ 2}$	861.82	29.467421	35.732639
3	W84b GT	$W_{DP\ 3}$	808.59	29.340959	35.855645
4	W72 GT	$W_{DP\ 4}$	816.83	29.376162	35.870822
5	W94 GT	$W_{DP\ 5}$	848.43	29.486488	35.768032
6	W64 GT	$W_{DP\ 6}$	864.83	29.479227	35.73164
7	P1A GT	$W_{DP\ 7}$	867.24	29.472573	35.787571
8	W86 GT	$W_{DP\ 8}$	905.22	29.333002	35.736758
9	W98 GT	$W_{DP\ 9}$	930.99	29.408731	35.707753
10	W69 GT	W_{DP10}	867.29	29.46167	35.643365
11	W95 GT	W_{DP11}	854.62	29.48011	35.776918
12	W65 GT	W_{DP12}	869.07	29.487706	35.727821

Source: BRGM Final Report 2023 [1]

*asml: Above mean sea level

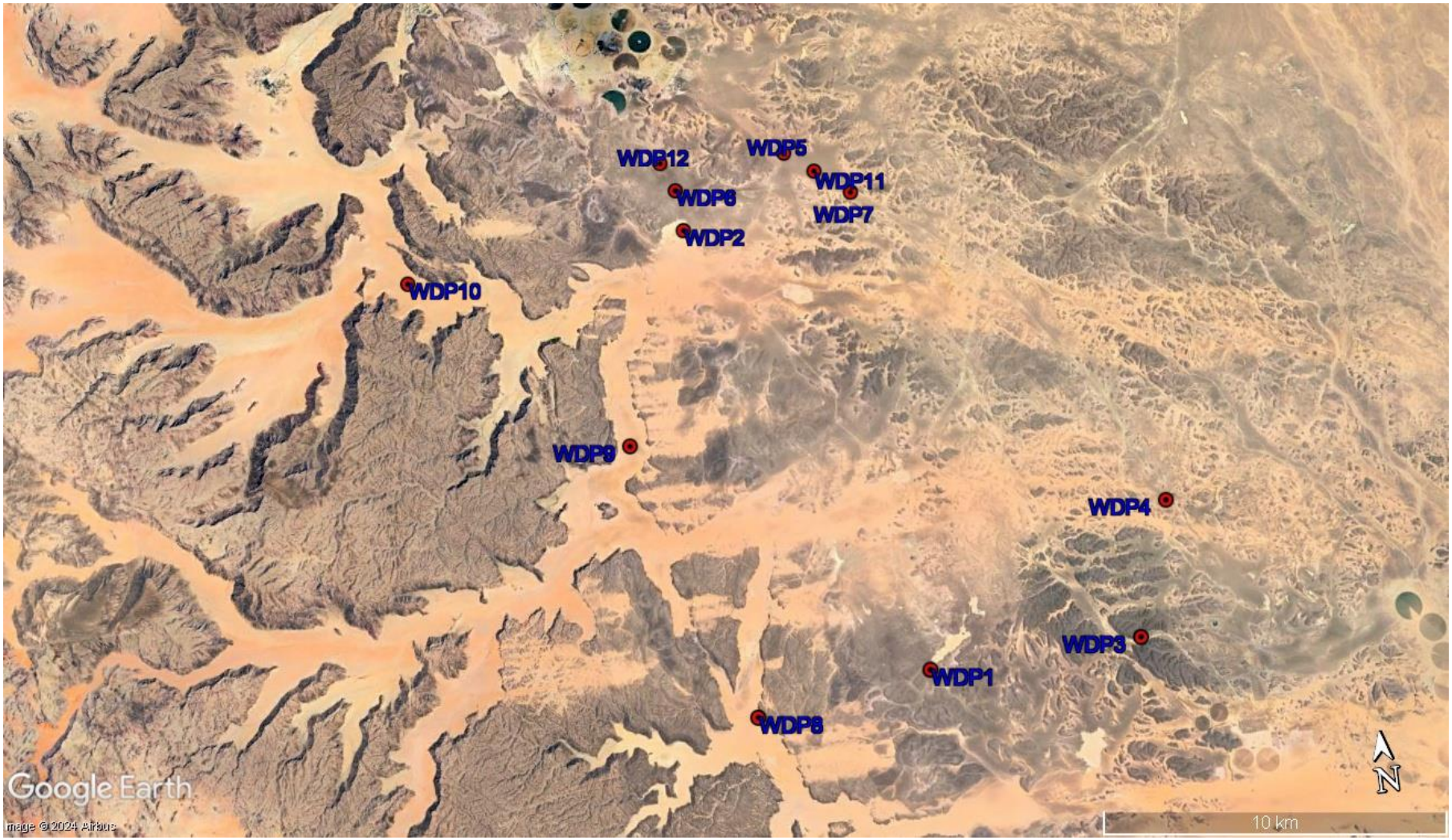


Figure 5: Map of the new drilling well's locations

Construction of the new wells will involve drilling of the well shafts, installation of well casing, screens and pump head with all necessary valves, pipes and instruments). In addition to wellhead components (including mechanical works, electrical and control rooms, transformers, lifting equipment and fence). Associated service road and electricity company connection are also included.

Appendix 6 illustrates the wellhead general layout plan.

Project's Area of Influence

The Project is situated in the Disi-Mudawarra area south of Jordan, near the border with Saudi Arabia. It is part of the larger Disi aquifer, a significant source of ancient, non-renewable fossil groundwater. This region has gained prominence due to its strategic water resources, especially in a country like Jordan, which faces chronic water scarcity. The area experiences an extremely dry, desert climate, with hot summers and mild winters. The waters of the Disi Basin are hydrologically non-renewable waters with an average age of 10-30 thousand years. The Tabuk-Mudawara-Disi region extends from the Tabuk Plain in Saudi Arabia to the Wadi Rum Desert in Jordan, between the Disi, Mudawara and Al-Jafer regions.

Figure 5 below illustrates the wellfield boundary, along with 1 km and 5 km buffer zones. The map indicates that the nearest communities are located more than 5 km from the project boundary. Additionally, it shows two farms situated within the 1 to 5 km buffer zone, and the Rum Protected Area is approximately 14 km away from the wellfield boundary.

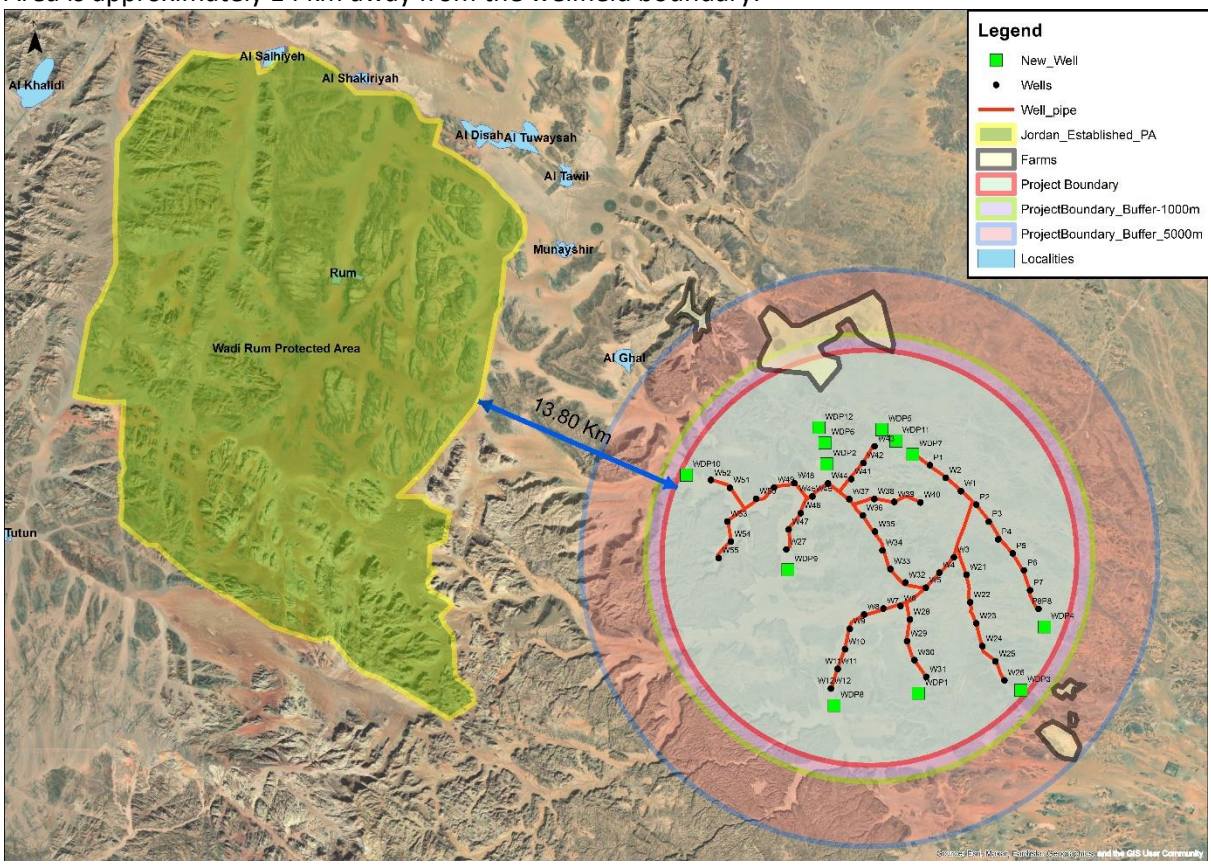


Figure 6: Map of the Project's Area of Influence

Key Stakeholders Relevant to the Study:

- **Owner**: Government of Jordan (GoJ) represented by the MWI/WAJ,
- **Other governmental stakeholders**: relevant ministries.
- **DIWACO**: Disi water company, the owner of the project facilities during the concession period of 25 years since the commercial operation date January 27th, 2014 under the BOT contract signed with MWI/WAJ.
- **Technical Expertise**: Owner's Engineer (OE) will be appointed by DIWACO and will seek technical advice from external experts.
- **Lender (Investor):** EIB, US DFC and Proparco.
- **Environmental and Social Impact Assessment Study Consultant:** AJi Water and Environmental will prepare the comprehensive ESIA.
- **Beneficiaries**: Amman City which will utilize the Disi water for domestic needs, the cities along the Disi conveyor rout will be provided with emergency turn out.
- **The Operator:** DISI Amman Operation and Maintenance (DAOM) is responsible for operating and maintaining the entire Disi Conveyance System starting from the well field in the south of Jordan all the way up to the Greater Amman Area.

The ESIA will cover the following phases:

- The construction phase which includes drilling the new groundwater wells, connection to the existing pipeline network and/or new network, electricity network, and the service roads within the wellfield area.
- The operation phase for the different newly constructed facilities throughout the project.
- The decommissioning phase of the project.

2 LEGAL AND REGULATORY FRAMEWORK

This section provides an overview of the national legal and regulatory considerations applicable to the proposed project, including relevant international conventions and treaties of which Jordan is a party of or a signatory. Also, IFC and lenders requirements will be considered in addition to these national requirements.

2.1 National Laws and Guidelines

2.1.1 Laws

- Environment Protection Law No. 6 of 2017
- Protection of Cultural Heritage and Sites Law No. 5 of 2005
- Roads Law No. 24 of 1986 and its amendments
- Transportation Law No. 89 of 2003 and its amendments
- Waste Management Framework Law No. 16 of 2020
- Local Administration Law No. 22 of 2021
- Water Authority Law No. 62 of 2001 and its amendments (Law No. 22 of 2014)
- Agricultural Law No. 13 of 2015 and its amendments
- Public Health Law No. 47 of 2008 and its amendments (Law No. 11 of 2017)
- Renewable Energy and Energy Efficiency Law No. 13 for 2012 and its amendment Law No. 33, of 2014, and Law No. 12 of 2024 amending the Renewable Energy and Energy Efficiency Law
- Traffic Law No. 49 of 2008 and its amendments of 2020
- Labor Law No. 8 of 1996 and its amendments of 2019
- Civil Defense Law No. (90) of 2003; read with Law No. (18) of 1999
- Cultural Heritage & Antiquities Law No. (21) of 1988 and its Amendment Law No. (55) of 2008
- Professional Licensing Law No. 28 of 1999 and its amendments
- Monitoring and Control of Economic Activities Law No. 33 of 2017
- Industry and Trade Law No. 18 of 1998
- Temporary General Electricity Law No.64 of 2002 and its amendments
- Management of Natural Resources Law No. 19 of 2018
- Industry & handicraft law No. 16 of 1953
- Municipalities Law, No. 14 of 2017
- Anti-human trafficking Law No. (9) of 2009
- Land Transport Regulatory Authority Law (2011)

2.1.2 Regulations

- Regulation of the Environmental Classification and Licensing No. 69 of 2020 and its amendments.
- Regulation of the Joint Services Councils No. 113 of 2016
- Regulation of the Protection of the Environment from Pollution in Emergency Situations No. 26 of 2005
- Regulation of Soil Protection No. 25 of 2005
- Regulation of Natural Reserves and National Parks No. 29 of 2005
- Regulation of Air Protection No. 28 of 2005
- Regulation of Groundwater Monitoring No. 64 of 2002, read in conjunction with regulation No. 85 of 2002.
- Regulation of Hazardous Materials and Waste Management[3] No. 68 of 2020
- Regulation of Solid Waste Management No. 27 of 2005
- Regulation of Land Use Planning No. 6 of 2007
- Regulation of Hazard Prevention, Charges, and Waste Collection Fees within Municipalities Areas No. 68 of 2016
- Regulation of Protection and Safety from Industrial Tools and Machines and Worksites No. 43 of 1998[4]
- Regulation for the Establishment of Occupational Health and Safety Committees and Supervisors in Institutions No. 33 of 2023[5].
- Regulation for Occupational Safety & Health and Prevention of Occupational Hazards in Institutions No. (31) of 2023[6]
- Bird Protection and Hunting Regulation No. (13) of 1973 and all amendments
- Regulation for the licensing and permitting of excavation and infrastructure network projects No. 112 of 2007
- Regulation of Environmental Protection No. 37 of 2018.
- Regulation of 2013 on the instructions of the use, import, and export of ozone depleting substances.
- Regulation of Harmful and Hazardous Substances Management No. 24 of 2005

[3] issued in accordance with Articles 6 and 7 of Environmental Protection Law No. 6 of 2017

[4] Issued by the virtue of the provisions of Paragraph (c) of Article (85) of the Labor Law No. 8 of 1996 and its amendments

[5] Issued in accordance with Paragraph (a)Article (85) of the Jordanian Labor Law No. 8 of 1996 and its amendments

[6] Issued in accordance with Paragraph (b)Article (85) of the Jordanian Labor Law No. 8 of 1996 and its amendments

- Regulation No. (85) of 2020.of Environmental Information and Control System for Waste Management
- Regulation of Climate Change No.79 of 2019 issued pursuant to Article 30 of the Environmental Protection Law No.6 of 2017.

2.1.3 Instructions

- Instruction for the Limitation and Control of Noise of 2003
- Instructions for the Management and Handling of Hazardous Waste of 2019
- Spent Mineral Oils Management and Handling Instructions of 2014 and its amendments Instruction No. 1 of 2013 for the preventing of occupational hazards related to health hazards resulting from labor housing units onsite, issued in accordance with article (49) of the Public Health Law No. 47of 2008
- Instructions for the General Health Conditions for Industries of 2019
- Instructions for Solid Waste Management of 2019
- Instruction for Controlling the Use of Substances that Deplete the Ozone Layer for the year 2003, issued in accordance with the Protection of the Environment Law No. 1 / 2003, Articles 9 through15
- Instructions for birds and wildlife protection and organizing their hunting and trafficking of 2021.
- Instructions for Disposal of Industrial and Commercial wastewater into the sewage network of 2017
- Instructions for the Selection of locations for Development Activities for 2007 issued in accordance with paragraph (d) of Article (4) of the Environmental Protection Law no. 52 of 2006.
- Instructions on the Prevention of Health Nuisances related to Health Hazards resulting from Housing Units of Labor Groups No. (1) of 2013
- Instructions of Protection of Workers from Workplace Hazards of 1998
- Instructions for the Protection of Water Resources for the Year 2011 and its Amendments for the Year 2019.

2.1.4 Guidelines and Policies

- Guidelines for the protection of migratory birds from the danger of electric shock
- Policy of the National Climate Change of the Hashemite Kingdom of Jordan (2022-2050).

2.1.5 Standards

- Standard for Ambient Air Quality No. 1140/2006
- Standards for the Maximum Allowable Limits of Air Pollutants Emitted from Stationary Sources No. JS 1189/2011
- Standards for Lighting — Lighting levels in work environment No. JS 524/1987
- Standards for Motor Vehicles — Emission - Diesel Engines No. JS 1054/1998
- Standards for Reclaimed Domestic Wastewater No. JS 893/2021

- Standards for Drinking Water No. JS 286/2015
- Standards for Storage – General precautionary requirements for storage of hazardous materials No. JS 431/1985
- Standards for Motor Emissions No. JS 1052/1998
- Standards for Motor Vehicles (Noise Levels) No. JS 1059/1998
- Standard for heat levels allowed to be exposed to in the work environment No. JS 525/1987
- Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain No. JS 2310 / 2021.
- Ergonomics of the thermal environment — Analytical determination and interpretation of heat stress using calculation of the predicted heat strain (ISO 7933/2004)

2.1.6 International Treaties and Conventions of Which Jordan is a Party/Signatory

- Basel Convention of Transboundary Movements of Hazardous Wastes and Their Disposal — 1989. Designed to reduce the movement of hazardous waste between countries and specifically to prevent the transfer of hazardous waste from developed to undeveloped countries. Jordan signed on this convention in 1989, but it went into effect in 1992.
- Convention on Biological Diversity — 1992. The convention was dedicated to promote sustainable development. It recognizes that biological diversity is about more than plants, animals, and microorganisms and their ecosystems — it is also about people and their need for food security, medicine, fresh air, water, shelter, and a clean and healthy environment in which to live. Jordan signed this convention in 1992 and it became a party in 1994.
- Convention on the Conservation of Migratory Species of Wild Animals, Bonn Convention — 2000. The convention is aimed at protecting migratory species, their habitats, and migration routes.
- The United Nation Framework Convention on Climate Change — 1994. It is an international environmental treaty that aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
- United Nations Convention to Combat Desertification — 1994. The convention aims to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (December 17, 1975);
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (May 10, 1977);
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (March 14, 1979);
- Protocol to amend the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (RAMSAR Convention) (October 1, 1986);
- Amendment to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (art. XI) (April 13, 1987);

- Protocol on Substances that Deplete the Ozone Layer (August 30, 1989);
- Convention for the Protection of the Ozone Layer (August 31, 1989);
- Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer (September 28, 1995);
- International Plant Protection Convention (April 24, 1970);
- International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (December 26, 1996);
- International Labor Organization (ILO) Conventions, Jordan has ratified 26 ILO Conventions, which will clearly be presented in the Labor Management Plan (LMP) as a part of the ESIA preparation.

2.1.7 Lender's Requirement

In addition to the national requirements, the ESIA study will be conducted in line with:

- The Performance Standards (PSs) of IFC's Sustainability Framework (2012)[7]: The IFC of the World Bank Group has established its Performance Standards on Environmental and Social Sustainability (2012) building on the World Bank Environmental and Social Policies. IFC's Sustainability Framework is represented by the following eight PSs that the client [8] is to meet throughout the life of an investment by IFC:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 2: Labor and Working Conditions
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
  - Performance Standard 5: Land Acquisition and Involuntary Resettlement
  - Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
  - Performance Standard 7: Indigenous Peoples
  - Performance Standard 8: Cultural Heritage

- The EIB Statement of Environmental and Social Standards of February 2, 2022[9]. The EIB Group Environmental and Social Sustainability Framework is an overarching policy framework that allows EIB to focus on sustainable and inclusive development, committing to a just and fair transition and supporting the transition to economies and communities that are climate and disaster resilient, low carbon, environmentally sound, and more resource-efficient.

  It consists of an Environmental and Social Policy and a revised set of EIB Environmental and Social Standards (ESSs) which describe the requirements that all EIB-financed projects must meet. The standards are grouped in the following 11 thematic areas:

  - Standard 1: Environmental and Social Impacts and Risks
  - Standard 2: Stakeholder Engagement

[7] Performance Standards of IFC's Sustainability Framework (2012)
[8] Refers to the party responsible for implementing and operating the project that is being financed, or the recipient of the financing, depending on the project structure and type of financing
[9] The EIB Statement of Environmental and Social Standards of February 2, 2022

- Standard 3: Resource Efficiency and Pollution Prevention
- Standard 4: Biodiversity and Ecosystems
- Standard 5: Climate Change
- Standard 6: Involuntary resettlement with relevance to this project, ESS 6 is irrelevant
- Standard 7: Vulnerable Groups, Indigenous Peoples and Gender
- Standard 8: Labor Rights
- Standard 9: Health, Safety, and Security
- Standard 10: Cultural Heritage
- Standard 11: Intermediated Finance With relevance to this project, ESS 11 is irrelevant

- The applicable World Bank Group Environmental, Health, and Safety (EHS) guidelines are General EHS Guidelines dated April 30, 2007 [10].
- The EHS Guidelines for Water and Sanitation dated December 10, 2007[11]

[10] The applicable World Bank Group Environmental, Health, and Safety (EHS) guidelines
[11] https://www.ifc.org/content/dam/ifc/doc/2000/2007-water-and-sanitation-ehs-guidelines-en.pdf

3 CONSULTATIVE WORK APPROACH AND METHODOLOGY

3.1 Stakeholders Engagement & Identification

Stakeholders should play a vital role in providing advice to the project management in compliance with local ESIA regulations, IFC, and lenders requirements and guidelines. Stakeholder engagement will be an ongoing process by DIWACO, DAOM, and MWI/WAJ through the reactivation of the Disi Project Advisory Committee (DPAC) to review the local community requests. and ensure transparency with all stakeholders that may be affected by the proposed project or have an influence on the project.

In addition, the AJi team will be engaged with the stakeholder activities during this ESIA as follows:

- Identifying the project stakeholders and all parties affected or related to this project
- Conducting a scoping session and documenting its results in a scoping session report as part of this final ToR.
- Conducting a disclosure session to present the ESIA study findings.

The Environmental Classification and Licensing Regulation No. 69 for the Year 2020 and its amendments No.97 requires that consultation session(s) be conducted with all project's related stakeholders to identify valued environmental and social components that need to be addressed in the ESIA study. The ESIA will assess the significance of the anticipated impacts of the proposed project (activities) on each identified component. The scoping process aims to achieve the following:

- Ensure that inputs of stakeholders as well as experts in the field are not overlooked and are affirmed.
- Ensure coordination with related governmental bodies in compliance with the ESIA procedures.
- Identify stakeholders' concerns and assess these concerns significance. These include concerns raised by related governmental organizations, nongovernmental organizations, civil society organizations, and the identified people affected by the project.
- reviewing the grievance mechanism for both the community and the project labor provided by DIWACO. The grievance mechanism provides the public with a tool enabling alternative and pre-emptive resolution of disputes between them and the project management. This mechanism will lead to a good administration by contributing to the identification of possible improvements to the implementation of the project.
- The stakeholder engagement process will identify the related parties and stakeholders influencing and/or influenced by the project and detail how the project management will communicate, inform, and discuss the substantive issues with all interested and affected parties.

An initial list of stakeholders is identified based on the project location, nature, and its potential social and environmental impacts. Governmental stakeholders include Ministries, Directorates, municipalities, and other agencies, while non-governmental stakeholders include non-governmental organizations (NGOs), businesses, residents, and academic institutions.

Table 2 provides a list of key national and local stakeholders along with their influence on the project.

Table 2: Initial List of Stakeholders

Stakeholder	Stakeholder Details	Description
The Client	Ministry of Water and Irrigation (MWI)/Water Authority of Jordan (WAJ)	The client of this project as it is considered as the official body is responsible for the overall monitoring of the water sector, water supply and wastewater systems, and related projects, planning and management, and the formulation of national water strategies and policies.
	Disi Water Company (Diwaco)	Disi Water Company (Diwaco) is a Jordanian project company owned by Gama Enerji. DIWACO is the owner of the project facilities during the concession period of 25 years since the commercial operation date January 27th, 2014 under the BOT contract signed with MWI/WAJ.
Shareholders	GAMA Energy Water Investment • GAMA Enerji A.Ş: o GAMA Holding (50.5%) o Tenaga Nasional Berhad (TNB) (30%) o International Finance Corporation (IFC) (14.5%) o IFC Global Infrastructure Fund Holding (GIF) (5%)	• GAMA Energy Water Investment Build-Operate-Transfer concession agreement based on 25-year guarantee of purchase. • TNB is the largest electrical infrastructure services company in Malaysia. The main activities of TNB include the entire electric production and supply value chain which consists of "Production", "Transmission" and "Distribution". • IFC improves the lives of people in developing countries by investing in private sector growth. • GIF invests capital in new or developing projects in the energy, transportation, public utilities, telecom and urban infrastructure sectors.
Government	Ministry of Environment (MoEnv)	National body responsible for the protection of the environment through the development of legislation and ensuring it is enforced.

