



REPUBLIC OF LEBANON
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
LEBANON ROADS AND EMPLOYMENT PROJECT
LOT 5 - PACKAGE 1 - TRIPOLI CAZA

Final
October 2020



EXECUTIVE SUMMARY

INTRODUCTION

The Government of Lebanon (GOL) has solicited and obtained World Bank (WB) financing for the Roads and Employment Project (REP). The Council for Development and Reconstruction (CDR) is acting as the executing agency on behalf of the GOL and its Council of Ministers (COM). The REP involves rehabilitation activities that are confined within the alignments of existing roads with no road widening, no involuntary resettlement, and no land acquisition. As such, the WB classified the REP as a category B project that require the preparation of an Environmental and Social Management Plan (ESMP) for its sub-components. Accordingly, a series of ESMPs were stipulated to be prepared for these roads and put together by CDR in packages for bidding purposes. In this context, CDR awarded the contract number 20379 to TEAM International, hereinafter referred to as the Consultant, to prepare the assessment, design and ESMPs for roads in the districts of Batroun, Bcharre, Koura, Tripoli, Baalbeck, and Hermel. This ESMP is concerned with roads within the Tripoli district.

PROJECT DESCRIPTION

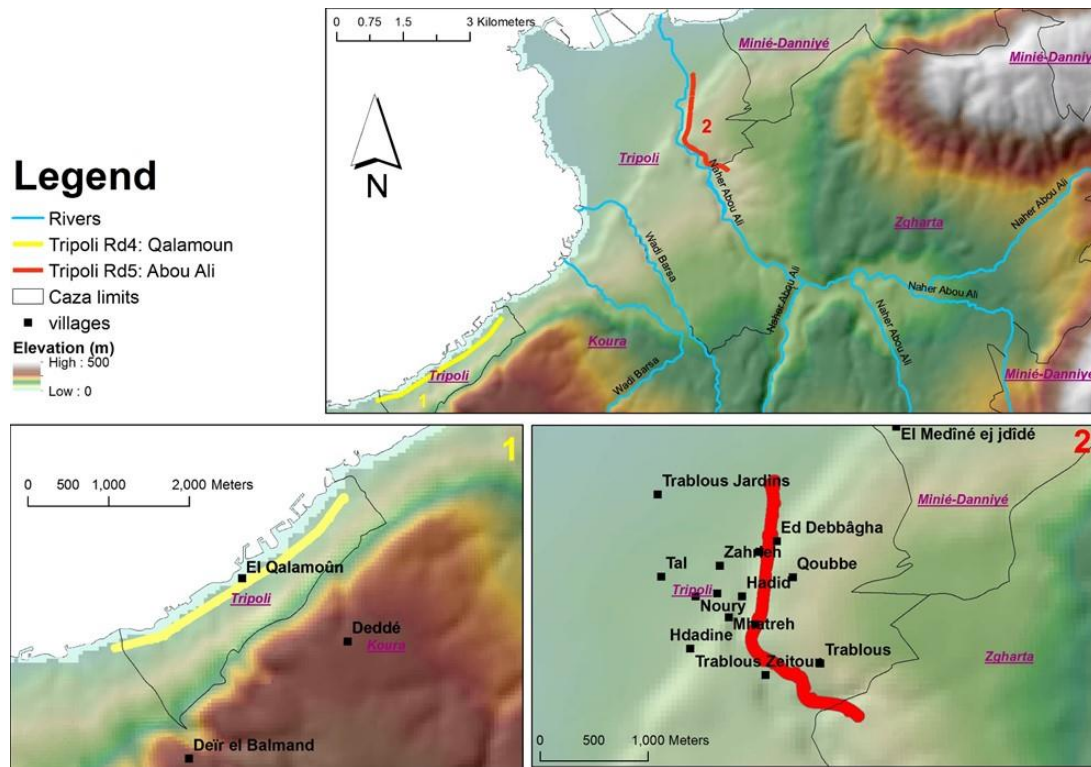
The REP consists of the rehabilitation, maintenance, and minor construction. Activities to be performed during the project vary between one road and the other, depending on the road rating in terms of the condition of the pavement, shoulders, potential flooding and drainage, potential landslide/soil erosion and retaining walls, pedestrian walkways, and addition or rehabilitation of street lighting.

The land acquisition did not occur during the design of any road under study. In the Tripoli district, two roads are proposed (Figure I) whose details are elaborated within the ESMP.

- Road 4 in Tripoli Caza starts at the Sea Side Road at Las Perlas Beach and extends south for 3.5 km towards the southern borders of the town of Qalamoun.
- Road 5 in Tripoli Caza starts at the Abou Ali roundabout and extends east for 2.8 km till it reaches the Tripoli-Zgharta Caza limits connecting with the existing Tripoli-Zgharta main road along the south side of Abou Ali River.

During the execution of rehabilitation activities, roads will not be closed or shutdown. Before the execution of rehabilitation works, the Contractor will secure the access and traffic movement via other alternative routes and means in coordination with the related Municipality. The duration of the project is 18 months with a one -year liability period. It is assumed that an estimate total number of workers shall range between 150 and 250. These workers must be hired preferably from the surrounding local communities (including Syrian labors that reside in the concerned project areas)

Figure I. Proposed roads within Tripoli Caza (District)



Source: Layers by CNRS

BASELINE ASSESSMENT

The environmental and social assessment recorded the existing conditions within the project area including physical, biological, and socioeconomic conditions prior the project implementation and operation. Baseline data and field surveys were conducted to describe the status of the following environmental receptors: air quality, water quality, soil quality, geological conditions, climate and meteorology, natural habitats and biodiversity, land-use/land-cover, acoustic environment, cultural resources, and socio-economic conditions (employment opportunities, labor influx, social tensions, labor induced Sexual Exploitation and Abuse (SEA) Sexual Harassment (SH), occupational health and safety).

