Republic of Iraq
Emergency Water Supply Project
(P094650)

Environmental and Social Safeguards Audit
Wasit Sub-Project

March, 2015
EXECUTIVE SUMMARY

The Wasit Water Supply Project (WWSP) is a component of the World Bank-assisted Iraq Emergency Water Support Project (EWSP - Project ID No. P094650) aimed at addressing the urgent need for safe and adequate water supply to the people of Ghammas, Al-Nasr and Wasit urban centers and surrounding neighborhoods. Prior to the project, the communities were experiencing substantial challenges due, in part, to lack of adequate and safe water supply, which is attributable to aged and deteriorated water infrastructure. The EWSP, including the WWSP is required to comply with the Bank’s Environmental and Social Safeguard policies, and relevant environmental and social standards of the Government of Iraq (GoI).

Subsequently, an environmental and social audit was undertaken to observe and record the project’s attendant current and cumulative environmental and social impacts, as well as to ensure that the implementation of the environmental and social mitigations measures is consistent with the recommendations of the Environmental and Social Management Plan (ESMP), and as necessary, suggest appropriate corrective measures.

The primary objectives of the audit are to:

- Develop an up-to-date summary of the assessment, monitoring and reporting approaches of project’s potential environmental and social impacts;
- Investigate and verify the project civil work’s compliance with the Occupational Health and Safety standards, and
- Prepare a practical safeguards corrective action plan, as necessary, to remedy any residual or unaddressed adverse environmental or social impacts.

Limitation of the Audit: The notable constraint of the audit is attributable to heightened security concern in the project area, which essentially impeded the requisite monthly safeguards monitoring and supervision in the earlier stage of the implementation process.

Highlight of the Findings: Consistent with the Bank’s Environmental and Social Safeguards requirements, an Environmental and Social Impact Assessment (ESIA) with the adjoining ESMP was prepared for the WWSP. The audit was necessary to ensure that the project implementation process is in line with the recommendations of the ESMP, and to develop a remedial action plan where gap existed. Subsequently, multiple site visits were conducted in the fall of 2014, for the purposes of assessing the current state of environmental and social safeguards. Through the site visits, it was ascertained that all the expected environmental impacts as described in the ESIA/ESMP were minor, well controlled and mitigated. Nonetheless, the site visit delineated a safeguards corrective action plan to bring various impact areas into full compliance. Specific findings/notations included:

- No special corrective actions procedures were needed under the areas of soil, surface, and groundwater resource management. There are no impacts will be expected on the soil such as soil erosion in the operational phase. No additional corrective steps were needed in the regard of the surface and ground water resources. However, the client
was advised for the periodical surface and ground water sampling and testing in order to ensure no deviation were occurred in water quality.

- No post-construction impacts are expected in air quality and point-source noise. However, the client was advised to conduct air quality testing measure PM, NOx, and SOx periodically. Similarly, noise level measurements should also be tested periodically. And as a matter of fact for such projects, it will be expected no harmful level will be recorded.

- No deficiencies in occupational health and safety equipment were noticed. The plant has its own safety plan, which was approved previously. The client authorities were advised to continuously ensure the availability of all of the safety equipment within the site. Also, a record book for work accidents and/or for occupational injuries must be provided and checked periodically. In addition, regular check-ups on all fire extinguishers must be made and recorded.

- No ecological and biodiversity conservation impact was recorded, nevertheless, the contractor was advised to plant native plants and vegetation upon completion of construction.

- No “chance find” of any cultural heritage was observed and/or recorded.

- The project was constructed on a government-owned land. No compensation was recorded by any of the public, no removal or displacement or deportation for any citizen were recorded, no claims for any type of private land ownership were requested by any individuals, tribes or third party. Also, no removal of any plants, trees, or vegetation cover was recorded. The whole area belongs to the ministry. Many of the residents in the area expressed their appreciation and gratitude for such project that will return good beneficial steps to their daily life sanitation quality. Thus, no corrective measures were needed in this section.

- As the project shifts from construction to operational phase, it is imperative to update and circulate the operational phase monitoring program, including appropriate emergency response plans.