Stakeholder	Stakeholder Details	Description
	Ministry of Planning and International Cooperation (MoPIC)	MoPIC endeavors to promote a culture of excellence, good governance, sustainable development, and improvement in accordance with best practices, and activate its role and its desired goal in development, planning, and international cooperation, so as the interest of the country and the citizen.
	Ministry of Health (MoH)	MoH is the competent authority accountable for the protection of public health in the country. It is also responsible for monitoring the drinking water to ensure its safety and adequacy for human consumption.
	Ministry of Labor (MoL)	MoL is the main entity responsible for labor issues and affairs, regulating the labor market, supervising labor unions, providing vocational training and enhancing labor education, employment of Jordanians and non-Jordanians, etc.
	Ministry of Local Administration (MoLA)	Land uses in Jordan are designated by MoLA, which in turn identifies the projects and activities that are allowed at each location. For this project, this mainly includes issues related to designated land use of the Project site.
	Ministry of Tourism and Antiquities (MoTA) / Department of Antiquities (DoA)	MoTA and DoA are mainly responsible for tourism development and protection of antiquities in Jordan. Their interest in this project is primarily the potential for impacts related to archaeology and cultural heritage at the project area.
	Ministry of Energy and Mineral Resources (MEMR)	The official body is entrusted with administering and organizing the energy sector in a way that achieves the national objectives.

Stakeholder	Stakeholder Details	Description
	Jordan Institution for Standards and Metrology (JSMO)	It plays a proactive role in protecting the interests, health, and safety of citizens and the environment and enhancing the competitiveness of Jordanian products in national, regional, and international markets. JSMO prepares, approves, revises, amends, and monitors the implementation of standards and technical regulations covering all services and products (with the exception of pharmaceutical products, medicines, veterinary medicines, serums, and vaccines). JSMO fulfills its mandate to build, implement, and update systems compatible with international practices, in the fields of standardization, metrology, conformity assessment, market surveillance, accreditation, information, and related areas by providing an internal supportive working environment and developing all needed human, knowledge, material, technological, and financial resources.
	Ministry of Industry and Trade	It contributes to building and enhancing a national, competitive, global, and diverse economy in partnership with the private sector to raise citizens' standard of living where it enhances investment and business environment, so it becomes more competitive through the development of economic policies and legislations in order to ensure protection for both consumers and business sectors.
	Disi Basin Municipality	One of the southern municipalities affiliated with the Aqaba Governorate. It provides public services to all the villages of the basin.

Stakeholder		Stakeholder Details	Description
The lenders (Investors)	Providing a Loan for the implementation of the proposed project	European Investment Bank (EIB)	The European Investment Bank (EIB) is the lending arm of the European Union.
		United States International Development Finance Corporation (US DFC).	It is America's development finance institution.
		Proparco	It is the private sector financing arm of Agence Française de Développement Group (AFD Group.
The Operator		Disi Amman Operation & Maintenance (DAOM)	For this Project, it is the Project Operator who is responsible for operating and maintaining the entire Disi Conveyance System starting from the well field in the south of Jordan all the way up to the Greater Amman Area.
Service Providers		Civil Defense, Traffic Department, and Electricity Providers (EDCO)	Service and utility providers within the Project Area
Non-Governmental Organizations (NGOs)		The Royal Society for the Conservation of Nature (RSCN)	The RSCN is responsible for protecting the biodiversity and natural resources in Jordan. This environmental NGO sets up protected areas to safeguard wildlife and birds. As part of this Project, RSCN's role involved issues related to the proposed Project area being in environmental reserves and important bird areas (If any) as well as the potential impacts of the Project on biodiversity.
Local Community nearby Dubaydib well field		Local Community within the vicinity of the Dubaydib well field	
DISI Project Advisory Committee (DPAC)		The social aspects of the DISI project are managed through the DPAC. It comprises the review unit for the Disi project's environmental performance.	
Gama HQ Head Quarters (Ankara, Turkey)		Technical expertise, support, and knowledge sharing	
Dar Al Handasah & AJi Water & Environment (AJi)		Dar Al Handasah is the consultant who is responsible of designing the new network for the wells and AJi for design review.	
Bureau de Recherches Géologiques et Minières (BRGM)		BRGM, France's leading earth science public institution, (Additional production well targeting and well design for the Dubaydib wellfield)	

4 TERMS OF REFERENCE FOR THE ESIA STUDY

Prior to the commencement of the Environmental and Social Impact Assessment (ESIA) scoping session, a preliminary Terms of Reference (ToR) document was submitted to the Ministry of Environment (MoEnv). The preliminary ToR provided the MoEnv with a project description, a proposed approach to completing the required ESIA study, including provisions of impact assessment criteria and methods for establishing mitigation measures to control (eliminate and/or minimize) those impacts identified as significant, and a list of identified project-related key issues. The Preliminary ToR document was submitted to MoEnv before the scoping session in order to facilitate the scoping process.

The following presents the preliminary ToR which was presented at the scoping session for stakeholders' and participants' review and comments. The updated version was produced after the scoping session to address the comments and inquiries gathered from the scoping session participants, and will accordingly be submitted to DIWACO, and lenders for their review and approvals and then to MoEnv for the final approval.

The significance of the expected impacts will be determined based on stakeholder feedback, current prevailing conditions, and technical and preliminary expert analysis of each impact. The significance and assessment of impacts will be discussed in the ESIA study.

The ESIA will address impacts that have been identified to be of high to medium importance according to professional judgment.

4.1 Comprehensive ESIA Study Methodology

The expected workflow for preparing the ESIA study is detailed in the following sections, while **Table 3** presents the timeline of the study.

Table 3: ESIA Study Timeline

No.	ESIA Major Task	Expected Date
1	Assessment of Environmental and Social Baseline Conditions.	January 2025
2	Identification of Environmental and Social Impacts. As part of the assessment, potential cumulative impacts will also be considered.	January 2025
3	Development of Environmental and Social Management Plan (ESMP)	March 2025
4	Submission of Draft ESIA	March 2025

4.2 Environmental and Social Baseline

The consultant will assemble, evaluate, and present baseline data on the relevant environmental, social, and economic characteristics of the project study area.

The baseline will be prepared according to the methodology in **Table 4**.

Table 4: Methodology for Baseline Study

No.	Environmental/ Social Component	Baseline measurements that will be conducted during ESIA
1	**Air Quality and Dust**	● No baseline air quality measurements are anticipated for the project site due to the predicted transitory air emissions during the construction phase, the absence of any nearby residences or the local community, and the very low expected air emissions throughout the operating period.

No.	Environmental/ Social Component	Baseline measurements that will be conducted during ESIA
		● The air quality baseline description will be completed based on secondary information only.
2	**Noise**	● Noise measurements will be conducted at the project site in accordance with noise measurement methodologies aligned with good international practices, taking into account occupational health and safety as well as biodiversity considerations. Noise measurements will be carried out over a 24-hour period at four proposed locations, as indicated on the map in **Appendix 7**.The survey will include current conditions at locations distant from existing wells, as well as areas near operational wells.
3	**Land and Soil**	● Literature review and review of previous studies, in addition to rapid visual field assessment.
4	**Water Resources**	● Literature review and review of previous studies including the BRGM study in addition to rapid visual field assessment. ● Review DIWACO, DAOM and MWI/WAJ recent groundwater testing for all the parameters (2021-2024), in addition to review the radioactivity report (2021-2022). No further testing is suggested. The parameters are: Colour, Taste, Odour, Turbidity, Ammonium, Aluminum, Manganese, Iron, Copper, Zinc, Sodium, Chloride, Sulphate, Hydroxide, TDS, Total hardness, Chemical detergents, Arsenic, Lead, Cyanide, Cadmium, Chrome, Barium, Selenium, Boron, Mercury, Silver, Nickel, Antimony, Fluoride. Radionuclides: - Alpha Radionuclides excluding Radon. - Beta Radionuclides excluding Tritium and Carbon 14.
5	**Solid Waste**	● Previous studies, such as previous ESIA conducted in 2004 and its addendum.
6	**Hazardous Waste**	● Previous studies, such as previous ESIA conducted in 2004 and its addendum.
7	**Drilling liquid waste**	● Literature review and review of previous studies, in addition to DIWACO expertise.
8	**Aesthetics**	● Field rapid diagnosis / assessment.
9	**Socioeconomic Issues**	● Data review and collection from (i) DoS, https://dosweb.dos.gov.jo/ar ; (ii) MoPIC, https://www.mop.gov.jo/Default/Ar ; (iii) Ministry of Education (MoEdu), https://moe.gov.jo ; and (iv) MoI, https://moi.gov.jo/Default/Ar. ● Investigate the official land use of the Project area as well as the actual customary land use (informal land use) if differs from the planned. ● Analyze data to map and profile the socio-economic conditions of the project area, using on-site assessments, operator's feedback,

No.	Environmental/ Social Component	Baseline measurements that will be conducted during ESIA
		and satellite imagery to identify informal community activities such as temporary structures. ● Display the outcomes and findings using illustrative maps, tables, and photos as applicable.
10	**Public Health and Safety**	● Literature review. ● Scoping and disclosure sessions. ● DPAC outcomes.
11	**Occupational Health and Safety**	● Review of the well field existing safety procedures and documents.
12	**Land Use**	● Department of Lands and Survey documents.
13	**Climate Risk & Vulnerability Assessment**	● Literature review and review of previous studies. In addition to assess the sensitivity of project component(s) and Labor to climate/weather conditions such as temperature, rainfall or flooding in order to improve preparedness for climate variability through the incorporation of resilient designs for all infrastructure works, and ensure adaptations measures for the labor on site for the assessed climate risks.
14	**Biodiversity**	● Literature review and review of previous studies, in addition to rapid ecological assessment of the project implementation site. The methodology for the biodiversity study is detailed in **Appendix 8**.
15	**Archeology and Cultural Heritage**	● Literature review and review of previous ESIA for the well field. ● Based on data obtained from the Department of Antiquities.

In case of any monitoring tests and measurements, they will be conducted by accredited laboratories using methods in accordance with the related requirements.

4.3 Methodology of Impact Identification and Assessment

After reviewing the project's proposed design and approach, the consultant will identify potential risks and impacts expected during the construction, operation, and decommissioning phases. Identified impacts will be further assessed during ESIA preparation. Mitigation and monitoring measures will be designed to mitigate these risks and impacts.

This section presents the methodology to be implemented by the ESIA consultant to identify expected impacts. Upon identifying the impacts, consideration will be given to the outcomes from the stakeholder's consultation, results of previous ESIAs for similar projects, as well as expert judgment and experience in this field.

The consultant will assess the affected elements and will determine the magnitude of the potential impacts on them after reviewing the project's design, conducting a site visit, collecting online data, conducting a scoping session, and using the experience gained from similar previous projects.

The significance of the expected impacts on the identified valuable environmental and social components will be assessed.

To enable the determination of the overall significance of the impact, each identified impact interaction will be ranked in terms of consequence and likelihood. Impact significance is expressed as the product of the consequence and likelihood of occurrence of the activity.

Consequence

To assign a level of consequence to each potential environmental and social impact, criteria are defined for environmental and socio-economic consequences. The consequence categories and their rankings are presented in **Table 5** below. "Catastrophic" represents the most severe consequence.

Table 5: Consequence Categories & Rankings

Consequence	Ranking	Description
Catastrophic	5	Massive effect: Persistent severe environmental damage or severe nuisance extending over a large area. In terms of commercial or recreational use or nature conservation, a major economic loss for the contractor/operator. Constant, high exceedance of statutory or prescribed limits.
Severe	4	Major effect: Severe environmental damage. The contractor/operator is required to take extensive measures to restore polluted or damaged environment to its original state. Extended breaches of statutory or prescribed limits.
Critical	3	Localized effect: Limited discharges of known toxicity. Repeated breaches of statuary or prescribed limit that affect the surrounding neighborhood. Spontaneous recovery of limited damage within one year.
Marginal	2	Minor effect: Contamination. Damage sufficiently large to attack the environment. Single exceedance of statutory or prescribed criterion. Single complaint. No permanent effect on the environment.
Negligible	1	Slight effect: Local environmental damage. Within the fence and within systems. Negligible financial severity.
None	0	No impact
Positive	+	Beneficial impact – enhances the environment.

Likelihood

To assign likelihood to each activity, five categories are defined and ranked. Level five, "certain", represents the highest likelihood that the activity will occur. The likelihood categories and their rankings are presented in **Table 6** below.

Table 6: Likelihood Categories and Rankings

Category	Ranking	Definition
Certain	5	The activity will occur under normal construction and operation conditions.

Category	Ranking	Definition
Very Likely	4	The activity is very likely to occur under normal construction and operation conditions.
Likely	3	The activity is likely to occur at some time under normal construction and operation conditions.
Unlikely	2	The activity is unlikely to but may occur at some time under normal construction and operation conditions.
Very Unlikely	1	The activity is very unlikely to occur under normal construction and operation conditions but may occur in exceptional circumstances.

Significance

As described above, the significance of the impact is expressed as the product of the consequence and likelihood of occurrence of the activity, expressed as follows:

Significance = Consequence x Likelihood

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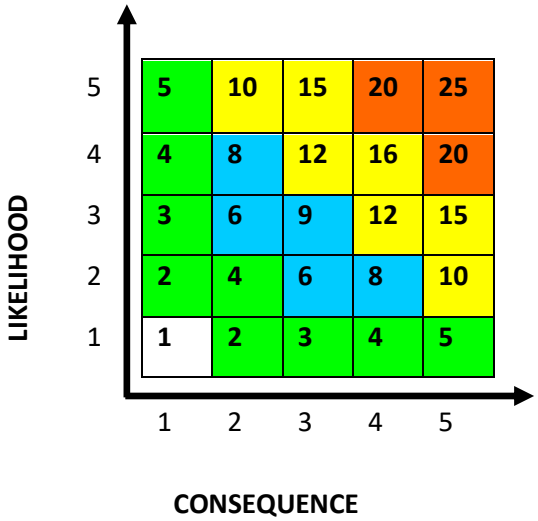


Figure 7: Product Results for Consequence & Likelihood Categories

Based on its consequence-likelihood score, each environmental aspect can be ranked into five categories or orders of significance as illustrated in **Table 7.**

Table 7: Significance Categories

Ranking (Consequence X Likelihood)	Significance
>16	Critical
10-16	High
6-9	Medium
2-5	Low
<2	Negligible

To assist in determining and calculating the significance of an impact, impact assessment matrices will be developed based on an aspect identification exercise.

4.4 Potential Environmental and Social Impacts during the Construction and Reinstatement Phase

Table 8 presents the expected potential construction phase and impacts that will be consulted on with the identified stakeholders and the impact's significance would be revised based on the outcomes of the scoping process, which will be further studied and mitigated during the ESIA study.

Table 8: List of the Potential Environmental and Social Impacts during Construction Phase

No.	Environmental / Social Component	Potential Impact(s)
1	**Reinstatement**	● Cleaning and reinstatement of well sites following construction completion.
2	**Air Quality and Dust**	● Exhaust emissions and dust generation from construction activities may cause local degradation of air quality.
3	**Noise**	● Increased noise because of construction activities (e.g., construction works, excavation), the use of heavy machinery, and vehicle and equipment operation.
4	**Land and Soil**	● The nature of construction activities (land clearing, excavations, etc.) could disturb the soil. ● Improper housekeeping practices during construction including the improper disposal of solid waste as well as hazardous materials and wastes could contaminate and pollute soil. ● Soil erosion as a result of land preparation and well drilling. ● Contamination of soil because of accidental spillage/leakage of chemicals or oils stored on-site or used during construction.
5	**Water Resources**	● Drilling operations can introduce contaminants into groundwater if not properly managed. This includes the potential contamination from lubricants and other chemicals used in the drilling process, as well as the risk of improper waste disposal such as oil and fuel by workers.
6	**Solid Waste**	● Improper management of the waste generated from the workers at the site, affecting the soil, water, and occupational health and safety.

No.	Environmental / Social Component	Potential Impact(s)
7	**Liquid Waste**	● Potential absence of appropriate liquid waste management system from construction workers housing would increase the possibility of occurrence of negative impacts on the surrounding environment mainly soil and public health and pollute the groundwater aquifers. ● Potential impacts from drilling fluids will be managed in accordance with MWI/WAJ instructions.
8	**Hazardous Waste**	● Potential absence of appropriate management system of hazardous waste, such as fuels, oils and lubricants, would increase the possibility of occurrence of negative impacts on the surrounding environment and public health.
9	**Biodiversity**	● Possible habitat loss/destruction due to physical damage from clearance activities and vehicular transport during construction.
10	**Employment**	● Temporary workforce employment.
11	**Infrastructure and Public Services**	● Disruption or disturbance to road networks and services provided within the site.
12	**Public Health and Safety**	● Impact on public health and safety because of dust generation and noise generation. ● Movement of heavy machinery on-site for excavation work, could pose health risks to local community. ● Entering the well field site by unauthorized people and/or vehicles.
13	**Occupational Health and Safety**	● Work-related injury risk for construction workers as result of the construction activities.
14	**Land Acquisition**	● No land acquisition is required.
15	**Land use**	● No significant change in land use.
16	**Archaeology and Cultural Heritage**	● Possible damage to cultural or heritage sites (chance find) during construction activities; contractor to follow chance find procedure
17	**Aesthetic**	● Visual intrusion and aesthetic interference due to potential generation of waste as well as presence of construction machinery in the project area.
18	**Climate Risks**	● Heat waves or heavy precipitation and flood risk during the construction phase.
19	**Additional impacts**	● Any other identified impacts by the stakeholder engagement and the ESIA process.

4.5 Potential Environmental and Social Impacts during the Operation Phase

Table 9 presents the potential operation phase risks and impacts that will be discussed further with the stakeholders and that will be assessed and mitigated during the ESIA study.

Table 9: List of the potential Environmental and Social Impacts during Operation Phase

No.	Environmental / Social Component	Potential Impact(s)
1	**Air Quality and Dust**	• Energy consumption from pumping and thus the emission of combustion gases into the air; however, power will be supplied from the EDCO grids. • Dust generation from vehicular movement.
2	**Noise**	• Noise is expected to result mainly from operation of the pumps.
3	**Land and Soil**	• Excessive groundwater extraction lowers the pressure within aquifers, causing the surrounding unconsolidated or semi-consolidated sediments to compact. This compaction can result in ground-level sinking, known as land subsidence. In some cases, excessive groundwater depletion leads to permanent aquifer compaction., • The use of heavy machinery during the operation and maintenance of wells and pumps can cause soil compaction. • Accidental spills or leaks can contaminate the soil, affecting its quality and potentially impacting groundwater if contaminants infiltrate through the soil.
4	**Water Resources**	• Continuous pumping from the wellfield will lead to a decrease in the groundwater table. Therefore, affecting the availability and quality of water of the wellfield and the neighboring communities' wells as well. • A declining water table can lead to increased pumping costs as wells need to be drilled deeper to access water. • Operational risks, accidents, and failures of wells. • Accidental spills from fuel, lubricants, and other chemicals used for maintenance and operation, and accidental chemical spills and leaks could negatively affect groundwater water quality.
5	**Radioactivity**	• Natural radioactivity of water abstracted.
6	**Solid Waste**	• Improper management of the waste generated from the workers at the site, affecting the soil, groundwater, and occupational health and safety.
7	**Liquid Waste**	• Improper management of the waste generated from the workers at the site, affecting the soil, groundwater, and occupational health and safety.
8	**Hazardous Waste**	• Potential absence of appropriate management system of hazardous waste, such as fuels, oils and lubricants, would increase the possibility of occurrence of negative impacts on the surrounding environment and public health.
9	**Biodiversity**	• Improper conduct or poor housekeeping practices by workers (e.g., hunting of animals, discharge of hazardous waste to land) would impact biodiversity.
10	**Employment**	• Limited permanent employment opportunities are expected to be generated by the project for local communities.
11	**Infrastructure and Public Services**	• The water supply system will be enhanced, providing additional water volume to meet the increased demand in Amman.

No.	Environmental / Social Component	Potential Impact(s)
12	**Public Health and Safety**	• The project could positively impact public health by ensuring sufficient supply of clean water, subject to appropriate water quality standards (JS 286/2015).
13	**Occupational Health and Safety**	• Potential for worker exposure to risk of accidents, injuries, and health impacts related to moving mechanical equipment, maintenance activities, and operational failures of pumping and conveyance system.
14	**Archaeology and Cultural Heritage**	• Impacts on archaeology and cultural heritage are not anticipated during operation and maintenance because any required maintenance or repair would not require excavating undisturbed ground or major earthworks that could potentially disturb archaeological assets.
15	**Aesthetic**	• No significant impact is anticipated during the operation phase.
16	**Climate Risks**	• To be minimized through the well's designs during the design phase.
17	**Additional impacts**	• Other identified impacts during the ESIA process and the stakeholder engagement plan.

Decommissioning activities are anticipated to be similar to construction; therefore, the potential impacts are anticipated to be relatively similar.

4.6 Development of the Environmental and Social Management Plan (ESMP)

The consultant will develop an ESMP for all phases of the project (construction, operation and decommissioning), including:

- Mitigation measures to avoid, minimize, or limit potentially adverse impacts and to maximize positive effects where applicable. Wherever a negative impact is inevitable, rehabilitation, restoration, or compensation should be considered.
- Institutional structures required to implement the mitigation measures, along with addressing a clear responsible party for each activity and to whom they report functionally and legally.
- Monitoring program to verify compliance with the recommended mitigation measures.

This ESMP aims at ensuring the application of the mitigation and monitoring measures needed to reduce and control the various environmental and social impacts associated with the implementation of the proposed project, the social and human rights for different stakeholders' categories will be imbedded within the mitigation measures, and a social responsibility measure will be added to the ESMP (if applicable).

4.7 Development of the Environmental and Social Monitoring Plan

The consultant will develop a monitoring plan for all phases of the project, which will include the following:

- Parameters to be monitored
- Location of monitoring
- Measurement method and equipment to be used
- Frequency of measurement
- Monitoring responsibility

5 OVERALL SCOPE OF THE ESIA

5.1 ESIA Compliance and Key Components Overview

The study will be conducted in compliance with local legislation, specifically the Environmental Impact Assessment (EIA) regulations, as well as international guidelines and requirements for Environmental and Social Impact Assessment (ESIA) in accordance with IFC and lenders standards.

The ESIA will be supported by the following major components:

1. **Scoping Process:** A scoping session was conducted on the 20th of August 2024 to ensure that the input of stakeholders, as well as experts in the field, is not overlooked and affirmed, which will guide the development of the ESIA. The session was conducted according to Environmental Classification and Licensing Regulation No. 69 of 2020 and its amendments No.97. Full coordination with the related governmental bodies will be assured according to the enforced ESIA procedures. Then, the result of the scoping session was documented in this final ToR in **Appendix 9**, which will be submitted to the client, lenders, lender's engineers and MoEnv for final review and approval.
2. **Draft ESIA:** Analysis of activities, environmental and socioeconomic components, impacts, and mitigation will be carried out, and an ESMP will be developed. To ensure proper implementation of the mitigation measures, the ESMP will also include monitoring measures.
3. **A disclosure session** will be conducted following the production of the revised version of the Draft ESIA and after the review of the draft report by DIWACO. In this session, the consultant will present the ESIA findings related to stakeholders and interested groups to ensure the input of stakeholders, as well as experts in the field, is not overlooked and is affirmed.
4. **Non-Technical Report:** A non-technical report will be prepared and delivered for public disclosure to ensure the findings are accessible to the public and to promote transparency.
5. **Revised ESIA:** A final ESIA will be prepared to include any comments and inquiries instructed by the disclosure session, MWI/WAJ and MoEnv, thus integrating the consultant's response to these comments. The revised report will be submitted to DIWACO, and lenders in English for review and final approval. The translated Arabic version will be submitted to MoEnv for final approval.

5.2 Proposed ESIA Reporting

The ESIA report will include, at a minimum:

Table 10: ESIA Report Outline

No.	Section	Sub Section
0	**Executive Summary**	Summary (in English and Arabic) of the project, main findings and Recommendations.
1	**Introduction**	Overview and purpose of the project and scope of the ESIA.
2	**Project Description**	A clear and concise description of different activities over the life of the project. The description should be sufficient to allow the risks and impacts to be identified, described and evaluated.
3	**Project Alternatives**	This section reviews the site selection process, explaining how various alternatives were considered and assessed based on environmental, social, and technical criteria.
4	**Legislative and Institutional Framework**	Details of the applicable national and international legislation, regulations and standards with potential implications to the project.
5	**Environmental and Social Baseline Description**	Assessment of the baseline conditions against which the impacts of the project can be assessed.
6	**Impact Assessment & Cumulative Impact**	This section evaluates the project's impacts, detailing the methodology used. It lists, describes, and quantifies both positive and negative effects on the environment and socio-economic context. It also considers potential cumulative impacts and unplanned but predictable activities enabled by the project
7	**Stakeholder Identification and Engagement**	Summary of the stakeholder engagement process which will identify affected parties and detail how the project will communicate, inform, and discuss the substantive issues with all interested and affected parties.
8	**Analysis of Project Alternatives**	A comparison of the “Project” Vs. “No Project” Alternatives and their potential impacts.
9	**Environmental and Social Management Plan (ESMP)**	Details of specific activities to be carried out during different phases of the project and project activities to ensure the identified mitigation measures are implemented.
10	**ESIA Conclusions**	A summary of the key environmental and social impacts identified, along with the proposed mitigation measures. It shall confirm the project’s ability to proceed responsibly, with ongoing monitoring and compliance with the ESMP.
11	**References**	A listing of all the references used in the ESIA study. Including the CRVA document.