The topography of the studied roads was analyzed using digital elevation slope model and contour line maps provided by CNRS. The two existing roads pass over the coastal plane with elevations varying between sea-level up to 33 m ASL. Road 4 (Qalamoun Seaside Road) is a coastal relatively flat road with a constant elevation of 8 m ASL. Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit), has elevations varying between 12 m and around 33 m ASL. Steep slopes saddle Road 5 as it traces the natural valley created by the Abou Ali River.

The geology of the studied roads was investigated for outcropping formations, subsurface stratigraphy, structure (faults, folds, seismic, etc.), hydrogeology (groundwater and sea water intrusions) and hydrology (surface water). Assessments showed Tripoli Road 4 falls completely on a Miocene (mcg) formation consisting of conglomerates and limestone. Tripoli Road 5 falls on two different formations equally, which are the Miocene (mcg) and Quaternary (q).

In context of surface and groundwater potential, the study showed that Road 5 crosses Abou Ali River at Abou Ali roundabout-Tripoli/Zgharta limit. In addition, this borders the Abou Ali River channel, starting from the Abou Ali Roundabout and moving east for more than half its length. The

river is highly contaminated due to the continuous discharge of anthropogenic raw sewage and solid waste. It is worth to mention that a wastewater plant with secondary level treatment is located immediately to the north at the mouth of Abou Ali river. The plant is equipped with a sea outfall and is currently serving Tripoli coastal area, Al Qalamoun, some sections of the Districts of Koura and Zgharta, in addition to the coastal areas of Beddaoui, Deir Amar and Minieh.

Data regarding air pollution levels in the area was also obtained. The study showed that the concentrations collected by the MoE stations for all criteria air pollutants in 2018 for the studied area are within the national ambient air quality standards defined by MOE Decision 52/1. However, TSP and PM measurements were collected by the Tripoli Environmental and Development Observatory (TEDO) in 2008, which showed that TSP values exceeded the Daily National Standard of $120 \mu\text{g}/\text{m}^3$ 25 times out of 105 measurements. Moreover, the mean $\text{PM}_{2.5}$ in downtown Tripoli ($34.6 \mu\text{g}/\text{m}^3$) was consistently higher than $\text{PM}_{2.5}$ values at the seafront station ($23.6 \mu\text{g}/\text{m}^3$), principally due to heavier traffic in downtown Tripoli

Regarding natural habitats and biodiversity, given the nature of the project, the direct influence area concerns existing roads. Consequently, a rapid biological assessment has been carried out to draw the ecological profile of the adjacent areas to the concerned roads. The field investigation did not aim for an exhaustive inventory of the biodiversity of the project area but a general overview of present species (mainly flora) and habitats.

Overall, the natural environment in the study area is degraded by heavy urbanization with limited agricultural activity and does not harbor pristine habitats of particular conservation importance. More specifically, the natural cover along Road 4 (Qalamoun Seaside Road) covers a total of 28 percent of the area 50 m from both sides of the road and consists predominantly of grasslands (11.4 percent), scrublands (10.9 percent), and scrublands with some dispersed bigger trees (6.2 percent). As for Road 5, natural vegetation covers only 0.2 percent of the area and consists of grasslands. The remaining vegetative cover along this road is mainly agricultural in nature and consists of olives and citrus trees. Out of the whole study area of Road 5, 14.2% is olive trees and 4% consists of citrus fruit trees.

Finally, a socio-economic assessment was conducted in the project area to map the demographic, social, and economic baseline conditions at the level of Tripoli Caza. The assessment allowed drawing conclusions regarding the project's potential impacts on the socio-economic conditions of the study area.

The population in the villages that are directly served by the roads is around 428,140. According to the 2016 statistics by UNHCR, there are around 96,229 registered refugees in the Tripoli urban area with 33% (31,797) being Palestinian refugees.

Road 4 (Qalamoun Seaside Road) and Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) are both surrounded by urbanized areas with residential units, and commercial shops . A particular feature on a 700 m stretch of Road 5 is the existence of street vendors selling vegetables, fruits and clothes on the western sidewalk of this road. As per the site visit of August 2020, those vendors are located at 5m distant from the borderline of Road 5. None of them is located or occupying the street.

Moreover, there are several Primary Healthcare Centers (PHCs), hospitals and schools in Tripoli, however, none were encountered directly along the proposed roads. Further, there are no sites of cultural heritage significance that are located directly along the roads to be rehabilitated.

In the context of traffic volume, the average daily traffic (ADT) for the two roads was monitored by traffic stations. Traffic on Road 4 (Qalamoun Seaside Road) is 2.5 times higher than that on Road 5 (Abou Ali Roundabout-Tripoli/Zgharta limit), being an important link to Tripoli and Akkar, with Road 4 exhibiting an ADT of 25,450 vehicles per day on both sides and Road 5 exhibiting an ADT of 10,121 vehicles per day.

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The rehabilitation phase of any development is known to have potential adverse impacts on several indicators including traffic, air quality, noise level, construction waste, water and soil quality, landscape and visual intrusion, resources consumption, damage to existing utilities, health and safety, as well as socio-economics. During the rehabilitation phase, these impacts are temporary with the majority being minor or moderately negative (Table I). During operation, the rehabilitation of the road, combined with the natural increase in the vehicle fleet size, will ultimately increase traffic volume and hence, typical impacts associated with increased traffic will be inevitable in the long term. Yet, improved traffic flow on rehabilitated roads will lead to improved fuel efficiency and better engine performance, thereby reducing vehicle emissions and maintenance. Rehabilitated roads can lead to improved landscape and visual intrusion, albeit some increase in light glare. Finally, improved safety design of roads can reduce the potential for accidents. The magnitude and significance of these impacts is similar along both roads.

