



Munich, Germany

## Climate Change Mitigation Measures Program: Effluent Pressure Pipeline

Addendum No. 2- Additional Measures

Environmental and Social Impact Assessment  
Non-Technical Summary (NTS)

Final

Partnership Information



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## ABBREVIATIONS

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CCMM	Climate Change Mitigation Measures
CESMP	Contractor's Environmental and Social Management Plan
DoA	Department of Antiquities
DoS	Department of Statistics
EIA	Environmental Impact Assessment
ESHS	Environmental and Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FTP	Final Treatment Plant
GHG	Greenhouse Gases
IBA	Important Bird Area
ILO	International Labour Organisation
MEGA	Middle Eastern Geodatabase for Antiquities
Mol	Ministry of Interior
MoPIC	Ministry of Planning and International Cooperation
MSW	Municipal Solid Waste
MWI	Ministry of Water and Irrigation
NTS	Non-Technical Summary
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
TMP	Traffic Management Plan
UPVC	Unplasticized Poly Vinyl Chloride
WAJ	Water Authority of Jordan
WWTP	Wastewater Treatment Plants

## 1 Introduction

The KfW Development Bank has granted the Water Authority of Jordan (WAJ) a concessional loan from the German Government. The main purpose of the loan is to improve the sanitation infrastructure and reduce the stress caused by climate change, population growth, and the Syrian refugees crisis. This investment program will work on developing the existing reuse conveyance system delivering reclaimed water to the Jordan valley, nexus planning, and Climate Change Mitigation through the reduction of Greenhouse Gas (GHG) emissions.

The framework of this Investment is translated into two programs: Sanitation Programme – Nexus and Resource Protection, and Climate Change Mitigation Measures (CCMM) Programme.

Under the CCMM Programme, WAJ initiated ongoing works to improve system operation and efficiency through energy efficiency, sludge treatment and disposal, and acceptability towards reclaimed water for irrigation in the Jordan Valley. The consulting Contract between WAJ and the Joint Venture Partnership led by Dorsch International Consultants GmbH included three parts as follows:

- Part 1: Construction of As Samra Mono-Landfill: The construction, as well as the construction supervision services, has been completed as of 18th February 2020 and the project is now in the Defects Notification period.
- Part 2: Rehabilitation and Upgrading of Irbid Central and Wadi Arab Wastewater Treatment Plants (WWTPs): The consulting services comprise design, preparation of tender documents and prequalification of tenderers has been completed. The contract has been awarded and currently under construction.
- Part 3: Final Treatment Plant (FTP): The consulting services comprised of the preparation of a feasibility study and detailed design; both have been completed. Further consulting services have been suspended.

The Final Treatment Plant (FTP)'s main purpose is to ensure to the farmers' downstream that the combined effluent from Shallalah, Irbid Central and Wadi Arab WWTPs will comply with the Jordanian Standard for Class A irrigation use, even if the WWTPs failed to treat the effluent to the required standards. However, Part 2 of the CCMM provides comprehensive upgrading of Irbid and Wadi Arab WWTPs to be able to reliably achieve Class A effluent standards and this, together with the separate consultancy services related to the CCMM Accompanying Measures to improve the standards of operation, will ensure that the combined effluent quality overall complies with the standards. Under these conditions, assuming reliable, sustainable operations of the WWTPs, the additional treatment provided by FTP will not be needed; therefore, it was decided to suspend the implementation of the FTP.

Consequently, the remaining budget was reallocated. Additional measures to the CCMM Programme that were not foreseen in the original contract were introduced in Addendum No.2. The Contract for this Addendum was signed on July 1<sup>st</sup>, 2021 covering Wadi Arab Hydropower Plant (HPP) as well as the design and tender documents for a new pressurized effluent pipeline to replace the existing DN ranging from 500 to 600 mm concrete gravity effluent pipeline, which stretches over 13.5 km between Central Irbid Wastewater Treatment Plant (WWTP) and Wadi Al-Arab WWTP. The new effluent pressurized pipeline will provide improvement to the operational efficiency of the "Reuse System" to be utilized as a supplementary source of agricultural water for irrigation in the Jordan Valley.