6 STUDY TEAM

The study team for this project comprises the personnel from AJi Infrastructure & Environment, who possess significant expertise in the field. **Table 11** provides descriptions outlining the qualifications of the Key Project Staff:

Table 11: EIA Study Team (AJi Infrastructure & Environment)

No.	Name	Position	Qualifications
1	**Wafa Daibes**	Team Leader / Social Expert	B.Sc. in Civil Engineering, with over 30 years of expertise that includes comprehensive involvement in project stages, with a specific focus on conducting Environmental & Social Impact Assessments (ESIAs), stakeholder engagement, and Occupational Health & Safety Assessments.
2	**Anwar El Halah**	Biodiversity Expert	B.Sc. in Rangeland & Forestry, with over 23 years of specialized experience in biodiversity conservation and surveying across Jordan's ecosystems. Extensive collaboration with international financing institutions on infrastructure projects. Specialized in biodiversity assessments, mitigation strategies, and promoting sustainable practices. Proficient in aligning project goals with conservation priorities, ensuring regulatory compliance and ecological preservation.
3	**Ghada Jaber**	Process/ Mechanical Engineer	M.Sc. in Environmental Engineering, with over 22 years of experience, she has successfully managed projects in Jordan and Iraq, showcasing proficiency in environmental initiatives, including water and wastewater treatment. Eng. Ghada's commitment to sustainability is evident through her leadership in developing eco-friendly solutions adhering to high standards.
4	**Mais Makkawi**	Project Coordinator	B.Sc. in Industrial Engineering, with over 11 years of experience, specializing in internationally funded climate projects in the MENA region, she seamlessly combines business growth with a strong commitment to environmental initiatives. Eng. Mais played a vital role in the World Bank's Climate Investment Mobilization Plan, demonstrating her expertise in project prioritization and environmental assessment.
5	**Ghada Halaweh**	Environmental Engineer	M.Sc. in Environmental and Renewable Engineering with 6 years of relevant experience. Her work consistently reflects a commitment to sustainable solutions, demonstrating proficiency in integrating environmental considerations into various projects and initiatives, particularly in conducting ESIA for major infrastructure projects in Jordan.
6	**Mohammed Jurf**	Environmental Engineer	B.Sc. in Civil Engineering, with over 2 years of relevant experience, he specializes in conducting ESIA and coordinating major infrastructure projects, including water supply, wastewater, and road developments. His

No.	Name	Position	Qualifications
			work demonstrates a strong commitment to environmental sustainability.
7	**Weam Mahdawi**	Senior Environmental Engineer	M.Sc. in Water Resources and Environmental Engineering with over 9 years of experience in environmental impact assessment studies, particularly for wastewater treatment plants. Led environmental impact assessment studies for major projects such as the South Amman Wastewater Treatment Plant and the Fuheis and Mahes Plant, ensuring environmental compliance and community protection.
8	**Lara Louzi**	Hydrology Engineer	B.Sc. in Civil Engineering, specializing in hydrology, she excels in conducting hydrological studies and flood assessments. Her expertise encompasses evaluating water resources, analyzing flood risks, and implementing sustainable water management practices.
9	**Khalid Al Majali**	Water Resources Expert	M.Sc. in Civil Engineering, with over 35 years of experience, he specializes in the study and management of water resources for major projects. His expertise encompasses the evaluation of water resources, assessment of water quality, and identification of potential impacts on water systems, including groundwater resources.

APPENDICES

Appendix 1: Project Classification

وزارة البيئة

الرقم ٤/١/٦٣٦
التاريخ
الموافق ٢٠٢٣/٨/٢١

معالي وزير المياه و الري/سلطة المياه

تحية طيبة وبعد ،،

إشارة الى كتابكم رقم 12306/2/7 تاريخ 2023/6/22 بخصوص حفر الابار التسعة الجديدة بمنطقة حقل ابار مشروع جر مياه الديسي.

يرجى التكرم بالعلم بأن المشروع أعلاه يتطلب إعداد دراسة تقييم أثر بيئي شاملة و ذلك استناداً لأحكام نظام التصنيف و الترخيص رقم 69 لسنة 2020.

وتفضلوا بقبول فائق الإحترام ،،،

وزارة المياه والري - سلطة المياه
الديوان المركزي
٣٠ آب ٢٠٢٣
الرقم المتسلسل: ٧٢٦٧
رقم الملف:

وزير البيئة
الدكتور معاوية خالد الردايدة

د.محمد الخشاشنة
الأمين العام

Appendix 2: The agreement between the Government of Jordan and the government of Saudi Arabia in order to manage and invest groundwater in the Al-Saq layer Disi

A Royal Decree was issued approving Cabinet Decision No. 9619 dated 13/5/2015 containing Approval of an agreement between the Government of the Hashemite Kingdom of Jordan and the Government of the Kingdom of Saudi Arabia for the Management and investment of groundwater in the Al-Saq layer / Al-Disi, which was signed in the city of Riyadh on 30/04/2015 as the following:

The Government of the Kingdom of Saudi Arabia is represented by the Ministry of Water and Electricity, and the Government of the Hashemite Kingdom of Jordan is Represented by the Ministry of Water and Irrigation, (hereinafter referred to as the two parties), and based on the bonds of brotherhood that link between the two peoples and the two brotherly countries and the distinguished relations that exist between them, and in confirmation of the sincere cooperation between them, And since there is a common water basin layer between them, known in the Kingdom of Saudi Arabia as the AL-Saq layer, and in the Hashemite Kingdom of Jordan, in the Disi layer, and to match the two countries' desire to apply the utmost wisdom in the management and investment of limited renewable groundwater in this layer for the benefit of both.

The parties agreed on the following:

Article (1)

For the purposes of this Agreement, the following words and phrases shall have the meanings set forth therewith:

Saudi Arabia: Government of the Kingdom of Saudi Arabia - Ministry of Water and Electricity.

Jordan: Government of the Hashemite Kingdom of Jordan - Ministry of Water and Irrigation.

The Al-Saq layer: it is the part of the water-bearing geological formation from the main Al-Saq layer and extending from the boundary Jordan until the end of the wells field of the central Tabuk water project in the Kingdom of Saudi Arabia.

Disi Layer: It is the part of the water-bearing geological formation of the main Disi layer extending from

The Saudi border until the end of the wells field of the Disi water transfer project in the Dubaydib area in the Hashemite Kingdom of Jordan.

Disi Water Transfer Project: A project to transfer water from the Disi layer in the Dubaydib area to the city of Amman and other counties.

Tabuk Central Water Project: Water transfer project from Al-Saq layer to Tabuk and other cities and villages.

Joint Technical Committee: The committee shown in Article (Third) of this Agreement.

Pollution: Any pollution of surface or ground water, whether chemical, bacterial, or other, directly or indirectly.

International Border Line: It is the international border line between the Kingdom of Saudi Arabia and the Hashemite Kingdom of Jordan, according to the agreement signed between the two countries in Amman on Monday, August 9, 1965.

Administration area: It is the area bounded by the coordinates of points (B1, B2, J1, J2) in Jordan and the area bounded by the coordinates of the points (B1, B2, S3, S4) in Saudi Arabia, and it's part of the Disi layer in Jordan and the Al-Sag layer in Saudi Arabia, and shown in the attached plan (the map of the agreement for the management and investment of groundwater in the Al-Saq layer / Al-Disi).

The Protected Area (Restricted): It is part of the management area bounded by the coordinates of points (B1, B2, J3, J4) located in Jordan and the area bounded by the coordinates of points (B1, B2, S1, S2) in Saudi Arabia, which are shown in the attached plan (the map of the agreement for the management and investment of groundwater in the Al-Saq layer / Al-Disi).

Article (2)

The two parties agreed on the necessity of efficient management, investment and sustainability of the water of the Al-Saq layer / Al-Disi, through the following:

1. Elimination of all activities in the protected (Restricted) area that depend on the extraction of groundwater within a period of five years from the date of signing this Agreement.

2. Keep the protected (Restricted) area between the two brotherly countries free from all activities that depend on extracting groundwater from it.

3. Drilling monitoring wells for groundwater in the protected (Restricted) area to extract information related to the quality and levels of groundwater, provided that drilling operations are preceded by coordination through the Joint Technical Committee.

4. The drilling of water wells in the administration area shall be in accordance with the technical specifications approved in the two countries, and horizontal or diagonal drilling in water wells is prohibited to avoid any pollution.

5. Preserving the groundwater in the administration area between the two countries from any pollution and not allowing the injection of any pollutant, whatever its type or quantity.

6. Limit the use of groundwater extracted from the administration area to be only used locally by the two countries.

Article (3)

1. A joint Saudi Jordanian technical committee will be formed, consisting of five members from each side, to be chaired by the side Saudi Undersecretary of the Ministry of Water and Electricity for Water Affairs, and headed on the Jordanian side by the Secretary-General of the Ministry of Water and Irrigation.

2. The Committee has the right to be guided by experts, consultants and to employ assistants, technicians and employees from the nationals of the two countries or others as needed to do limited work.

3. The Joint Technical Committee holds its meetings periodically every (six) months; Or whenever needed.

4. The Joint Technical Committee undertakes the following:

A. Supervising the implementation of the provisions of this Agreement.

B. Monitoring of groundwater in terms of withdrawal quantity, water levels and quality.

C. Collecting and exchanging data, information and studies, analyzing them, and presenting the results to the competent authorities in Saudi Arabia and Jordan, and this information and data shall be owned by both parties, and the Joint Technical Committee may not provide it to a third party Only with the written consent of both parties.

Article (4)

1. This agreement is approved in accordance with the provisions and legislation in force for both parties, and it becomes effective from the date of its signing according to the official procedures in both countries.

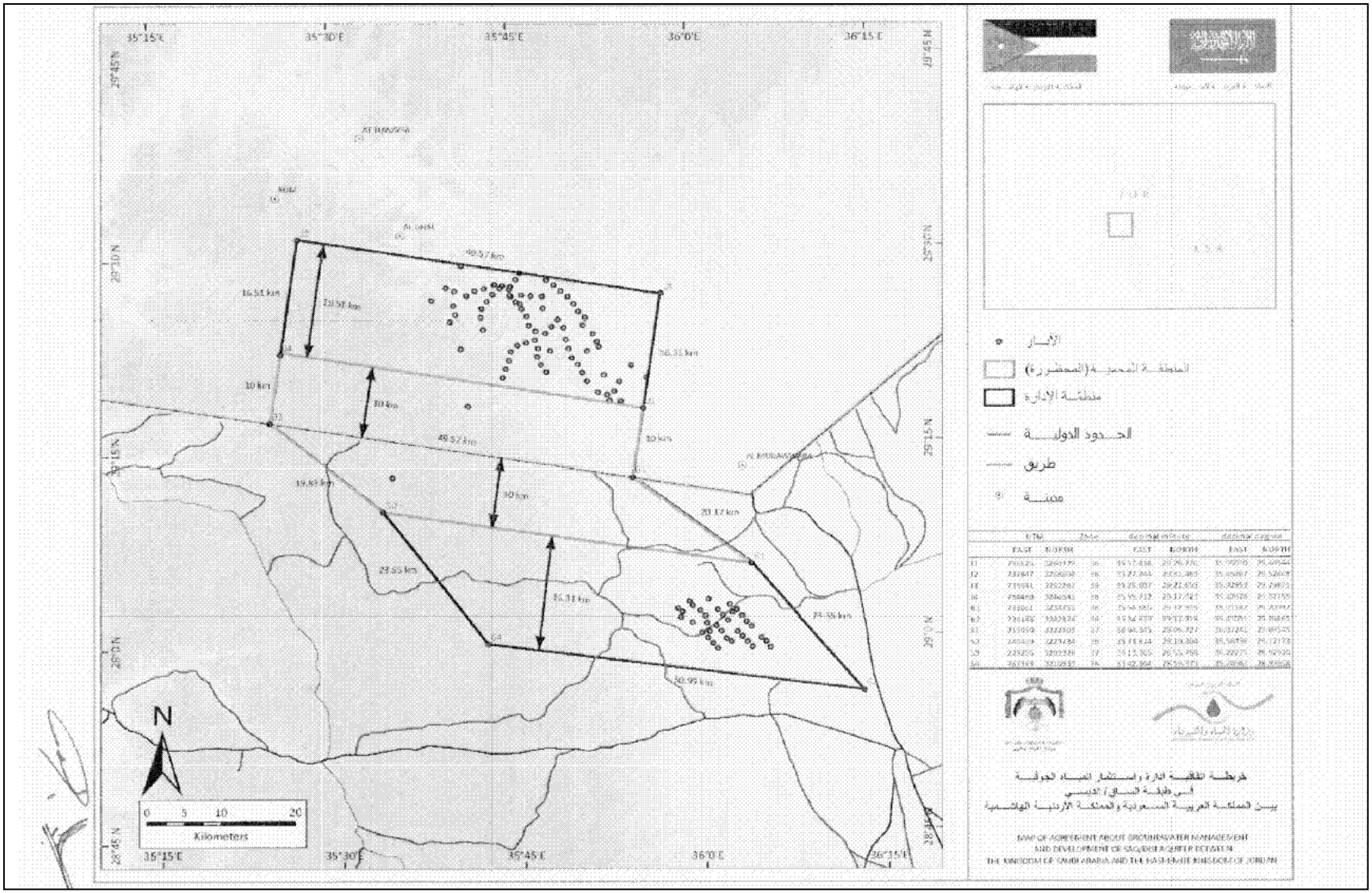
2. The chart attached to this Agreement is considered an integral part of it, and the provisions of this Agreement shall apply to the part specified therein.

3. This Agreement shall be revised every twenty-five years.

4. When there is a need to amend any of the provisions of this agreement for the benefit of the two countries, the Joint Technical Committee shall study that and submit it to the competent authorities to complete the official procedures in both countries for approval.

5. This agreement was made in the city of Riyadh on the 30th of April 2015, in two original copies in the Arabic language, and they are equally authentic, and a copy was given to each party.

Appendix 3: Agreement Map


35°15'E
35°30'E
35°45'E
36°0'E
36°15'E
29°45'N
29°30'N
29°15'N
29°0'N
28°45'N
N
0 5 10 20
Kilometers
الآبـــار
المنطقـــة المحميـــة (المحضورة)
منطقـــة الإدارة
الحـــدود الدوليـــة
طريق
مبنـــى
خريطـــة اتفاقيـــة الادارة واستثمار المياه الجوفيـــة
في حوضـــ الســـاق / الديســـي
بيـــن المملكـــة العربيـــة الســـعودية والمملكـــة الأردنيـــة الهاشـــمية
MAP OF AGREEMENT ABOUT GROUNDWATER MANAGEMENT
AND DEVELOPMENT OF SAQ/DISI AQUIFER BETWEEN
THE KINGDOM OF SAUDI ARABIA AND THE HASHEMITE KINGDOM OF JORDAN

Appendix 4: Letters of Saudi Arabia Approval for the Agreement

The Hashemite Kingdom Of Jordan Ministry Of Water & Irrigation Minister's Office	لائحـة وقـائـع	المملكة الأردنيـة الهاشميـة وزارة الميـاه والـري مكتب الوزير

Minister's Office : .... إشارتنا : ٢٤٦٨

Date: .... التاريخ : ٢٠-٤-٢٠١٦م

Incoming Ref No : .... رقم الكتاب الوارد : ١٥١٢٥

Date: .... التاريخ: ١٧-٤-٢٠١٦م

From: .... من : وزارة المالية

Subject: .... الموضوع: موافقة مجلس الوزراء على اتفاقية ادارة واستثمار المياه الجوفية لحوض الديسي

الرقم	التاريخ	إلى	المشروحات والتوقيع / Action
	٤/٢١	عطوفة أمين عام سلطة المياه	للاطلاع ...
		عطوفة أمين عام الوزارة بالوكالة	
			مكتب وزير المياه والري مؤرشف
	٢٤/	م. مدير مياه مشروع الديسي	
			للاطلاع والإجراء اصولياً
		رول ـ ـ ـ	
		مؤرشف	

ROYAL EMBASSY OF SAUDI ARABIA
AMMAN

سفارة المملكة العربية السعودية
عمان

تهدي سفارة المملكة العربية السعودية في عمّان اطيب تحياتها إلى مقام وزارة الخارجية وشؤون المغتربين بالمملكة الأردنية الهاشمية الشقيقة .

تفيدها بصدور الموافقة على إتفاقية بين المملكة العربية السعودية والمملكة الأردنية الهاشمية من أجل إدارة إستثمار المياه الجوفية في (طبقة الساق/ الديسي) والمصادق عليها بتاريخ ١٤٣٧/٦/٢٧ هـ الموافق ٢٠١٦/٤/٥ م .

تأمل التفضل بالإطلاع واتخاذ ما تراه مناسباً حيال أبلاغ الجهة المعنية بذلك .

وتنتهز السفارة هذه المناسبة لتعرب لمقامها عن فائق تقديرها واحترامها .

AMMAN
ROYAL EMBASSY OF SAUDI ARABIA

المملكة الأردنية الهاشمية
وزارة الخارجية وشؤون المغتربين - الديوان العام
17 APR 2016

الرقم : ٦٢٢٢ التاريخ : ١٤٣٧/٧/٢٦ هـ الموافق : ٢٠١٦/٤/١٣ م المرفقات : بدون

Appendix 5: Letters of Jordan Approval for the Agreement

رئاسة الوزراء

الرقم ٥٧ / ١/١١ / ٢٥٦٠٦
التاريخ ٢٠ / شعبان / ١٤٣٦
الموافق ٢٠١٥/٠٦/٠٧

معالي وزير المياه والـــري

أشـــــير لكتـــــابكم رقـــــم وم ر/١٦٠٨/٣٧/٥/١ تـــــاريخ ٢٠١٥/٥/٥.

صدرت الإرادة الملكية السامية بالموافقة على قرار مجلس الوزراء رقم (٩٦١٩) تاريخ ٢٠١٥/٥/١٣ ، المتضمن الموافقة على اتفاقية بين حكومة المملكة الأردنية الهاشمية وحكومة المملكة العربية السعودية من أجل إدارة واستثمار المياه الجوفية في طبقة الساق / الديسي التي تم التوقيع عليها في مدينة الرياض بتاريخ ٢٠١٥/٤/٣٠ بصيغتها المرفقة بكتابكم المشار إليه أعلاه.

واقبلوا فائق الاحتـــرام.

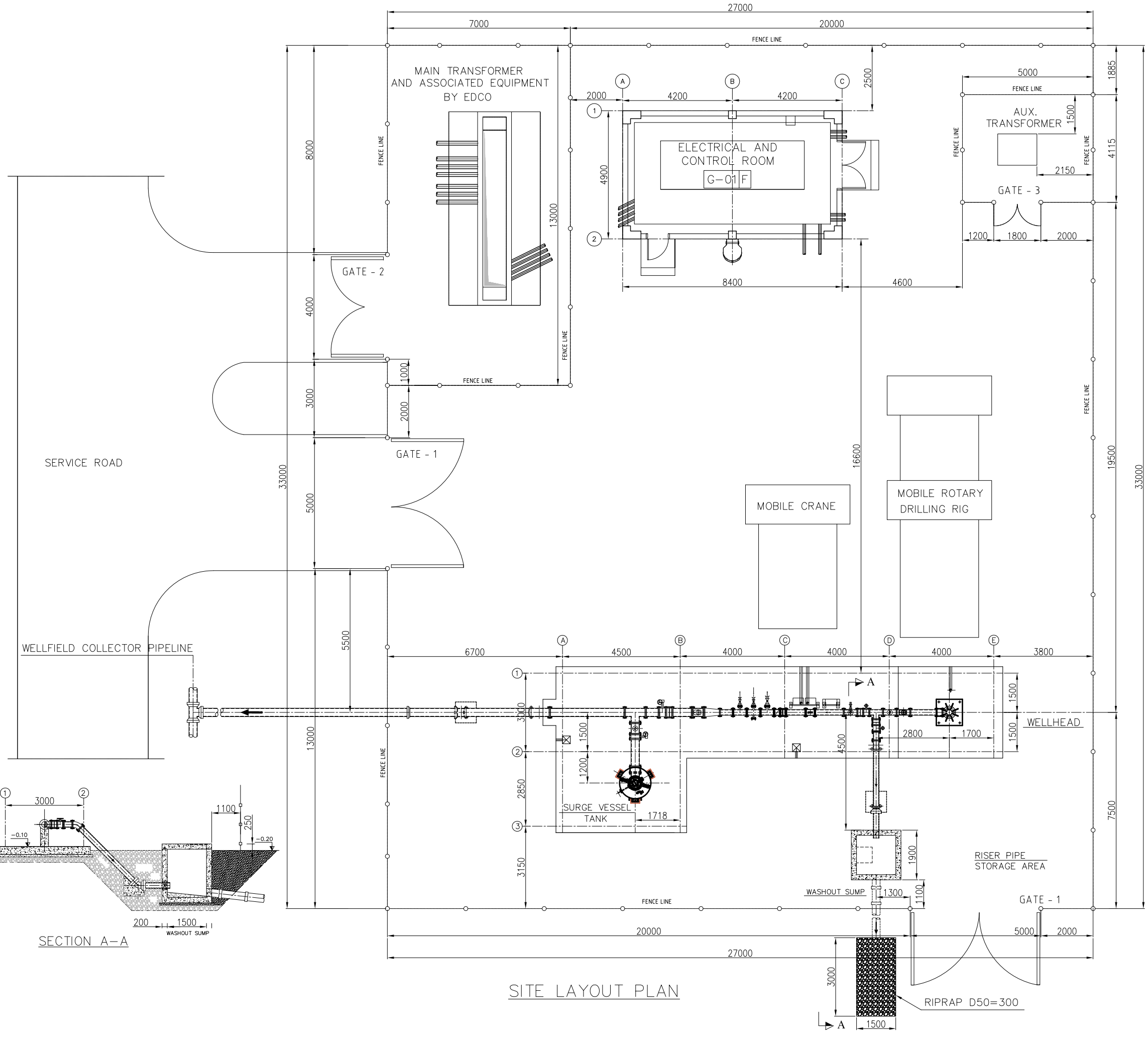
المملكة الأردنية الهاشمية
وزارة المياه والري - سلطة المياه
الديوان المركزي
الرقم المتسلسل ١٨٠٧٣
رقم الملف

/ رئيـــس الـــوزراء

نسخة / إلى معالي نائب رئيس الـــــوزراء
ووزير الخارجية وشؤون المغتربيـن
نسخة / إلى عطوفة أمين سر مجلس الوزراء
قرار رقم (٩٦١٩).
نسخة / إلى مدير الجريدة الرسميـــــــة

و ٦/٤

Appendix 6: Wellhead General Layout Plan



THE HASHEMITE KINGDOM
OF JORDAN
MINISTRY OF WATER AND
IRRIGATION

DISI-MUDAWARRA TO AMMAN
WATER CONVEYANCE SYSTEM PROJECT

Diwaco
Disi Water Company

GAMA
GAMA GÜÇ SİSTEMLERİ MÜHENDİSLİK VE TAAHHÜT A.Ş.

SURGE VESSELS

WELL NUMBER	SURGE VESSEL CAPACITY (m^3)
W12	8
W23	6
W26	6
P8	6

AS BUILT
MARCH 2014

GAMA GUC SISTEMLERI	
Approved by: S.K	Date: 13/03/14

No	Description	Date	Checked	Approved

REVISIONS

Drawing Title:
WELLHEAD
GENERAL LAYOUT PLAN

Designer:
GAMA POWER SYSTEMS INC.
GAMA GÜÇ SİSTEMLERİ A.S.