Table I. Summary of potential impacts of proposed roads in Tripoli district

<i>Potential Impact</i>	<i>Rehabilitation phase</i>	<i>Operation phase</i>	
<i>Traffic</i>	Major negative	Minor negative to	Positive
<i>Air quality</i>	Moderate negative	Minor negative to	Positive
<i>Noise</i>	Moderate negative	Minor negative to	Positive
<i>Biodiversity</i>	Neutral	Neutral	
<i>Construction Waste</i>	Major negative	Neutral	
<i>Soil and water</i>	Moderate negative	Minor negative to Zero	
<i>Resources consumption</i>	Moderate negative	Neutral	
<i>Existing infrastructure</i>	Minor negative	Neutral to	Positive
<i>Visual Intrusion</i>	Minor negative	Minor negative to	Positive
<i>Health and Safety</i>	Moderate negative	Minor negative to	Positive
<i>Socio-Economic</i>	Moderate negative	to Positive	Positive
<i>Street Vendors on Road 5</i>	Minor negative	to Positive	Positive
<i>Archaeology / Cultural Heritage</i>	Minor negative	Neutral	
<i>Expropriation/involuntary resettlement</i>	Neutral	Neutral	

As for socio-economic impacts, during the rehabilitation phase, they are expected to be positive in terms of providing job opportunities and moderately negative in terms of temporary increase in travel time, impeded accessibility to residences / businesses, and potential health and safety, and social tensions that could lead to exploitation, abuse and harassment.

Regarding the street vendors bordering Road 5, it is important to mention that the REP will possibly result in positive impacts on the socio-economic conditions of the street vendors as workers during the rehabilitation works might buy their needs from the stalls of street vendors.

During the operation phase, the rehabilitation of roads is expected to have positive impacts by improving access to remote areas, reduced trip times, reduced traffic congestion, and enhanced livelihood opportunities.

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

Mitigation Plans

While the road rehabilitation is associated with some potential negative impacts, most of them can be alleviated. Tables II and III present a summary of environmental and Table IV of social mitigation measures that should be adopted to eliminate or minimize these impacts.

Table II. Environmental and Social Mitigation Plan for the Tripoli district roads during the rehabilitation phase

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Traffic delays and congestion	<ul style="list-style-type: none"> <input type="checkbox"/> Schedule transportation of construction materials during off - peak traffic hours and during nighttime. Generally peak traffic hours are from 7 to 10 am and from 3 to 6 pm. <input type="checkbox"/> Develop routing strategies for construction-related traffic to avoid sensitive receptors <input type="checkbox"/> Inform the public about the schedule of rehabilitation activities <input type="checkbox"/> Maintain access to roadside businesses, resorts, and residences via detours and temporary access features <input type="checkbox"/> Ensure adequate warning, signing, delineation and channeling at least 500 m down and up-gradient from the construction site. <input type="checkbox"/> Provide personnel to manage traffic at the rehabilitation site, supported by Municipal police if need be <input type="checkbox"/> Avoid peak traffic times when laying asphalt and to the extent feasible, schedule construction activities outside peak hours while always keeping part of the road accessible particularly road 5 near the vegetable market and the coastal road 4 during the summer where many sea resorts are located. 	<ul style="list-style-type: none"> <input type="checkbox"/> Contractor 	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Air emissions	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure adequate maintenance and repair of construction machinery and vehicles; <input type="checkbox"/> Maintain good housekeeping practices that keep the site and its surroundings clean <input type="checkbox"/> Ensure good quality of diesel fuel used with on-site equipment <input type="checkbox"/> Turn off all equipment when not in use <input type="checkbox"/> Sprinkle water on the construction site on windy days to hamper the generation of dust and its entrainment in the wind <input type="checkbox"/> Ensure that excavated soil and fine construction material that are stored on site are properly sited away from the dominant wind direction and that they are watered and/or covered entirely by impervious sheeting when not in use <input type="checkbox"/> Handle cement material properly 	<ul style="list-style-type: none"> <input type="checkbox"/> Contractor 	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<ul style="list-style-type: none"> ❑ Keep hauling routes free of dust and regularly cleaned ❑ Ensure good quality of fuel is used in trucks transporting construction material to and from site ❑ Ensure optimum and regular transportation of construction materials to minimize storage of large heaps on-site and to minimize concentrated truck-trips. ❑ Cover all vehicles hauling materials likely to give off excessive dust emissions; ❑ Restrict vehicle speeds to 25km/h on unpaved roads and trucks 			
Increased noise levels	<ul style="list-style-type: none"> ❑ Use quiet/well-maintained equipment ❑ Regularly maintain equipment and turn them off when not in use ❑ Use operational noise mufflers ❑ Limit construction activities to working hours designated by decision number 2/163 – 31/1/1995 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Generation of construction waste	<ul style="list-style-type: none"> ❑ Minimize the generation of construction waste ❑ Adequately sort construction waste to remove any hazardous substances ❑ Reuse inert waste materials as filling material for road reconstruction where feasible ❑ Establish an arrangement with the municipality and the North Lebanon Governor to secure suitable locations for construction waste disposal 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Pollution of soil and water resources	<ul style="list-style-type: none"> ❑ Minimize usage of chemicals (lubricants, oil, solvents) ❑ Ensure the proper storage of building materials, asphalt, oil and chemicals on-site in well- controlled areas and away from riverbanks ❑ Do not discharge wastewater into river or on soils ❑ Do not discharge waste oil into rivers or on soils ❑ Contractor to provide mobile/portable cabin toilet linked to the existing wastewater network. When the latter is absent within the work zone, the toilet is linked to a polyethylene storage tank that is emptied when full into the nearest wastewater network. ❑ For vehicles and equipment, the Contractor will have to rent a land within the Project area. This land should be fenced and used for parking purpose only. The Contractor shall not perform any repair on site and is obliged to execute vehicles and equipment maintenance in a repair shop preferably located within the Project area. ❑ Waste material or water containing waste chemicals such as thinners, oil, and mineral spirits shall not be pumped or disposed of into storm water drains, sanitary sewers or into the ground. ❑ Cover any stockpiled construction material covered with an impermeable layer. ❑ Store diesel in designated tanks away from the road maintenance site and drainage ditches. Place it on an elevated concrete base to prevent soil or water pollution in case of accidental spill at the specified storage location. ❑ Conduct all refueling operations off-site. Fuel vehicles up before arriving to the road section. ❑ Decrease water usage ❑ Maintain surface water drainage ❑ Ensure that in the event of any fuel or chemical spills, the affected area is attended to and that the top soil is removed for disposal. A spill response plan shall be in place and all workers should be trained on its implementation. 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<ul style="list-style-type: none"> ❑ Control over vehicle hauling hazardous materials ❑ Clean the site periodically ❑ Each receptacle should be marked with the correct technical name of the substance it contains. ❑ Incompatible materials shall not be placed in common containment. ❑ Used or waste fuel or other waste chemicals shall be stored in an isolated area until collected for off-site disposal by an approved waste contractor. ❑ Vehicle and equipment wash-down should only be done in designated areas away from the road under rehabilitation to protect water and soil quality in the area. ❑ A collection system shall be provided under any machinery or equipment that may leak hydrocarbons (e.g. mobile generator). ❑ Control all operations involving the use of concrete to avoid leaching into water sources. ❑ Provide bins on-site for the disposal of non-construction related wastes ❑ Work with the municipalities to include the site on the current solid waste collection route ❑ Minimize soil exposure time ❑ Install retaining walls before starting with drainage ditch excavations to block soil erosion ❑ Carry out excavations for drainage channels in complete precision and transport resulting excavated soil to offsite locations for proper disposal in case of contamination. ❑ Reduce the time excavated drainage channels remain unsupported ❑ Keep vegetation clearing to a minimum and encourage re-vegetation immediately after construction activity finishes, at sites where vegetation is removed, 			