This report covers the Non-Technical Summary (NTS) of the Environmental and Social Impact Assessment (ESIA) for the new pressurized effluent pipeline.

## **2 Project Description**

### **2.1 Project Objectives**

The current gravity system will not be able to handle future flows. Therefore, and in order to reuse the treated effluent for irrigation purposes at As-Shouna, the existing effluent pipeline is to be replaced, in turn this will also resolve the current problems with the residents in the area (stealing manhole covers, flooding manholes for agricultural purposes)

The new pressurized pipeline, as mentioned earlier, will transfer the treated sewage effluent from Central Irbid WWTP to Wadi Al-Arab WWTP; the treated effluent will be utilized to generate hydropower at Wadi Al Arab WWTP through the difference in elevation. The generated power will supply both Wadi Al-Arab and Irbid Central WWTPs with electricity.

The detailed design for the Effluent pipeline have been concluded by the Consultant and approved by WAJ on June 1<sup>st</sup> 2022.

## 2.2 Project Location

The project is located in Irbid governorate, north of Jordan. Based on the administrative settings set by the Ministry of Interior (MoI), the project is located in Qasabet Irbid District within Irbid Subdistrict. The project area extends from Central Irbid WWTP, along the existing DN600 gravity line up to the inlet of Wadi Al-Arab WWTP

