The Hashemite Kingdom of Jordan

Millennium Challenge Corporation

Millennium Challenge Account - Jordan

PREPARATION OF THE FEASIBILITY STUDY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR ZARQA GOVERNORATE WATER SYSTEM RESTRUCTURING AND REHABILITATION

DETAILED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume (II), Part (3)
Environmental and Social Management Plan (ESMP)

Contract 3

Zarqa High Distribution Area and Strategic Infrastructure

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الجمعية العلمية الملكية
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ABBREVIATIONS

CESMP	=	Construction Environmental and Social Management Plan
DA	=	Distribution Area
DESIA	=	Detailed Environmental and Social Impact Assessment
EHS	=	Environmental, Health and Safety
ESMP	=	Environmental and Social Management Plan
EIA	=	Environmental Impact Assessment
HS	=	Health and Safety
IMP	=	Investment Master Plan
l	=	Liter
lcd	=	Liter Per Capita Per Day
LAeq	=	Equivalent Sound Pressure Level (measured with A-weighting)
m	=	Meter
m^3	=	Cubic Meter
MCA	=	Millennium Challenge Account
MCA-J	=	Millennium Challenge Account - Jordan
MCM	=	Million Cubic Meter
mm	=	Millimeter
MoEnv	=	Ministry of Environment
m^3/year	=	Cubic Meter Per Year
MWI	=	Ministry of Water and Irrigation
No.	=	Number
OP	=	Operational Policy
PMC	=	Program Management Consultant
SI	=	Strategic Infrastructure
TIP	=	Trafficking In Persons
TSP	=	Total Suspended Particulate
VESCs	=	Valued Environmental and Social Components
TORs	=	Terms of References
WAJ	=	Water Authority of Jordan
WB	=	World Bank
WSA	=	Water Supply Area

1. INTRODUCTION

This Environmental and Social Management Plan (ESMP) has been prepared as part of the Detailed Environmental and Social Impact Assessment (DESIA) for the water system rehabilitation and restructuring project of Zarqa Governorate. This ESMP outlines the mitigation measures and the monitoring program that shall be implemented during the construction and operation phases of the project to ensure that all project's identified impacts including social concerns are mitigated and monitored. However, this project is design-build and accordingly the contractor shall propose any revisions to this ESMP that may be necessary as a result of final project design.

The proposed mitigation measures for environmental and social issues for construction and operation phase are presented in section 4, while the monitoring program is presented in section 5. The required training and capacity building during construction and operation phase is presented in section 9.

1.1 Objectives

The environmental and social management plan (ESMP) for the water system rehabilitation and restructuring project of Zarqa Governorate has been prepared to prevent or minimize negative impacts and enhance positive ones during construction and operation phases.

The main objectives of ESMP are as follows:

- To ensure compliance with relevant regulatory authorities requirements (MWI, WAJ, MoEnv, etc) as well as MCC guidelines and policies.
- To undertake monitoring program to assess the effectiveness of the proposed mitigation measures in the DESIA and undertake the necessary changes in the mitigation measures or construction activities.
- Provide a framework for the contractors to set the necessary procedures, plans and instructions to manage the environmental and social impact.
- To provide main training requirements for all project staff.

1.2 Project Overview

The overall objective of the project is to reduce both the physical and administrative losses through the implementation of a major network restructuring and rehabilitation program, thus enhancing the efficiency of the water supply to all consumer categories. This will allow a more equitable per capita water allocation and consequent benefits in terms of quality of life.

The project will cover parts of Zarqa Governorate areas. Zarqa Governorate consists of three main districts, these are:

- Zarqa Qasabah District.
- Russaifah District.
- Hashemeyeh District.

The most populated areas in Zarqa Governorate are Zarqa city, Russaifah, Hitteen camp, Dhulail, Hashemeyeh and Sukhna. Approximately 83% of population of the Zarqa Governorate lives in the cities of Zarqa and Russaifah.

The greater Zarqa / Russaifah area is currently divided into 78 water supply zones. Due to the limited water resources, water supply is rationed across the entire supply area so that each area receives a supply for a certain period each week.

As the first phase of implementation of the Investment Master Plan (IMP), a prioritization process was developed to identify priority works. These priority works are a subset of the overall IMP-recommended works and are concentrated mainly in the most highly-populated urban areas of Zarqa and Russaifah WSAs, where the most urgent problems of customer water shortage and supply difficulties are currently encountered. These works will take place within an initial 5-year period. There will be three proposed priority works contracts; these will be procured as Design-Build contracts.

Within the 2 WSAs, the works will be very extensive, and will include:

- Restructuring and rehabilitation of the entire existing pipeline network.
- Construction of new pipelines.
- Upgrading and refurbishment of existing reservoir and pumping station facilities.
- Construction of new reservoir and pumping station facilities at Basateen.

The projected scope of construction works is as follows:

- Design-Build Contract 1: Russaifah High Distribution Area (DA) and Russaifah Low DA
- Design-Build Contract 2: Batrawi DA
- Design-Build Contract 3: Zarqa High DA and Strategic Infrastructure (SI)

The project funding will be provided by the Millennium Challenge Corporation (MCC). This project fund is part of an MCC program consisting of several water and wastewater projects, which will be implemented in Zarqa Governorate over 5 years of the Compact. The Compact program is managed and implemented by the Millennium Challenge Account – Jordan (MCA-J), which is a company owned by the Government of Jordan.

The detailed design, to be undertaken as part of the design-build contracts, will include an appraisal of the existing infrastructure assets and of the works sites. The appraisal stage will include the contractor undertaking a pipe-by-pipe, and component-by-

component, verification and assessment investigation prior to finalizing and presenting his design for review before commencing construction.

1.3 Scope of the Environmental and Social Management Plan

The scope of this ESMP includes evaluation of the environmental and social impacts resulting from construction and operational activities of the project, the mitigation measures to reduce the negative impacts and enhance the positive ones, and the necessary monitoring program. The project will include the following three contract areas:

- Russaifah High Distribution Area (DA) and Russaifah Low DA
- Batrawi DA
- Zarqa High DA and Strategic Infrastructure (SI)

Table (1.1) provides a non-exhaustive list of the sensitive social receptors for the design-build contract 3: Zarka High DA and Strategic Infrastructure. The location of the sensitive social receptors listed in Table (1.1) is indicated in the map at Annex (1).

Table (1.1): Sensitive Social Receptors for the Design-Build Contract 3: Zarqa High Distribution Area and Strategic Infrastructure

Site Symbols and No. (as Used on Map)	Neighborhood	Sensitive Receptors Description	Name
18 E	Al Batrawi	School	Um Salama Sec. For girls
19 E	Al Batrawi	School	Manahel Secondary private School
26 E	Al Batrawi	Kindergarten	Al Khabeer
70 E	Al Batrawi	Mosque	Al Ghweri
91 E	Al Batrawi	School	Ibn Tolon Elementary for boys
38 E	Barrakh	Public building	Business Center
39 E	Barrakh	Kindergarten	Rawdat Al Risala
40 E	Barrakh	Kindergarten	Rawdat Al Hanan
44 E	New Zarqa	Kindergarten	Rawda
55 E	Hai Ramzi	Bank	Amman Cairo Bank
56 E	Hai Ramzi	Mosque	Azzah Ramez
57 E	Hai Ramzi	Small workshops	No Name
76 E	Hai Ramzi	Exhibition & commercial Center	Safeway & Zarqa International Exhibition Center
94 E	Hai Ramzi	Mosque	Oqba Bin Amer
79 E	Hai Al Ameer Mohammad	Kindergarten	Al Mawakeb Al Ahliah
82 E	Hai Al Ameer Mohammad	Nursery	Al Mawakeb
93 E	Hai Al Ameer Mohammad	Mosque	Bin Majah
6 A	Hai Al Ameer Mohammad	Shambles Slaughterhouse	AZarqa Slaughterhouse
16 A	Hai Al Ameer Mohammad	School	Asmaa Bint Abu Baker
17A	Hai Al Ameer Mohammad	Public Building	Soldiers Wellfare Society
18 A	Hai Al Ameer Mohammad	School	Hai Al Hawooz
19 A	Hai Al Ameer Mohammad	Public Services	Ground Reservoir
92 E	Hai Al Ameer Mohammad	Mosque	Abu Mehjan Al Althaqafy
80 E	Hai Al Ameer Mohammad	School	Al Waleed Bin Abd Al Malek
102E	Hai Al Ameer Mohammad	Public Building	Area Municipal building-Al Manteka Althamena
103E	Hai Al Ameer Mohammad	Public Building	Central Municipal Maintainance Center-Alsiyana Almarkaziyya

2. IMPLEMENTATION OF THE ESMP

2.1 Involved Entities and their Roles and Responsibilities

The following are the entities involved in implementing the ESMP and their role and responsibilities.

- **Millennium Challenge Corporation:** The Millennium Challenge Corporation (MCC) is created by the U.S. Congress as an innovative and independent U.S. foreign aid agency that is helping lead the fight against global poverty. MCC is changing the conversation on how best to deliver smart U.S. foreign assistance by focusing on good policies, country ownership and results.

  The water system rehabilitation and restructuring project of Zarqa Governorate will be funded by MCC as part of an MCC program, which will be implemented in Zarqa Governorate over 5 years of the Compact.

  MCC will have overall oversight to ensure that ESMP is implemented and in compliance with their polices and guidelines.

- **The Millennium Challenge Account – Jordan:** The Millennium Challenge Account – Jordan (MCA-J) has been established in June 2010 to manage and implement the program funded by MCC in accordance with the Compact Agreement and international best practices. The program consists of several projects in Zarqa Governorate, which has been identified by the country as priority projects that can effectively contribute to the poverty alleviation in Jordan.

  MCA-J is responsible for managing and implementing the project in accordance with the Compact Agreement. Also, MCA-J will be responsible for the proper implementation of ESMP during the construction phase to ensure compliance with Jordanian regulations as well as MCC guidelines and policies.

- **Water Authority of Jordan:** Water Authority of Jordan (WAJ) carries full responsibility for the public water supply, wastewater services and related projects as well as for the overall water resources planning and monitoring, construction, operations and maintenance.

  WAJ will be responsible for the day-to-day management and operation of the water distribution network in the project areas, thus, WAJ will be responsible for implementation of the ESMP during the operation phase.