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Resources consumption	<ul style="list-style-type: none"> <input type="checkbox"/> Replace wet cleaning methods with dry clean-up methods whenever practical (sweeping, dust collection vacuum, wiping...etc.), while taking into consideration dust generation. <input type="checkbox"/> Install signs near water-using appliances to encourage water conservation. <input type="checkbox"/> Use appropriate water proof sheeting to cover the concrete after water curing to preserve moisture and reduce the evaporation that leads to decrease water quantities used <input type="checkbox"/> Turn off equipment when not in use <input type="checkbox"/> Regularly maintain machinery and generators and operate them in an efficient manner. <input type="checkbox"/> Do not leave vehicles idle for long periods. <input type="checkbox"/> Site offices shall be well insulated to retain heat or cool, utilize energy efficient bulbs and energy efficient cooling systems. <input type="checkbox"/> Reuse excavated material whenever feasible <input type="checkbox"/> Accept construction material only from permitted quarrying sites 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Existing infrastructure	<ul style="list-style-type: none"> <input type="checkbox"/> Consult with municipality engineers to obtain information on existing shallow infrastructure prior initiation of works. Execute trial pits in case information is not readily available and only if necessary. <input type="checkbox"/> Develop procedures for rapid notification of the concerned municipality/ ministry, in the case of disruption of any existing utility, along, with requirements for immediate assistance with re-instatement, and close follow-up with concerned authorities 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Visual intrusion	<ul style="list-style-type: none"> <input type="checkbox"/> Document existing conditions prior to initiation of the works <input type="checkbox"/> Preserve existing vegetation when feasible <input type="checkbox"/> Restore depleted vegetative cover by replanting with endemic trees (pine, oak, etc.) where cutting is necessary during rehabilitation. <input type="checkbox"/> Clearance all equipment, spoil heaps, and other materials after construction <input type="checkbox"/> Ensuring that the street light source has minimum intensity needed. 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Health and safety	<ul style="list-style-type: none"> <input type="checkbox"/> Follow CDR's and WB's safety, health and environmental regulations and guidelines <input type="checkbox"/> Ensure the construction sites are completely enclosed and restrict entrance to construction personnel <input type="checkbox"/> Create buffer zones around the site and provide pedestrian walkways <input type="checkbox"/> Ensure traffic by-passes in working areas <input type="checkbox"/> Install clear warning signs <input type="checkbox"/> Provide adequate loading and off-loading space within the site itself <input type="checkbox"/> Provide appropriate personal protective equipment to construction workers, including helmets and earmuffs) <input type="checkbox"/> Provide on-site first aid kit with adequate content (ex. including antiseptic fluid, gauze, cotton etc. and other items that are needed to deal with any cuts and bruises) <input type="checkbox"/> Provide accident insurance for workers <input type="checkbox"/> Report incidents to the WB within 48 hours 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Socio-economics	<p>Social Tensions</p> <ul style="list-style-type: none"> Develop and communicate clear criteria for job selection and allocation, with attention to ratio of Syrian and Lebanese community workers, non-discrimination and fair treatment of all workers including equal contractual wages/benefits and working conditions, types of positions and jobs restricted to Lebanese citizens, and consideration also for sub-group allocations within different communities. Ensure work permit requirements are satisfied in accordance to the Ministry of Labor regulations Clear communication with all affected workers and a robust GRM are essential to mitigate the potential risk of social tensions or dissatisfaction among Syrian and Lebanese workers. <p>Child Labor</p> <ul style="list-style-type: none"> Child labor under this project will not be allowed through a transparent hiring process that maintains a registry of verification about work permits and age. Particular attention is essential to prevent child labor by maintaining and monitoring a labor registry for age verification process prior to hiring potential workers. <p>Labor Influx</p> <ul style="list-style-type: none"> Providing workers with the necessary training and awareness raising session on issues regarding SEA/H, prior to signing the CoC (refer to Annex D). Obliging employees to attend an induction training course prior to commencing work on site to ensure they are familiar with the company's commitments to address GBV, in specific, SEA/H and the project's CoC. Repeating training and awareness raising on a regular 	<input type="checkbox"/> Contractor	Consultant on-site engineer responsible for HSE supervision amongst other tasks	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p>basis as new staff commence work on the project.</p> <ul style="list-style-type: none"> • Informing laborers regarding national laws that prosecute perpetrators of SEA/H • Providing CoC in a language understood by the workers who will sign the CoC. • Ensuring requirements in CoCs are clearly understood by those signing it. • Ensuring that the sanctions embodied in the CoC are be clearly explained. • Ensuring that workers at the rehabilitation site sign the CoC (refer to Annex D) that targets GBV risks, specifically SEA/H induced by labor influx, and penalizes the perpetrators of SEA/H. • Verifying that GRM (refer to section 8.3) is adequately implemented to record complaints from the surrounding communities and workers onsite, to find adequate resolutions and implement corrective actions. <p>Access to Services</p> <ul style="list-style-type: none"> • The Contractor should ensure adequate and timely communication with the concerned municipalities and dissemination of project-related work schedule with the surrounding community. • Nearby communities should be informed of the exact timing of activities prior to the commencement of works. • The rehabilitation works should not be performed during peak traffic hours to ensure that access to surrounding sensitive receptors and residential areas is not hindered. • During rehabilitation of long roads, the Contractor should work on one small segment at a time, to avoid disturbance of the surrounding sensitive receptors for a long period of time. • Clear communication with all PAPs and a robust GRM should be adequately implemented and disseminated. <p>Traffic</p>			