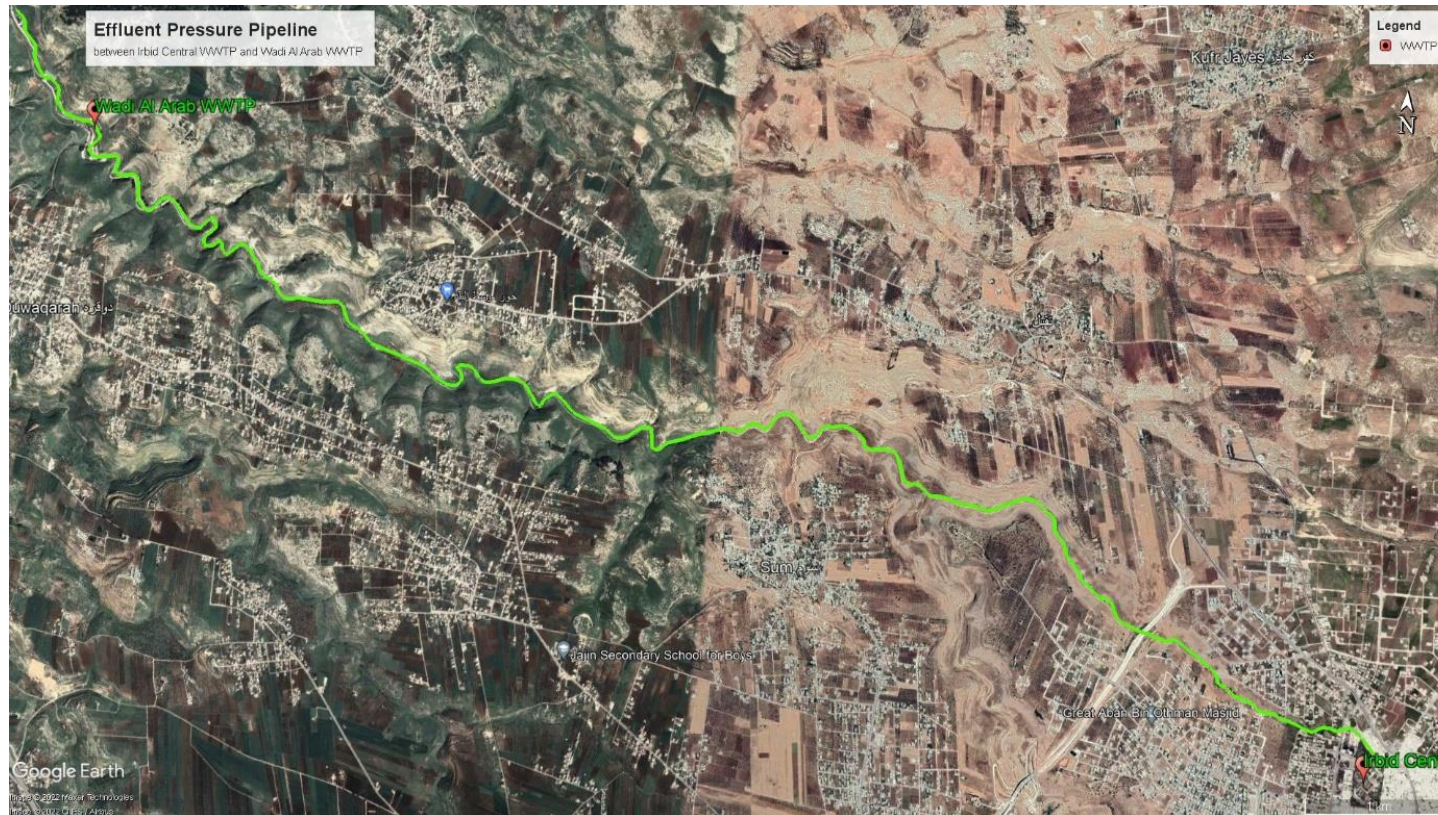


Figure 1: Layout of Existing Pipeline

## 2.3 Project Components

The main components of the project include:

- Steel DN800 Pipe
- Fibre Optic Cable in Unplasticised Poly Vinyl Chloride (UPVC) Pipes
- 11 kilovolt armored cable, if required.

## 2.4 Project Phases

### Detailed Design Phase:

- Limited geotechnical investigation.
- Hydraulic analysis.
- Flow and effluent quality monitoring at Irbid Central, Wadi Al Arab and All locations.
- Confirmation of pipeline route.
- Design of pipeline ancillaries.
- Preliminary Environmental Impact assessment study as required by local authorities.
- Permitting and licenses for construction works.

### Construction Phase (Duration 18 months):

- Transportation and delivery of project components to the project site.
- Setup the site and service area, including safety signs and equipment, and ensuring office space, resting area, WC, storage and waste management facilities are duly organized.
- Land preparation (levelling).
- Construction of civil structures, DN800 Pipeline, and fibreoptic control cable.

### Operational and Maintenance Phase:

- Preventative maintenance – limited, routine services such as replacement of worn parts (valves) this will be limited to in-line valves in every 2-5 years and air valves every year.
- Corrective maintenance – repair of pipeline leakages, repair/replacement of damaged equipment and faults.

### Decommission Phase:

- Disassemble pipeline.
- Dispose of/recycle system components.
- Reinstate land.

## 2.5 Project Setup and Responsibilities

Different entities are involved in the planning and implementation of the Project. Responsibilities of each entity are listed in the table below:

Key Contributor	Main Roles
WAJ	<ul style="list-style-type: none"> <li>• Project proponent and will be the <u>owner</u> of the Project</li> <li>• Approving the design of pipeline</li> </ul>
KfW Development Bank	<ul style="list-style-type: none"> <li>• An International Financing Institution who are the Project Lenders</li> <li>• Grants no objection on the design</li> </ul>
The Consultant	<ul style="list-style-type: none"> <li>• i.e. the engineer: Dorsch International Consultants, Orient Engineering Consultancy and Design, and Consolidated Consultants Group who are commissioned to prepare the detailed design, tender documents, surveys and ESIA for the Project as well as undertake construction and supervision.</li> </ul>
The Ministry of Public Works and Housing	<ul style="list-style-type: none"> <li>• Ensure trench details are compliant and approve</li> </ul>



Key Contributor	Main Roles
The Ministry of Environment (MoEnv)	<ul style="list-style-type: none"> <li>MoEnv is responsible for the approval of the ESIA Study, if required, and is also responsible for granting the environmental clearance for the Project.</li> </ul>
Yarmouk Water Company (YWC)	<ul style="list-style-type: none"> <li><u>Operator</u>; Responsible for Operation and Maintenance (O&amp;M) of the Project</li> </ul>

### 3 Environmental and Social Baseline and Impact Assessment of the Project

The study is comprised of environmental and social baseline studies and an assessment of impacts. Mitigation measures, which are included in the Environmental and Social Management Plan (ESMP), were identified for potential significant effects and the significance of residual effects determined. The impact assessment followed an assessment methodology developed to reflect current best practice. The key baseline and impact assessment findings are further discussed below.