In conclusion, all the operational activities regarding Wasit treatment plant had no long-term environmental impacts. In-turn, all of the related mitigations and the needed procedures were conducted by the contractor (during the constructional phase) and advised to the client (during the operational phase) in order to comply with the required environmental laws and regulation. The constructional and operational phase of the project had a very positive impact on the locals from many points of view. In addition to providing a healthy and sanitary access to the drinking water, WWTP promotes the financial level of the locals. Many job opportunities were available during construction phase, thus enhancing the economical level of the locals.

**Corrective Action Plan:** The corrective measures suggested include the following:

1. Installation of a screen over the intake pipe for protection of the pipe, which is in the river;
2. Installation of a chlorine submerged basin and shower facility, as now mandated by GoI law;
3. Proper onsite vehicle and equipment management;
4. Consistent measurements of air (PM, NOx, and SOx) and noise quality, as well as periodic surface and groundwater sampling;
5. A system for record-keeping of on-site accidents and injuries;
6. Consistent checking of fire extinguishers to ensure their viability;
7. Creation of a Grievance Redress Mechanism for the operational phase; and
8. A comprehensive staff training programs for effective monitoring and reporting, including emergency response measures during the operational and maintenance phase water treatment plant.
9. Plant native plants and vegetation upon completion of construction; and
10. Updating and circulation of the operational phase monitoring program, including appropriate emergency response plans.
# TABLE OF CONTENTS

EXECUTIVE SUMMARY .................................................................................................................. ii  

CHAPTER 1: INTRODUCTION ............................................................................................................ 1  

CHAPTER 2: FINDINGS OF THE AUDIT ............................................................................................ 8  

2.1: Potential Impacts Assessment during Project Preparation ....................................................... 8  

2.2: Site Observations and Potential Impacts .................................................................................... 9  

2.3: Monitoring and Reporting Arrangements during Implementation ............................................. 10  

2.4: Occupational Health and Safety aspects of the Selected Sites ................................................. 11  

3.1: Short-term Plan ........................................................................................................................ 12  

3.2: Medium and Long-term Plan .................................................................................................... 13  

ANNEXES: ....................................................................................................................................... 17  

Annex 1: Environmental Mitigation and Monitoring Plan (EMMP) .................................................. 17
CHAPTER 1: INTRODUCTION

1. The Emergency Water Support Project (P094650) IDA credit helps finance the costs associated with addressing the urgent needs for safe and adequate water supply to the people of Ghammas, Al-Nasr and Wasit urban centers and surrounding communities who are presently experiencing drinking water challenges as a result of unsafe water quality and inadequate water supply attributed to deteriorated and aged water infrastructure.

2. The financial assistance helps to respond to the emergency situation through the provision of abundant volume of safe drinking water to the target population. The project includes the upgrading and in most cases, replacement of some of the existing water supply and distribution infrastructure. The project is also aimed to strengthen the in-house capacity of the Iraqi Ministry of Municipalities and Public Works (MMPW) in the area of planning, management, and supervision of the project implementation process, as well as operations and maintenance.

3. This environmental and social safeguards audit is specific to Component 3: Rehabilitation and Upgrading of Wasit Water Supply Schemes (US$28.56 million). This component includes replacing existing dysfunctional water treatment assets with a standardized modular design water treatment plant customized to local site conditions, with production capacity of 1,000 cubic meters per hour, including intake structure, pumping stations, transmission pipelines for raw, treated water storage tank; and replacement of about 60 kilometers of pipes of various diameters in the distribution network, including house connections.

4. Background: The project is located north west of the Wasit governorate, 29 km from the center of city, situated on the Dujaili River, a branch of the Tigris River. The capacity of the treatment plant is 1000 (m³/hr), to serve 40000 residents. The project consists of an intake point on the River Dujaili near with distance 60m from the Treatment Plant. The Treatment Plant consists of sedimentation basin, filters, chlorinators and treated water storage tank and an elevated storage tank, and then to the distribution network in the Wasit district by a transmission ductile iron pipeline 560m length. In addition to the major basins mentioned above, the project consists of chemical building and chlorine building and maintenance building and electrical control building, staff building, and administration building.