- **Ministry of Environment (MoEnv):** The ministry has a mandate to inspect, audit and monitor the compliance with the set standards and regulations in addition to the implementation of the mitigation measures included in the ESMP based on the Environmental Protection Law (No. 52, 2006).

MoEnv is responsible for environmental licensing of the project according to the EIA regulations.

- **Contractors:** The contractors will undertake the construction works. They will be responsible for the following:
  - Implementing all the mitigation measures, monitoring program and training as described in the ESMP, and proposing any revisions to the ESMP that may be necessary as a result of final project design.
  - Preparing and implementing construction environmental and social management plan (CESMP) as per ESMP requirements.
  - Preparing and implementing the necessary plans as described in the ESMP such as materials handling and waste management plan, health and safety plans, and recruitment policy.
  - Preparing and implementing the necessary instructions and procedures.
  - Conducting inspection on all environmental, social, health and safety issues on a monthly basis.
  - Submit the audit reports to the Engineer. Additionally, the contractor shall submit an immediate report for certain cases such as serious accidents resulting in serious injury or death flood incident and trafficking in person cases.
  - Raising environmental awareness among the workers by conducting awareness sessions.
  - Ensure that all subcontractors that were hired by the contractors are in compliance with the CESMP by carrying out regular inspections and raising their awareness on all environmental, social, safety and health aspects.
- **Engineer (Program Management Consultant, PMC):** The Engineer will be hired by MCA-J to follow up and supervise the contractors for implementing the ESMP in a proper manner. So, the Engineer should conduct regular audits and site inspection on contractors / subcontractors activities on a regular basis. Also, the Engineer should provide MCA-J with periodical reports presenting all audit and inspection results. Additionally, the Engineer shall submit an immediate report for certain cases such as accidents resulting in serious injury or death, flood incident and trafficking in person cases.
- **Other entities:** During the implementation of the project, different governmental entities will be involved in the project. The following table summarizes the responsibilities of these entities.

The Following is a description of these entities and their roles and responsibilities.

- Ministry of Labor:
  - Permitting prior to operation (after occupational health and safety measures).
  - Inspection during construction and operation.
- Ministry of Health:
  - Inspection during construction and operation phases.
- Department of Antiquities:
  - Permitting in case of existence of Archaeological sites (In this case, Department of Antiquities may ask about the existed DESIA report).
- Civil Defence Directorate:
  - Approval for construction plans.
  - Permitting prior to operation.
- Ministry of Public Works and Housing:
  - Permitting prior to crossing of the highway and main roads.
  - Approval prior to the operation of the water facility.
- Municipalities of Zarqa and Russaifah:
  - Permitting prior to crossing of the secondary roads inside the municipality.
  - Approval prior to the operation of the water facility.

2.2 Coordination among MCA-J, WAJ and MoEnv

To achieve an effective implementation of the ESMP, close cooperation and coordination shall be established between the involved responsible entities. So, all of the contractors technical reports that will be prepared during the construction works shall be submitted to the Engineer who will review and communicate them to MCA-J. On the other hand, MCA-J will review these reports and send copies to MCC, WAJ and MoEnv.

2.3 Environmental and Social Management Plan Internal Audit

The contractors are responsible for implementing the ESMP during the construction phase in a proper manner. So, they should conduct regular audits and inspections on project environmental and social performance. This includes inspection on working sites, documents, plans and monitoring the environmental issues such as noise, dust and emissions. The main objective of the inspection and audit is to ensure that all mitigation measures are implemented properly.

The results of inspection and audit shall be presented in a monthly report and submitted to the Engineer. The Engineer will review the report and ensure that all the

mitigation measures are implemented properly and the correction actions for the noncompliance issues were completed and then the Engineer will forward the report to MCA-J. After that, MCA-J will communicate the report to MCC, WAJ and MoEnv as needed.

During the operation phase, the ESMP provides recommendations for WAJ to implement them including a monitoring program.

2.4 Environmental and Social Management Plan Implementation Review

The Engineer shall conduct a regular inspection as well as reviewing the contractor documents to ensure that the ESMP is implemented properly. The results shall be presented to MCA-J for reviewing and taking the necessary action.

Other entities such as Ministry of Labor, Ministry of Health and Ministry of Environment could conduct inspection to ensure that all requirements and mitigation measures mentioned in the ESMP are implemented in a proper manner.

3. ENVIRONMENTAL AND SOCIAL IMPACT

Construction

Public Health

Water supply availability

The impact of construction activities on the water supply availability due to necessary supply outages as a result of new connections is assessed to be of low significance.

Water supply quality

The impact of construction activities on the water supply quality due to contamination of the old pipelines during the construction works and at the takeover stage is assessed as having low significance.

Air Quality

The impact of dust and other pollutants that could be generated from the construction activities on public health is assessed to be of medium to low significance mainly due to the short exposure time (site construction duration).

Noise

The project might cause some short-term negative impacts on public health during the construction phase. These include the noise impact mainly near the sensitive receptors. The impact of noise generated from the construction activities and from the machineries and vehicles used is assessed having medium to low significance.

Solid waste

The impact of excavated soil and the residues of the building materials including metals residues (pipes, valves and meters) and the domestic solid waste produced by workers is assessed to be of low significance.

Wastewater

The impact of wastewater generated by the workers is assessed as having low significance.

Public safety

The impact construction activities mainly excavation works and construction traffic on the public safety is assessed as having medium significance.

Water Resources

The direct impact of the flood runoff on the stability of the main pipeline network at the low Russaifah will be medium to high due the erosion that might be occurred on the top soil cover of the main pipeline network. The flood runoff will impact highly on the proposed pumping station due to its location at a lower point of the catchment area. The impact of the groundwater pollution by the spilled chemicals and oil, disposed solid waste, or any spilled wastewater which will be generated by the construction activities will be high at Basateen area whereas it is low for other areas of the project. The impact of wash out from hydro-testing and cleaning of the pipeline and water facilities on water channels is assessed as having low significance. The impact of construction works on the contamination of the existing water supplies such as reservoirs and water pipes is assessed as having low significance.

Biodiversity

For the reservoirs and pumping stations, there is no impact on the biodiversity at these project sites due to the type of the proposed activities. However, at Sukhna and Alouk Pumping Stations and at Al Basateen proposed pumping station it is expected to have a minor impact on the surrounding environment where remnants of natural and cultivation habitats exist in the surroundings.

For construction works on the Azraq-Zarqa Strategic Pipeline; the impact will be minor on the biodiversity since the habitat is highly deteriorated and does not contain conservation important species.

Cultural Heritage and Archeology

The impact of the construction activities on the cultural heritage and archaeology is assessed as having low significant impact. The only low significant impacts may result

from any unseen sites or archaeological remains that might be discovered during construction.

Socio-economic Conditions

Employment and business prosperity

The impact of the project on the employment of local residents and the enhancement of business prosperity is assessed to have medium positive significance.

Visual impact

The potential impacts of the project on visual amenity would result from the site investigation and construction activities within the area. This impact is assessed to be of medium significance.

Stress on infrastructure

Transport of pipes, accessories and heavy machineries during construction phase will cause a stress on the main roads and highways used for transportation. This impact on infrastructure and potential traffic impacts due to trenching and excavation works, which may cause road damages, is assessed as having medium significance.

The water pipeline route will cross the underground utilities such as natural gas pipelines, power and telephone cables and other infrastructure items. This impact is assessed to be of high significance.

Disruption to the social sensitive receptors

Impacts like access limitation to customer as well as owner to businesses areas due to road closure; piling of excavated material on sides to trenches leading to disruption of existing businesses is assessed as having high significance. Impacts to residents and businesses owners due to duration of construction activities and timing of these activities during certain times of the day are assessed as having medium significance.

Social impacts like potential increase in noise levels causing stress for students by affecting their ability to concentrate during exam time if construction takes place close to a school or household is assessed as having high significance. Nuisance impacts to local community and businesses in the area due to emission of dust and bad odor from construction works is assessed as having high significance.

Trafficking in persons

Risks of TIP as a result of forced labor and/or child labor is assessed as having low significance therefore, the impact of the project on the trafficking in persons is assessed to be of low significance.

Resettlement Impact

The impact of the project on the resettlement is assessed to have low significance where a permanent private land (with area of 2.941 dunum) in Al Basateen area will be acquired.

Social impact due to land acquisition for the new reservoir and pumping station is assessed as having high significance.

Accidents

Social impacts like physical and psychological strain to women due to concerns on mobility, workers, and crossing over trenches during construction works is assessed as having high significance therefore, the accidents occurring during construction, especially for children and women due to the construction works is assessed to be of high significance.

Occupational Health and Safety

The impact of exposure to air pollutants, noise and vibrations and working with mechanized equipment on the health and safety of the workers is assessed as having medium significance.

Operation

Public Health

Water supply availability

The impact of the project on water supply availability is assessed to have a high positive in the long term.

Water supply quality

The impact of the project on water supply quality is assessed to have a high positive in the long term due to the new operation system (gravity system).

Air Quality

During the operation phase there will be no source of dust and other pollutants.

Noise

The impact of the noise generated from the Al Basateen pumping station is assessed to have low significance.

Solid waste

The impact of the domestic solid waste produced by employees is assessed as having low significance.

Wastewater

The impact of wastewater generated by the employees is assessed as having low significance.

Public safety

The impact of using chorine gas in the reservoirs and pumping stations on the neighboring residents is assessed as having medium significance in case of an accident (leak of chlorine from a cylinder).

Water Resources

The impact of the groundwater pollution by the spilled chemicals and oil, disposed solid waste, or any spilled wastewater which will be generated by maintenance will be of low significance. The impact of the project on water abstractions will be positive due to reduction of water losses and improving the performance of the water distribution network.

Biodiversity

During the operation phase there will be no activities that will impact the flora and fauna.

Cultural Heritage and Archeology

During the operation phase there will be no activities that will impact the cultural heritage and archeology.

Socio-economic Conditions

Implementation of this project will enhance people life at all levels of society in Zarqa Governorate. Women will benefit from the project as they are generally responsible for household issues where water supply plays a key role.

Other positive impacts of the project will be saving in the operation and maintenance cost of the water supply system, provision an environment conducive to business development.

Occupational Health and Safety

The impact of exposure to noise on the health of the employees is assessed as having medium significance. Also, the impact of using chorine gas in the reservoirs and pumping stations on the health of the employees is assessed as having high significance in case of an accident (leak of chlorine from a cylinder).

4. ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

This section presents all proposed mitigation measures that should be implemented during the construction and operation phases of the project. The contractor is responsible for implementing the mitigation measures during the construction phase

under Engineer and MCC supervision and follow up. WAJ is the responsible entity for implementing the proposed mitigation measures during the operation phase.

The mitigation measures cover the issues related to the following environmental and social components:

- Public health.
- Water resources.
- Biodiversity.
- Cultural heritage and archeology
- Socio-economic conditions.
- Occupational health and safety.

4.1 Mitigation Measures during Construction Phase

Since all water network contracts are Design-Build, its anticipated that some of the early survey work (ex. Trial-Pits, Slit trenches, Boreholes, etc.) supporting the design review are considered as a construction work happening during the design phase, which sometime goes in parallel with the construction phase, therefore, all mitigation measures in Tables (4.1) and (4.2) proposed during the construction will also be applicable to the above design phase relatively based on the type of construction at that time.

Table (4.1) summaries the mitigation measures that shall be implemented during the construction phase, for all environmental and social aspects, at Al Batrawi Contract, Zarqa High and strategic infrastructure Contract, and Russaifah High and Low Contract.

Table (4.2) summaries the mitigation measures that shall be implemented during the construction phase, for all environmental and social aspects, at Basateen Reservoir and Pumping Station at Russaifah area.

Table (4.1): Mitigation Measures during Construction Phase, for all Environmental and Social Aspects, at Zarqa High and Strategic Infrastructure Contract

No.	Aspect	Mitigation Measures	Responsibility
		Public Health	
1	**Air quality**	Dust resulting from the construction activities of water supply networks and water pipelines - mainly nearby high density populated areas - shall be minimized by: • The velocity of the work vehicles shall be restricted to a maximum speed of 20 km per hour on the unpaved roads. • No stockpiling of fine materials shall be allowed in working sites without protection from erosion. • The contractor shall make sure that any vehicle or equipment leaving the project area is cleaned of loose debris. • The contractor shall use dust suppression measures on unpaved roads, excavations, stockpiles, and for transport of excavated material to reduce airborne particulates near populated areas and sensitive receptors during windy conditions and when needed. • The contractor shall store cement, sand, or other such fine grained material in manner to prevent wind erosion and dust. • Vehicle and machinery movements during construction shall be restricted to designated routes at all times where practicable. • Spillage of materials on roads or pathways shall be cleaned up promptly in accordance with the spill prevention and response plan that shall be developed by the contractor as part of the Construction Environmental Management Plan (CEMP).	Contractor
		The contractor shall use heavy equipment, machinery, and fuels in compliance with national regulations. The contractor shall perform regular maintenance on all equipment, vehicle and machinery to prevent air emissions.	Contractor
		The contractor shall limit idling of engines when not in use.	Contractor
		The construction materials loaded by trucks shall be well covered during transportation in order to minimize the generation of dust.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		Good work practices and engineering controls shall be followed at all work sites to minimize asphalt fumes. The application temperature of heated asphalt shall be kept as low as possible. Local residents should receive prior notification of asphalt application activities, at least three days before the start of the activity.	Contractor
2	**Water supply availability**	Construction work on the pipelines shall be done during the non-supply days, in consultation with the WAJ, so the people will be supplied with water as scheduled.	Contractor
3	**Noise and vibration**	Contractor shall take reasonable measures, such as installing acoustic screens or close barricades, to maintain noise levels within the national requirements at all construction sites. If such measures are not reasonable, the contractor shall try to minimize disruption through other means such as scheduling noisy activity during less sensitive times in consultation with the sensitive receptors (e.g. consult with schools to avoid exam periods) or using alternative techniques that create less noise.	Contractor
		In residential areas, contractor shall restrict work activities between 8 am to 5 pm on weekdays with coordination and approval of the Engineer, and shall avoid work on Fridays (weekend).	Contractor
		The contractor shall execute construction activities during night times along the main commercial streets with prior approval from the Engineer, Police and Local Authorities.	Contractor
		Local residents should receive prior notification of noisy activities, at least 24 hours before the start of the noisy activity, especially in the highly densely populated quarters, such as: Al-Ghweireyeh, Al-Hussein, Janna'a, Zarqa Palestinian Refugee Camp, Al-Ameer Mohammad, Al-Shyoukh, Ramzi, Al-Nasr and Al-Nuzha which have a population density between 300 and 500 people/hectare. Also, the streets and roads in the above quarters are narrow and the houses are adjacent to the roads in most cases, there are no free spaces between the windows of the houses and the roads. The same can be applied for Awajan, Al-Jabal Al-Shamali and Al-Daheriyah quarters in Russaifah city, since these quarters have a population density of more than 300 people/ hectare.	Contractor
		The contractor shall take responsibility for rectifying damages caused by vibration generated from or by the use of any equipment and machinery.	Contractor
		The contractor shall use heavy equipment, machinery, and fuels in compliance with national regulations. The contractor shall perform regular maintenance on all equipment, vehicle and machinery to prevent noise emissions.	Contractor
		The contractor shall limit idling of engines when not in use to reduce its contribution to noise emissions.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
4	**Generated waste and disposal**	The contractor shall prepare a site materials handling and waste management plan based on minimization and high quality housekeeping practices. This plan shall include a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites). Also, the plan shall include a monitoring plan of the efficiency of collection, handling and disposal procedures.	Contractor
		The contractor shall segregate storage for different types of wastes, such as hazardous, non-hazardous recyclable construction material, plastic, paper, etc. to facilitate proper disposal as per site materials handling and waste management plan.	Contractor
		The contractor shall provide a separate storage area for hazardous materials. The hazardous materials must be labeled with proper identification of its hazardous properties.	Contractor
		Chemical waste shall be stored in accordance with the provisions of Material Safety Data Sheets (MSDS). The contractor shall keep MSDS onsite.	Contractor
		Contractor shall provide trash bins within each construction site so as to prevent littering in the project area and surrounding areas as well as animal foraging.	Contractor
		The contractor shall establish regular intervals for waste collection and disposal as per site materials handling and waste management plan.	Contractor
		The sanitary and organic wastes shall be collected and disposed daily.	Contractor
		Inert waste generated, if any, from excavation activities shall be recycled to the extent possible, sold to contractors or disposed of to a landfill approved by Zarqa Municipality.	Contractor
		Storage of waste (including temporary) shall not be permitted in public areas, wadis, drainage channels, vegetated areas, or farms.	Contractor
		Littering is strictly forbidden as well as burning any type of waste.	Contractor
		All hazardous wastes shall be collected and managed according to the regulations of Hazardous Waste Management and Handling issued by the Ministry of Environment.	Contractor
		Debris resulting from construction activities shall be frequently disposed of to an authorized area and in cooperation with the local municipalities.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		The remains of construction materials shall be removed from the working sites frequently and the streets and roads shall be kept clean immediately after finishing the work each day at each site.	Contractor
5	**Public safety**	The maximum length of open trench permitted in any location shall be 150 m, or the length necessary to accommodate the amount of pipe installed in a single day, whichever is lesser.	Contractor
		The contractor shall make available a maintenance crew to repair immediately any functional water or wastewater pipelines which may be broken due to excavation works. The contractor shall coordinate repair works in close cooperation with WAJ/Zarqa.	Contractor
		Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 30 m shall be provided.	Contractor
		Works on footpaths must leave at least 1.5 m unobstructed width where possible and a minimum of 1 m shall be provided. Where 1 m minimum unobstructed width is not obtainable, an alternative safe route for pedestrians must be provided. Temporary pedestrian ways should never be less than 1 m wide and, where possible, they should be 1.5 m or more in width.	Contractor
		Rigid barriers must be used to mark any temporary footway and to protect pedestrians from traffic, excavations, plant and materials. Road danger lamps must be placed at the ends of the barriers at night. For pedestrian crossings, hand rails should be between 1.0 and 1.2 m above ground level and tapping rails should be fixed with the lower edge approximately 150 mm above the ground.	Contractor
		Continuous unobstructed, safe and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments such as mosques, schools, parking lots, service location, police stations and hospitals.	Contractor
		The priority ranking of safety measures that could be employed would be: 1) backfilling to the extent possible, 2) bridges/secured stable plates (to support pedestrians in residential areas and vehicular traffic in main streets) placed over any open segments, 3) barriers with supervision and oversight, in cases where neither of the previous measures are possible.	Contractor
		All trenches located close to schools, and houses regardless of width must be guarded during the entire school day. Direct supervision on trenches is essential to prevent any accidental falls and injuries.	Contractor
		Construction works shall be ceased for half an hour in the morning during (school days) weekdays (Sunday through Thursday) during school start time and school leaving time, where schools are located within 100 m of the construction site. During that time, the contractor's health & safety manager can carry out the daily	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		toolbox talk to workers.	
		The contractor shall maintain and facilitate mobility and access for the public within the construction sites.	Contractor
		The contractor will ensure workers are properly trained on public health and safety concerns.	Contractor
		The contractor will provide training and awareness materials to the affected communities on public health and safety issues of the construction project prior to construction.	Contractor
		Traffic management plan shall be developed and implemented by the contractor which shall address health and safety issues associated with safe and efficient movement of traffic around the construction area, reversing vehicles and interface with site pedestrians / members of the public	Contractor
		Vehicular movement to and from the project area shall be minimized to the extent possible.	Contractor
		The contractor shall establish adequate coordination system with other contractors working in the project area to minimize traffic disruption to Zarqa residents and visitors, and ensure that all traffic hazards are kept to a minimum.	Contractor
		Visible signs shall be posted at each site of construction activities including the name and telephone number of contractor's contact person to receive complaints.	Contractor
		Where excavation is being performed in primary streets or highways, one lane in each direction must be kept open to traffic at all times unless otherwise indicated.	Contractor
		Contractor shall provide, place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the Jordanian Traffic Directorate to protect traffic in public or private streets.	Contractor
		Barricades and obstructions must be illuminated at night, and all lights must be kept on from sunset until sunrise. The contractor shall station such guards on floggers and shall conform to such special safety regulations relating to traffic control which may be required by the public authorities within their respective jurisdictions.	Contractor
		A representative from the Jordanian Traffic Directorate shall be allowed to access and observe the traffic management plan prepared by the contractor to make any changes as field conditions warrant. Any changes	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		shall supersede the contractor's plan and be done solely on the contractor's expense.	
		Contractor shall remove traffic control devices when no longer needed and shall repair all damage caused by their installation and removal (backfilling holes, etc.)	Contractor
		If closure of any street is required during construction, the contractor shall submit a formal application to Zarqa Municipality or other relevant competent authorities as directed by the Engineer at least 30 days in advance of the required closure. A proposed detour scheme and traffic management plan shall be submitted along with the application.	Contractor
		The contractor must notify the owner or occupant of the driveway to be closed for more than eight-hour at least for 3 working days prior to closure. The contractor shall minimize the duration for which a driveway will be closed. The contractor shall provide information to the owner/occupant about timing of the closure.	Contractor
		Provision for additional traffic lanes and traffic regulating devices (traffic lights, road sign) shall be made available by the contractor to prevent congestion and minimize the risk of vehicular accidents at road crossing points.	Contractor
		Traffic of vehicles on roads leading to the areas surrounding the project, especially residential and service premises shall remain smooth and unblocked.	Contractor
		Heavy transport trucks shall be driven by highly qualified and skilled drivers.	Contractor
		The vehicles shall be frequently maintained.	Contractor
		Traffic management plan shall be prepared and implemented by the contractor. This plan shall include: • When the excavation is being done in multi lane streets, one lane in each direction shall be kept open all the time. • The contractor shall have the approval from the municipality or other relevant authorities in advance if it is required to close a street during construction works. The contractor shall also propose to the authority the alternative detour and implement it.	Contractor
		All building materials shall be stored in such a way not to endanger the safety of the public. Building materials shall be temporarily stored at work locations in public areas only for the needed quantities for maximum of a single day's work at a time. Building materials shall be not be stored in public areas at work locations within 300 m of a school or of a place of worship.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		The contractor shall rehabilitate the working sites to their original state or better. This includes repaving streets to after excavation when more than half of the road width is excavated.	Contractor
Water Resources			
6	**Disposal of used oil**	The contractor shall use clean, well maintained machineries, equipments and vehicles for excavation and installation to reduce to the minimum oil spills over unsealed ground.	Contractor
		The contractor shall conduct a maintenance/ oil change to the machineries and vehicles in designated areas out of the project sites. However, for emergency situation, the contractor shall adopt control measures to prevent any oil spill over unsealed ground by isolating the onsite maintenance area and collecting the used oil in sealed containers.	Contractor
		The contractor shall provide appropriate sealed containers for the collection and storage of used oils.	Contractor
		The collected used oil containers shall not be stored in non-approved areas (i.e wadis, drainage channels, mudflats, farms and public areas).	Contractor
		The contractor shall abide with the Jordanian Regulations for Management and Handling of Used Oil of 2003.	Contractor
		The contractor shall provide spill kits. The spill kits shall include absorbents (sand, oil pads), plastic bags, and booms to absorb oil leaks, or contain a spill. The contaminated waste absorbent shall be disposed of as a hazardous waste.	Contractor
		Any stored used oil will be delivered to the used oil collectors who are permitted/ licensed by Ministry of Environment. Documentation of generated used oil quantities, time of removal and disposal destination. These records shall be kept on file.	Contractor
		A spill response plan regarding the used oil spill on unsealed ground shall be prepared by the contractor which contains the control measures that shall be conducted by the contractor to avoid an accidental used oil spill; and mitigation measures to remove, collect, and store the used oil spills in environment friendly manner.	Contractor
7	**Disposal of washout waste**	The following steps shall be conducted regarding the disposal of washout waste: • A water quality test from accredited laboratory shall be conducted for the water used in hydro testing/ cleaning of pipelines and water facilities. The test results will be compared to Jordanian Standard JS:	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		202/2006 "Industrial Reclaimed Wastewater". • If the test result is accepted, the contractor shall prepare a plan for discharge into water channels, or diverting the flushing flow and shall define the location of the flow section(s). • An approval from Ministry of Water and Irrigation shall be obtained prior to discharge into wadi/ water channels. • If an approval is obtained, the contractor shall not discharge/flushing this wastewater into water channels during rainy season. • The contractor shall adopt control measures to minimize erosion during flushing, for example by avoiding discharge that are susceptible to erosion and spreading the flow to reduce flow velocities.	
		No excavated material shall be disposed within the wadi channels.	Contractor
		Silt trapping shall be put in place at discharge points.	Contractor
		Spill response control and mitigation measures shall be implemented for any possible spills on the water channels.	Contractor
8	**Handling and disposal of domestic wastewater**	The following steps shall be followed for the generated domestic wastewater: • Mobile toilets equipped with wastewater tank shall be available to be used by the workers at each working site. The wastewater shall be collected in a sealed tank. • The collected sewage has to be evacuated frequently in an environmentally friendly manner in close cooperation with Water Authority of Jordan. • Documentation of disposed wastewater, time of removal and disposal destination shall be done and these records shall be kept on file.	Contractor
9	**Direct surface runoff impact**	The following measures shall be implemented to manage and control the flood: • Control the flood by structural or non- structural measures. Flood walls, transversal protection works, embankment, diversion channels and small dams are examples of structural measures shall be adopted at the flood receptors to reduce flood impact into minimum. • Continuous monitoring and communicating of rise and fall of water level in the wadi shall be assured. • Construction activities shall be ceased at the affected site, and early backfilling of critical sections that located close to wadis, or trenches of low altitude when compared to the surrounding topography. • The transferring of the equipments and materials located at risk points away from the trench sides and	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		from the low points within the operation site to higher ground if possible. • Fill and provide sandbags for retaining flood flows or for weighing down the pipes. • Pumping out of water from the open trenches.	
Biodiversity			
10	**Biodiversity**	For investigation excavations of strategic pipelines, and for Alouk pumping station and Sukhna pumping station, the construction activity shall not be undertaken within 8 m distance of any tree or well without prior permission from the Engineer.	Contractor
		For Azraq – Zarqa strategic pipelines slit trenches, top fertile soil shall be maintained separated and returned back after the completion of construction activity.	Contractor
		Cutting of plant and tree species is prohibited in the surroundings of working areas at all locations, and in particular at strategic pipelines slit trenches and Alouk Pumping Station without prior permission from the relevant authority (Ministry of Agriculture) and the Engineer.	Contractor
		The contractor's personnel shall not undertake any activities outside the designated works areas, particularly at the strategic pipelines slit trenches, and at Alouk and Sukhna Pumping Stations.	Contractor
		The contractor's personnel shall not capture or hunt animals and birds in project areas, particularly along the strategic pipelines routes, and at Alouk and Sukhna Pumping Stations.	Contractor
		Rehabilitation of the construction areas and corridors to their original condition or better.	Contractor
Cultural Heritage and Archaeology			
11	**Cultural heritage and archaeology**	The contractor shall pause construction work and excavations in case of discovering any antiquities or archeological items and shall follow the following steps: • Notify the Engineer immediately. • Notify the Department of Antiquities immediately According to the article 15 of the Antiquities Law No. 21 for year 1988. • Obtain a written approval from the Department of Antiquities before the removal of any chance find site(s) or remains. All designated salvageable material shall be removed and transported without causing any damage. The Department of Antiquities may choose and approve a suitable location for later use or for the	Contactor