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<ul style="list-style-type: none"> • It is important to note that full road closures won't be done as all closures will be of partial nature; detours will comprise of merely temporary diversions. • Informing the public about the schedule of rehabilitation activities • Maintaining access to roadside businesses and residences via detours and temporary access features • Avoid peak traffic times when laying asphalt and to the extent feasible, schedule construction activities outside peak hours while always keeping part of the road accessible particularly road 5 near the vegetable market and the coastal road 4 during the summer where many sea resorts are located. <p>Street Vendors on Road 5 (700 m stretch)</p> <p>Coordinate with the Municipality the schedule of rehabilitation activities before the execution of any work onsite taking into consideration the below special measures:</p> <ul style="list-style-type: none"> ○ The rehabilitation works should not be performed during working hours (8 a.m. to 5 p.m.) of the vendors. It is highly recommended to execute the rehabilitation work activities in the early morning and/or after the end of working hours and avoid working during night time. ○ Dissemination of project-related work schedule with the vendors in culturally appropriate languages and written in clear and understandable manner ○ A robust external GRM should be adequately implemented and disseminated in culturally appropriate languages and written in clear and understandable manner. Make sure that vendors will have access to this GRM. ○ Timely completion of the rehabilitation phase 			

Table III. Environmental and Social Mitigation Plan for the Tripoli district roads during the operation phase

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Traffic congestion & delays	<input type="checkbox"/> Maintain road safety infrastructure	<input type="checkbox"/> MOPWT	<input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Noise	<input type="checkbox"/> Provide speed limit signs at critical locations and enforce speed limit <input type="checkbox"/> Regularly maintain the roads	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Water and soil quality	<input type="checkbox"/> Maintain surface water drainage systems	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Resource consumption	<input type="checkbox"/> Using water-efficient equipment during maintenance operations to avoid excessive and overuse of water	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Visual intrusion	<input type="checkbox"/> Ensuring that lights are turned off by a timer or manually when they are not needed.	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Health and safety	<input type="checkbox"/> Follow CDR's and WB's standard safety, health and environmental regulations during maintenance works <input type="checkbox"/> Proper road management, signage and maintenance	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Socio-economics	<p>Socio-economic impacts during operation are expected to be positive (due to improved overall road safety). However, some measures are necessary to ensure that positive impacts are maximized. These measures include the following:</p> <ul style="list-style-type: none"> • Ensure that workers during the maintenance phase sign the CoC that targets GBV risks and penalizes the perpetrators of GBV. • Ensure that GRM mechanism is functional to receive any public concerns throughout this phase and to address the received complaints within the set timeframe (specified in section 8.2) <p>Knowing that any maintenance activities that might be required within the One Year Liability Period are considered a subset of the works done during the rehabilitation phase, the corresponding mitigation measures are presented in Table 6-1.</p> <p>It is also important to note that possible maintenance during this period, if any is deemed necessary, is expected to be very limited in terms of duration and impact with respect to similar works during rehabilitation.</p>	<input type="checkbox"/> Contractor	<input type="checkbox"/> Consultant on-site engineer responsible for HSE supervision amongst other tasks	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation

Monitoring Plan

Since the project is a category B, monitoring activities for such projects rely primarily on visual observation and documentation with photos although measurements of certain indicators (traffic count, air / water quality and noise level) can be conducted upon public complaints. The project supervising consultant holds the responsibility of monitoring activities during the rehabilitation phase to ensure the implementation of the mitigation plan by the contractor. Upon public complaints, a third party (consultant) can also be appointed by CDR to conduct periodic monitoring with measurements of environmental indicators depending on the nature of the complaint. Table V presents a summary of monitoring indicators / activities during the rehabilitation phase.

During the operation phase, regular monitoring activities become more part of the duties and responsibilities of local municipalities and stakeholders. Similar to the rehabilitation phase, upon public complaints, a third party consultant can also be appointed by CDR (up to 2 years after project completion) to conduct periodic monitoring with measurements of environmental indicators depending on the nature of the complaint (Table VI).

During the rehabilitation phase, the Supervising Consultant shall submit a quarterly report about the monitoring activities to various stakeholders including the CDR and the municipalities. These reports shall be made readily available or accessible to the public upon submittal. The content of a typical report should mirror the indicators of the mitigation plan with proper documentation with photos and actions taken in the event of accidents, concerns or complaints.