5. Water Quality: WWTP will provide for treatment of raw water for drinking and domestic use. Thus, the system must treat the raw water so that the project effluent will comply with the World Health Organization (WHO) standards. The plant is designed to produce the following quality of water, in accordance with the WHO guidelines:
   - Target turbidity: 0.5 NTU average, 1 NTU maximum;
   - E-coli or thermo-tolerant coli form bacteria – 0 in 100 ml sample.

6. It is anticipated that the target residual metals will be followed, subject to confirmation of concentrations in the raw water:
- Aluminum: Less than 0.2 mg/l;
- Iron: Less than 0.2 mg/l

7. The water treatment process is an assemblage of unit processes that effectively produces a supply of safe drinking water. The treatment system generally consists of interrelated components. These components include coagulation, flocculation, clarification, filtration and disinfection with the necessary process control and instrumentation. Since the unit processes must be interrelated, the operation of each component affects the performance of others, and then the entire system.

![Water Treatment Plant Flow Diagram](image)

**Fig(1): Wasit water treatment plant flow diagram**

8. **Process Flow Diagram:**
The main process functions are shown in the process flow diagram below and include:
1. Extraction and transmission of raw water from the intake site to the treatment plant site;
2. Makeup, storage and injection of flocculation chemicals into the raw water stream;
3. Flash mixing of flocculation chemicals and raw water into the raw water main;
4. Flocculation and clarification of the raw water;
5. Rapid gravity filtration of the clarified water;
6. Makeup, storage, and injection of disinfection chemicals into the filtered water stream;
7. Collection and storage of treated water, including establishment of disinfection contact time;
Transmission of treated water from the treatment plant site to the distribution network;
Extraction and storage of sludge from the filters and flocculate / clarifiers; and
Collection and storage of miscellaneous process wastes.
Transmission of sludge and miscellaneous process wastes from the treatment plant site to the river outfall. Figure 1 above refers to the flow diagram of the project.


Background: Wasit sub-district is located in the south eastern part of the Wasit Governorate. It is about 28 km south east of A1 Kut City. The population of the town, living within the service area in 2007, was estimated at 39,000, with the population growth rate estimated at 2.9% per year. About 40% of the population has access to piped-water supply system. The present produced drinking water is about 1.4 MCM per year and the water losses constitute about 55% of the production. There are two compact units (CU) serving the Wasit sub-district. The first one was constructed in 1973 with a production capacity of 90 m$^3$/hour, while the second was constructed in 2002 with a capacity of 200 m$^3$/hour. The present condition of the first CU is considered fair, however, it needs full maintenance. The second CU is in good condition.

Existing Situation

Water Sources: The main source of water in Wasit City is the Al-Dujaila irrigation Canal, which is a branch of the Tigris River. Al-Dujaila canal passes through the urban area of Wasit City with continuous water flow throughout the year. The intake is located on the canal and the raw water transmission pipes are not more than 30 m in length.

Treatment Plant: There are two compact units serving the Wasit sub-district. The first was constructed in 1973 with a production capacity of 90 m$^3$/hour, while the second was constructed in 2002 with a capacity of 200 m$^3$/hour. The present condition of the first compact unit is considered fair however, it needs full maintenance. The second unit is in good condition. The operation time of the WTP ranges between 15 and 18 hours.

Storage Tanks: There is one elevated water storage tank serving the Wasit City. The tank, made of steel, was constructed in 1975 with a capacity of 120 m$^3$.

Pumping Stations: There are two submersible pumps (one operational and one standby) and two high lift pumps (one operational and one standby) at the compact unit site. The capacity of the operational submersible pump is 210m$^3$h with 30 m head, while the capacity of the standby pumps is 240m$^3$h with 30 m head. The capacity of the high lift pump that is under operation is 200m$^3$h with 50 m head, while the capacity of the standby pump is 200m$^3$h with 50 m head.

Distribution Network: Only about 40% of the total population of Wasit City is served by a piped system. The remaining population is served by tankers or use water directly from the canal. The distribution system in the city is very old and is made mostly of asbestos, cast iron, plastic and cement pipes. Only 25% of the total area is covered by existing water facilities.
The main transmission pipe is 250 mm in diameter, while the distribution pipe diameters ranges from 110 mm to 200 mm.