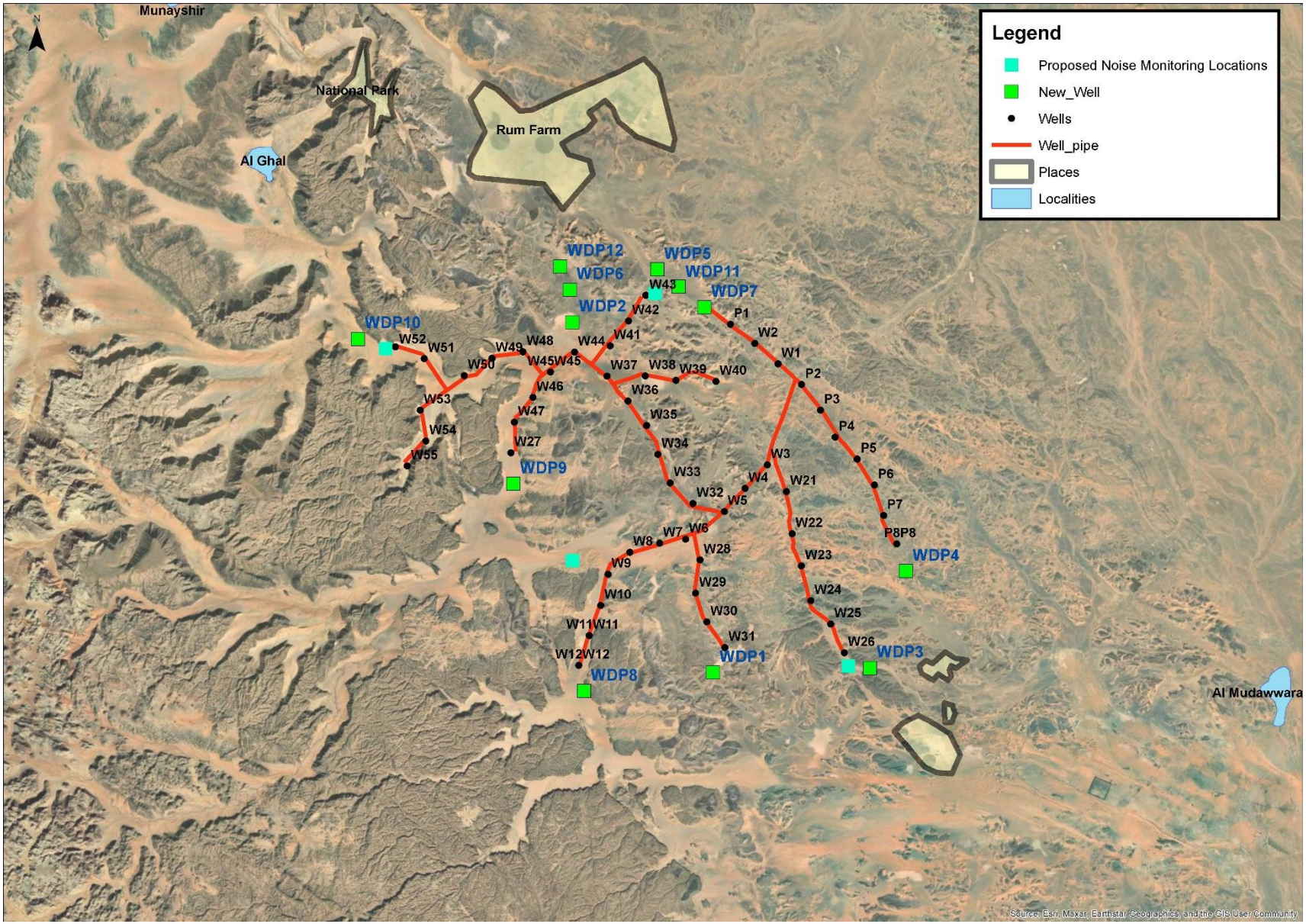
Drawn by:	Designed by:	Checked by:	Approved by:
H.D	S.V	S.F	S.K

Scale: 1/50	Size: A0	Date: MARCH 2014

DRAWING NO	REV
JO8086-WLF-WLH-AB-ENV-GN-001 DET-201	A

GAMA POWER SYSTEM INC. AutoCAD & AutoPlant

Appendix 7: Proposed Locations for Noise Monitoring


Munayshir
National Park
Rum Farm
Al Ghal
Al Mudawwara
Legend
Proposed Noise Monitoring Locations
New_Well
Wells
Well_pipe
Places
Localities
WDP1
WDP2
WDP3
WDP4
WDP5
WDP6
WDP7
WDP8
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P6
P7
P8
P8
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Appendix 8: Biodiversity Study Methodology

Approach/Methodology for the Biodiversity Study

1) Overview

The biodiversity survey will adopt a comprehensive approach to assess the biological environment by evaluating key ecological components in relation to their physical settings and shall be in compliance with IFC PS6. This methodology will aim to provide a holistic understanding of the potential environmental impacts a project may have on the local ecosystem.

The key steps involved in the approach will be as follows:

- **Biogeographical Zones and Vegetation Types:** The survey will begin by identifying the biogeographical zones and vegetation types within the area of interest. These zones will be critical for understanding the environmental conditions, such as soil type, climate, and natural plant communities, which influence the distribution of flora and fauna.
- **Flora Assessment:** A detailed examination of plant species will be conducted to evaluate the diversity, abundance, and conservation status of the vegetation. Special attention will be given to species that are endemic, rare, or threatened, as they may be more vulnerable to potential project impacts.
- **Fauna Assessment:** Key wildlife groups, including mammals, birds, and reptiles, will be selected for study based on their ecological importance, national conservation status, and sensitivity to habitat disturbance. The focus will be on species that could be affected by habitat changes or human activities.
- **Sensitive Habitats:** Areas of significant biological importance, such as protected areas, reserves, and key wildlife habitats, will be identified and assessed. These habitats will be vital for the survival of various species and will require careful consideration during project planning to ensure minimal disruption.
- **Ecosystem Services:** The study will evaluate the range of ecosystem services provided by the local environment. Potential impacts of the project on these services will be analyzed to ensure that ecosystem functions are preserved and not compromised by development activities.

2) Literature Review

As part of the study, a thorough review of existing literature will be undertaken to gather all relevant data from previous surveys, environmental impact assessments, and scientific research. This will help establish baseline conditions for the project area and highlight any existing knowledge gaps. Key areas of focus will include:

- **Flora and Fauna Species:** Reviewing the presence and distribution of plant and animal species, with particular attention to species of conservation concern, such as threatened or endangered species.
- **Habitat Types and Species Communities:** Investigating the types of habitats present and the species communities that define these habitats, will provide insight into ecological interactions and dynamics.

3) Fieldwork and Rapid Biodiversity Assessment

Fieldwork will be conducted to complement the findings from the literature review and gather on-the-ground data. Rapid biodiversity assessments will typically be scheduled over several days to survey key locations within the project area. At each site, observations of flora and fauna species will be recorded using standardized methods, such as:

- **GPS Mapping:** Handheld GPS devices will be used to record the coordinates of important species and habitats to ensure precise data collection.
- **Systematic Observation:** A structured approach to recording observations of species, habitat characteristics, and any signs of ecological disturbance will be followed to maintain accuracy and consistency in the data collection process.

This systematic approach will allow for a detailed evaluation of biodiversity, ensuring that any potential environmental impacts of the project are carefully considered and mitigated where necessary.

Appendix 9: Scoping Session Report

Environmental & Social Impact Assessment (ESIA) for Drilling New Make-up Wells and Associated Infrastructure Works – DUBAYDIB Well Field / Disi

Scoping Session Report

August 2024

Document Title: Scoping Session Report

Project: ESIA for Drilling New Make-up Wells and Associated Infrastructure Works – DUBAYDIB Well Field / Disi

Code AW146

Client: DIWACO

Main Contributors	Aspect/Section	Notes
Wafa Daibes	Check & Review	
Ghada Jaber	Check & Review	
Mohammed Al Jurf	All Sections	
Ghada Halaweh	Check & Review	

Project Code: AW146.00		Document No:		Controlled Copy No: 1	
Revision No	**Date**	**Description/Amendment**	**Checked**	**Reviewed**	**Authorized for Issue**
01	26/08/2024	Scoping Session Report	WD	WD	GJ

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Issue No.	1	2	3	4	5

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List of Abbreviations

DIWACO	Disi Water Company
DAOM	Disi Amman Operation & Maintenance
ESIA	Environmental and Social Impact Assessment
MoEnv	Ministry of Environment
MWI	Ministry of Water and Irrigation
RSCN	Royal Society for the Conservation of Nature
ToR	Term of References
WAJ	Jordan Water Authority

1 Scoping Methodology

1.1 Invitations and Logistical Arrangements

Prior to the commencement of the Environmental and Social Impact Assessment (ESIA) scoping session, a preliminary Terms of Reference (ToR) document was prepared by the AJi team and submitted to the Ministry of Environment (MoEnv). The preliminary ToR provided the MoEnv with a project description, a proposed approach to completing the required ESIA study, including provisions of impact assessment criteria and methods for establishing mitigation measures to control (eliminate and/or minimize) those impacts identified as significant, and a list of identified project-related key issues. The Preliminary ToR document was submitted to MoEnv before the scoping session in order to facilitate the scoping process.

AJi team coordinated with the MoEnv to hold the scoping session on August 20th, 2024. The MoEnv prepared and sent the official invitations to relevant stakeholders including representatives from various ministries and governmental institutions, academia, relevant municipalities (Disi and local community), the Royal Society for the Conservation of Nature (RSCN), and all related stakeholders.

The location, date, and time of the session were as follows:

Location: Hilton Hotel-Amman

Date: Tuesday, August 20th 2024

Time: 10:00 am – 01:00 pm

1.2 Scoping Session Components

The Scoping Session consisted of the following:

Opening Statement:

- Eng. Fawaz Al-Karasneh Director of the Licensing Directorate at the Ministry of Environment.

ESIA Presentation:

- The first part of the presentation was provided by Eng. Wafa Daibes (AJi - Project Team Leader). Wafa presented an introduction and an overview about the scoping session and its objectives.
- Eng. Ghada Jaber (AJi - Process Design) and Eng. Mohammed Jurf (AJi - Environmental Engineer) led the second part of the presentation. Ghada provided a comprehensive overview of the project, including its description, technical components, area of influence, and objectives. Mohammed followed by discussing the findings of the site visit and presenting the assessment of project alternatives.
- The third part of the presentation was presented by Eng. Ghada Halaweh. Ghada presented the project's ESIA approach, legal framework and environmental/social potential impacts.

The detailed presentation is included in **Appendix 1.**

The following is a general outline of the presentation:

Part 1: Scoping Session Overview

- ESIA approach.
- Scoping session objectives and main stakeholders to the project.

Part 2: Technical presentation

- Project Description
- Project Current and Projected Components
- Project Area of Influence
- Project phases
- Wells General Layout
- Site Visit Findings
- Project alternatives including with or without project, and new makeup wells site alternatives.
- Questions and answers

Part 3: Environmental impact assessment

- Objectives.
- Legal framework
- ESIA Methodology
- Expected impacts
- Questions and answers

The stakeholders participated in discussions and a feedback period where they voiced their areas of concern. Detailed comments, discussions, and issues raised are included in section 2 below. Responses were subsequently given by:

- Eng. Khalil Al Wazir, Technical Manager, Dissi Water Company (DIWACO).
- Eng. Mohammad Abu Hamdeh, Operation & Maintenance Manager, Disi Amman Operation & Maintenance (DAOM).
- Eng. Mustafa Al Mazneh, Operator, (DAOM)
- Eng. Wafa Daibes, ESIA Team Leader, AJi.

Figure 1 below presents some pictures from the scoping session.

Appendix 2 includes additional photos from the scoping session.

ESIA Project Presentation

Working Groups

Figure 1: Pictures from the Scoping Session

2 Main Issues of Concern

2.1 Overview

The scoping session was attended by stakeholders from a number of organizations including, but not limited to: Ministry of Environment, Ministry of Local Administration, Ministry of Interior, Ministry of Energy and Mineral Resources, Royal Society For The Conservation of Nature, Ministry of Public Works and Housing, Ministry of Water And Irrigation, Water Authority of Jordan, Ministry of Health, Ministry of Agriculture , Ministry of Labor, Department of Lands and Survey and many others. A detailed list of participants (sign-in sheet) attended the scoping session is provided in **Appendix 3**.

The stakeholders raised their concerns, comments, and questions; a summary of these deliberations is provided in the next section.

The main issues of that were raised during the session can be summarized as following bullets:

- Participants emphasized the importance of considering how the project could impact farming operations near the Disi wellfield. Besides the potential impacts on the Disi aquifer as a whole from the water over pumping operations (agricultural and regional water extraction).
- The importance of identifying any cultural or archaeological heritage before commencing construction was highlighted.
- Concerns were raised regarding the potential for collapses or earthquakes due to the water extraction from the Disi aquifer.
- The importance of having an on-site clinic and ambulance to ensure the health and safety of workers during both construction and operation phases.
- The importance of the social impact, which includes local community development and water availability to meet demand.
- Project security and safety and the risk of theft and vandalism.

2.2 Scoping Session Deliberations

A summary of the discussions is provided below, which includes the outcome from the session's questions and answers.

Table 1: Summary of Comments and Feedback Discussed During the Session

No.	Name	Organization	Comment/ Feedback/ Concern	Response
1	Eng. Ruba Ennab	PMU at Jordan Water Authority (WAJ)	**Eng. Ruba** emphasized the need to confirm whether water mixing is occurring and whether sensitivity maps are being used during the construction phases. Eng. Ruba also inquired whether DIWACO has taken into account the nearby farms around the wellfield, particularly their water pumping activities and how these might be impacting the Disi aquifer.	**Eng. Khalil Al-Wazir (DIWACO)** stated that there is no mixing of water in the field because the mixing occurs in the two main reservoirs in Abu Alanda and Dabouq. **Eng. Wafa Daibes (AJi)** stated that the Sensitivity maps will be evaluated as part of the Environmental Impact Assessment later on. **Eng. Khalil Al Wazir (DIWACO)** confirmed that an updated model is conducted every five years to assess the aquifer. He noted that the water level in the wells decreases by 2-4 meters annually. Based on current studies, the aquifer is expected to remain sustainable, assuming a 1% annual increase in water extraction from the surrounding farms. He also confirmed that the planned additional wells will be drilled within the same 20x20 km field area, which is owned by the Ministry of Water and Irrigation (MWI) and is restricted from residential presence. Over the past 25 years, no significant issues have been observed; however, a decrease in flow rate may occur within the next 50 years. As of now, water levels remain within acceptable limits, and the model continues to align with actual conditions.

No.	Name	Organization	Comment/ Feedback/ Concern	Response
2	Dr. Reem Qashtawi	Ministry of Energy and Mineral Resources	**Eng. Reem** emphasized the need to clarify the criteria used for selecting the wells and whether drilling the wells impacts the recharge of the Disi reservoir. Eng. Reem emphasized the concern that draining the water might lead to collapses and earthquakes.	**Eng. Wafaa Daibes (AJi)** stated that the Disi aquifer is a non-renewable aquifer, and therefore, it has no recharge areas. During the study, the geology of the entire aquifer was thoroughly examined, and the layers of the wells were studied, along with the 11 criteria, to identify the best areas for wells in terms of productivity and well depth. **Eng. Mohammad Abu Hamdeh (DAOM)**, explained that the Disi aquifer consists of sandstone with a void ratio characteristic of sandstone, ensuring stability during water extraction. He emphasized that water has been extracted from the aquifer for over 10 years without any incidents of collapse.
3	Eng. Dalia Bannoura	Ministry of Public Works and Housing	**Eng. Dalia** emphasized that If any work is to be carried out on the main roads, approval or a permit must be obtained from the Ministry of Public Works.	**Eng. Wafa Daibes (AJi)** confirmed that no work will be conducted on the main roads. Instead, construction will be limited to establishing new service roads (dirt roads) within the wellfield area.
4	Eng. Iyad Al Hajibi	Jordan Engineers Association	**Eng. Iyad** emphasized the critical importance of preserving any cultural heritage or archaeological sites within the project area, particularly noting that certain rocks in these locations may hold	**Eng. Mustafa Al Mazneh (DAOM)** confirmed that there are no designated archaeological sites within the wellfield or project area. DIWACO also assures that any cultural heritage or archaeological sites within the project area will be identified during this ESIA study.

No.	Name	Organization	Comment/ Feedback/ Concern	Response
			significant archaeological and cultural value.	
5	Mrs. Reem Al Rouisi	Ministry of Health	**Mrs. Reem** proposed the use of solar power to operate the wellfield and pumps. She also inquired about the number of workers that would be employed during both the construction and operational phases.	**Eng. Mustafa Al Mazneh (DAOM)** mentioned that the electricity demand is significantly high. He noted that MWI has already implemented a solar panel project that provides 24 megawatts of power to the Disi primary station. **Eng. Khalil Al Wazir (DIWACO)** highlighted that the construction phase for each well is expected to last approximately three months and will involve around 15-20 workers. Multiple contractors will work sequentially during this phase. Once in operation, only two guards will be stationed at each well, with no additional workforce required for the operator. **Eng. Mustafa Al Mazneh (DAOM)** confirmed the presence of a clinic and an ambulance at the Mudawara station.
6	Mr. Mohammed Jamal	Ministry of Health	**Mr. Mohammed Jamal** emphasized the need of having a Clinic and an Ambulance in the site.	
6	Mr. Ayman Al Bowari	Ministry of Labor	**Mr. Ayman Al Bowari** noted that the Ministry of Labor regulations require the presence of a clinic, an emergency responder, and a technical specialist.	**Eng. Khalil Al Wazir (DIWACO)** confirmed the presence of a clinic at the Mudawara station and that 110 guards from the local community have been employed to safeguard the existing wells, as part of the company's commitment to

No.	Name	Organization	Comment/ Feedback/ Concern	Response
			He also highlighted the importance of considering whether the local residents will receive any form of compensation from a community perspective.	supporting the community. Additionally, several local community members are employed by the operator. The operator is dedicated to community support, having provided a garbage compactor truck, an ambulance, and assistance to local schools by supplying backpacks and other necessities for students. Trees have also been planted in the area. Furthermore, MWI and the Ministry of Local Administration have established a committee "DPAC" to assess and address the needs of the local community, ensuring that the operator can meet these needs in the future. **Eng. Wafa Daibes (AJi)** confirmed that the well area is confined to a (20x20) km zone and is owned by the Ministry of Water and Irrigation, leased to the operator. The local communities are located more than 5 km away from the project perimeter, the project's impact is not expecting to have negative impacts. There are some local demands focusing on jobs and community development. A section on stakeholder engagement will be included in the study report to consider all social aspects related to the local community.
7	Eng. Rawan Farhan	WAJ	**Eng. Rawan** emphasized the importance of prioritizing the social impact, even though the environmental impact is more apparent. She highlighted the need to give greater attention to how the project will affect the local community.	

2.3 Groups Deliberations

Following the presentation, attendees were divided into three working groups. Each group received a form, as outlined in **Appendix 4**, to assess potential environmental impacts during both the construction and operational phases.

The forms were used to evaluate the severity of each environmental and social component and to identify any additional components that may not have been initially considered. The completed forms from each group are provided in **Appendix 5**.

Table 2: Summary of Working Group (1) Findings

Group	Level of Impact	Comments
1	1. **Air Quality:** High to very high impact on the air quality during the construction phase due to dust and vehicle emissions, and limited to negligible impact during operational phase. 2. **Noise:** High to very high impact during construction phase, and limited to negligible impact during operational phase. 3. **Soil and Land:** High to moderate impact during construction phase due to oil spills and soil erosion, and limited to negligible impact during operational phase. 4. **Water Resources:** Moderate to limited impact on surface/ground water pollution during construction phase, and limited to negligible impact during operational phase. 5. **Waste Management:** Moderate impact for solid/liquid/hazardous waste during construction, and limited or negligible impact during operation. 6. **Biodiversity:** Moderate impact in disturbing habitat and negligible impact on affecting vegetation cover during construction phase, and limited to negligible impact during operational phase. 7. **Socio-economic:** Moderate impact on creating job opportunities for both construction and operation phases. 8. **Public Infrastructure and Utilities:** Limited to negligible impact to main roads and other service utilities during construction phase and no impact during operational phase.	Additional Impacts: 1. **Security and Safety:** Very high or high impact during construction phase and operational phase, due to the heightened risk of theft and vandalism. 2. **Local Community Demands:** High to moderate impact in both construction and operation phases, due to increased water demand and heightened expectations for the project to contribute to local community development.

Group	Level of Impact	Comments
	9. **Public Health and Safety:** Moderate impact during construction phase due to noise and dust, and no impact during operational phase. 10. **Occupational Health and Safety:** High to very high impact during construction phase due to the harsh climate situation in disi, and moderate impact during operational phase. 11. **Archeology and Cultural Heritage:** Limited to negligible impact in construction phase and no impact during operational phase. 12. **Climate Risks:** High to very high impact during construction phase due to the possibility of occurrence for flash floods, and moderate impact during the operational phase.	

Table 3: Summary of Working Group (2) Findings

Group	Level of Impact	Comments
2	1. **Air Quality:** High to moderate impact on the air quality during the construction phase due to dust and vehicle emissions, and limited to negligible impact during operational phase. 2. **Noise:** Moderate to high impact during construction phase because of the construction works, and limited to negligible impact during operational phase. 3. **Soil and Land:** Moderate impact during construction phase due to oil spills and soil erosion, and limited to negligible impact during operational phase. 4. **Water Resources:** Limited to negligible impact on surface/ground water pollution during construction and operation phases. 5. **Waste Management:** Moderate impact for solid/liquid/hazardous waste during construction, and limited or negligible impact during operation. 6. **Biodiversity:** Moderate impact in disturbing habitat and negligible impact on affecting vegetation cover during construction phase, and limited to negligible impact during operational phase. 7. **Socio-economic:** Moderate impact on creating job opportunities for both construction and operation phases. 8. **Public Infrastructure and Utilities:** Limited to negligible impact to main roads and other service utilities during construction phase and no impact during operational phase. 9. **Public Health and Safety:** Limited to negligible impact during construction phase	

Group	Level of Impact	Comments
	due to noise and dust, and no impact during operational phase. 10. **Occupational Health and Safety:** Moderate impact during construction phase due to the harsh climate situation in disi, and limited to negligible impact during operational phase. 11. **Archeology and Cultural Heritage:** Limited to negligible impact in construction phase and no impact during operational phase. 12. **Climate Risks:** Moderate impact during construction phase due to the possibility of occurrence for flash floods, and moderate impact during the operational phase.	

Table 4: Summary of Working Group (3) Findings

Group	Level of Impact	Comments
3	1. **Air Quality:** High to very high impact on the air quality during the construction phase, and limited to negligible impact during operational phase. 2. **Noise:** Moderate impact during construction phase, and limited to negligible impact during operational phase. 3. **Soil and Land:** Moderate impact during construction phase, and limited to negligible impact during operational phase. 4. **Water Resources:** Moderate to limited impact on surface/ground water pollution during construction phase, and limited to negligible impact during operational phase. 5. **Waste Management:** Moderate impact for solid/liquid/hazardous waste during construction, and limited or negligible impact during operation. 6. **Biodiversity:** Moderate impact in disturbing habitat and negligible impact on affecting vegetation cover during construction phase, and limited to negligible impact during operational phase. 7. **Socio-economic:** Moderate impact on creating job opportunities for both construction and operation phases. 8. **Public Infrastructure and Utilities:** Limited to negligible impact to main roads and other service utilities during construction phase and no impact during operational phase. 9. **Public Health and Safety:** High to very high impact during construction phase due to noise	Additional Impacts: 1. The impact on water quantity in the case of excessive pumping 2. The impact on the local wells in nearby farms.

Group	Level of Impact	Comments
	and dust, and no impact during operational phase. 10. **Occupational Health and Safety:** Moderate impact during construction phase due to the harsh climate situation in disi, and moderate impact during operational phase. 11. **Archeology and Cultural Heritage:** Moderate impact in construction phase and no impact during operational phase. 12. **Climate Risks:** Moderate impact during construction phase due to the possibility of occurrence for flash floods, and no impact during operational phase.	