Table V. Environmental and Social Monitoring Plan for the Tripoli district roads during the rehabilitation phase

<i>Impact</i>	<i>Monitoring activities</i>	<i>Responsibility</i>	<i>Frequency/ Duration</i>	<i>Location</i>	<i>Methods</i>	<i>Estimated Cost¹</i>
<i>Traffic</i>	Continuous supervision with periodic documentation with photos of mitigation measures (congestion, traffic disruption, speed limits, working hours, the presence of a traffic police and construction worker at detours)	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Air quality</i>	Continuous supervision with periodic documentation with photos of mitigation measures (vehicle and excavation emissions, turning off of equipment not in use, equipment maintenance, type of fuel used on site and in hauling trucks, speed limits, cleanliness of site, water spraying, storage conditions of soil and fine construction material, working hours, schedule of material transportation	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	Total Suspended Particles (TSP), PM ₁₀ , PM _{2.5} (wherever feasible), SO _x , NO _x and CO	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	1-hr measurements, and visual observation of dust dispersion (scale and direction)	2000\$/event

<i>Noise</i>	Continuous supervision with periodic documentation with photos of mitigation measures (equipment mufflers, equipment maintenance, equipment turned off when not in use, speed limits, working hours) and measurements of indicators in case of public complaints	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	L_{eq} , L_{min} and L_{max}	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	Single sample per location (average 1hr reading-15min intervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	500\$/ event
<i>Construction and other solid waste</i>	Continuous supervision with periodic documentation with photos of mitigation measures while maintaining a record of waste generation, collection, segregation, storage, transportation and disposal in terms of type, quantity, and disposal location of generated waste	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Runoff water/ drainage</i>	Continuous supervision with periodic documentation with photos (chemical usage, chemical and material storage, water usage, wastewater discharge from mobile/portable toilets and storage tanks into existing or nearest sewage network, bins for solid waste disposal, oil spill management) while checking on culverts particularly following rainfall events	Supervising Consultant Contractor	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	Water quality analysis	Supervising Consultant	Upon public complaint	At nearby river/ stream	Totals suspended solids, BOD, COD, Oil and grease	1000\$/ event

<i>Resource consumption</i>	Continuous supervision with periodic documentation with photos of reuse of excavated material, water and energy conservation practices and design elements	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Existing infrastructure</i>	Continuous supervision with periodic documentation with photos of excavation and response to disruption of underground utilities	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Visual intrusion</i>	Continuous supervision with periodic documentation with photos of excavation and re-planting / re-vegetation while checking on culverts particularly following rainfall events	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Health and Safety</i>	Continuous supervision with periodic documentation with photos (PPE, site enclosure, buffer zones, warning signs, first aid kit, accident insurance), while maintaining a record of injuries / accidents specifying cause and location	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Socio-economic</i>	Continuous supervision with periodic documentation with photos of mitigation measures while maintaining a record of employment and grievance, sharing construction schedule with the public, access to roadside businesses, street vendors and residences, and grievance record. Documentation of training and raising awareness for SEA/H and signing of the code of conduct as well as record of age verification against child labor.	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks

Table VI. Environmental and Social Monitoring Plan for the Tripoli district roads during the operation phase (up to a year after project completion)

<i>Impact</i>	<i>Monitoring activities</i>	<i>Responsibility</i>	<i>Frequency/ Duration</i>	<i>Location</i>	<i>Methods</i>	<i>Estimated Cost</i>
<i>Air quality</i>	Total Suspended Particles (TSP), PM ₁₀ , PM _{2.5} (wherever feasible), SO _x , NO _x and CO	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	1-hr measurements, and visual observation of dust dispersion (scale and direction)	2000\$/event
<i>Noise</i>	L _{eq} , L _{min} and L _{max}	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	Single sample per location (average 1hr reading-15min intervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	500\$/ event
<i>Water</i>	Totals suspended solids, BOD, COD, Oil and grease	Supervising Consultant	Upon public complaint	At nearby river/ stream	Single sample analytical analysis	1000\$/ event
<i>Social Satisfaction</i>	External complaints or grievances	Supervising Consultant	Upon public complaint	Along the concerned roads	Received complaints and records	Included in rehabilitation Cost

CONSULTATION, DISCLOSURE AND GRIEVANCE REDRESS MECHANISM

Public Consultation

A public consultation meeting was conducted on December 18, 2019 at the Municipality of Tripoli. The number of attendees was 22, including 15 females. The attendees consisted of the Head of the Tripoli Municipality, 2 municipal board members, staff from the various municipal departments related to infrastructure planning and implementation, a representative of the NGOs and social affairs committee at the Municipality, a representative of the CDR and 3 representatives from TEAM International. The complete attendance list is presented in Annex E. Several issues were raised during the meeting including

- ❑ The selection criteria applied for road selection are not clear and transparent. There are other roads that are in need for rehabilitation. The municipality suggested such roads of similar importance for the consideration of CDR in a phase 2 of the project.
- ❑ Many complained that they were not aware of this project until now although the project was discussed with municipality before the latest municipal elections.
- ❑ Some opined that there are infrastructure projects in Tripoli that are more important than the rehabilitation of these roads and that should have been given priority.
- ❑ Several pointed out that some sections of Road 5 have recently undergone rehabilitation works. Could the allocated budget be transferred to additional works along the proposed roads?
- ❑ The staff at the Municipality expressed interest in examining the design maps to provide their opinion on the proposed rehabilitation elements. It was stated that this can be accommodated in subsequent meetings upon the request of the Municipality either with the Consultant's Engineer and with the Contractor prior to initiation of construction activities.
- ❑ Some emphasized the need to rehabilitate the walls and the ground along the Abou Ali River (Road 5) which is critical to the stability of the road.
- ❑ They equally emphasized the need to rehabilitate the first section of the Mallouli bridge at the start of Road 5 (i.e. Abou Ali Roundabout).
- ❑ Qalamoun Road 4 has drainage issues which need to be considered in the design.
- ❑ Enforcing construction schedule in a timely fashion.
- ❑ Including design elements that ensure access to persons with disability (PWD)
- ❑ Public concerns should be respected during project execution.
- ❑ Using construction material that is of good quality and that does not deteriorate rapidly.
- ❑ Contractor to give priority employment to local people from the city particularly from nearby neighborhoods where the roads rehabilitation will take place.