15. **Site location:** Wasit governorate is located about 160 kilometers to the south-east of Baghdad, in the mi-easter side of Iraq. The project is located within Wasit District, which in turn is located about 29 kilometers northwest of Al-Kut city:

![Map of Iraq](image)

**Baseline Conditions:**

16. The climate in Wasit is dry and hot in the summer and dry cold to mild in the winter. The average annual precipitation is about 100 mm and most of this occurs in the winter months. The average daily temperatures range between 10-16°C in winter and 38-50°C in summer. The main occupation in the sub district is agriculture and animal husbandry.

17. Wasit is located in the southern-eastern part of Iraq. The topography of the District is mainly flat. It crosses flat land, the total population of the urban centers affected by the project positively. Regarding the basic environmental data, as such data are not available for the specific site, hence the recorded data were considered especially for Al Kut governorate.
18. **Climate:** Al-Kut governorate is located in the eastern-middle part of Iraq and has a hot climate with sparse rainfall during the months of May to September highest temperatures in July and August reach over 47 degrees centigrade. Rainfall is normally recorded during the months of December to February almost.

19. **Rainfall:** Recent three years rainfall observation date is shown in the following tables. It is characteristic to have rainfall from the end of October to March with quite heavy rainfall in a single day, according to the Ministry of Planning, Environmental Survey Statistics, 2010 records.

Table 1: Monthly Rainfall Data (2008, 2009, 2010) within Wasit Governorate

<table>
<thead>
<tr>
<th>Month</th>
<th>Observed days</th>
<th>Days of rain</th>
<th>Total rain fall</th>
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<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>1</td>
<td>93</td>
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<th>Observed days</th>
<th>Days of rain</th>
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<td>39</td>
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<tr>
<td>2</td>
<td>28</td>
<td>1</td>
<td>25</td>
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<tr>
<td>3</td>
<td>31</td>
<td>0</td>
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</table>
20.  **Wind velocity:** Monthly wind velocity record in recent years is shown to be generally from North West to south east; average wind velocity is approximately 2.1m/sec.

21.  **Site topography:** The project sites is a flat plateau areas that starting from the middle of Iraq till the mid-southern parts of the country, no specific terrains or natural land obstacles are presented in the project area. The area is free of mountains, cliffs, and valleys.

22.  **Seismic activity:** The site has no seismic activities records for more than 25 years. While some poor reflected earthquake waves were recorded last year, without any serious damages.

23.  **Land acquisition:** In this project and according to the official documents, no additional land needed to be purchased, to allow construction works, the land needed for project implementation is owned by the government. There are no livelihoods in the project vicinity that can be significantly affected by the project, hence neither involuntary nor voluntarily relocation of people and any individuals are needed. As a result no individual(s), person(s) will adversely affected or need to be relocated. no claims were recorded from individuals, organizations, tribes... etc., for financial compensation as land owners. All the project land territory belonging to the government.

**The Environmental and Social Audit:**

24.  This document discusses the findings of an independent environmental and social auditor. The audit was necessary to ensure that project implementation process is in compliance with World Bank’s environmental and social safeguards requirements, as well as the relevant environmental requirements of the Government of Iraq (GoI). Such requirements also include monitoring and reporting criteria. It should be noted that the project site is in an area that is almost difficult for local staff, consultants and World Bank staff to carry out any physical inspection due to prevailing security challenges in the area.

25.  The primary objectives of the audit are to:

- Develop an up-to-date summary of the assessment, monitoring and reporting approaches of project’s potential environmental and social impacts;
• Investigate and verify the project civil work’s compliance with the Occupational Health and Safety standards, and
• Prepare a practical safeguards corrective action plan, as necessary, to remedy any residual or unaddressed adverse environmental or social impacts.
CHAPTER 2: FINDINGS OF THE AUDIT

2.1: Potential Impacts Assessment during Project Preparation

26. Consistent with the World Bank’s Safeguard Policy, an ESIA and the adjoining ESMP were developed to identify, minimize and, where necessary, mitigate potential negative short-, medium- and long-term environmental and social impacts that may result from the project implementation, and likewise enhance any positive impacts.