Appendices

Appendix 1: Scoping Session Presentation

مشروع تقييم الأثر البيئي والاجتماعي لحفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

20, August,2024

البرنامج

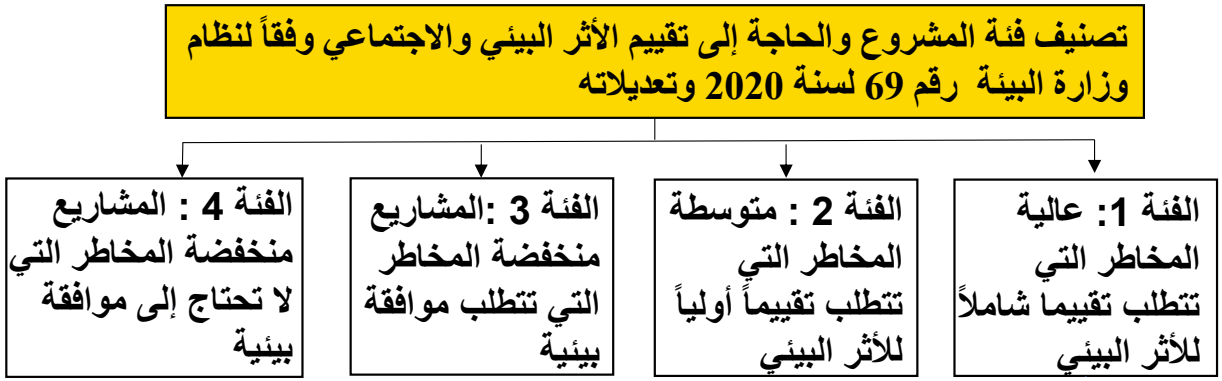
البرنامج

الوقت	النشاط
9:30 – 10:00	التسجيل
10:00 – 10:15	افتتاح الجلسة التشاورية والكلمات الترحيبية
10:15 – 10:20	الإجراءات المتبعة في تقييم الأثر البيئي
10:20 – 10:50	العرض الفني
10:50 – 11:05	استراحة
11:05 – 11:20	الآثار البيئية والاجتماعية المتوقعة
11:20 – 12:30	مجموعات العمل والنقاش
12:30 – 1:30	فترة الغداء

الكلمات الترحيبية

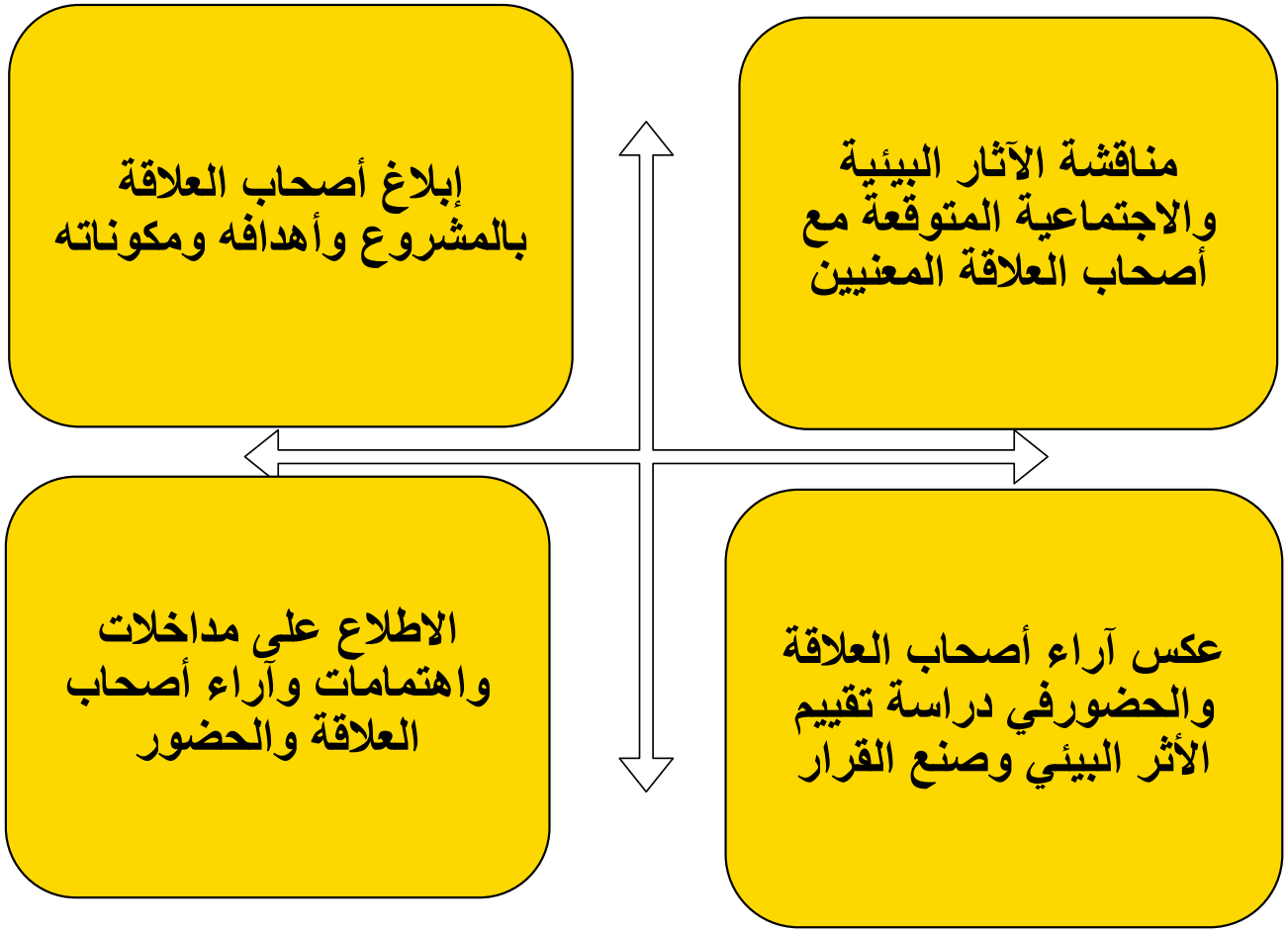
- افتتاحية وزارة البيئة :المهندس فواز الكراسنة، مدير مديرية التراخيص

الاجراءات المتبعة في تقييم الأثر البيئي

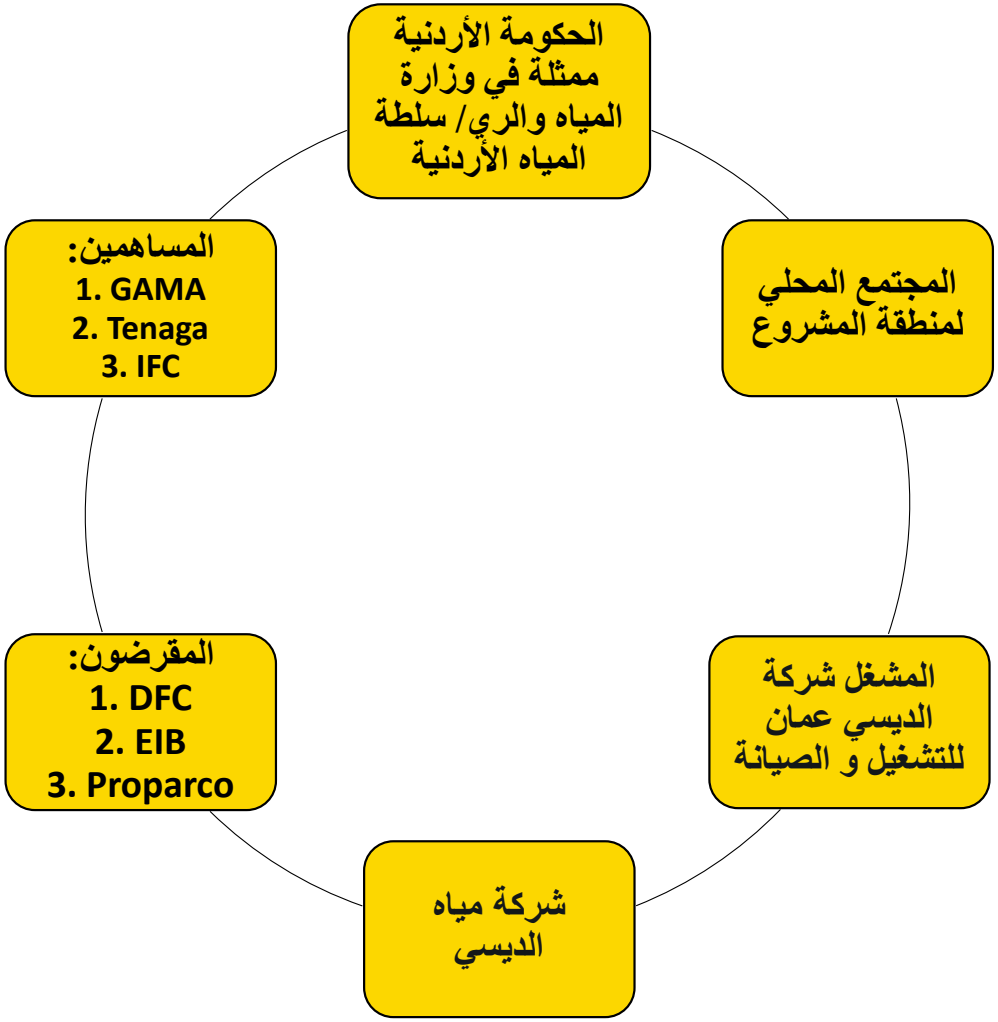


- إعداد وتقديم مسودة الشروط والأسس المرجعية
- إجراء الحلقة التشاورية
- إعداد وتقديم تقرير الحلقة التشاورية
- إرسال تقرير الشروط والأسس المرجعية النهائية
- البدء بإجراء دراسة تقييم الأثر البيئي وتقديم المسودة
- موافقة وزارة البيئة /عدم الموافقة

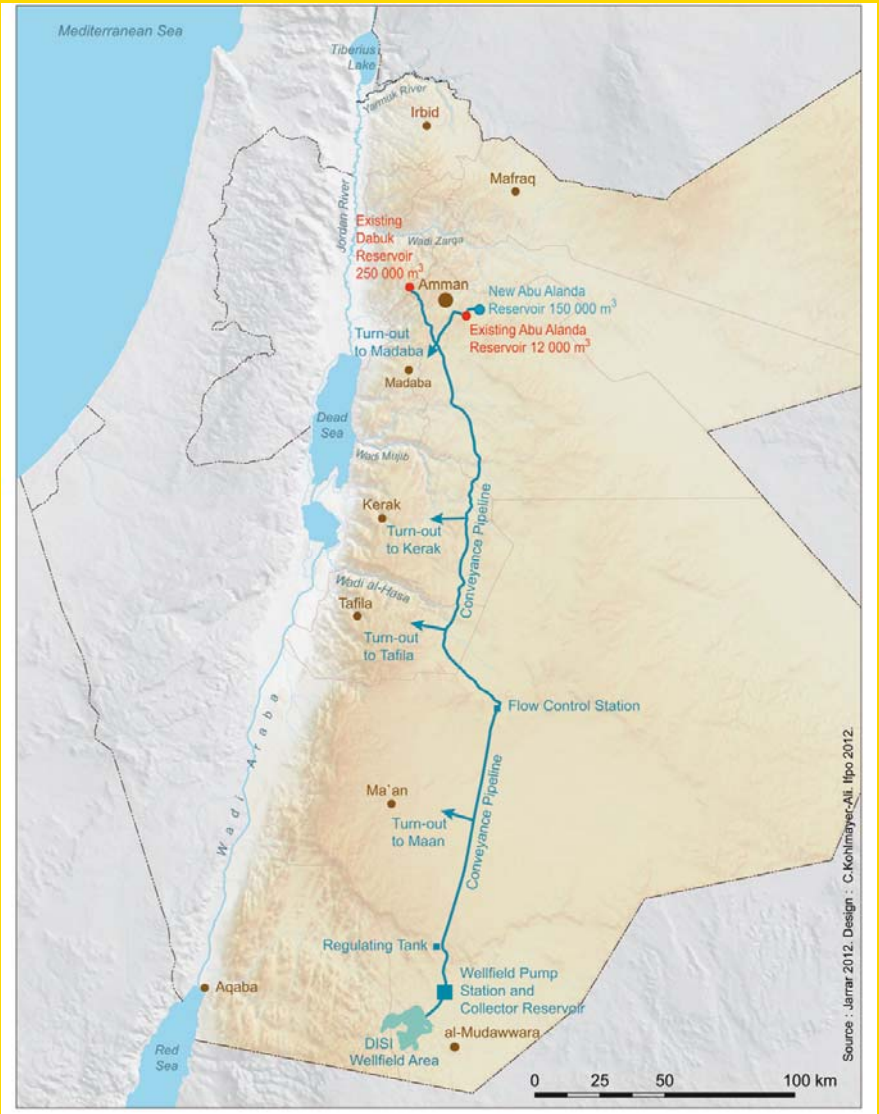
أهداف الجلسة التشاورية



أصحاب العلاقة الرئيسيون في الدراسة



العرض الفني



محتويات العرض الفني

- **وصف المشروع القائم :**
  - الموقع
  - المنطقة المخدومة للمشروع
  - مكونات وعناصر المشروع
- **مبررات المشروع الجديد " الآبار التعويضية المقترحة "**
  - وصف المشروع
  - مكونات المشروع
  - موقع المشروع
  - مراحل المشروع
- **بدائل المشروع**
  - تنفيذ المشروع / عدم تنفيذ المشروع
  - بدائل موقع الآبار

وصف المشروع

وصف مشروع الديسي القائم

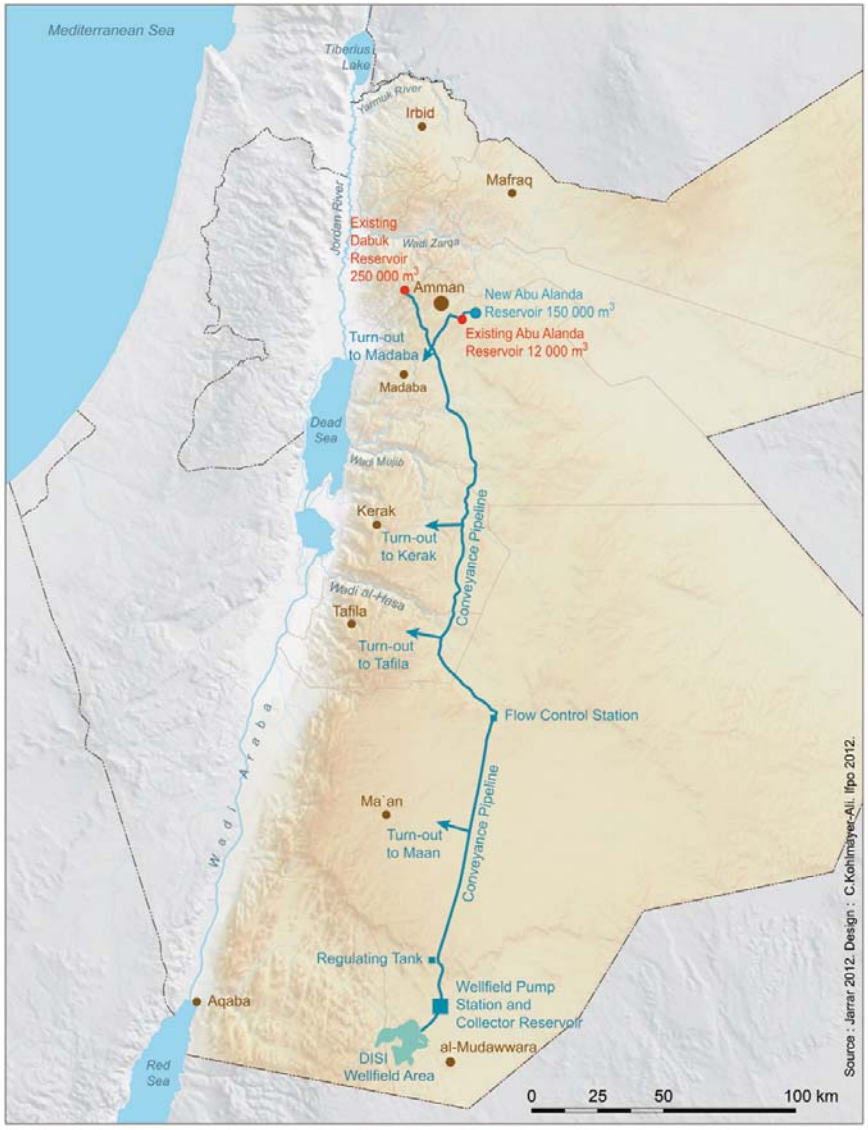
لمحة عامة :

- تم تصميم نظام نقل "مياه الديسي / المدورة إلى عمان" لتزويد 100 مليون متر مكعب سنوياً من مياه الشرب من طبقة الديسي الجوفية في جنوب الأردن "حقل بئر دبيدب" إلى منطقة عمان عبر خط أنابيب بمسافة 325 كم

- بدأ تشغيل المشروع 2014 حيث يعتبر المشروع جزءاً من الإطار الإقليمي الأكبر للحكومة الأردنية لإدارة المياه وتنمية الموارد الجديدة.

- يساهم المشروع في :

- حل مشكلة إمدادات المياه التي تعاني منها عمان والمنطقة المحيطة بها
- تحسين نوعية المياه التي يتم تزويدها إلى عمان
- تحسين ظروف الصحة العامة.



Source: Atlas

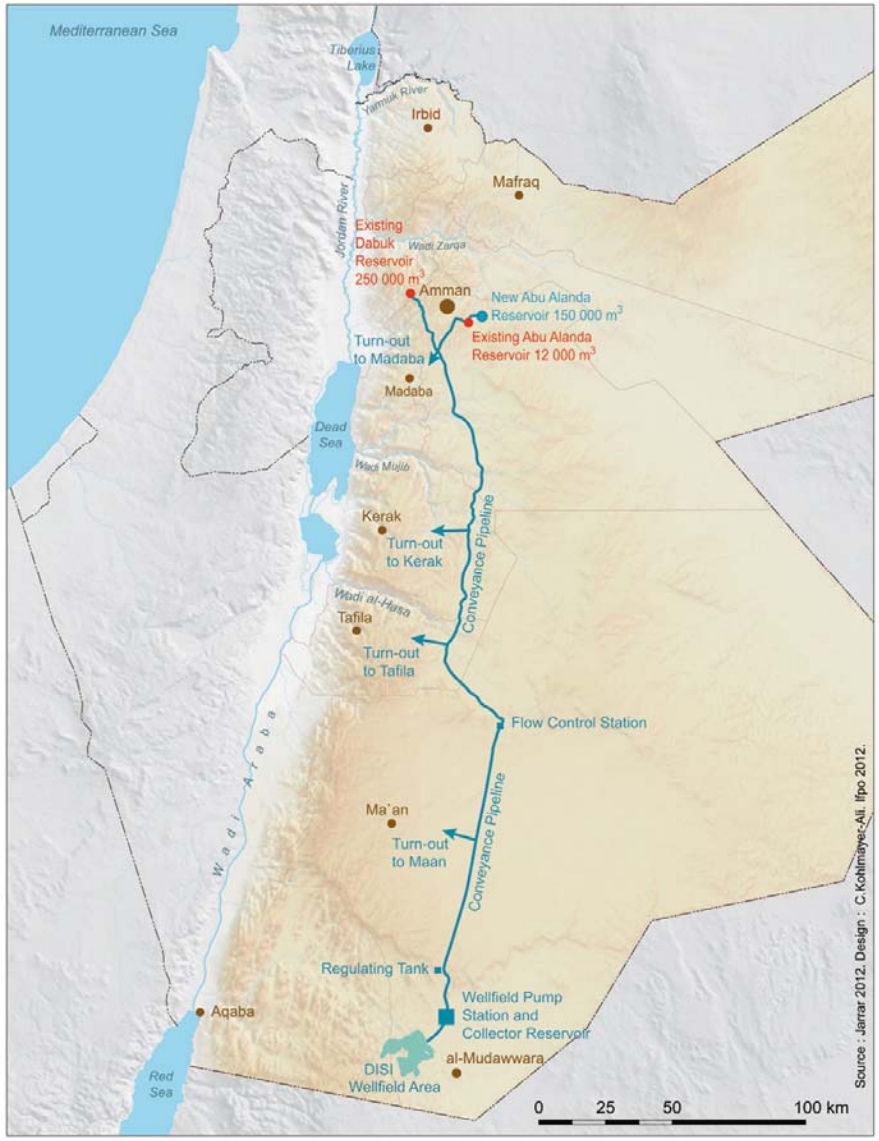
وصف مشروع الديسي القائم

موقع مشروع الديسي-عمان القائم

- منطقة المشروع هي المنطقة الواقعة على طول المسار الناقل للمياه من حقل بئر دبيدب إلى محافظة عمان مروراً بمعان و الطفيلة و الكرك و مادبا.
- يتم استخراج المياه بشكل رئيسي من حقل بئر دبيدب في منطقة الديسي- المدورة جنوب الأردن ونقلها إلى عمان.

المناطق المخدومة:

- مدينة عمان التي تستخدم مياه الديسي للاحتياجات المنزلية
- المدن الواقعة على طول مسار ناقل الديسي التي تُزود بمياه الطوارئ عند الحاجة : مادبا ، الكرك ، الطفيلة ،معان.



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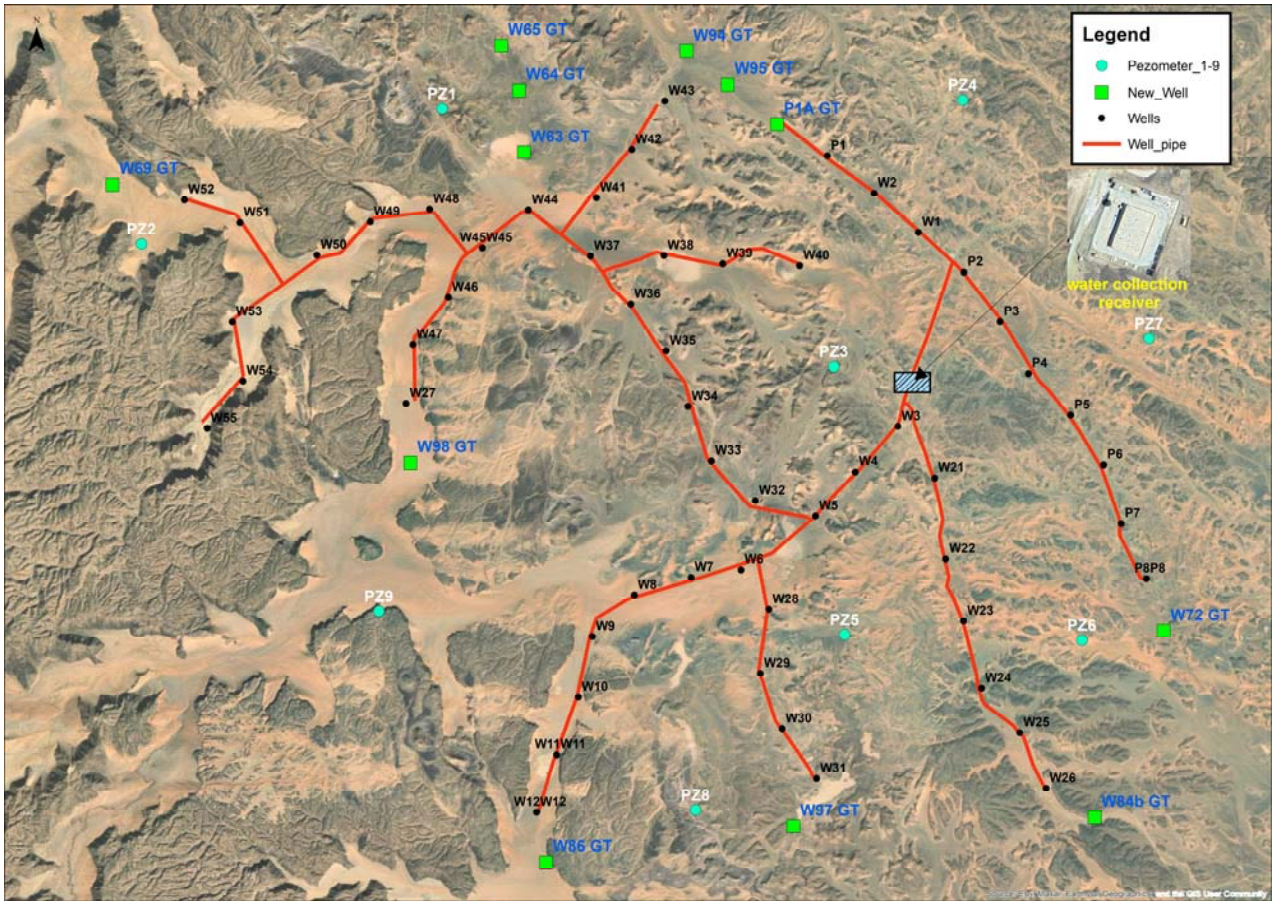
وصف مشروع الديسي القائم

لمحة عامة :

أ- مشروع الديسي-عمان القائم

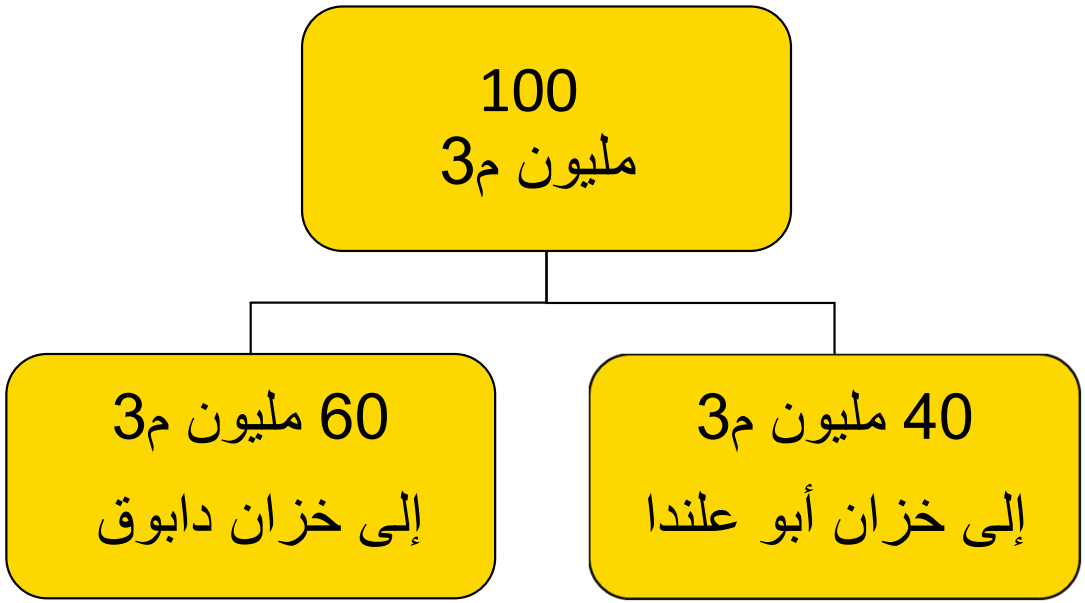
- يتكون مشروع الديسي-عمان القائم من 55 بئر جوفي إنتاجي: 46 بئرتم تشغيلها و 9 آبار احتياطية
- يتم جمع المياه من كل بئر من الآبار عبر شبكة تجميع "متفرعة" ويتم توصيلها إلى خزان تجميع شمال حقل الآبار بواسطة خط تجميع رئيسي.
- يتضمن المشروع 9 آبار مراقبة ومرافق تشغيلية التي تنقل المياه لمسافة حوالي 325 كم لتزويد 100 مليون م3 سنويًا من المياه إلى عمان.