No.	Aspect	Mitigation Measures	Responsibility
		possession by the Department of Antiquities of these sites or remains. • Obtain a written approval from the Department of Antiquities to resume construction work.	
Socio-economic Conditions			
12	**Trafficking in persons (TIP)**	The contractor shall be committed to abide with Jordanian prevention of human trafficking law and MCC approach on trafficking in persons. Commitment to anti- TIP requirements will be one of the selection and evaluation criteria for the contractors prior to awarding the contracts and bids.	Contractor MCA-J
		The contractor shall embed TIP prevention in his management systems (quality, health, safety and security systems). Where TIP issues are identified in project development, the contractor shall not engage in or allow TIP.	Contractor
		The contractor shall conduct training and raising awareness of his employees and subcontractors on all issues related to TIP.	Contractor
		To avoid trafficking in persons, contractors are required to comply with the above mentioned requirement including the following: • Contractors shall provide all employees with a signed copy of their employment contract, in English as well as the employee's native language, that defines the terms of their employment / compensation. • Contractors shall not utilize unlicensed recruiting firms, or firms that charge illegal recruiting fees. • According to MCC Sub clause 6.13, Prohibition of Child Labor, of the Conditions of Particular Application states that "the contractor shall not employ any child to perform work that is economically exploitative, or is likely to be hazardous to, or interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development." • Regarding child labor, the contractor shall also follow the Jordanian labor law which mentions the following: The labor code sets the minimum legal working age at 16 years. In February 2003, HM King Abdullah II issued a Royal Decree requiring that the minimum age for employment of children working in hazardous occupations is 18 years instead of 17. Minors are not allowed to work more than 6 hours per day and shall be given a break after 4 hours of work, and may not work during weekends and holidays, or at night. Before hiring a minor, a prospective employer shall obtain a guardian's written approval, the minor's birth certificate, and a health certificate. An employer that violates these provisions faces a fine. The fine doubles for subsequent infractions. • Contractors shall comply with international laws regarding transit/exit/entry procedures, and the requirements for work visas. Contractors shall follow all Host Country entry and exit requirements.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		Contractors have an affirmative duty to advise the Contracting Officer if they learn of their employees violating the human trafficking and inhumane living conditions provisions contained herein. • Contractors shall avoid the abuse of migrant workers who are subjected to conditions of forced labor after arrival, including through such practices as the unlawful withholding of passports, restrictions on movement, delayed or non-payment of wages, verbal and physical abuse. • Contractors shall employ all his foreign and domestic workers on the basis of a standard work day of maximum 8 hours duration, with paid leave, entitlement to family contact and freedom of religion. • Contractors shall provide medical services to all foreign and domestic workers who have an accident or face any health problems during their work on the project. • Special attention shall be given by the contractor to ensuring the safety of school girls and boys who usually walk to school, in terms of coming into contact with foreign and local workers.	
		The Engineer will monitor the compliance of the contactor with the anti-TIP as stated in MCC approach on trafficking in persons and national regulations and report that to the MCA-J. The Engineer will propose to the MCA-J to take the necessary penalties and actions in case of any violations.	Engineer
		The contractor shall monitor that the employees are committed not to engage in or accept any actions related to TIP such as removal of organs and prostitution.	Contractor
13	**Other Socio-economic aspects**	The contractor shall comply with standard procedures to mitigate risk to the public, including the following: • Where the road width is insufficient for excavation to install a pipeline, realignment and modification of the route shall be considered if it will minimize impacts on residences and businesses. • Long pipeline routes shall be divided into sub-sections, each of maximum 150 in length, where the contractor shall complete the excavation and backfilling of the sub-section, before moving on to the next sub-section, to avoid having open trenches for long period of time. • A sufficient number of bridges with handrails for the people to cross the excavated trenches to facilitate their movement, at maximum 30 intervals. • Wherever, narrow roads or sidewalk have been removed during construction phase appropriate sidewalks shall be installed and kept until the work is completed.	Contractor
		Removing the soil and dust of excavations from the side of roads during the construction works especially in front of worship places, hospitals, medical centers and schools.	Contractor
		The use of signs: road markings, cautionary, mandatory and informative signs, delineators and object markers, crash barriers, road humps and rumble strips, reflective pavement markers, median and footpath	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		markers are suggested to be used where it is needed during the construction work.	
		Reducing impacts on existing social sensitive receptors (worships places, hospitals, medical centers, and schools) by avoiding as much as possible the construction work in front of these places. In case there is a need to make any excavation or any work in front of holy places, hospitals and schools, the contractor shall provide safe and easy access to these sites.	Contractor
		The contractor shall not tolerate harassment on the part of its employees, sub-consultants, or sub-consultant employees, and provide awareness raising and sensitization to all workers to prevent harassment (physical, psychological and sexual) between employees, or directed at community members (particularly women and children). These trainings should also educate employees on Jordanian sexual harassment laws and the contractor's response, including punitive measures, to employees who engage in this type of behavior.	Contractor
		Special attention shall be given to the safety of school girls and boys who usually walk to school in terms of accidents. In addition, safe routes to school around the works area shall be created to them.	Contractor
		The contractor shall consider the factories in the project area, where the construction work could be in front of some of them, and where the impact could be on transportation from and to these factories. In some cases, special measures may be needed to ensure continuous access to such factories.	Contractor
		When working inside houses, for example to install water meters, the workers whether foreign or local shall respect the society values and norms.	Contractor
		The contractor shall give priority of the employment to eligible unskilled and semi-skilled local people, including women, vulnerable groups and those who are affected by the project, when they possess necessary qualifications and ability. When they do not possess the required skills, they may be provided with vocational training to enable them to take on employment during the construction phase.	Contractor
		The contractor shall provide employees with appropriate benefit package such as health insurance and social security, according to Jordanian relevant laws and regulations.	Contractor
		The contractor should get supplies, food, spare parts (if available with requisite quality and competitive price) from local stores.	Contractor
		The main streets and roads shall not be cut using the excavation method, but the boring method (trenchless) shall be applied to construct the main pipelines.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		The contractor shall coordinate with local authorities, utilities providers conducting or planning construction work in the same project area in order to reduce public disruption.	Contractor
		In areas where it is expected that the water pipeline will cross existing cables and pipes, it is recommended to make exploratory pits by manual excavation to avoid damage to these cables and pipes.	Contractor
14	**Grievance mechanism**	Necessary measures shall be taken to ensure that presence and demeanor of construction workers is not sexually or physically threatening to women and children under any circumstance. And that appropriate grievance mechanisms shall be developed to cope with infractions Jordanian supervisors shall be visible to the local community around the construction sites to demonstrate that the demeanor of construction workers is observed and non-threatening. This shall include sensitization of the workers and the community on appropriate behaviors, expectations, and disciplinary actions against workers who do not follow the established protocol. The contractor shall participate and positively respond to the grievance mechanism established by the Engineer and MCA-Jordan. The contractor will comply with the Social and Gender Integration Plan developed by MCA-Jordan. MCA-Jordan shall establish grievance mechanisms for damages accidentally done to property or assets that are both promoted and accessible to community members. The mechanism should take into account the possibility of damage which construction works could cause.	Contractor
Occupational Health and Safety			
15	**Occupational health and safety**	The occupational health and safety plan shall be established and then be well implemented and reviewed by the management staff frequently.	Contractor
		A hazard assessment of the work site shall be completed by the contractor prior to construction.	Contractor
		All underground utilities, i.e., pipelines, electrical cables, etc., shall be identified, located and if necessary, isolated.	Contractor
		Excavation permit to work system shall be implemented.	Contractor
		Contractor shall develop a site specific confined space entry procedure.	Contractor
		Ground movement shall be controlled and collapse prevented by systematically shoring, sloping, benching, etc., as appropriate.	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		A buddy system (observer, safety equipment & tools) shall be employed when inside a trench.	Contractor
		Provide clear and visible warning signs within a safe distance from the trenches to alert the workers and visitors.	Contractor
		First aid kit with adhesive bandages, antibiotic ointment, antiseptic wipes, aspirin, non-latex gloves, scissors, thermometer, etc. shall be made available by the contractor at each work site.	Contractor
		All personnel involved shall be trained and competent to do the work.	Contractor
		The contractor shall provide a separate storage area for hazardous materials. The hazardous materials/products must be labeled with proper identification of its hazardous properties.	Contractor
		Storage of chemicals shall be performed in accordance with MSDS's.	Contractor
		All involved workers shall attend Chemical Handling training.	Contractor
		Appropriate safety signs and warning labels shall be used during storage, handling and transportation of hazardous materials.	Contractor
		Appropriate personnel protection equipment (PPE) shall be used when handling chemicals and entering confined locations.	Contractor
		All PPE shall be maintained frequently and replaced by new ones after end of their life time.	Contractor
		Equipment operators shall obtain the proper licenses and shall possess the proper training to operate equipment safely and efficiently.	Contractor
		No work must be carried out on any live cable, or so near as to cause danger; unless it is not practicable to make the cable dead and all necessary precautions are taken to ensure safety.	Contractor
		Other than supplies for welding purposes, cables carrying a voltage to earth in excess of 65 V should have continuous metal armour or, sheath which has been effectively earthed. Where trailing cables are concerned, this earthing should be in addition to the normal cable protective conductor.	Contractor
		In view of the risks from damaged or faulty electrical equipment, an appropriate maintenance system should be set up. It is also important that equipment is regularly serviced in accordance with manufacturers'	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		instructions.	
		The contractor shall ensure that all equipment and machinery are turned off, unplugged, and properly stored when not in use.	Contractor
		High visibility clothing shall be provided to all construction workers.	Contractor
		Utilize banksman in narrow places and where a visibility is restricted.	Contractor
		The contractor shall develop and implement appropriate fire precautionary measures as per the Health and Safety Plan.	Contractor
		The contractor shall provide and maintain firefighting equipment, such as fire extinguisher at the work site.	Contractor
		The contractor shall prohibit smoking in areas identified as a fire hazard.	Contractor
		Contractor shall formally alert civil defense prior to start of activities with potential fire hazards.	Contractor
		Hot work permit system for construction activities (e.g. welding) shall be developed and implemented by contractor.	Contractor
		The contractor's fire protection program shall comply with the requirements of the appropriate Local Standards for Construction.	Contractor
		All employees shall have the necessary personal protecting and safety equipment such as dust masks, safety slip retardant shoes, helmet and hearing protection equipment. This is intended to provide additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems. The personal protective equipment shall be maintained frequently and replaced by new ones after the end of their life time.	Contractor
		Vehicles shall be outfitted with audible back-up alarms.	Contractor
		Emergency Phone Numbers shall be provided on workers' notice boards.	Contractor
		The working sites shall be provided with a rest area, in which the workers can have their pause and this can be achieved by locating office-containers at the working sites. Provide appropriate facilities for both men and women, including bathrooms/changing rooms and separate	Contractor