27. The overall negative environmental and social impacts of the project were predicted to be very limited, unaffected, minor and short-term. Most of the predicted negative impacts were expected to occur during the construction phase of the project. Air quality impact due to dust releases from construction activities and possible minor emissions of NOx, CO, SOx, HC, etc. from fossil fuel combustion at the project site were predicted. Also noise impacts from equipment handling and movement were predicted, however, due to the location of the project site, the increase in noise level may not have any significant impact to human and ecological populations. There was predicted issue of possible ecosystem fragmentation due to project site fencing. There was no prediction of any negative social impacts such as population displacement, physical cultural resources or impact on indigenous people.

28. The ESMP recommended key mitigation measures required to address the identified negative impacts. The recommended mitigation measures for the construction phase of the project include:

- Avoidance and reduction of noise by restricting all noise related activities to daytime operation, and when practicable, minimize the use of noise generating equipment.
- Apply road watering during construction works and after heavy movements.
- Ensure that vehicles and machinery are in good condition in order to minimize gas emissions and noise.
- Ensure that construction preparations are located away from populated areas.
- Animal crossing structures should be regularly maintained to avoid closure.
- Minimizing waste generation.
- General waste must be collected and transported to local council approved disposal sites.
- Refuse containers must be located at each worksite.
- Where practical, waste must be segregated and reused / recycled (e.g. scrap metal).
- Personal protection equipment such as eyeglasses, gloves, hard heads and safety belts must be supplied and worn during work activities.

29. Monitoring and reporting activities are required to ensure proper implementation of the mitigation measures. The monitoring program focuses on noise impact, air quality, and water quality. A matrix table for the Environmental Monitoring and Mitigation Plan (EMMP) is presented in Annex 1.
2.2: Site Observations and Potential Impacts

30. Site visits were conducted in the fall of 2014 for the purpose of assessing and ascertaining the current state of environment at the project site. Through these site visits, it was witnessed that all the expected environmental impacts as described in the ESIA/ESMP were minor, well controlled and mitigated. Nonetheless, the site visit observed some potential impacts and subsequently delineated a safeguards corrective action plan to bring the various unaddressed and residual impacts into full compliance. The observed state of environment included:

- **Soil, Surface and Ground Water Resource Management:** No special corrective actions procedures were required under these classifications, as no significant disturbance, such as erosion was noticed on the soil. Also, no additional corrective steps were needed with respect to surface and ground water resources - there is no surface water in the project area.

- **Air Quality and Noise:** Due to the location of the project area, the noise impact from project activities does not pose any significant harm to human and/or ecological resources. There are issues of combustion emissions from site equipment and vehicle movement. The contractor was previously instructed to take measurements of the levels of PM, NO\textsubscript{x}, and SO\textsubscript{x} using portable monitoring devices. At the time of this visit, measurements have been taken, and corrected results are being awaited. These corrected results will establish the difference between baseline levels and construction phase levels, and subsequently help to determine whether continuous monitoring of air quality will be necessary during the operation phase. A timetable has been established for the data analysis.

- **Ecology:** The contractor has been advised to plant native evergreen plants, trees and vegetation upon completion of construction.

- **Biodiversity Conservation:** According to previously-collected data as well as visual investigations, no impact has been recorded on any species, hence no correction plan is needed in this regard. However, due to water intake created to aid construction activities, the subsequent river bank disturbance may have a minor impact on the aquatic species. The contractor has been advised to limit this impact as much as possible; this impact will attenuate once the construction phase is completed.

- **Cultural Heritage:** There were no physical cultural heritage sites identified during the ESIA/ESMP preparation phase. There was also no “chance finds” of any physical cultural resource during the project implementation phase.

- **Social Aspects:** No displacement and/or resettlement of citizen were recorded during the construction phase and hence no compensation was necessary. The contractor created a source of income to some of the local residents by employing a number of them during the implementation phase.