The project will result in crucial positive environmental and economic impacts which include the following:

- The Project is expected to contribute to enhancing the livelihood of the small business as well as providing job opportunities.
- Provide an opportunity for energy generation through a Hydropower at the low point of the pipeline.
- Eliminate the risks of blocking in existing gravity lines.

On the other hand, the project will result in certain negative environmental impacts. Nevertheless, the EIA concludes that such impacts do not pose significant issues of concern, and through the implementation of the appropriate mitigation and monitoring requirements they are considered not significant.

The project will result in impacts on the following environmental receptors each of which is discussed in detail throughout the study: landscape and visual; land use; air quality and noise; infrastructure and utilities; occupational health and safety; geology and hydrogeology; and archaeology and cultural heritage.

#### 3.1 Summary of Environmental and Social Baseline Conditions

Environmental Attribute	Description of Baseline Conditions
Landscape and Visual	<ul style="list-style-type: none"> <li>No key visual receptors– such as recreational activities, environmental reserves, remarkable historical or cultural sites, or other natural structures normally seen as valuable by the human perception are found within or around the pipeline route. In general, the pipeline route flows within two existing wadis, Wadi Al Arab and Wadi Hamam, which can be categorized as a desert-like habitats that are barren with very limited and scattered vegetation coverage.</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>The project is located in an existing wadi where the route of the effluent pipeline will follow the route of the current gravity main. 0.5 km of the route are located in a built-up residential area while the rest falls within existing wadis.</li> <li>20 land plots will be impacted and need to be acquired along the pipeline route.</li> </ul>

Archaeology and Cultural Heritage	<ul style="list-style-type: none"> <li>According to MEGA Jordan database, along the pipeline no major archaeological and/or cultural heritage sites were recorded; however, there are two search sites that do not yet correspond to actual artefact or cultural heritage sites.</li> <li>in reference to a letter received from the Department of Antiquities (DoA) 5/4/4822 dated December 14th 2022, there are no archaeological remains or registered heritage sites along the pipeline route, thus there is no objection on the construction of the pipeline.</li> </ul>
Biological Environment	<ul style="list-style-type: none"> <li>The proposed site is not located in a preserved area. However, the closest IBA to the pipeline route is the Yarmouk River Important Bird Area (IBA).</li> <li>During the site visits, no threatened, rare or endangered species of fauna or flora were registered or known to exist along the pipeline route.</li> <li>No sensitive or fragile habitats were noted in relation to the extent and magnitude of the envisaged works.</li> <li>No species of fauna or flora that could be exploited for commercial purposes have noted in proximity to the proposed works.</li> <li>The current degree and extent of the proposed works does not interfere with any protected area.</li> </ul>
Socio Economic Conditions and Population Profile	<ul style="list-style-type: none"> <li>739,212 reside in Qasabet Irbid District in which the proposed project is located. As reported by the Department of Statistics the population in the District for the year 2021 was estimated to be 856,200.</li> <li>According to DoS, the unemployment rate in Irbid in 2019 was 18.5%. Based on the Development Program of Irbid Governorate prepared by MoPIC for the years 2017-2019, the top sectors in which most of the population work are (in descending order) Public Administration, Defence and Social Security; Education; Wholesale retail and vehicle repairs; and Education.</li> <li>According to DoS, in Qasabet Irbid directorate of Education there are a total of 521 schools, 382 of which are mixed schools, while 43 schools are girls only schools and 96 schools are boys only schools. The governorate also has five universities, three of which are public and two are private with a number of a community colleges.</li> <li>According to the health directorate in Irbid, the Qasabet Irbid district has 3 comprehensive health centres, 24 primary centres, and 6 secondary centres.</li> <li>the share of water per capita in the Governorate is estimated at 120 L/day with 63% of households connected to the public water network. As for sewerage services, 52% of households in Irbid are connected to the sewage networks.</li> <li>The waste collection system covers 100% of Greater Irbid Municipality area but does not provide separate collection. Municipal Solid Waste (MSW) collected from the municipality is transferred to one of two existing transfer stations (Togbul and Al Shahinat). The final disposal of MSW is in Al Ekaider Disposal site.</li> </ul>

### 3.2 Summary of Environmental and Socio-Economic Impacts during Construction

No.	Resource Area	Potential Impact(s)
1	Landscape and Visual	Visual intrusion and aesthetic interference due to potential generation of waste as well as presence of construction machinery in the project area.
2	Hydrology and Hydrogeology	Increased surface water runoff leading to erosion and sedimentation during and after significant rainfall events.