No.	Aspect	Mitigation Measures	Responsibility
		prayer rooms if requested.	

4.2 Mitigation Measures during Operation Phase

Table (4.2) summaries the mitigation measures that shall be implemented during the operation phase for all environmental and social aspects. These mitigation measures are recommendations for implementation by WAJ during operation phase and therefore, contractor needs not to account for these mitigation measures in the CESMP during construction phase.

Table (4.2): Mitigation Measures during Operation Phase

No.	Aspect	Mitigation Measures	Responsibility
		Public Health	
1	**Water supply availability**	The lack of availability of water sources shall be strictly avoided by having enough water supply studies and applying different scenarios taking into consideration the population increase in the future which shall be reviewed frequently by the Ministry of Water and Irrigation.	WAJ
2	**Noise and vibration**	The pumps and equipment shall be replaced after the defined operational life time. A periodical maintenance to all pumps and pumping station equipment shall be done.	WAJ
3	**Solid waste**	All domestic solid wastes shall be collected in closed containers and then disposed of with coordination with the municipalities.	WAJ
4	**Public safety**	The overflowing of the reservoirs shall be avoided by maintaining frequently all the control valves.	WAJ to maintain and operate.
		Chlorine cylinders shall be put in a closed cabin aerated through diagonal openings in the walls. The cylinders shall be fixed in such a way to protect them from falling-down. The cabin shall have an underground-level bund. A spray water system shall be installed to reduce the vapors. Chlorine gas sensors with alarm shall be installed in the chlorine storage room or cabin and in the room where the chlorine gas cylinder is injected.	WAJ to maintain and operate.
		Water Resources	
5	**Disposal of used oil**	Isolate the onsite maintenance area and collect the used oil in sealed containers.	WAJ
		The collected used oil containers shall be stored in approved areas and away of sensitive areas, bounded, impermeable and covered areas.	WAJ
		Spill kit shall be provided	WAJ
		Any stored used oils will be delivered to the used oil collectors which are permitted/ licensed by Ministry of Environment to collect the used oil from the source. Documentation of generated used oil quantities, time of removal and disposal destination. These records shall	WAJ

No.	Aspect	Mitigation Measures	Responsibility
		be kept on file.	
6	**Handling and disposal of domestic wastewater**	Permanent toilets for men and women shall be provided for operations staff at the Basateen Pumping Station site.	Contractor to design and install.
Occupational Health and Safety			
7	**Noise and vibration**	The maximum noise levels generated by the new Basateen Pumping Station shall comply with the specified limits. In case the noise level exceeds the allowable exposure limit of 85 dB(A), the employees shall wear hear protection equipment.	WAJ to maintain and operate.
8	**Safety**	Passages to emergency exits in Basateen Pumping Station shall be unobstructed at all times. Exits shall be clearly marked to be visible in total darkness.	WAJ
		Training of the personnel related to the management and handling of chlorine shall be conducted at the start of the employment and refreshed periodically. The Material Safety Data Sheet (MSDS) related to chlorine gas shall be placed on the wall and accessible to operations personnel in Arabic and English languages.	WAJ

5. ENVIRONMENTAL AND SOCIAL MONITORING PPROGRAM

This section presents the monitoring program that should be implemented during the construction and operation phases of the project. The main objectives of the monitoring program with respect to the project activities are as follows:

- To ensure compliance with relevant regulatory authorities requirements.
- To assess effectiveness of the proposed mitigation measures.
- To assure that the objectives of environmental and social monitoring plan are met.