- **Operational Phase Mitigation and Monitoring Program:** As the project is gradually shifting from construction to operational phase, it is imperative to update and circulate the operational phase monitoring program, including appropriate emergency response plans.
2.3: Monitoring and Reporting Arrangements during Implementation

31. During project preparation stage, the ESIA guidance included a summary of comparison between the mitigation measures developed in compliance with Iraqi standards vis-à-vis the World Bank safeguards requirements. The guidance also advised that the mitigation measures must be consistent with both national environmental laws and regulations and World Bank’s safeguard policies.

32. To ensure that the project implementation processes were in compliance with the Iraqi and World Bank environmental and social standards, periodic monitoring and inspections of the implementation activities as well as the application of the ESMP’s recommended mitigation measures were scheduled from the early stage of the project.

33. Institutional strengthening through training and capacity building are necessary to ensure the effectiveness of the monitoring and reporting processes. Table 2 below presented the scheduled training for the ESIA implementation.

<table>
<thead>
<tr>
<th>Training Activity</th>
<th>Participants</th>
<th>Types of Training</th>
<th>Content (modules, etc.)</th>
<th>Scheduling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental assessment</td>
<td>Resident engineers, contractors</td>
<td>Office lectures, case study</td>
<td>Principles of EIA, methodologies, concepts, objectives</td>
<td>10 days</td>
</tr>
<tr>
<td>Environmental and social applications in the projects</td>
<td>Resident engineers, contractors</td>
<td>Office lecturing, social survey</td>
<td>General concepts</td>
<td>7 days</td>
</tr>
</tbody>
</table>

34. During the initial phase of the project (mid-2013), there were scheduled monthly monitoring reports. However, in early 2014, these monthly monitoring reports ceased, primarily due to the inability of the safeguards consultants to gain access to the project site because of heightened security concerns.

35. Prior to this period, the recurrent safeguards issues noted at the project site included the following:

- Emission of a large amount of fine dusts and particulate matter due to the excavation, digging, movement of machines, and other construction activities, accentuated by dust from sand storms and other weather effects;
- Similarly, emission of pollutant gases such as NOx, SOx, and CO, HC, etc. released due to the use of a portable electrical generators on-site;
- Noise harmful to unprotected workers due to the use of lorries, cement mixers, etc.;
• Need for precautions (not mentioned in ESMP) ensure that construction activities do not damage existing infrastructure within the working area such as communication cables, raw water pipe lines, etc.; and
• Periodic tests to ensure that the concrete works do not contaminate the ground water, as the site is adjacent to the river, where the water table is close to the ground surface.

2.4: Occupational Health and Safety aspects of the Selected Sites

29. Mitigation measures specific to addressing the onsite occupational health and safety issues were revised with the contractor. The contractor had previously submitted a safety plan, which was approved. However, some deficiencies in the safety equipment were observed, and the contractor had made a commitment to rectify all the deficiencies as necessary. The contractor was also advised to keep record of accidents and/or occupational injuries on site, and carry out periodic inspection of the onsite fire extinguishers.
CHAPTER 3: CORRECTIVE ACTION PLAN

30. Corrective action plan is necessary to remedy the unaddressed and/or residual negative environmental impacts that may have occurred during the project implementation process. The recommended corrective measures include the following:

1. Installation of a screen over the intake pipe for protection of the pipe, which is in the river;
2. Proper onsite vehicle and equipment management continuous measurements of air, noise, surface and groundwater qualities;
3. A system for record-keeping of on-site accidents and injuries;
4. Installation of a chlorine submerged basin and shower facility, as now mandated by GoI law;
5. Consistent checking of fire extinguishers to ensure their viability;
6. Creation of a Grievance Redress Mechanism for the operational phase; and
7. A comprehensive staff training programs for effective monitoring and reporting, including emergency response measures during the operational and maintenance phase water treatment plant.

31. Also as part of the corrective action plan, it is necessary for the project managers as well as relevant staff members to be sufficiently trained on operational phase workers’ health and safety standards, emergency response procedures, etc. The recommended training schedule is presented in Table 3.