وصف مشروع الديسي القائم

لمحة عامة

- يتم استقبال المياه في خزانين : خزان دابوق (غرب عمان) و خزان أبو علندا (شرق عمان)
- تم تصميم النظام لينقل تدفقًا سنويًا قدره 100 مليون متر مكعب :

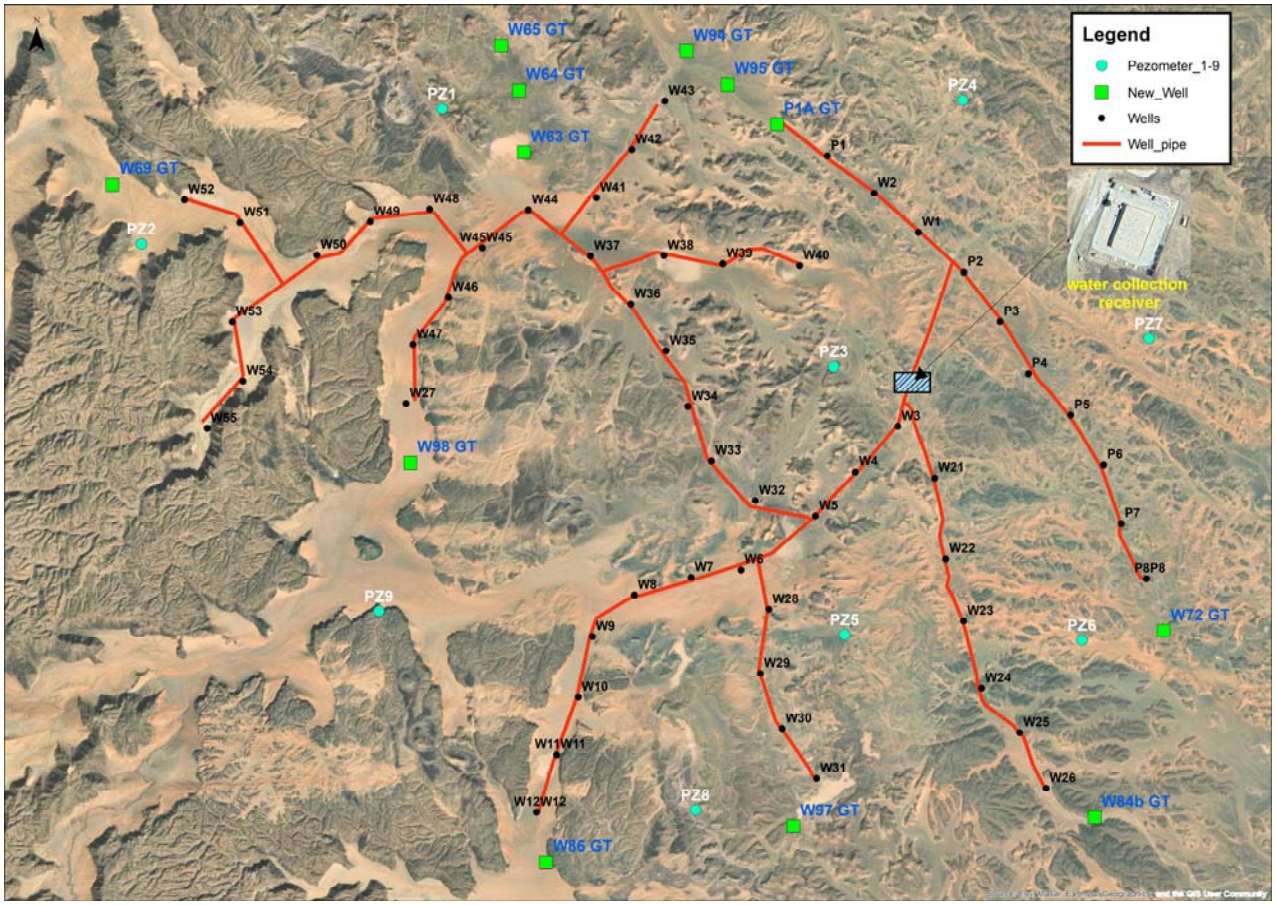


وصف مشروع الديسي القائم

لمحة عامة :

ب- تحسينات تم إجراءها على التصميم الرئيسي للمشروع بهدف زيادة إنتاج الآبار :

- تم تشغيل 4 آبار احتياطية (50 بئر تم تشغيها ، 5 آبار احتياطية.
- تم تحديث و زيادة سعة المضخات في محطة ضخ المدورة. إن كمية المياه التي تم ضخها من الآبارأصبحت حوالي 111.06 مليون م3 في عام 2023 .

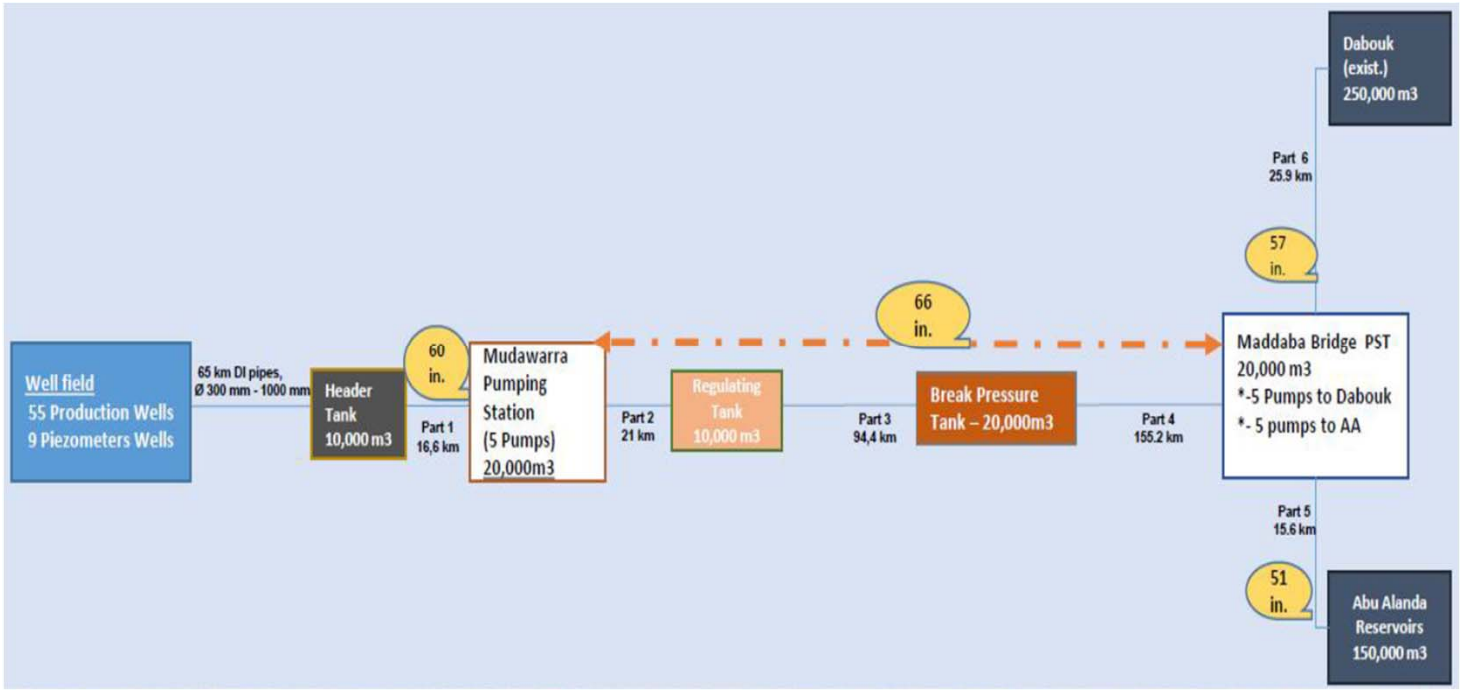


وصف مشروع الديسي القائم

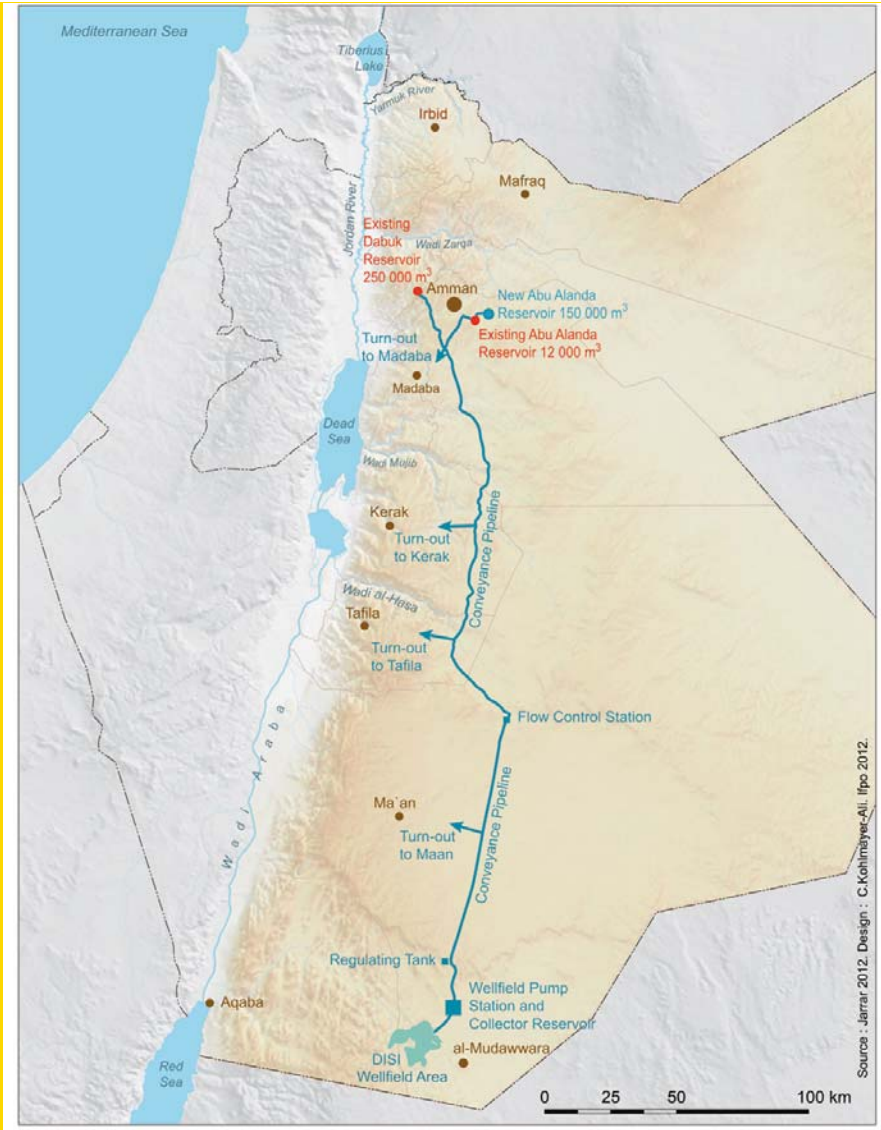
مكونات مشروع الديسي القائم:

تشمل المكونات الرئيسية القائمة لمشروع ديسي -عمان :

- حقل بئر يتكون من 55 بئر جوفي إنتاجي:
  - 50 بئراً قيد التشغيل و5 آبار احتياطية
- شبكة تجمع حقل الآبار
- خط الأنابيب الرئيسي
- خزان تجميعي
- محطتي ضخ في المدورة ومادبا على التوالي.
- خزانات منظم التدفق.
- خزان كاسر الضغط .
- الخزانات (خزان أبو علندا وخزان دابوق)
- المباني الملحقة المرتبطة بها
- البنية التحتية لإمدادات الطاقة والاتصالات
- طرق الوصول والخدمة



المخطط التفصيلي للمكونات الرئيسية لمشروع الديسي-عمان



Source: Atlas

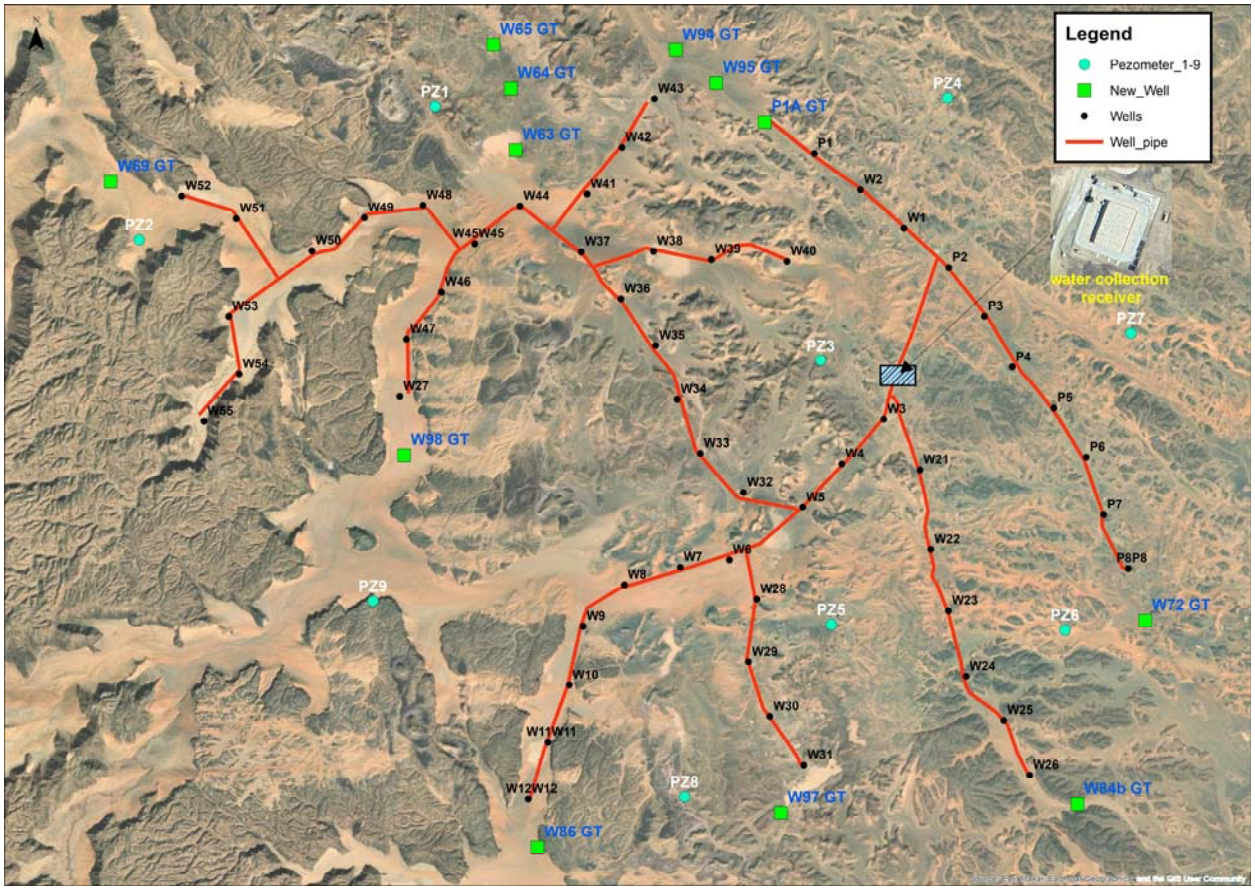
مبررات المشروع الجديد

- **مبررات المشروع :**

- نتيجة لارتفاع الطلب على المياه ،منذ عام 2018 وخصوصاً في فصل الصيف، فقد طلبت وزارة المياه والري من شركة مياه الديسي زيادة كميات تزويد المياه إلى أكثر من 100 مليون متر مكعب.

- لتلبية هذه الزيادة في الطلب على المياه ، تخطط شركة مياه الديسي لإجراء أعمال إضافية " حفرآبار إنتاجية جديدة إضافية (الآبارالتعويضية) " لزيادة إنتاج حقل الآبار بما يصل إلى 120 مليون متر مكعب سنويًا.

وصف المشروع

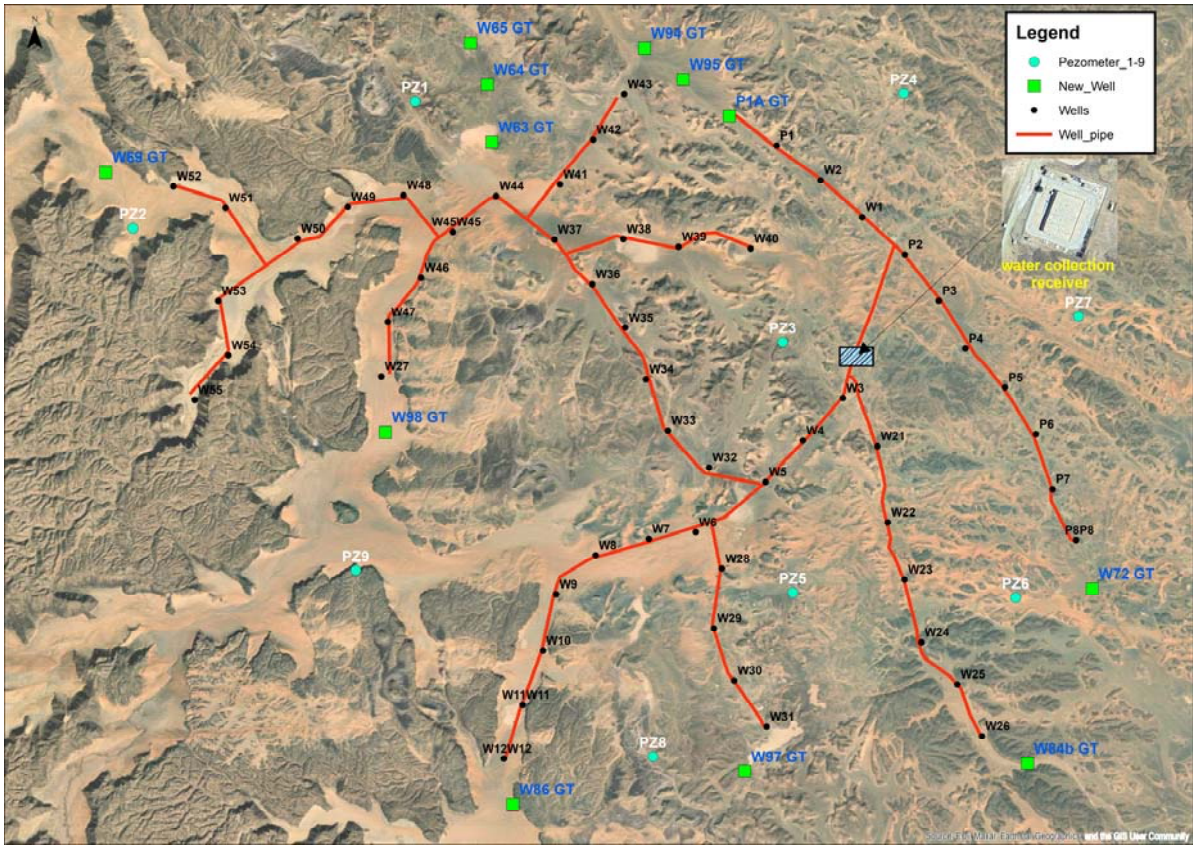


لمحة عامة :

أ- الآبار التعويضية المقترحة

- إضافة آبار حسب الحاجة
- الهدف الإنتاجي لكل بئر إنتاج جديد بين 70 إلى 80 لتر/ثانية.

مكونات المشروع



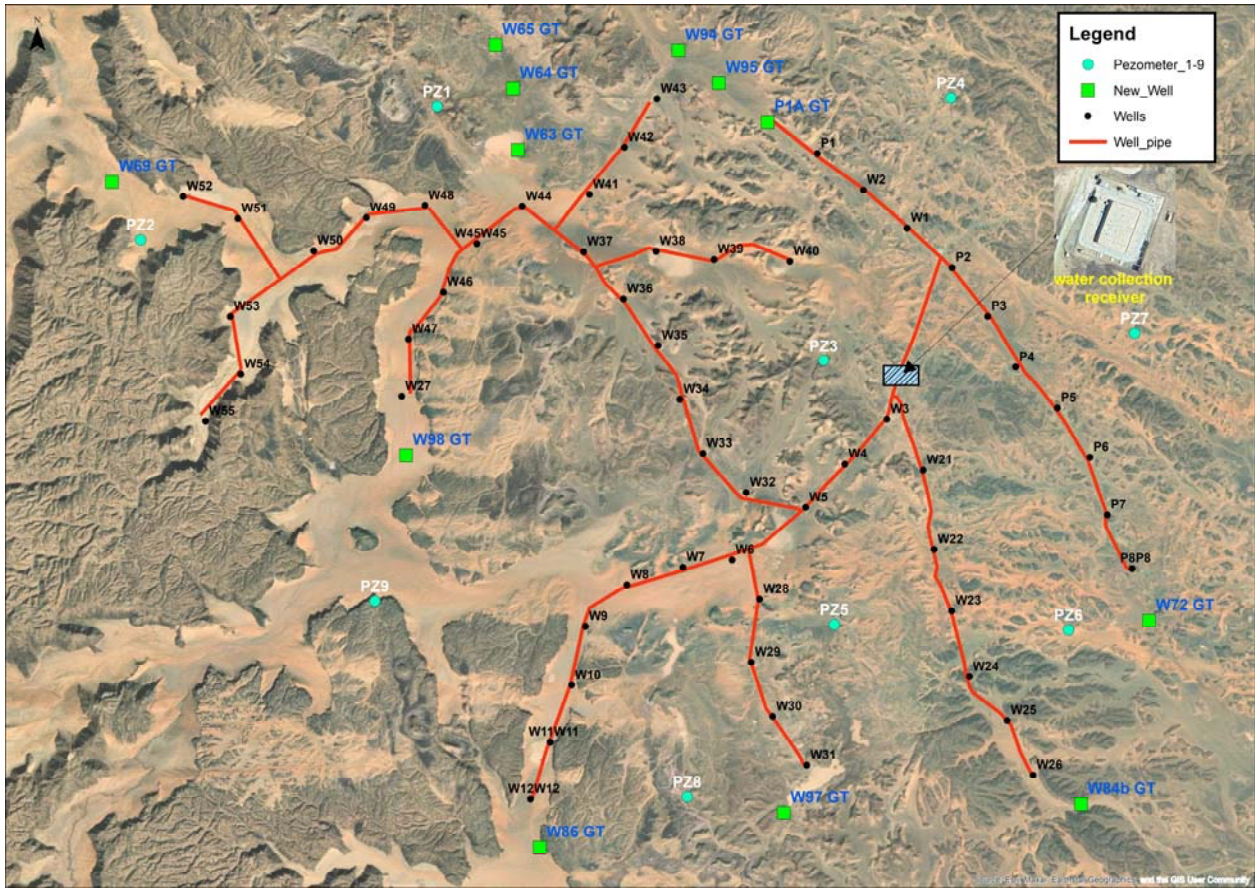
مكونات المشروع الرئيسية التي سيتم تغطيتها أثناء إعداد دراسة تقييم الأثر البيئي :

1. حفر آبار جوفية جديدة.
2. إنشاء البنية التحتية ذات الصلة لتجميع ونقل المياه إلى الخزان القائم.
3. إنشاء شبكة الطرق الداخلية لربط الآبار الجديدة بأجزاء المشروع القائمة في منطقة المدورة.