To achieve these objectives, a performance indicator(s) is set to each mitigation measure. The contractor shall conduct inspection and monitoring according to the time frame mentioned in the following two tables. This inspection should be conducted on working sites, storage areas, administration, construction machineries and vehicles, documents including plans, policies, procedures and public complaints. All the results of the monitoring and inspection shall be summarized and submitted to the Engineer on a monthly Environmental, Health and Safety (EHS) report. For certain cases an immediate report shall be submitted to the Engineer by the contractor as illustrated in the two following tables.

5.1 Monitoring Program during Construction Phase

Table (5.1) summaries the monitoring program that shall be implemented during the construction phase for all environmental and social aspects.

Table (5.1): Environmental and Social Monitoring during Construction Phase

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
Public Health							
1	**Air quality**	Visual inspection (The use of light water sprays, cleaning the paved streets and areas, velocity of vehicles, accumulation and stockpiling and covering of soil and unused materials, the use of premixed concrete, idling of unused machineries and vehicles, covering of trucks, the use of good work practices for asphalt application, and the existence of notification and complaints receiving signs)	Daily	Working sites	Contractor	Monthly report from Contractor to Engineer	Number of residents complaints. Number of violations. Visible dust arising from the construction sites.
		Dust measurement at Al Basateen area and other sites.	Measurements for 24 hours at Al Basateen area and short-term measurements at other sites. The frequency is every 3 months.	Al Basateen area (Contract 1 only) Other sites as described in Annex 1, Volume I, Tables (2)-(10)	Contractor	Quarterly report from Contractor to Engineer	Dust measurements compliance with national standards (JS: 1140/2006) and compared with baseline levels
		Audit maintenance records of machineries and vehicles	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Records compliance. Number of incidents due to lack of maintenance.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
		Measurement of emissions of machineries and vehicles	Spot measurements once per month (by the end of year all machineries and vehicles shall be tested at least once)	Working sites	Contractor	Monthly report from Contractor to Engineer	Compliance with national standards (JS 1053/1998).
2	**Water supply availability**	Audit of water supply schedule against the working activities	Monthly	Administration	Contractor	Monthly report from contractor to Engineer	Number of residents complaints regarding water supply.
3	**Water supply quality**	Testing quality of water	One water sample after each sterilization	Water sample before pumping to residents	Contractor	Immediate report before the start of pumping to residents from contractor to Engineer	Compliance of water characteristic with the Jordanian drinking water standards (JS: 286/2008).
4	**Noise and vibration**	Audit maintenance records of all equipment and vehicles	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Records compliance. Number of residents complaints regarding noise of machineries. Number of workers complaints regarding noise of machineries.
		Visual inspection (Time of conducting construction works and activities) Audit workers time sheet to ensure no working during night time.	Daily	Working sites Administration	Contractor	Monthly report from Contractor to Engineer	Number of residents complaints.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
		Noise measurement at schools and worships during construction activities	Once per working site (short-term monitoring)	At schools and worships	Contractor	Monthly report from Contractor to Engineer	Number of exceedence to the Guidelines for Prevention of Noise, 2003. Number of complaints.
		Asking the residents as a random sample about getting the prior notification	Once per working site	Residents at working sites	Contractor	Monthly report from Contractor to Engineer	Percent of houses not getting the prior notification from the random sample.
5	**Solid waste**	Auditing materials handling and waste management plan	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Compliance with the plan.
		Reviewing the documents and records of solid waste management	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Percent of reuse and recycle waste to total waste. Quantities and locations of hazardous materials. Number of complaints of residents.
		Visual inspection (Collecting containers, working sites)	Weekly	Working sites and Contractor's compounds	Contractor	Monthly report from Contractor to Engineer	Quantities and locations of construction materials.
		Visual inspection (Storage and disposal of waste, and hazardous waste management and handling)	Daily	Working sites and Contractor's compounds	Contractor	Monthly report from Contractor to Engineer	Cleanliness of working areas. Accumulation of solid waste in non-

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
							approved areas. Existence of hazardous material near construction sites and in the storage areas.
6	**Public safety**	Visual inspection (Length of excavation trench, maintenance of vehicles, posting of warning and traffic signs, establishing of detours and access roads, existence of well bridges, pilling of building materials and soil debris, and existence of appropriate fences)	Daily	Working sites	Contractor	Monthly report from Contractor to Engineer	Compliance with maximum works section length. Compliance with locations of pedestrian bridges. Number of accidents. Number and type of signs. Existence of fences. Awareness records. Number of residents complaints.
		Reviewing the documents and records of waste management	Once for each working site (upon starting the construction at that site)	Working sites	Contractor	Monthly report from Contractor to Engineer	Site safety awareness training records.
		Reviewing the drivers qualifications and experiences	Once upon employment	Administration	Contractor	Monthly report from Contractor to Engineer	Number of accidents.
		Reviewing the drivers trip register	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Hours worked per week per driver.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
		Visual inspection and reviewing the documents and records vehicles maintenance	Daily	Working Administration and working sites	Contractor	Monthly report from Contractor to Engineer	Number of accidents. Number of residents complaints.
Water Resources							
7	**Contamination of existing water supplies**	Reviewing document of employer guidelines and specifications	At starting of the construction phase	Administration	Contractor	A report from contractor to Engineer at starting of construction phase	Compliance with ESMP requirements.
8	**Disposal of used oil**	Visual inspection of vehicles/ machineries Auditing certificates of the excavators by competent 3rd party Auditing on working activities and reviewing oil change records	Daily Annually Monthly	Working areas and parking yard	Contractor	Monthly report from Contractor to Engineer	Abide with the Management and Handling of Used Oil Regulations or 2003. Existence of oil spills.
		Visual inspection (Oil collection, handling and storage management, existence of oil spill kit)	Monthly	Working areas, storage area and on site workshop	Contractor	Monthly report from Contractor to Engineer	Existence of oil spills. Existence of oil spill kit. Abide with the Management and Handling of Used Oil Regulations for 2003.
		Reviewing documents of contracting with used oil collectors and their records	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Existence of invoices of contracts with used oil collectors
		Reviewing document of spill response plan	Once	Administration	Contractor	A report from contractor to	Existence and effectiveness of spill

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
						Engineer	response plan.
9	**Disposal of washout waste**	Auditing the records (Testing and approval of water quality)	Before the start of cleaning hydro-testing water	Administration	Contractor	Every time the washout is carried out, a report from contractor to Engineer	Compliance of records. No violations
		Visual inspection (Disposal of the excavated materials, existence of spills)	Daily	Working sites	Contractor	Monthly report from contractor to Engineer	Existence of excavated material within wadis. No spills in wadis.
		Visual inspection on discharge / flushing of wastewater	Every time the washout is carried out, including before and after disposal of hydro-testing water	Working sites	Contractor	Every time the washout is carried out, a report from contractor to Engineer	Photography of the morphology of wadis before and after. Existence of silt trapping.
10	**Handling and disposal of domestic wastewater**	Visual inspection of handling and disposal of domestic wastewater Reviewing the documents and records of domestic wastewater management	Daily Monthly	Working sites Administration	Contractor	Monthly report from contractor to Engineer	Existence of proper mobile toilets (availability of water, soap and sealed collection tank). Reports and records.
11	**Direct surface runoff impact**	Auditing flood management plan Visual inspection	Once Once flood happens	Administration Working sites	Contractor	A report from contractor to Engineer Immediately report from contractor to Engineer	Existing of an effective plan. No human accidents.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
Biodiversity							
12	**Biodiversity**	Visual inspection (Working within working corridors, reinstatement of working sites, cutting of plants and tree species, and capturing or hunting animals and birds)	Weekly	Work sites and surroundings sites	Contractor	Monthly report from contractor to Engineer	Work within working corridor. Reinstatement report after the completion of work. Existence of debris at the construction sites. Number of complaints.
Cultural Heritage and Archaeology							
13	**Cultural heritage and archaeology**	Visual inspection Reviewing the documents and records	Daily In case of chance findings	Working sites Administration	Contactor	Monthly report from contractor to Engineer Immediately report from contractor to Engineer	Existence of chance find procedure. Workers are well informed about the procedure.
Socio-economic Conditions							
14	**Trafficking in persons (TIP)**	Audit contract requirements (Anti-TIP plan and commitment) Audit on anti-TIP plan of the Contractor and the commitment	Once	Administration	Contractor Engineer / Employer	Within the Contractor bid	Existence of commitment of anti-TIP plan in the contract. Anti-TIP plan in the contract comply with the requirements.
		Audit anti-TIP plan within the	Once a year	Administration	Contractor	Yearly report from	Ant-TIP requirements