Employment opportunities were discussed for both Lebanese and Syrian workers. The latter contributes significantly in the construction sector throughout Lebanon including the Tripoli District. Besides private entities, the municipalities are resorting to Syrian labor in this sector in particular. There appears to be a clear split in job types between local communities. The delineation line is between skilled jobs (mainly taken by the Lebanese workforce) and unskilled labor (filled primarily by Syrian workers). This split has resulted in a control of potential tensions or conflict between the communities. In relation to the selection of roads within the scope of REP, the consultant explained that the Government prioritized roads based on municipalities' official requests beside several technical criteria. It was explained that no alternative roads can be suggested

at this stage of the project. Further, regarding the technical concerns that were revealed during the meeting including design and raw materials issues, the consultant ensures to communicate these remarks to the consultant engineer. Finally, the consultant will ensure that the road design maps will be sent to the concerned municipalities as requested.

Although the Consultant and the CDR representative requested a side meeting with the women participating in the session, female attendees have asked to skip it due to the following reasons: (a) time limitation since the session took about two hours; (b) their personal and work obligations; (c) they were the majority (15 out of 22) in the meeting; and (d) they have confidently and highly voiced their concerns throughout the session.

As for NGOs Consultation, this ESMP has targeted them according to their position in Lebanon. They consist of two levels as follows: (1) Local: they are specific to each Caza. Their mission is to address different concerns and issues among the local society including social, economic, gender equality, environment, poverty, women empowerment, etc. and (2) International: they cover the whole country and their consultation will be applied to all the ESMPs of the REP. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrians in Lebanon by providing aid and responding to their critical situation.

Invited local NGOs include Rene Moawad Foundation, Alliqaa' Alnissa'i Al Khairi Association and Rouwwad Al Tanmia Association. As for international NGOs, ANERA, and DRC were invited. Out of all invited NGOs none attended the consultation meeting.

A grievance redress mechanism (GRM) is in place to allow stakeholders to voice their concerns during the project phases: pre-construction, construction, and operation. The GRM is designed to allow a timely resolution of concerns, assuring stakeholders that grievances have been heard and that the institutionalized mechanism will yield a fair and impartial outcome. Furthermore, the grievance mechanism is applicable for both Lebanese and Syrian workers with the option to remain anonymous when filing a grievance to encourage workers to speak out without potential fear of repercussions. The GRM concept was presented and communicated during the public participation.

Individual Consultation with Street Vendors

With the outbreak of COVID-19 and the growing concern about the risk of the virus spread, group consultation for the street vendors along Road 5 was not possible in Tripoli Municipality. Therefore, in accordance with the suggested alternative channels of communication in the “Technical Note: Public Consultation and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings”, twenty individual interviews were performed randomly during the site visit of August 2020. Since the market is dominated by men all the interviewed vendors were men. The street vendors were consulted on the road rehabilitation activities and informed about the related GRM to be implemented during the project's duration. The consultation highlighted on the positive impact of the REP on the socioeconomic conditions of the vendors as well. The main concern of the interviewed vendors was to be notified ahead of time regarding the schedule and the approximate duration of the work activities. The consultant responded to the vendors concerns by saying that the Contractor will not start any activity without informing them through the Municipality. The street vendors were informed that they can complain in case they have more concerns through the following CDR link <http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm> or by contacting the CDR on 01980096 ext.317.

ملخص تنفيذي

المقدمة

بتمويل من البنك الدولي تقوم الحكومة اللبنانية بتنفيذ مشروع الطرق والتوظيف عبر مجلس الإنماء والإعمار عن الحكومة اللبنانية ومجلس الموزراء. تتضمن أنشطة المشروع إعادة التأهيل للطرق الموجودة فقط مع عدم وجود توسيع للطرق أو إعادة توطین قسري أو تهجير أو حيازة الأراضي. لذلك، صنف البنك الدولي التقرير كمشروع من الفئة ب الذي يتطلب إعداد خطة إدارة بيئية واجتماعية (ESMP) لكافة مكوناته الفرعية، وعليه تم تطوير سلسلة الشروط وضمن خطط الإدارة البيئية والاجتماعية لتكون جزء لا يتجزأ من دفاتر شروط التلزم بواسطة مجلس الإنماء والإعمار.

منح مجلس الإنماء والإعمار العقد رقم ٢٠٣٧٩ إلى شركة TEAM International ، المشار إليها فيما يلي باسم الاستشاري، لإعداد التقييم والتصميم وخطط الإدارة البيئية والاجتماعية للطرق في مناطق البترون وبشري والكورة وطرابلس وبعبك والهمل. أما في التقرير الحالي فتتعلق خطة الإدارة البيئية والاجتماعية هذه بالطرق داخل منطقة طرابلس فقط.

وصف المشروع

إن المشروع المذكور يتضمن أعمال إعادة التأهيل وأعمال بناء الثانوي. تختلف الأنشطة التي يتعين القيام بها خلال المشروع بين طريق وآخر، وذلك بالإعتماد على تصنيف الطريق من حيث حالة الرصيف وجانبي الطريق وإحتمال الفيضانات ومصارف المياه الشتوية وإحتمال وجود الانهيارات الأرضية / تآكل التربة عبر عوامل التجوية والتهدية والجدران الاستنادية وممرات المشاة وصيانة إنارة الشوارع عند اقتضاء الحاجة. كما وتجدر الإشارة إلى أنه لن يتم إستملاك الأراضي أثناء تصميم أي طريق قيد الدراسة.