موقع الآبار المقترحة

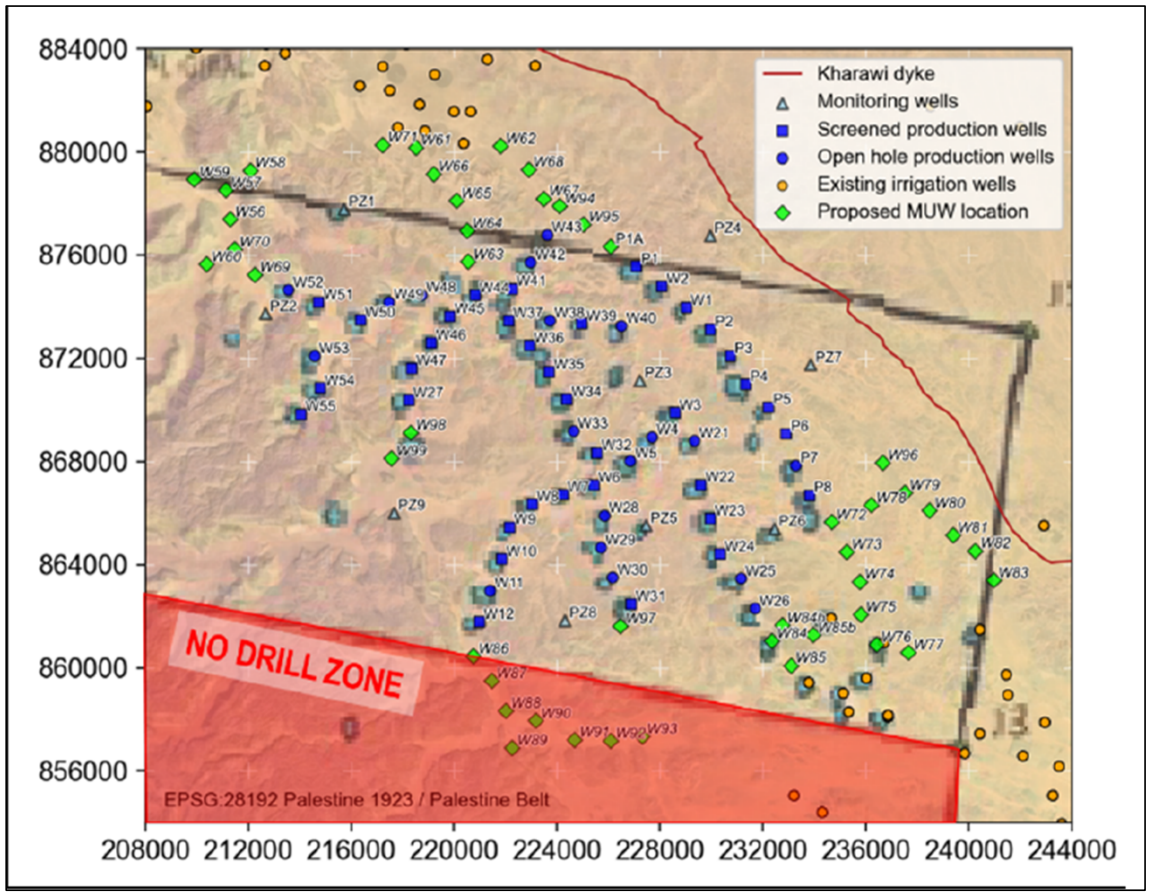
تم تحديد وتأكيد 12 موقع للآبار التعويضية الجديدة ضمن حقل آبار الدبيدب وذلك بناءً على:

- التضاريس و المعايير الجيولوجية
- متوسط المسافة بين الآبار البالغ 1,250 متر
- متطلبات أصحاب العلاقة .
- المنطقة المحمية التي يحظر فيها استخراج المياه الجوفية كما هو موضح بالاتفاقية بين حكومة الأردن و السعودية .



خريطة ل 12 موقع للآبار التعويضية الجديدة

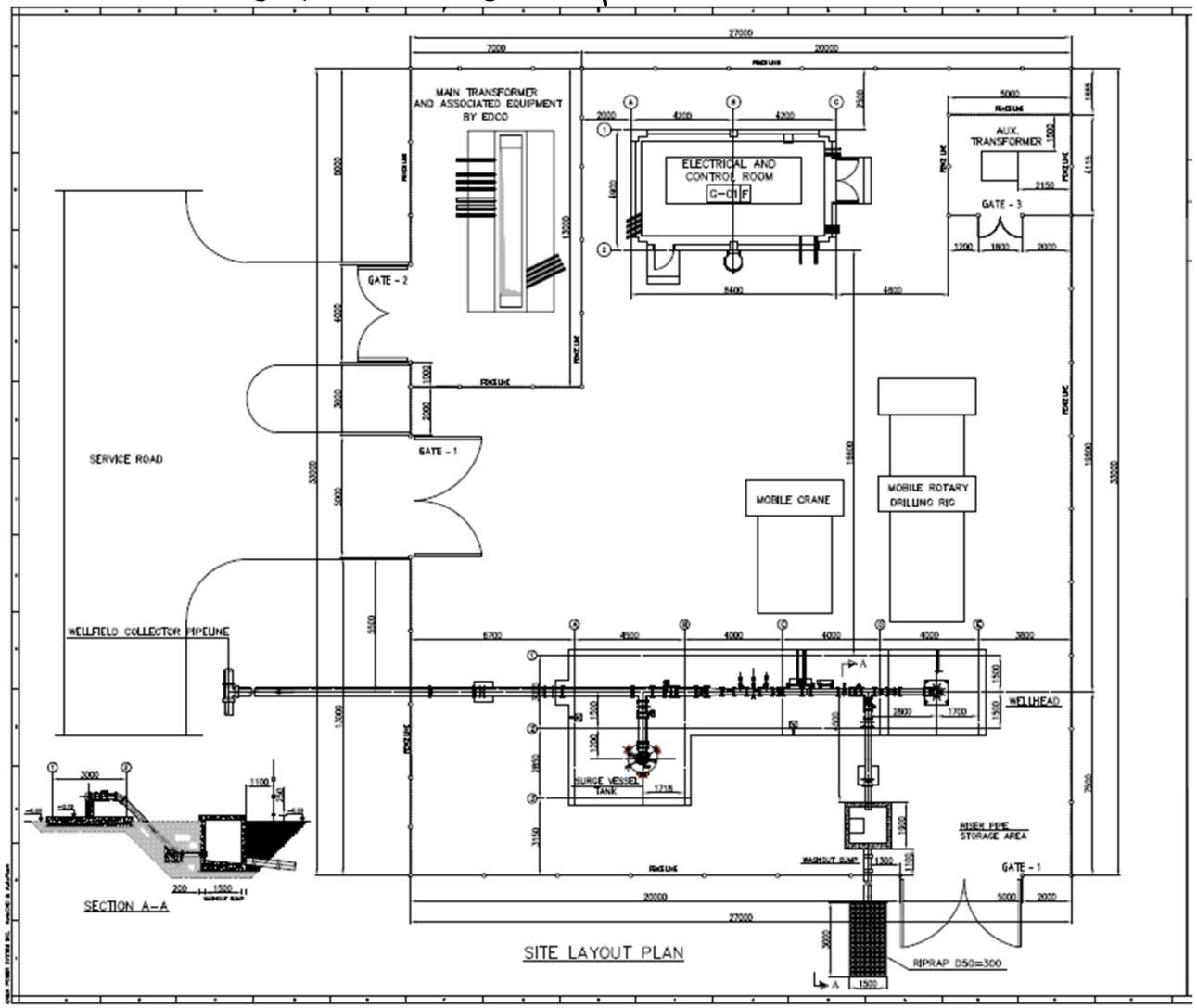
اتفاقية بين الأردن و السعودية لإدارة المياه الجوفية في طبقة الساق/الديسي



المنطقة المحمية (المحظورة) " المحددة في اتفاقية الأردن والمملكة العربية السعودية

- وقع الأردن والمملكة العربية السعودية "اتفاقية من أجل إدارة واستثمار المياه الجوفية في طبقة الساق/ الديسي" في عام 2015.
- تتضمن هذه الاتفاقية تعريف :
- "منطقة الإدارة"، حيث يجب أن تكون عمليات استخراج المياه الجوفية مخصصة لأغراض البلدية فقط.
- "المنطقة المحمية (المحظورة)"، حيث يحظر الحفر لاستخراج المياه الجوفية في هذه المنطقة.

المخطط العام لمكونات الآبار



صور تم التقاطها خلال زيارة موقع المشروع 30-31/7/2024

بئر إنتاجي

صور تم التقاطها خلال زيارة موقع المشروع 30-31/7/2024

بئر مراقبة

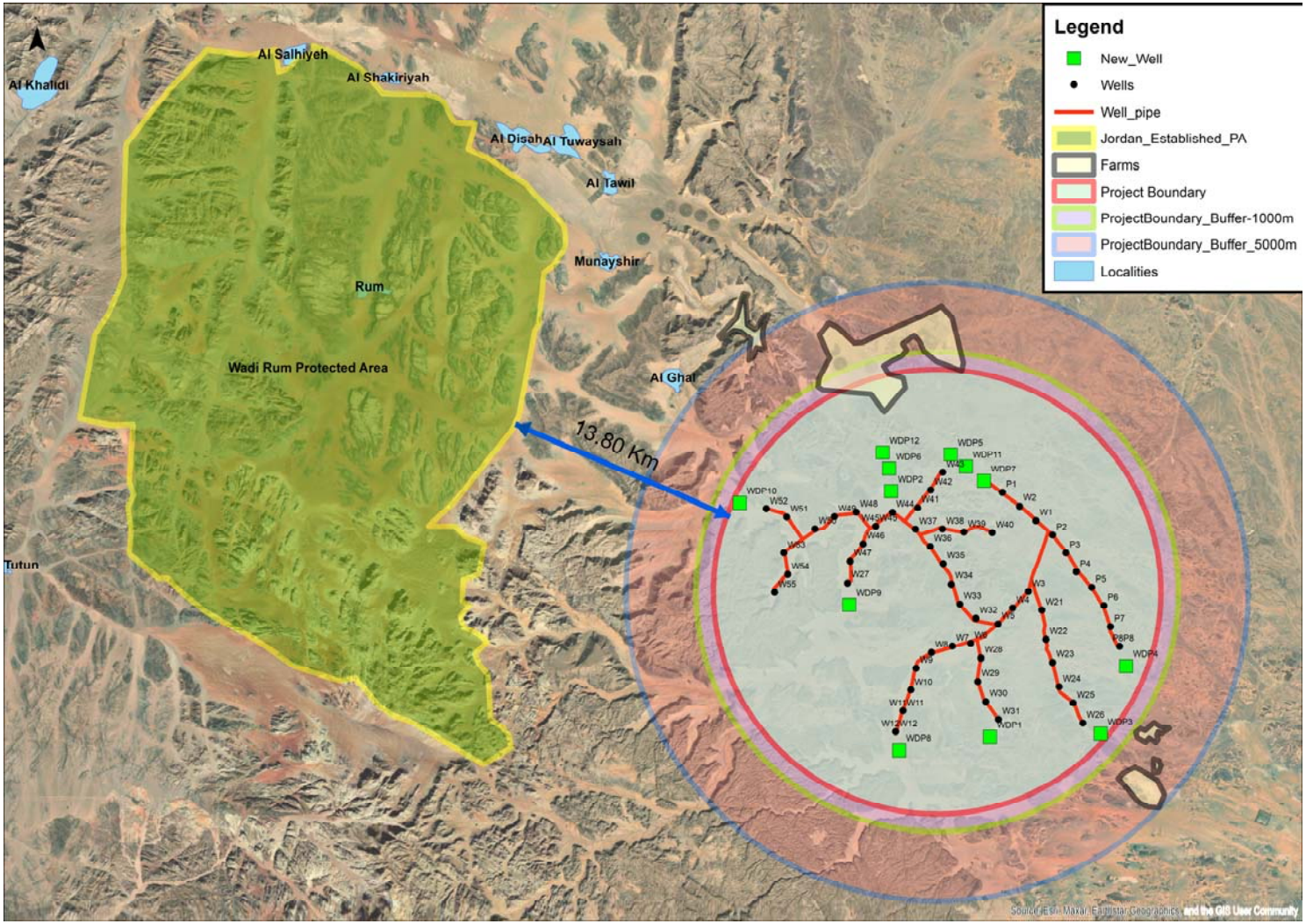
صور تم التقاطها خلال زيارة موقع المشروع 30-31/7/2024

محطة المدورة

صور تم التقاطها خلال زيارة موقع المشروع 30-31/7/2024

الموقع العام

العناصر المحيطة بالمشروع المقترح



مراحل المشروع

مكونات المشروع الرئيسية التي سيتم تغطيتها أثناء إعداد دراسة تقييم الأثر البيئي :

- سيغطي تقييم الأثر البيئي والاجتماعي المراحل التالية:

- مرحلة البناء التي تتضمن حفر آبار المياه التعويضية الجديدة، والربط بشبكة الأنابيب الحالية و/أو شبكة جديدة، وطريق الخدمة داخل منطقة حقل الآبار.
- مرحلة التشغيل لمختلف المرافق المشيدة حديثاً في جميع مراحل المشروع.
- مرحلة إنهاء تشغيل المشروع.

بدائل المشروع

بدائل المشروع

تنفيذ المشروع / عدم تنفيذ المشروع

بدائل الموقع

بدائل المشروع

عدم تنفيذ المشروع

عدم تنفيذ المشروع سيؤدي إلى أثار سلبية بما في ذلك :

- تدهور في إمدادات المياه في عمان و خصوصاً في فصل الصيف
- تأثير على الصحة العامة

بدائل المشروع

تنفيذ المشروع

المشروع لديه مساهمات إيجابية بما في ذلك :

المساهمة في حل مشكلة إمدادات المياه التي تعاني منها عمان والمنطقة المحيطة بها

تحسين نوعية المياه التي يتم تزويدها إلى عمان

تحسين ظروف الصحة العامة

توفير إمدادات المياه في حالات الطوارئ للمجتمعات على طول الخط الناقل

معايير اختيار مواقع الآبار

المعايير الأولية لاقتراح مواقع الآبار الجديدة

- التضاريس و المعايير الجيولوجية.
- متوسط المسافة بين الآبار البالغ 1,250 متر .

تم تقييم هذه المواقع المقترحة للآبار خلال 3 مراحل رئيسية:

المرحلة الأولى:

تمت مراجعة جميع البيانات الجيولوجية والعلمية المتاحة لحقل الآبارحيث تم تقييم كل موقع بئر جديد بناءً على 11 معيار، حيث تتوافق هذه المعايير مع خمسة (5) مخاطر رئيسية، هم:

- كمية المياه الجوفية.
- جودة المياه الجوفية.
- القدرة على تنفيذ الآبار.
- تكاليف الأنابيب.
- الموقع المقترح للبئر بالنسبة للمنطقة المحمية " المحظورة " بناءً على اتفاقية خاصة بين الأردن والمملكة العربية السعودية التي تمنع الحفر في المنطقة الجنوبية لحقل الآبار.

معايير اختيار مواقع الآبار

معايير اختيار مواقع الآبار

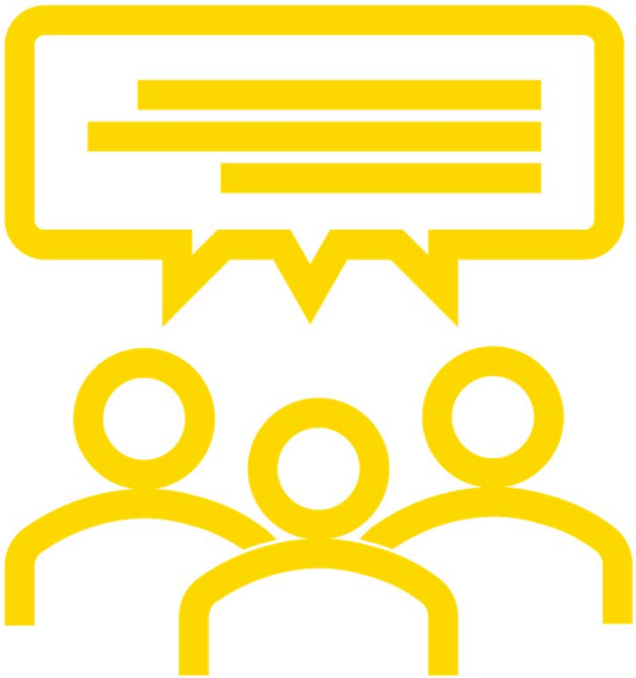
المرحلة الثانية:

تم حساب التقييم الإجمالي لجميع المعايير لكل بئر، وذلك كمجموع موزون لكل معيار. تُظهر هذه الطريقة الموزونة منظور إدارة المخاطر و منظور كل خطر من وجهة نظرأصحاب العلاقة .

المرحلة الثالثة:

تم عقد ورشة عمل جماعية في عمان مع أصحاب العلاقة الرئيسيين لحقل آبار الدبيديب. وتم تحديد اثني عشر موقعًا لإجراء مزيد من التقييم خلال الزيارات الميدانية ،حيث تم ترتيب الآبار ال 12 حسب أولوية الحفر .

أسئلة وأجوبة حول المشروع المقترح



تقييم الأثر البيئي و الاجتماعي

نظرة عامة على العرض التقديمي - تقييم الأثر البيئي والاجتماعي

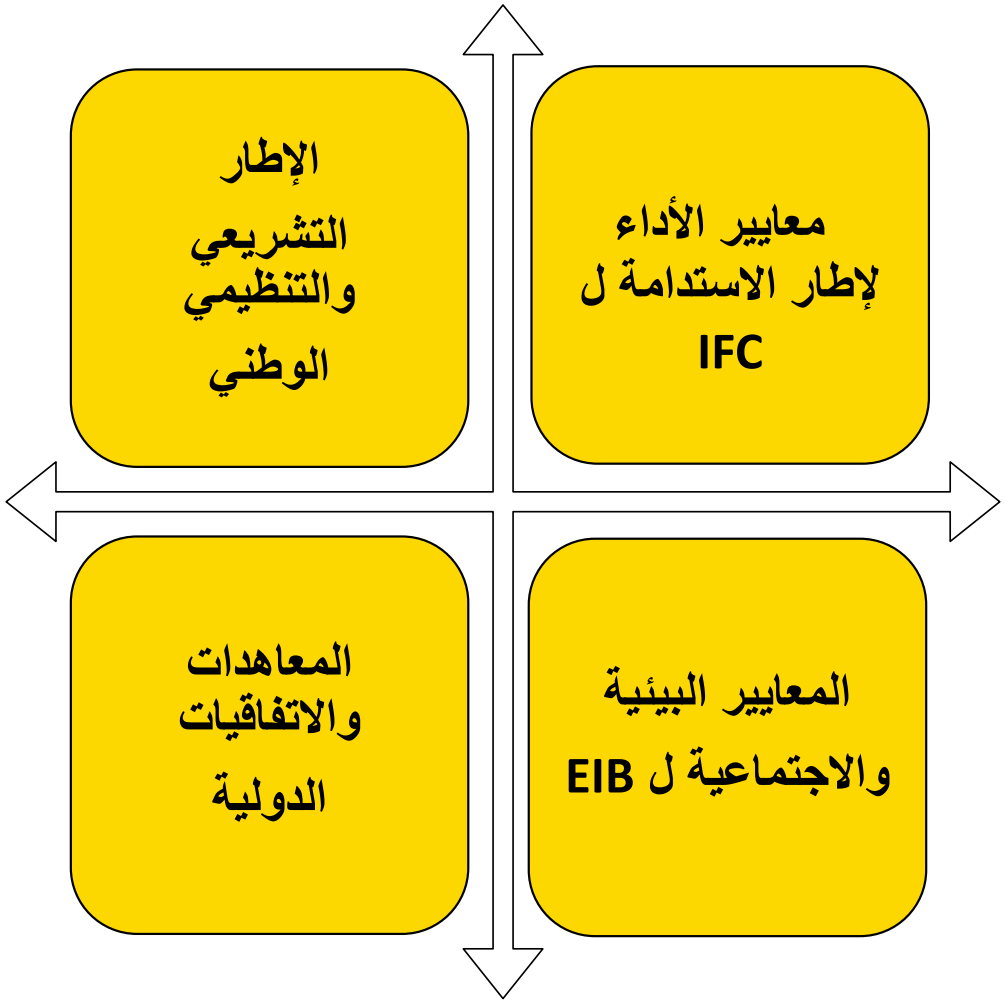
- أهداف تقييم الأثر البيئي والاجتماعي
- الإطار القانوني والتنظيمي
- المراحل الرئيسية لتنفيذ دراسة تقييم الأثر البيئي والاجتماعي
- أقسام تقرير دراسة تقييم الأثر البيئي والاجتماعي
- منهجية تقييم الوضع القائم
- الآثار البيئية المتوقعة للمشروع
- مجموعات العمل و النقاش

أهداف تقييم الأثر البيئي والاجتماعي

تهدف الدراسة إلى:

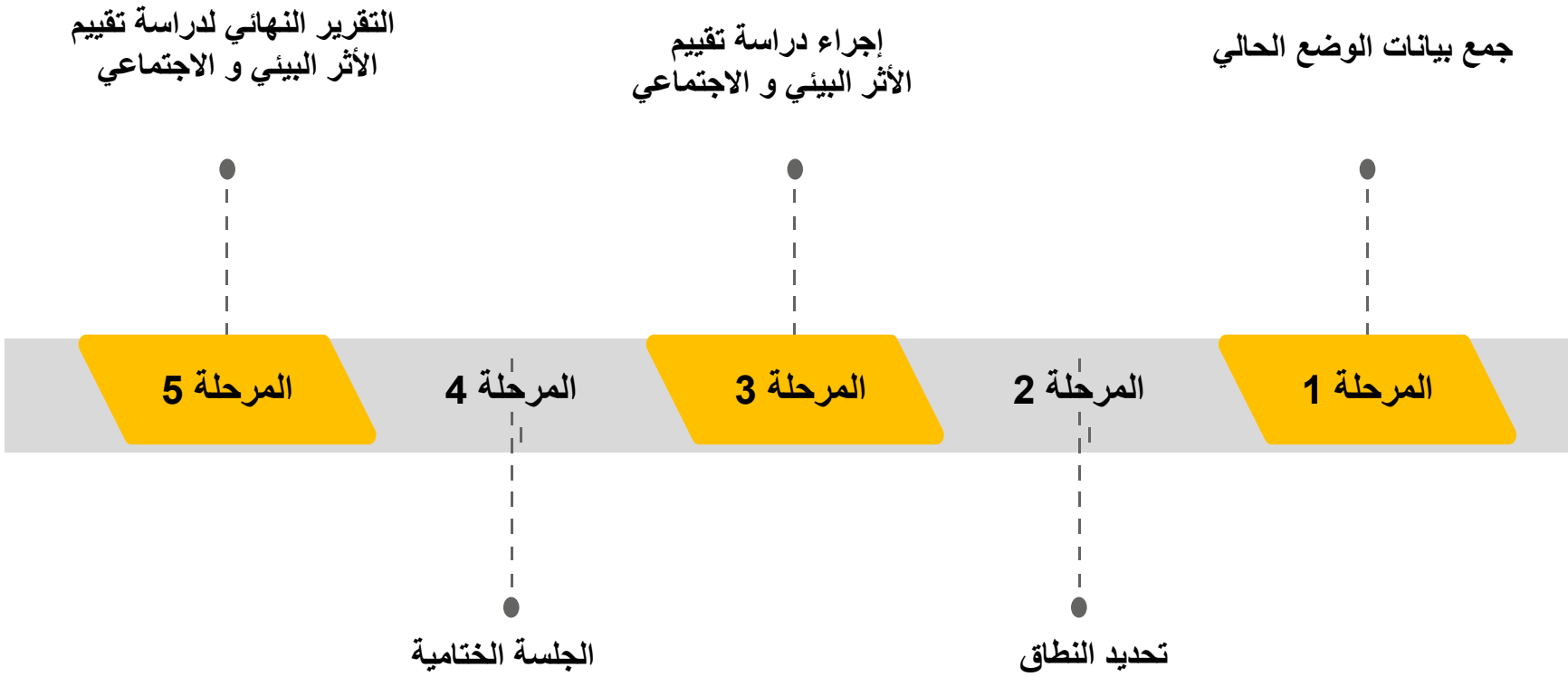
- تقييم الآثار البيئية والاجتماعية المحتملة للمشروع
- تغطي الدراسة دورة حياة المشروع بأكملها
- اقتراح تدابير مناسبة وقابلة للتنفيذ للحد من الآثار المحتملة ووضع خطة لإدارتها

الإطار القانوني والتنظيمي



المراحل الرئيسية – تقييم الأثر البيئي والاجتماعي

سيتم تنفيذ دراسة تقييم الأثر البيئي من خلال المراحل الرئيسية التالية:



أقسام تقرير دراسة تقييم الأثر البيئي والاجتماعي

وصف المشروع وتقييم البدائل

- وصف المشروع
- تقييم البدائل

تقييم الظروف البيئية والاجتماعية للوضع القائم

- قياسات نوعية الهواء والضجيج
- مراجعة الأدبيات والدراسات العامة
- استطلاعات وتقييمات ميدانية
- استشارة أصحاب العلاقة

تحديد وتقييم الأثر

- تحديد حساسية المستقبل كما تم تقييمها في الظروف الحالية
- تحديد طبيعة وقيمة الأثر
- تقييم أهمية الأثر

خطة الإدارة البيئة والاجتماعية

- تحديد تدابير التخفيف الممكنة لكل أثر سلبي

منهجية تقييم الوضع القائم

البيئة الفيزيائية

- نوعية الهواء، الضجيج، الأرصاد والمناخ، الجيولوجيا، التضاريس، التربة، موارد المياه، تقييم مخاطر المناخ... الخ.

البيئة البيولوجية

- النباتات والحيوانات والمناطق ذات الأهمية البيولوجية (المناطق المحمية ومناطق الطيور المهمة والمحميات الطبيعية والمناطق الحساسة).