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
		Contractor management system document				Contractor to Engineer	included within management system document.
		Audit on training material and sample of employees	two times a year	Administration and working sites	Contractor	Semi annual report from Contractor to Engineer	Training records. Workers complaints.
		Audit the recruiting procedure, working conditions, health insurance system Audit sample of school girls, boys and teachers	Daily	Administration and working sites	Contractor	Monthly report from Contractor to Engineer	No violation. Residents complaints.
		Audit documents and samples of employees	Four times a year	Administration and working sites	Engineer	Quarterly report from Engineer to Employer	Audit report.
		Audit a sample of employees and their contract and relevant document	Four times a year	Administration and working sites	Contractor	Quarterly report from contractor to Engineer	No incidents of organs selling or prostitution.
15	**Other Socio-economic aspects**	Audit the procedure (Standard procedure to mitigate public risk) Visual inspection of the implementation of the procedure	As needed Monthly	Administration Working sites	Contractor	Monthly report from Contractor to Engineer	Existence of the procedure. Number of complains regarding the accessibility.
		Visual inspection (Existence of soil and dust, existence of signs and road markings, working nearby sensitive receptors, safety of students, and existence exploratory pits)	Weekly	Administration and working sites	Contractor	Monthly report from Contractor to Engineer	Number of complaints from residents. Number of complaints from industries.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
							Existence of signs. Number of accidents. Number of incidents.
		Visual inspection (Using trenchless method when cutting main road or street)	Once a main street is crossed	Working sites	Contractor	Monthly report from Contractor to Engineer	No violations.
		Audit a sample of houses when working inside houses	Four times a year	Working sites	Contractor	Monthly report from Contractor to Engineer	Number of complaints.
		Audit the recruitment policy	Once	Administration	Contractor	A report from Contractor to Engineer	Existence of recruitment policy. Number of complaints.
		Audit the human resources documents, the procurement policy and documents, and the social responsibility policy and system	Two times a year	Administration	Contractor	Semi annual report from Contractor to Engineer	Number of complaints.
		Reviewing the documents (Coordination with utilities owners or providers)	Monthly	Administration	Contractor	Monthly report from Contractor to Engineer	Effect on utilities. Number of complaints.
16	**Grievance mechanism**	Reviewing the document of grievance mechanism	At the start of the project	Administration	Contractor	A report from Contractor to Engineer	Existence of grievance procedure.
Occupational Health and Safety							
17	**Air quality**	Visual inspection (Availability of personal	Daily	Working sites	Contractor	Monthly report from contractor to	Existence of masks to the workers.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
		respiratory protection tools, implementation of good work practices during asphalt application)				Engineer	Number of complaints. Number of violations.
18	**Noise and vibration**	Visual inspection (availability and use of well hearing protection equipment, and existing of warning signs)	Weekly	Working sites	Contractor	Monthly report from contractor to Engineer (PMC)	Use of hearing protection equipment. Existence of signs. Compliance with instructions.
		Reviewing medical checks	Yearly	Administration	Contractor	Yearly report from contractor to Engineer (PMC)	Medical report comparison with baseline data.
		Reviewing the list of workers according to the activity	Monthly	Administration	Contractor	Monthly report from contractor to Engineer (PMC)	No violation to exposure duration limit.
19	**Safety**	Reviewing the occupational health and safety plan document	Every six months	Administration	Contractor	Every six months report from contractor to Engineer (PMC)	Existence of effective plan.
		Visual inspection (availability and use of well personal safety equipment, existence of control zones and safety monitoring systems, existence of audible back-up alarms for vehicles, and existence of appropriate medical support)	Daily	Working sites	Contractor	Monthly report from contractor to Engineer	Using the personal safety equipment. Existence of signs. Number of incidents. Existence of audible back-up alarms. Existence of medical support.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
20	**General issues related to occupational health and safety**	Visual inspection (Existence of rest areas for workers)	Once at the start of the works	Working sites	Contractor	A report from Contractor to Engineer	Availability of the effective facilities. Existence of the rest areas.
		Visual inspection (Worker exposure to sunrays, and availability of cold drinking water)	Daily in summer	Working sites	Contractor	Monthly report from Contractor to Engineer	Existence of shades when required. Number of sunburns. Availability of cold drinking water.
		Visual inspection (Smoking inside the building)	Daily	Working sites	Contractor	Monthly report from Contractor to Engineer	Number of violations. Availability of smoking area. Existence of signs.
		Visual inspection (Availability of water, soap, etc at working sites)	Weekly	Working sites	Contractor	Monthly report from Contractor to Engineer	Availability of water, soap, etc
		Reviewing the grievance procedure document	At the start of the project	Administration	Contractor	A report from Contractor to Engineer	Existence of grievance procedure.

5.2 Monitoring Program during Operation Phase

Table (5.2) summaries the monitoring program that shall be implemented during the operation phase for all environmental and social aspects. This monitoring program is a recommendation for implementation by WAJ during operation phase.

Table (5.2): Environmental and Social Monitoring during Operation Phase

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
Public Health							
1	**Air quality**	Reviewing water distribution plan	Every five years	Administration	WAJ	Every five years, a report from the responsible directorate to the Ministry.	Water quantity per capita.
2	**Noise and vibration**	Noise measurement	Once per six months for 24 hours	Basateen Pumping Station and Booster Pumping Stations.	WAJ	Every six months	Number of excedances to the Guidelines for Prevention of Noise, 2003.
		Visual inspection and reviewing documents of the pumping stations (pumps maintenance and replacement)	According to the Operation and Maintenance Manual	Pumping stations	WAJ	Monthly	Number of excedances to the Guidelines for Prevention of Noise, 2003.
3	**Solid waste**	Visual inspection of solid waste collection and disposal	Monthly	Pumping station	WAJ	Monthly	No violations.
4	**Public safety**	Reviewing the plan (Avoidance of reservoirs overflowing) Visual inspection of the implementation of the required measures to avoid the reservoirs overflowing	Once at the start up Every six months	All reservoir sites	WAJ	Once at the start up Every six months	Number of reservoir overflows.
		Visual inspection (Chlorine cylinders installation and handling, and existence of alarm)	Once at the start up and checked on monthly basis	All reservoir sites	Contractor to establish the requirements and WAJ to follow up	Once at the start up by Contractor Monthly (WAJ)	No incidents.

No.	Aspect	Monitoring	Frequency of Monitoring	Sampling locations	Responsibility	Reporting	Performance Indicator
Water Resources							
5	**Disposal of used oil**	Visual inspection (Used oil collection, storage and disposal, and availability of oil spill kit)	Monthly	Pumping station	WAJ	Monthly	Abide with the Management and Handling of Used Oil Regulations or 2003. Existence of spills. Existence of spill kit.
		Reviewing documents of contracting with used oil collectors and their records	Monthly	Administration	WAJ	Monthly	Existence of invoices of contracts with used oil collectors. Existence of records.
Occupational Health and Safety							
6	**Noise and vibration**	Noise measurement	Every six months	Pumping stations	WAJ	Twice a year	Number of excedances to the limits specified in the Labor law
7	**Safety**	Visual inspection (Emergency exit with proper marks)	Yearly	Basateen Pumping Station	WAJ	Yearly	Existence of emergency exit with proper marks.
		Reviewing documents for training of the responsible persons and visual inspection.	Yearly	Administration and Basateen Pumping Station	WAJ	Yearly	No incident.

6. HEALTH AND SAFETY PLAN

A health and safety (HS) plan shall be established for the project to protect the employees, workers and public during the construction and operation phases. It the responsibility of the contractor to establish HS plan for the construction phase while WAJ is the responsible to prepare it for operation phase. HS shall include the necessary programs, guidance, operational plans and procedures for all activities of the project.

Each worker has a fundamental right to a healthy and safe work environment. Health and safety plan will promote safe and healthy workplaces to help prevent work-related injuries and illnesses. The quality of the work environment through compliance with safety and health standards has to be ensured by surveillance at the workplace. It is important to establish a constructive worker-management relationship and treat the workers fairly and providing them with safe and healthy conditions.

6.1 Health and Safety Policy

As a first step for establishing a comprehensive health and safety plan, the contractor for construction phase and WAJ for operation phase shall establish HS policy. In order to have a comprehensive health and safety policy, the following points shall be adopted:

- Abide by the laws and regulations, design painstaking.
- Use good quality materials and use the segregation principle to dispose wastes.
- Control the dirt of construction area in order to prevent the atmosphere pollution.
- Minimize noise generation to the permissible values.
- The serious complain of environment would be as low as possible.
- The death accident would be nil, severe injury rate would be as low as possible.
- Guarantee the health of the staff in case of occupational disease.
- No fire accidents.

6.2 Health and Safety Plan Elements

All activities that impose unreasonable risks on workers, employees and public health and safety shall be addressed and mitigated in the HS plan for either elimination or reduction of the risk to an acceptable level and according to established standards and regulations.

A health and safety plan shall be available, which clarifies:

- Health and safety plan objectives.
- Standards referred to: The plan shall be formulated referring to the relevant local regulations.

- Health and safety management system: The plan shall clarify the general requirements of the project on the establishment, implementation, maintenance and constant improvement of the health, safety and environment management system and the requirements on the formulation of the system.
- Management commitments including responsibilities: The contractor is responsible for appointing a person or a staff who is responsible for planning and executing of the health and safety plan. The head of different divisions (excavating, transporting, constructing, etc.) are responsible to make a safe work environment available. They have to encourage the workers to give their proposals related to health and safety. The supervisors are responsible to protect the workers who work under their supervision. They have to train the workers and to make the personal safety tools and equipment available to the workers. The workers are responsible to follow all instructions related to the health and safety.
- Resource management including training: In order to realize and maintain the health and safety plan as well as improve its effectiveness continuously, the project administrative should provide necessary human resources and infrastructure on time and create a suitable construction and operation working environment. It is very important to have trained human resources to implement the health and safety plan.
- Control of health and safety management system (including identifying the accidents and documentation procedure, prevent / mitigate the risk, emergency response plans, etc.)

The following list of procedures shall be prepared by the contractor before starting the construction phase:

- Demolition works.
- Excavations / trenches.
- Assembly, lifting, fixing, unfixing, dismantling of heavy components of buildings, pipes, machinery.
- Hazardous materials handling and management.
- Waste materials handling, storage, removal and disposal.
- Shift working, night-time working, out-of-hours working.
- Unplanned work interruptions.
- Confined spaces working.
- Working alone.

- Poor light - working after dark or in dark places.
- Hot work processes, hot work locations.
- Hot surfaces / cold surfaces / abrasive surfaces.
- Prefabrication / Pre-casting / Pre-assembly.
- Private land-owners.
- Inclement weather - high winds, heavy rain, excessive heat, sunshine, smog, lightning, storms, excessive cold.
- Works within full / partially full reservoirs and chambers.
- Works within empty reservoirs and chambers.
- Working with or close to pumping machinery.
- Working close to high-pressure pipes, vessels and containers.
- Steeply sloping ground.
- Rough / difficult ground surface.
- Contaminated land.
- Nearby embankments - roads, railways, canals, etc.
- Nearby industry / large commercial businesses.
- Underground electric or other cables.
- Overhead electric or other cables.

These procedures shall be part of HS plan and shall be reviewed on a regular basis to be checked for modifications / additions.