No.	Resource Area	Potential Impact(s)
		Contamination of groundwater resources due to improper housekeeping, waste storage and disposal
3	Air Quality and Dust	Local degradation to air quality due to exhaust emissions
		Local degradation to air quality due to dust generation from construction activities.
4	Noise	Noise pollution due to construction activities such as excavation, etc. and use of heavy machineries, vehicle and equipment operation.
5	Land Use	Use of the project area for grazing by the local communities will be hindered
		A number of lands through which the new pipeline passes will be acquired by WAJ
6	Geology and Soil	Removal of soil due to construction activities, thus causing erosion.
		Contamination of soil due to improper waste management or accidental spillage/leakage of chemicals or oils stored on site or used during construction or rupture of fuel storage tanks in construction site.
7	Biodiversity	Loss of (protected) terrestrial species and some trees
8	Socio-economic Issues	Emission of dust from construction works which may cause stress to local community and businesses in the area
		Disturbance of women's wellbeing and social life.
		Small scale business activities to increase with higher income generation and Workforce employment. (Positive)
9	Infrastructure and Utilities	Improper management of hazardous and non-hazardous waste generated at site leading to impacts on soil, water and visual environment and health and safety of construction workers and public
		Traffic and road accessibility will be disrupted with the possibility of creating congestions at peak hours and temporary disruption or disturbance to local road networks and services provided within the closed area of the first part of the effluent pipeline such as the electricity network, water supply, and telecommunication services.
10	Occupational Health and Safety	Risk to occupational health and safety from construction activities such as excavation, confined space entry, handling of hazardous materials and chemicals, manoeuvring of construction equipment and machinery, risk of exposure to injuries.
11	Community Health and Safety	Impact to public due to dust generation, noise generation, traffic accidents due to roadblocks, etc.

### 3.3 Summary of Environmental and Socio-Economic Impacts during Operation

No.	Resource Area	Potential Impact(s)
1	Land and Soil	Contamination of soil due to improper maintenance and leakage of wastewater
2	Landscape and Visual	During the operation phase of the Project, limited adverse impacts are anticipated to arise. Since the new effluent pipeline is underground, no visual impacts are foreseen during the operation phase.
3	Community Health and Safety	Health hazard if there is poor maintenance leading to groundwater contamination

No.	Resource Area	Potential Impact(s)
4	Occupational Health and Safety	Risk to occupational health and safety from maintenance activities

## 4 Environmental and Social Management and Monitoring

The study includes an Environmental and Social Management Plan (ESMP) which identifies measures to address any potential environmental and socio-economic impacts that might occur during the implementation of the Project. Detailed mitigation measures have to be identified and evaluated in order to avoid, reduce or remedy the impacts during the construction and operation phase.

In order to ensure that these mitigation measures are effective and properly implemented, a monitoring plan shall be implemented and maintained to evaluate efficiency of mitigation measures and provide a feedback about the actual environmental and social impacts from construction and operation activities.

Monitoring also will ensure compliance with environmental and social standards and will facilitate any required changes and improvements. Monitoring reports will be required from the contractor and operator during the construction and operational phases.

A summary of the general mitigation measures to be implemented throughout the project phases is provided below:

### (i) Construction Phase

- The Contractor shall submit an Environmental and Social Management Plan (CESMP) for the Engineer's approval indicating how the Contractor will comply with the contract requirements for execution of the works.
- A grievance mechanism for concerned stakeholders and workers has to be in place. It is the Contractor's responsibility to develop a Grievance mechanism for workers to be approved by the Engineer.
- Tenants (formal or informal) shall be notified of proposed construction works prior to construction to avoid using the land and subsequent delay of the project.
- Adequate compensation shall be provided to landowners according to national procedures and best practices.
- The Contractor shall perform regular maintenance on all equipment, vehicles and machinery to prevent air and noise emissions.
- The Contractor shall make sure that any vehicle or equipment leaving the project area is cleaned of loose debris.
- Construction vehicles shall comply with speed limits. Speed limits for heavy vehicles shall be restricted to 20 km/hr.
- A spill prevention and response plan shall be prepared by the contractor as part of the CESMP in order to control any inadvertent leakage or spillage. Spill response measures shall be implemented (as necessary) to contain and clean up any contaminated soil.
- A dedicated waste management plan shall be developed and implemented based on a minimization approach and high-quality housekeeping practices. The plan shall include waste segregation, intervals of waste collection, provision of waste bins, etc.
- Littering in the project area and surrounding areas shall be prohibited.
- If relevant, clearing of vegetation shall be confined to that necessary for the establishment of required infrastructure and lay down areas.
- If relevant, trees, shrubs, or other flora on pathways and/or access roads are to be protected by appropriate means.
- If relevant, removed vegetation shall be replaced at Contractor's own expense by re-planting indigenous species.

- The Contractor shall be responsible for the protection of the public health from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by his activities.
- The Contractor has to ensure that all workers have access to protective measures
- The Contractor shall nominate a qualified Environmental, Social, Health and Safety (ESHS) Supervisor.
- The Contractor shall submit a Traffic Management Plan (TMP) for sites located in areas with heavy traffic taking into consideration current traffic profiles in addition to suitable locations for bypasses, bus stops, drop-offs etc.
- The Contractor shall comply and respect workers' rights as per local legislations and other relevant international requirements including all Labour obligations outlined in the local legislative framework and International Labour Standards (ILO) stipulations.
- Develop and implement appropriate fire precautionary measures as per the Health and Safety Plan in accordance with the national requirements.

(ii) Operation Phase

- Development of an Operations and Maintenance Plan
- The Consultant shall, during the Construction phase, conduct proper quality control to ensure that all the vulnerable points (joints, connections, valves, etc) are installed properly.
- The Consultant shall, during the Construction phase, conduct proper quality control to ensure that all the vulnerable points (joints, connections, valves, etc) are installed properly.
- Inspection of Personal Protective Equipment (PPE) for operation and maintenance workers.

## 5 Grievance Mechanism for the Concerned Public

One of the most vital components of stakeholder engagement is grievance mechanisms. Grievances are a clear reflection of any growing concerns that might escalate if they weren't addressed properly.

The Project owner will identify and respond to all grievances and complaints in a timely and effective manner in order to ensure that positive relationships are developed and any recurrent issues are identified. In general, the grievance mechanism shall be at no cost and without retribution to the party that originated the issue or concern, it should also allow anonymous submissions.

The following mechanism describes the steps to be undertaken to address, respond, and close complaints:

1. Grievances are submitted through different communication channels:
  - The existing joint governmental platform (بخدمتكم) / Bekhedmetkom or 'at your service' to submit any complaints and/or suggestions, given that it is a neutral interactive portal to communicate with different governmental entities and follow up on the different questions, suggestions, and complaints.
  - WAJ Complaint Direct line: 117116 (this is generally used for technical complaints only i.e. water cuts, pipe breakages, leakages, sewer flooding, and water quality)
  - CLO
2. The public can submit grievances on ongoing project on Bekhedmetkom and WAJ offices. Grievances submitted will be recorded and for each grievance The complaints will have a specific number, date, data on the complainant, and the classification of the complaint.
3. The grievance will then be investigated and the reason behind the complaint will be analysed. Accordingly, the measures to be undertaken to solve the grievance are identified along with the needed timeline.

4. After resolution, the complainant is contacted to ensure that everything is sorted and resolved.
5. In the case that there are proposed actions and measures to solve the grievance, monitoring and follow up is required to ensure their implementation in the specified timeline
6. The grievance is considered closed if it was resolved within the specified timeline. If the problem was not solved within the estimated time, it is raised to the secretary general. If the problem is still not solved after 2 days, it is raised in a direct email to the minister of water and irrigation

## **6 Further Information & Contact Details**

Full project preparation documents, including the ESIA, NTS, and the grievance mechanism for affected stakeholders and communities are disclosed on the WAJ website (<https://mwi.gov.jo/>).