الظروف الاجتماعية والاقتصادية

- السكان وطبيعة التركيب السكاني في محيط منطقة المشروع
- الوضع الاقتصادي
- البنية التحتية ومرافقها

الموارد الثقافية والآثرية

- قاعدة بيانات الآثار الأردنية ونظام المعلومات (MEGA Jordan)
- دائرة الآثار الأردنية

مصفوفة تقييم الأثر البيئي و الاجتماعي

المستقبلات		الفيزيائية						البيولوجية			الاجتماعية - الاقتصادية							
النشاط		جودة الهواء	الضجيج	التربة	المياه الجوفية	هيدرولوجيا	المناظر الطبيعية/ التضاريس	النباتات (الموائل)	طيور	الزواحف والثدييات	السلامة و الصحة العامة	السلامة و الصحة العامة	السكان	استخدام الأراضي	القوى العاملة والتوظيف	المرافق والبنية التحتية	النقل والمرور	التراث الثقافي والأثري
الأنشطة المخططة																		
ما قبل البناء	مسارات الوصول																	
	المسح الميداني																	
	التحقيق في الموقع																	
	الاستحواذ على الأراضي																	
البناء	طريق الوصول إلى الموقع																	
	اماكن الاقامه																	
	النقل																	
	مسح الموقع																	
	فحص تربة الموقع																	
	أعمال الحفر																	
	نقل العمالة والمعدات																	
	بناء المضخات																	
	تشييد المباني / الآلات																	
	النفايات الناتجة عن أنشطة البناء																	
	مياه الصرف الصحي الناتجة عن عمال الموقع																	

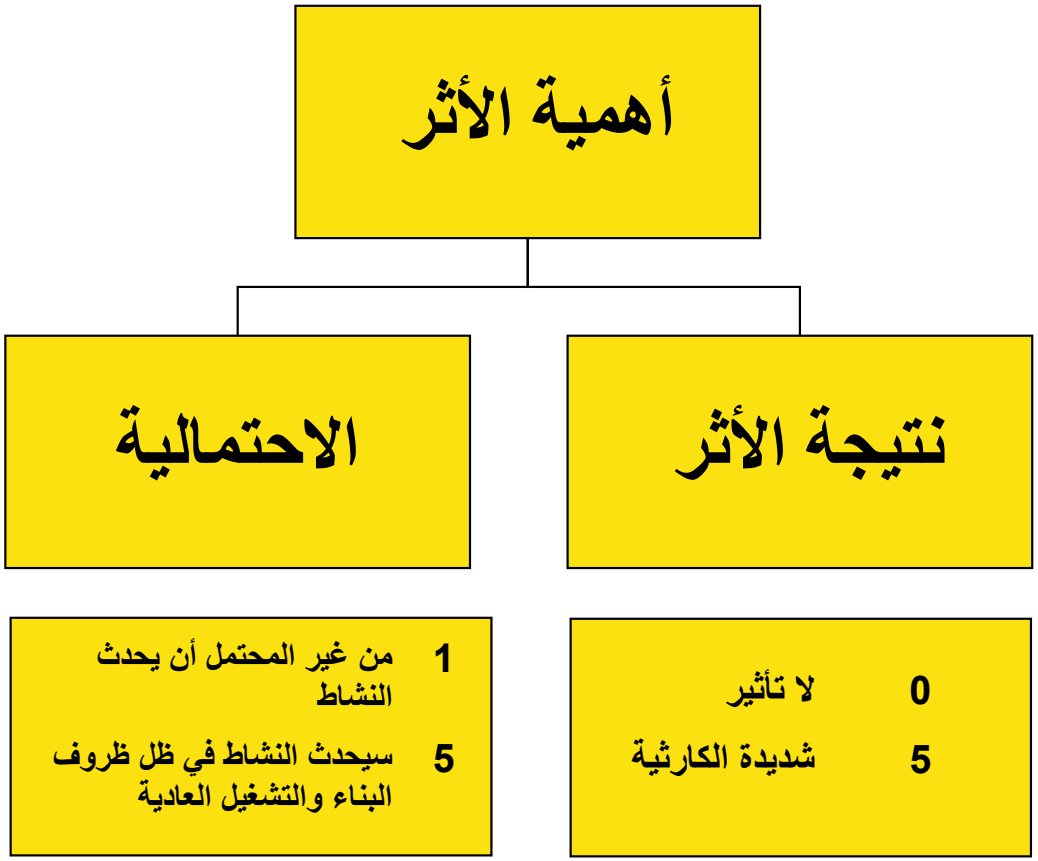
مصفوفة تقييم الأثر البيئي و الاجتماعي

المستقبلات		الفيزيائية						البيولوجية			الاجتماعية - الاقتصادية							
النشاط		جودة الهواء	الضجيج	التربة	المياه الجوفية	هيدرولوجيا	المناظر الطبيعية/ التضاريس	النباتات (الموائل)	طيور	الزواحف والثدييات	السلامة و الصحة العامة	السلامة و الصحة العامة	السكان	استخدام الأراضي	القوى العاملة والتوظيف	المرافق والبنية التحتية	النقل والمرور	التراث الثقافي والأثري
التشغيل	نقل مياه الصرف الصحي إلى الموقع																	
	المعالجة الأولية																	
	المعالجة الثانوية																	
	ضخ مياه الصرف الصحي المعالجة للتصريف																	
	معالجة الحمأة																	
	إدارة الحمأة																	
	معالجة النفايات الصلبة البلدية																	
	انبعاثات الهواء																	
	تخزين النفايات الخطرة / الكيميائية والتخلص منها																	
	استهلاك المواد الكيميائية / تخزين النفط																	
	تشغيل المركبات																	
	أنشطة الصيانة																	
الهدم	معدات التفكيك																	
	هدم البنية التحتية للمبانى والتخلص منها																	
	إزالة السياج																	
	الحفر والردم																	
	ترميم الموقع																	

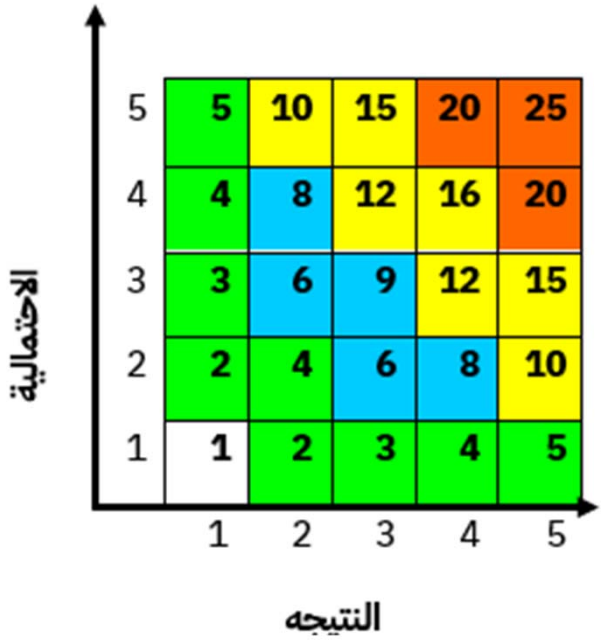
مصفوفة تقييم الأثر البيئي و الاجتماعي

المستقبلات		الفيزيائية						البيولوجية			الاجتماعية - الاقتصادية							
النشاط		جودة الهواء	الضجيج	التربة	المياه الجوفيه	هيدرولوجيا	المناظر الطبيعية/ التضاريس	النباتات (الموائل)	طيور	الزواحف والثدييات	السلامة و الصحة العامة	السلامة و الصحة العامة	السكان	استخدام الأراضي	القوى العاملة والتوظيف	المرافق والبنية التحتية	النقل والمرور	التراث الثقافي والأثري
أنشطة المشروع غير المخطط لها																		
البناء	تصادم المركبات																	
	انسكابات المواد الكيميائية أو الوقود السائل																	
	اشتعال المواد القابلة للاشتعال / الحرائق العرضية																	
التشغيل	انقطاع التيار الكهربائى																	
	تصادم المركبات																	
	انسكابات المواد الكيميائية أو الوقود السائل																	
	اشتعال المواد القابلة للاشتعال / الحرائق العرضية																	
الكوارث الطبيعية																		
البناء	زلزال "الأنشطة الزلزالية"																	
	الفيضانات																	
التشغيل	زلزال "الأنشطة الزلزالية"																	
	الفيضانات																	

منهجية تقييم الأثر



منهجية تقييم الأثر



تقدير أهمية الأثر المحتمل

تقدير أهمية الأثر المحتمل

الأهمية (Significance)	الترتيب (Ranking) (النتيجة×الاحتمال) (Consequence X Likelihood)
حرج	16<
عالي	16-10
متوسط	9-6
قليل	5-2
ضئيل (لا يذكر)	2>

تدابير تخفيفية

التأثيرات المتوقعة خلال مرحلة البناء والتشغيل

مرحلة البناء

- جودة الهواء
- الضجيج
- السلامة و الصحة العامة
- السلامة و الصحة المهنية
- التربة
- النفايات (الصلبة والسائلة والخطرة)
- الموارد المائية
- التنوع الحيوي
- البنية التحتية والخدمات العامة
- الآثار والتراث الثقافي
- مخاطر المناخ
- التوظيف (+)
- تأثيرات إضافية

مرحلة التشغيل

- الضجيج
- التربة
- النفايات (الصلبة والسائلة والخطرة)
- الموارد المائية
- التنوع الحيوي
- السلامة و الصحة المهنية
- التوظيف(+)
- البنية التحتية والخدمات العامة(+)
- السلامة و الصحة العامة (+)
- تأثيرات إضافية

مجموعات العمل و النقاش

شكراً لاستماعكم

For more information
info@ajigroup.com

Appendix 2: Scoping Session Additional Photos


مشروع تقييم الأثر البيئي والاجتماعي
لحفر آبار جديدة وأعمال البنية التحتية
المرتبطة بها -حقل بئر ديبدب / الديسي
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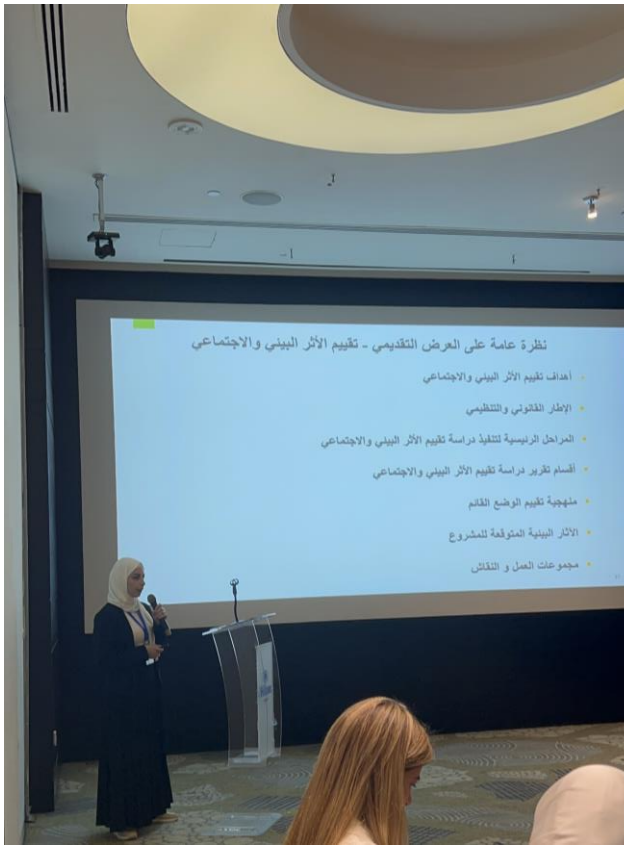
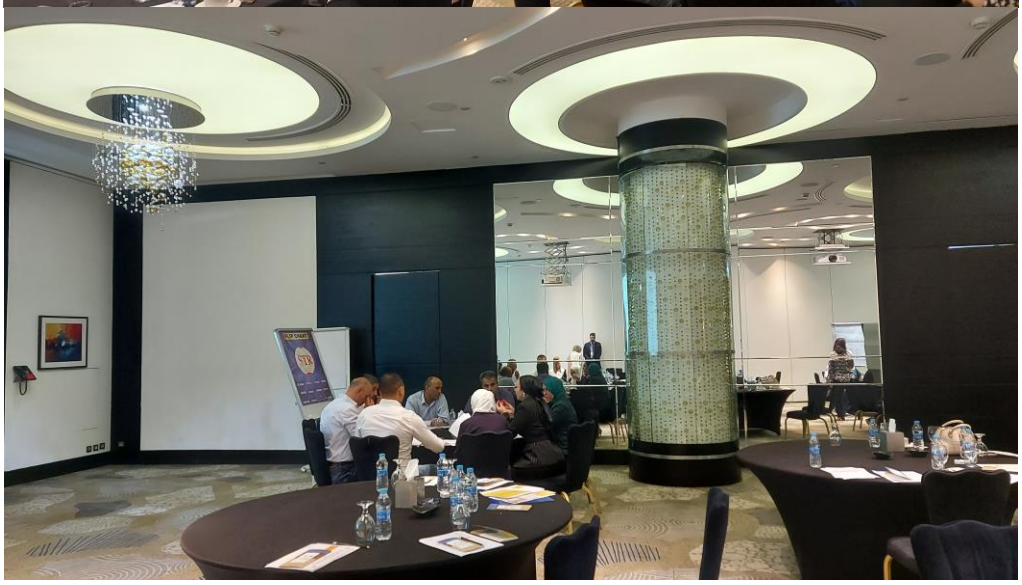

نظرة عامة على العرض التقديمي - تقييم الأثر البيئي والاجتماعي
أهداف تقييم الأثر البيئي والاجتماعي
الاطار القانوني والتنظيمي
المراحل الرئيسية لتنفيذ دراسة تقييم الأثر البيئي والاجتماعي
أقسام تقرير دراسة تقييم الأثر البيئي والاجتماعي
منهجية تقييم الوضع القائم
الآثار البيئية المتوقعة للمشروع
مجموعات العمل و النقاش


صور تم التقاطها خلال زيارة موقع المشروع 30-31/7/2024
بدر إنتاجي



Appendix 3: List of Attendees

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وزارة البيئة

Hashemite Kingdom of Jordan
Ministry of Water and Irrigation

مشروع تقييم الأثر البيئي والاجتماعي لحفر آبار جديدة وأعمال البنية التحتية المرتبطة بها

حقل بئر دبيديب /الديسي

تاريخ : 2024/08/20

الرقم	اسم الجهة	اسم الشخص	رقم الهاتف	التوقيع
1	Operator / Disi Amman Operation & maintenance	نور غنيم	0777212116	
2	DAOM	محمد عبد الهادي	0795706888	
3	WAJ	روان زهير مرجان	0780359564	
4	WAJ	صباح احمد عبد ربه	0795320960	
5	AJi	م. وفاء دعيبس	0777788644	
6	DIWACO	احمد علم الدين	0790867037	
7	MEMR وزارة الطاقة والثروة المعدنية	د. ريم طاهر شتاوي	0799803384	
8	Operator / Disi Amman Operation & maintenance	م. محمد يحيى ابو جمعة	0796708883	

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Hashemite Kingdom of Jordan
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	اسم الجهة	اسم الشخص	رقم الهاتف	التوقيع
9	DAoM	مصطفى [illegible] - [illegible]	0791661565	
10	~~[illegible]~~ وزارة العمل	احمد السبيرس	0777512936	
11		ايمن الشيابو	٠٧٨٨٣٠٣٨٧	
12	[illegible] وزارة المياه والري / سلطة المياه / PMU	[illegible] اسماعيل أبو عنزة	0792926274	
13	شركة مياه الديسي	خليل ابراهيم الوريكي	0795000213	
14	[illegible]	[illegible]	0797427497	
15	قوات الدرك / وزارة البيئة		٠٧٧٧٤٨٠٧٠	
16	[illegible]	وزارة البيئة	0796521126	
17	رشاد الفالح	MoenV	0779945528	
18	~~[illegible]~~ سلطة المياه / PMU	م. عناب	0799491915	
19	RSCN	براء علوه	0789148178	

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Hashemite Kingdom of Jordan
Ministry of Water and Irrigation

	اسم الجهة	اسم الشخص	رقم الهاتف	التوقيع
20	علي الكسالمة	وزارة الطاقة	0780395062	
21	عماد صالح	وزارة الزراعة	0779426460	
22	وزارة الأشغال العامة	م. د. العصام سيوقة	0795672792	
23	رائد صبحية	وزارة التربية		
24	د. عبلة الشرعي	وزارة الداخلية	0797446278	
25	د. سعاد العزازي	وزارة الإدارة المحلية	٠٧٩١٧٩٣٠٦	
26	علا الرويسي	وزارة الصحة	٠٧٩٥٠١٥٠٥٨٧	
27	عيسى مكاوي	AJi		
28	غادة جبر	AJi		
29	غادة حلاوة	AJi		
30	محمد عرف	AJi	0796372314	

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Aji

وزارة البيئة

Hashemite Kingdom of Jordan
Ministry of Water and Irrigation

	اسم الجهة	اسم الشخص	الهاتف	التوقيع
31	هيا طراونة	Aji		
32	زينب السويفان	Aji		
33	سحر حسن عمارنة	وزارة الصناعة والتجارة	0799727450	[signature]
34	د. محمد جمال العابد	وزارة المياه/ المياه البيئية	0796450987	[signature]
35				
36				
37				
38				
39				
40				
41				

Appendix 4: Questionnaire Form

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

ما هو تقييمك للآثار البيئية والاجتماعية المتوقعة للمشروع

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
1	جودة الهواء المحيط	الغبار							
		الروائح							
		انبعاث العوادم							
2	مستوى الضجيج								
3	الأرض والتربة	انسكاب زيوت							
		انجراف التربة							

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مواد البناء و النفايات							
4	الموارد المائية	تلوث المياه السطحية							
		تلوث المياه الجوفية							
5	إدارة النفايات بأنواعها	النفايات الصلبة							
		النفايات السائلة							
		النفايات الخطرة							
6	التنوع الحيوي	إزعاج/ تدمير الموائل							

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		فقدان الغطاء النباتي							
7	الظروف الاجتماعية	توفير فرص العمل							
8	البنية التحتية والخدمات العامة	تعطيل مؤقت أو تعطيل لشبكات الطرق المحلية والخدمات المقدمة في محيط المواقع							
9	السلامة و الصحة العامة	الضجيج							
		الغبار							
		مخاطر صحية							

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
10	السلامة و الصحة المهنية	ظروف العمل السيئة وتجاهل حقوق العمال							
11	الأثار والتراث الثقافي	ضرر على البقايا الأثرية والمواقع التراثية							
12	مخاطر المناخ								

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
التأثيرات الإضافية									
13	غيرها، حدد:								
14	غيرها، حدد:								
15	غيرها، حدد:								

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
16	غيرها، حدد:								
17	غيرها، حدد:								

Appendix 5: Questionnaire Filled by Each Working Group

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

وزارة البيئة

مجموعة ١ – [illegible] DAOM

ما هو تقييمك للآثار البيئية والاجتماعية المتوقعة للمشروع

الرقم	العامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
1	جودة الهواء المحيط	الغبار	x				x		
		الروائح		x				x	
		انبعاث العوادم	x					x	
2	مستوى الضجيج		x					x	
3	الأرض والتربة	انسكاب زيوت	x				x		
		انجراف التربة		x				x	

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استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مواد البناء و النفايات		X				X	
4	الموارد المائية	تلوث المياه السطحية		X				X	
		تلوث المياه الجوفية			X			X	
5	إدارة النفايات بأنواعها	النفايات الصلبة		X				X	
		النفايات السائلة		X				X	
		النفايات الخطرة		X				X	

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
6	التنوع الحيوي	إزعاج/ تدمير الموائل		X				X	
		فقدان الغطاء النباتي			X			X	
7	الظروف الاجتماعية	توفير فرص العمل		X			X		
8	البنية التحتية والخدمات العامة	تعطيل مؤقت أو تعطيل لشبكات الطرق المحلية والخدمات المقدمة في محيط المواقع			X			X	
9	السلامة و الصحة العامة	الضجيج		X				X	
		الغبار		X				X	

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مخاطر صحية			X			X	
10	السلامة و الصحة المهنية	ظروف العمل السيئة وتجاهل حقوق العمال	X				X		
11	الأثار والتراث الثقافي	ضرر على البقايا الأثرية والمواقع التراثية			X			X	

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

وزارة البيـــئة

الرقم	العامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
12	مخاطر المناخ		x				x		
التأثيرات الإضافية									
13	غيرها، حدد: الأسس ، الحماية	توفير الحماية للمنشآت ضد السرقات والعبث	x			x			
14	غيرها، حدد: المجمع الحالي	الكابحة للمياه		x			x		

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استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
15	غيرها، حدد: المجتمع المحلي	توقعات المجتمع المحلي للتعويض	X			X			
16	غيرها، حدد:								
17	غيرها، حدد:								

وزارة البيئة

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

مجموعة 2 م. محمد عبد الهادي DoAM

ما هو تقييمك للآثار البيئية والاجتماعية المتوقعة للمشروع

الرقم	العامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
1	جودة الهواء المحيط	الغبار	X				X		
		الروائح			X			X	
		انبعاث العوادم		X				X	
2	مستوى الضجيج			X				X	
3	الأرض والتربة	انسكاب زيوت		X				X	
		انجراف التربة		X				X	

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استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مواد البناء و النفايات		X				X	
4	الموارد المائية	تلوث المياه السطحية			X			X	
		تلوث المياه الجوفية			X			X	
5	إدارة النفايات بأنواعها	النفايات الصلبة		X				X	
		النفايات السائلة		X				X	
		النفايات الخطرة			X			X	

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
6	التنوع الحيوي	إزعاج/ تدمير الموائل		X				X	
		فقدان الغطاء النباتي			X			X	
7	الظروف الاجتماعية	توفير فرص العمل		X			X		
8	البنية التحتية والخدمات العامة	تعطيل مؤقت أو تعطيل لشبكات الطرق المحلية والخدمات المقدمة في محيط المواقع			X				
9	السلامة و الصحة العامة	الضجيج			X				
		الغبار			X				

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر ديبدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مخاطر صحية			✓				
10	السلامة و الصحة المهنية	ظروف العمل السيئة وتجاهل حقوق العمال		✓				✓	
11	الآثار والتراث الثقافي	ضرر على البقايا الأثرية والمواقع التراثية			✓				

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
12	مخاطر المناخ			X			X		
التأثيرات الإضافية									
13	غيرها، حدد:								
14	غيرها، حدد:								

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
15	غيرها، حدد:								
16	غيرها، حدد:								
17	غيرها، حدد:								

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

مجموعة (٣) ٢٠٣ زكي عناب وزارة المياه
مركز سورية المطيرة

ما هو تقييمك للآثار البيئية والاجتماعية المتوقعة للمشروع

الرقم	العامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
1	جودة الهواء المحيط	الغبار	✓				✓		
		الروائح			✓			✓	
		انبعاث العوادم		✓				✓	
2	مستوى الضجيج			✓				✓	محول + محق ٢٠. للمضخات.
3	الأرض والتربة	انسكاب زيوت		✓				✓	
		انجراف التربة		✓				✓	

خلال سنة { فترة الحفر ١٣ أشهر/شهر. لا يوجد تداخل } عدد العمال الحفر ١٠ - ١٥ عامل
حارسين على كل بئر وقت التشغيل فقط.

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مواد البناء و النفايات	✓					✓	
4	الموارد المائية	تلوث المياه السطحية		✓				✓	على عمق ٢٠ م
		تلوث المياه الجوفية		✓				✓	على عمق ٣٠٠ م
5	إدارة النفايات بأنواعها	النفايات الصلبة		✓				✓	
		النفايات السائلة		✓				✓	
		النفايات الخطرة			✓			✓	

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
6	التنوع الحيوي	إزعاج/ تدمير الموائل		✓			✓		
		فقدان الغطاء النباتي			✓			✓	
7	الظروف الاجتماعية	توفير فرص العمل		✓			✓		
8	البنية التحتية والخدمات العامة	تعطيل مؤقت أو تعطيل لشبكات الطرق المحلية والخدمات المقدمة في محيط المواقع			✓				
9	السلامة و الصحة العامة	الضجيج	✓						
		الغبار	✓						

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
		مخاطر صحية	✓						
10	السلامة و الصحة المهنية	ظروف العمل السيئة وتجاهل حقوق العمال		✓					
11	الأثار والتراث الثقافي	ضرر على البقايا الأثرية والمواقع التراثية		✓					

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)

لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	العامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
12	مخاطر المناخ			✓					Flash flood
التأثيرات الإضافية									
13	غيرها، حدد: التأثير على كمية المياه في حال الضخ الجائر.								
14	غيرها، حدد: تأثير على الآبار الخاصة ~~...~~ في المزارع المجاورة								

• الأمن والحماية لمنشآت الآبار

استبيان الجلسة التشاورية لتقييم الأثر البيئي والاجتماعي (ESIA)
لمشروع حفر آبار جديدة وأعمال البنية التحتية المرتبطة بها -حقل بئر دبيدب /الديسي

الرقم	المعامل البيئي	الأثر البيئي	مستوى التأثير / الأهمية						ملاحظات
			مرحلة الإنشاء			مرحلة التشغيل			
			عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود وغير مهم	عالي الى عالي جداً	متوسط التأثير	لا يوجد تأثير أو تأثير محدود غير مهم	
15	غيرها، حدد:								
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