7. EMERGENCY RESPONSE PLAN

The contractor shall establish an emergency response plan to ensure quick response for any emergency case during 24 hours. This plan shall include the following items:

- 24 hours emergency telephone number. This number should be displayed on signs at the working sites. This number should be communicated to all involved entities such as Engineer, WAJ, MCA-J, MoEnv, Municipalities.
- Emergency response staff which shall include designated supervisor and skilled work team who can deal with any emergency incidents such spills, pipe bursts, traffic accident at work site and fire.
- Equipment and training for the emergency response staff.
- Written emergency response procedures to deal with all potential scenarios.

This plan shall be part of the health and safety plan and it shall be reviewed on a regular basis for further modifications or additions.

8. TRAFFIC MANAGEMENT PLAN

The traffic management for the project is to minimize the interface wherever possible between public and site traffic, including avoiding deliveries during traffic peaks and controlling vehicular and pedestrian movements on and around the project site.

Traffic Management Plan shall provide practical guidance on the planning of these issues, the control measures that will be implemented and highlights the site-specific points for consideration and necessary action. Avoiding hazards and controlling the risk arising from the use of the vehicles in and around construction work is essential therefore, it's expected that the contractor prepare a site-specific traffic management plan that includes, but not limited to:

- Planning and managing both vehicles and pedestrian routes
- Safe driving and working practice
- Protection of the public
- Provisions of signs, barriers and adequate vision of lines and sights
- Adequate parking and offloading/storage area.

The Contractor shall prepare and submit the Traffic Management Plan for the Engineer approval in accordance to the Employer Technical Requirements and Specifications.

9. INCIDENT REPORTING AND INVESTIGATION

The contractor shall establish an incident reporting and investigation system and shall be developed before starting the construction works. The system shall include proper reporting procedure and investigation. This system will help in evaluating all incidents occurred with their causes to reduce the occurrence of such incidents in future. The contractor shall immediately notify the Engineer of any incident which occurs in connection with the operation of the works whether to personnel directly employed by the contractor, or to a third party. Such notification may initially be verbal, but shall be followed by a written report within 24 hours of any incident. Following any such incidents, the contractor shall provide the Engineer with a report detailing the cause of the incident and the corrective action taken to prevent a reoccurrence.

10. TRAINING AND CAPACITY BUILDING

Appropriate training programs should be established and implemented during the construction and operation phase for the project employees and workers as relevant to their duties and responsibilities including all activities taken place in the project.

All project employees should undergo professional training on occupational health and safety and on managing environmental issues relevant to their duties and practices.

Procedures should be developed to monitor the effectiveness of the training programs.

10.1 Training and Capacity Building for Construction Phase

Table (10.1) summaries the training and the capacity building that shall be implemented during the construction phase.

Table (10.1): Training Needs Program for Construction Phase

No.	Project Activity	Training Required	Target Population	Frequency	Trainer
1	**Construction activities**	The training should include: • Awareness-raising of how different construction activities can impact on the environment, why it is important to avoid environmental damage and what steps can be taken to mitigate the impacts of construction activities • General behavior on site such as elevated noise levels (e.g. shouting and hooting), toilet behavior, littering, no fire arms, no harvesting of firewood / plants, no trespassing or damage to property, no throwing of cigarette butts, etc. • Health and Safety Plan training including the emergency procedures and incident reporting • Responsibilities for ESMP implementation.	All construction workers	Monthly	Contractor's Person approved by Engineer
2	**Trenching and excavation works**	The training required includes: • Confined Space Training • General PPE handling and adequate information and instruction must be given on the wearing and use of PPE • First Aid Training • Emergency respond • Basic firefighting training • Environmental Awareness (This will cover the impacts and mitigation measures in addition to the eco-friendly practices).	Construction workers involved in confined space work	Quarterly	Contractor's Person approved by Engineer
3	**Solid waste generation/disposal**	• Implementation of programs for training and awareness in the field of solid waste management including segregation and handling. • Identification of possible archeological or historical objects and the requirement to notify Department of Antiquities if such an objective found	All construction workers	Quarterly	Contractor's Person approved by Engineer
4	**Material and chemical / oil storage and spill of chemical and liquid fuels**	Training on responsible handling of chemicals and spills and correct disposal of containers containing hazardous materials and other waste objects	All construction workers involved in handling chemicals	Twice a year	Contractor's Person approved by Engineer
5	**Equipment**	• Provide adequate training for workers that operates specific equipment	Equipment	Quarterly	Contractor's person

No.	Project Activity	Training Required	Target Population	Frequency	Trainer
	operation	• Provide adequate PPE and give induction on how to wear and use them	operators		approved by Engineer
6	**Vehicle operation**	Provide drivers on site of proper training including: • Speed limit training • Site signage • Driving in day light only	Drivers	Quarterly	Contractor's person approved by Engineer
7	**Ignitions of flammable materials / accidental fires**	Basic training on locating and use of fire- fighting equipment	Operator and selected construction worker (minimum 10% of the construction work force)	Quarterly	Contractor's person approved by Engineer
8	**Trafficking in persons**	Workers should be trained against TIP by: • Capacity building must be conducted with all key stakeholders in order to deal with trafficking, monitor investigations, and improving and training staff members in all facets related to TIP. • Responsibilities/ accountabilities and any associated training needed	Operator and Construction worker	Quarterly	Contractor's person approved by Engineer
9	**Health and hygiene**	Ensure that employees and line management understand all risks (including HIV and STD prevention) through proper instruction, training and supervision.	All Staff	Monthly awareness	Contractor's person approved by Engineer
10	**Social and gender issues**	Gender awareness trainings	Construction workers	Quarterly	Contractor's person approved by Engineer
11	**Disposal of washout waste**	Training in procedures for filling and draining down and washing out pipes and tanks.	Construction workers	Quarterly	Contractor's person approved by Engineer
12	**Direct surface runoff**	Train the employees on the flood management practices and response and conducting drills.	Construction workers	Quarterly	Contractor's person approved by Engineer

10.2 Training and Capacity Building for Operation Phase

Table (10.2) summaries the training and the capacity building that shall be implemented during the operation phase. This training program is a recommendation for implementation by WAJ during the operation phase.

Table (10.2): Training Needs Program for Operation Phase

No.	Project Activity	Training Required	Target Population	Frequency	Trainer
1	**Solid waste generation / disposal**	• Implementation of programs for training and awareness in the field of solid waste management including segregation and handling.	WAJ operators in reservoir and pumping station	Quarterly	WAJ Heath and Safety Officer
2	**Material and chemical / oil storage and spill of chemical and liquid fuels**	Training on responsible handling of chemicals and spills and correct disposal of containers containing hazardous materials and other waste objects	WAJ operators in reservoir and pumping station `	Twice a year	WAJ Heath and Safety Officer
3	**Equipment operation**	• Provide adequate training for workers that operates specific equipment • Provide adequate PPE and give induction on how to wear and use them	WAJ operators in reservoir and pumping station	Quarterly	WAJ Heath and Safety Officer
4	**Ignitions of flammable materials / accidental fires**	Basic training on locating and use of fire- fighting equipment	WAJ operators in reservoir and pumping station	Quarterly	WAJ Heath and Safety Officer

11. UNFORSEEN DISCOVERIES

It is expected that during construction works, the contractor find unforeseen discoveries such as antiquities or archeological items, human remains, underground obstructions and contaminated waste. The contractor shall stop the construction work and excavations and inform directly the Engineer who will take the necessary action such as contacting the MoEnv for the contaminated waste, police for the human remains and the Department of Antiquities for antiquities or archeological items.

In term of discovering antiquities or archeological items, the contractor shall protect the discovered items until the Engineer or the related organization take over the responsibility and the discovered items shall not be removed by the contractor.

The contractor shall guard the discovered contaminated waste (hazardous) and keep away from access by public until the Engineer or the related organization take over the responsibility.

Work activities will be resumed only after written approval from the Engineer.

12. SUBMITTALS

The contractor shall establish a construction environmental and social management plan (CESMP) to be approved by the Engineer. This plan shall be prepared before starting the construction work and shall be in compliance with the ESMP. This plan shall include all necessary procedures, programs and instructions to protect the environment, workers, employees and public from any potential hazard from the project activities. As a design-build contract, the contractor should update these documents as necessary to address any newly identified impacts or risks as a result of detailed design. These procedures and instructions shall include the following:

- Waste Management Plan
- Control of Hazardous Substances Plan
- Fire Protection Program
- Traffic Management Plan (including mobility and access facilitation needs)
- Socio-economic, including gender, requirements
- Emergency Response Plan
- Training and Awareness Plan
- Emergency response Plan
- Environmental Monitoring and Reporting

12.1 Implementing CESMP

The developed CESMP should provide the basis for ensuring that specific environmental and social requirements are met during the construction activities. It should describe

actions that will be carried out and who will be held responsible for them in order to implement the proposed mitigation and monitoring measures. These actions can be categorized into three groups:

- Project techniques that mitigate environmental and social (including gender) impacts to acceptable levels.
- Monitoring to provide data on ambient environmental and social (including gender) conditions during execution of activities and proper reporting mechanisms.
- Response and management procedures that ensure corrective actions are taken if impact mitigation is not considered to be effective.

The CESMP will be a mandatory reference document for the contractor and his subcontractors. Each subcontractor involved shall be provided with a copy of the document to which they must comply.

The CESMP should be considered the key tool for achieving environmental and social compliance at the construction site. Level of responsibilities and line of communications between regulators, client and contractor should be will defined by the CESMP including reporting requirements and procedures.

Staff training programs to insure proper implementation of the requirements provided by the CESMP should also be highlighted and outlined within the body of the document, including identified trainees, training materials and schedule of trainings.

12.2 CESMP Content

The CESMP document should contain as a minimum the following items (proposed table of contents):

1. Introduction
2. Project Description
   - 2.1 Method Statement
   - 2.2 Working Hours
3. Objectives of the CESMP
4. Planning
   - 4.1 Environmental and Social Responsibilities and Contacts
   - 4.2 Approvals, Licenses and Work Permits
5. Implementation
   - 5.1 Environmental and Social Management Requirements
   - 5.2 Site Environmental Protection Rules
6. Corrective and Preventive Actions
7. Communications and Complaints Procedure

Annex (1)

Sensitive Social Receptors Map

for the Design-Build Contract 3: Zarqa High Distribution Area and Strategic Infrastructure