Table 3. Wasit Operational Phase Training Recommended

<table>
<thead>
<tr>
<th>Training Activity</th>
<th>Participants</th>
<th>Scheduling</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESIA/ESMP requirements for operational phase</td>
<td>Site manager, site engineer, and other operational staff</td>
<td>1 day</td>
</tr>
<tr>
<td>Operational phase environmental mitigation and monitoring</td>
<td>Site manager, site engineer, and other operational staff</td>
<td>1.5 days</td>
</tr>
<tr>
<td>Grievance Redress Mechanism basics</td>
<td>Relevant ministry staff, site manager, site engineer, and other operational staff</td>
<td>1 day</td>
</tr>
</tbody>
</table>

32. The suggested corrective actions have been shared with and agreed to by the contractor as a part of the fall 2014 site inspections. In order to ensure the effectiveness of the environmental and social corrective actions, the actions implementation processes have been categorized into short-, medium- and long-term

3.1: **Short-term Plan**

33. The short-term corrective action plan will include continuous monitoring of the construction-phase elements of the Environmental Mitigation and Monitoring Plan (EMMP), to
be accompanied by a constructive escalation mechanism in the event of any violation or non-compliant issues. Most specifically, the Ministry of Environment must follow-up on all the environmental tests and measurements for air quality, noise and water quality with the, and in the event of any deviation from the standard, prompt mitigation(s) must be advised. It is also advised to purchase and install a screen to cover the intake pipe in the river, so that it is more protected from damage from boats, etc. Lastly, a chlorine submerged basin and shower facility should be procured and installed in order to bring the facility up to current GoI code.

3.2: Medium and Long-term Plan

34. The Medium to Long term Corrective Actions should focus on: (1) availability and use of air quality and noise monitoring equipment within the site during the remainder of the construction period; (2) application of Bank-compliant storm-water runoff and soil management procedures; and (3) formalization of procedures and protocols for holding public consultations, in order to afford the project affected communities the opportunity to obtain firsthand information on project activities, as well as be informed of their rights if and when adversely affected by project activities. The site does not have a Grievance Redress Mechanism (GRM) in place. The consultation process is perceived as an essential element of a GRM.
CHAPTER 4: CONCLUSIONS

35. The Wasit Water Supply project is a component of the Government of Iraq’s Emergency Water Support Project. Construction phase environmental and social safeguards monitoring and supervision was severely impeded due to heightened security concerns. The environmental and social safeguard audit was conducted to take stock of the current and cumulative environmental and social impacts, as well as ensure that the recommended mitigations measures were effectively incorporated in the project implementation process. Corrective action plan was recommended to ensure the remedy of any deviation or unaddressed negative environmental and social impacts in the safeguard documents (ESIA, ESMP, etc.). The corrective measures suggested include the following:

36. **Corrective Action Plan:** The corrective measures suggested include the following:

1. Installation of a screen over the intake pipe for protection of the pipe, which is in the river;
2. Installation of a chlorine submerged basin and shower facility, as now mandated by GoI law;
3. Proper onsite vehicle and equipment management;
4. Consistent measurements of air (PM, NOx, and SOx) and noise quality, as well as periodic surface and groundwater sampling;
5. A system for record-keeping of on-site accidents and injuries;
6. Consistent checking of fire extinguishers to ensure their viability;
7. Creation of a Grievance Redress Mechanism for the operational phase; and
8. A comprehensive staff training programs for effective monitoring and reporting, including emergency response measures during the operational and maintenance phase water treatment plant.
9. Plant native plants and vegetation upon completion of construction; and
10. Updating and circulation of the operational phase monitoring program, including appropriate emergency response plans.

36. To guarantee the effectiveness of the corrective action plans, the measures will be implemented in a progressive sequence (short, medium, and long term), and the outcomes will be monitored and validated as necessary.
ANNEXES:

Annex 1: Environmental Mitigation and Monitoring Plan (EMMP)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Mitigated Parameter</th>
<th>Location</th>
<th>Mitigation Measures</th>
<th>Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>Dust</td>
<td>Within the site</td>
<td>Wheel washing and damping down of un-surfaced and vegetation free area. (WB)</td>
<td>Once/day</td>
<td>Contractor with the acceptance of the resident engineer</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Retention of vegetation where possible will reduce dust movement. (IS/WB)</td>
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<td></td>
<td></td>
<td></td>
<td>Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighboring area. (WB)</td>
<td>As possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spraying all exposed soil surfaces with water when necessary to reduce dust. (IS/WB)</td>
<td>As required</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A speed limit of 30km/h must not be exceeded on dirty access roads.</td>
<td>As possible</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Within the whole site</td>
<td></td>
<td>Regular servicing of vehicles in order to limit gaseous emissions (to be done off-site)</td>
<td>Once/month</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Regular servicing of onsite toilets to avoid potential odors.</td>
<td>As possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Allocated cooking areas must be provided.</td>
<td>As possible</td>
<td></td>
</tr>
<tr>
<td>Indicator</td>
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<td>Location</td>
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<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise Level</td>
<td>In and around the site</td>
<td>Limit noise to within standard working hours in order to reduce disturbance of residential areas in close proximity. <em>(IS/WB)</em></td>
<td>As possible</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas.</td>
<td>As possible</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Truck traffic should be routed away from noise sensitive areas, where possible. <em>(WB)</em></td>
<td>Daily</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noisy operations should be combined so that they occur where possible at the same time.</td>
<td>Daily</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Construction activities are to be contained to reasonable hours during the day. <em>(WB)</em></td>
<td>As possible</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order.</td>
<td>As possible</td>
<td>Contractor with the acceptance of the resident engineer</td>
</tr>
<tr>
<td>Flora</td>
<td>Vegetation cover, plants, trees</td>
<td>In and around the site</td>
<td>No special mitigation needed as there is no serious impact in this field. <em>(IS/WB)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fauna</td>
<td>Animals, pets</td>
<td>In and around the site</td>
<td>No special mitigation needed as there is no serious impact in this field. <em>(IS/WB)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Placing speed limit signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Management</td>
<td>Rubbish</td>
<td>In and around the site</td>
<td>Construction rubble was disposed of in pre-agreed dumps that have been approved by the relevant Municipality. <em>(IS/WB)</em></td>
<td>Daily</td>
<td>Contractor with the approval of the resident engineer, consultant and the environmental directorate authority in the governorate</td>
</tr>
<tr>
<td>Indicator</td>
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</tr>
</tbody>
</table>
| **Litter**        |                     | In and around the site | Refuse bins were placed at strategic position to ensure that litter does not accumulate within the construction site.  
Waste generated on site were separated into glass, plastic, paper, metal and reused if possible. (WB)  
Littering by the construction workers shall not be allowed under any circumstances. | As possible        | Contractor                                                          |
| **Hazardous waste** | In and around the site | Periodic inspection | Periodic inspection of equipment maintenance.  
All hazardous materials must be carefully stored, and then disposed of offsite at a licensed landfill site. (WB)  
Contaminated waste to be stored safely to avoid spillage. (IS/WB)  
Machinery must be properly maintained to keep oil leaks in check. | As possible / as needed | Contractor with the approval of the resident engineer |
| **Health and Safety** | Accidents and injuries | In and around the site | First aid facilities must be available on site at all times. (IS/WB)  
Implementation of safety measures, work procedures and first aid must be implemented on site. (WB)  
All equipment is maintained in a safe operating condition.  
Personal Protective Equipment (PPE) will be made available all construction staff. Helmets and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. (IS/WB)  
Adequate warning signs of hazardous working areas. (WB)  
Emergency numbers for local police and fire department will be placed in a prominent area.  
Firefighting equipment will be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. (IS/WB) | Daily              | Contractor with the approval of the resident engineer |
<p>| | | | | | |
|                   |                     |                        |                                                                                       |                    |                                                      |</p>
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</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Water pipes and connections</td>
<td>In the site</td>
<td>Any water pipes and connections and related items must not be affected by the construction activities. <em>(WB)</em></td>
<td>As required</td>
<td>Contractor with the approval of the resident engineer</td>
</tr>
</tbody>
</table>
| Traffic   | Congestion          | In the site | Good Traffic management  
Provision of alternative access roads/ by-passes where feasible.  
Access of the construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. | As possible | Contractor with the approval of the resident engineer |

*IS: Iraqi standards; WB: World Bank Requirements*