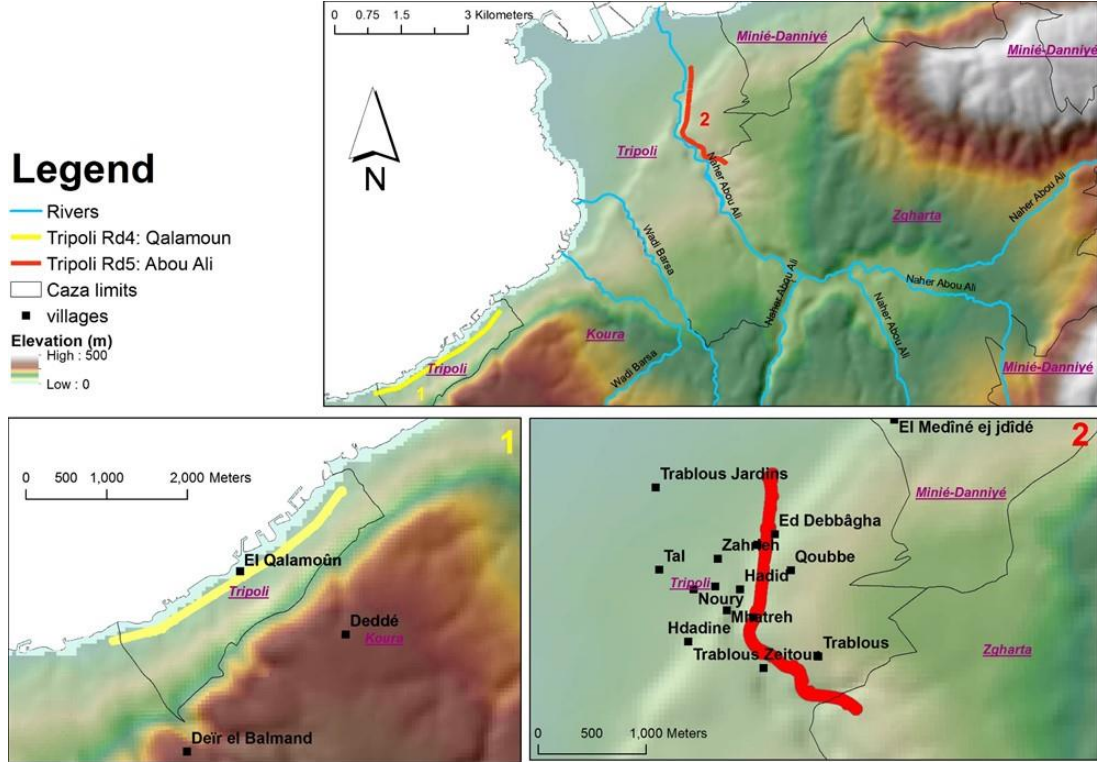
في منطقة طرابلس ، لم يتم إستملاك أي أرض أثناء تصميم أي طريق وتم اقتراح طريقين (الشكل الأول) تم توضيح تفاصيلهما ضمن خطة الإدارة البيئية والاجتماعية.

□ الطريق رقم ٤ في قضاء طرابلس يبدأ من طريق البحر على شاطئ Las Perlas ويمتد جنوبا لمسافة ٣,٥ كيلومتر باتجاه الحدود الجنوبية لبلدة القلمون.

□ يبدأ الطريق رقم ٥ في قضاء طرابلس عند دوار أبو علي ويمتد شرقا لمسافة ٢,٨ كم حتى يصل إلى حدود قضاء طرابلس- زغرنا متصلا بطريق طرابلس زغرنا الرئيسي الموجود على طول الجانب الجنوبي من نهر أبو علي.

أثناء تنفيذ أنشطة إعادة التأهيل، لن يتم إغلاق الطرق أو إعاقة السير ضمنها. قبل تنفيذ أعمال إعادة التأهيل، سيؤمن المقاول الوصول وحركة المرور عبر طرق ووسائل بديلة أخرى بالتنسيق مع البلدية ذات الصلة. مدة المشروع هي حوالي ١٨ شهر مع فترة صيانة لسنة واحدة. من المفترض أن يتراوح العدد الإجمالي التقديري للعمال بين ١٥٠ و ٢٥٠، وبفضل أن يتم تعيين هؤلاء العمال من المجتمعات المحلية المحيطة (بما في ذلك العمال السوريون المقيمون في مناطق المشروع المعنية).

الرسم ١: الطرق المقترحة داخل قضاء طرابلس (قضاء)



Source: Layers by CNRS

وصف البيئة المحيطة بالمشروع

تمت دراسة البيئة الفيزيائية والكيميائية والبيولوجية والاجتماعية والاقتصادية ضمن منطقة المشروع في الوضع الحالي وقبل تنفيذ المشروع. إذ قام فريق العمل بجمع البيانات الأساسية وإجراء المسح الميداني للعناصر البيئية التالية: جودة الهواء وجودة المياه وجودة التربة والظروف الجيولوجية ووضع المناخ والأرصدة الجوية والموائل الطبيعية والتنوع البيولوجي واستخدام الأراضي / الغطاء الأرضي ونسبة الضوضاء والموارد الثقافية والظروف الاجتماعية الاقتصادية (فرص العمل وتوفر اليد العاملة والمشاكل الاجتماعية والاستغلال و/أو الانتهاك الجنسيين الناجمين عن العمل والتحرش الجنسي والصحة والسلامة المهنية).

تبين من تحليل تضاريس الطرق المقترحة وذلك باستخدام نموذج منحدر الارتفاع الرقمي وخرائط الشقولات المعدة من قبل مركز البحوث العلمية (CNRS)، بأن الطريقان الموجودان بمران فوق المستوى الساحلي مع ارتفاعات تتراوح بين مستوى سطح البحر حتى ٣٣ مترًا فوق سطح البحر. وأن الطريق رقم ٤ (طريق القلمون البحري) هو طريق ساحلي منبسّط نسبيًا بارتفاع ثابت يبلغ ٨ أمتار فوق سطح البحر. والطرق رقم ٥ (دوار أبو علي - طرابلس / حد زغرنا) تتراوح ارتفاعاته بين ١٢ م وحوالي ٣٣ م فوق سطح البحر. وأن منحدرات شديدة الانحدار تجاذي الطريق رقم ٥ حيث يتبع الوادي الطبيعي الذي أنشأه نهر أبو علي.

أظهرت الدراسة أن الوضع الجيولوجي ضمن الطرق المقترحة لناحية الطبقات الصخرية المتكشفة والطبقات الجوفية والتكوينات التكتونية (فوالق، طيات، الوضع الزلزالي، إلخ)، الهيدروجيولوجيا (المياه الجوفية ومياه البحر) والهيدرولوجيا (المياه السطحية والأنهر)، أن طريق طرابلس ٤ يسقط بالكامل على تكوين ميوسيني (mcg) بحيث يتكون من التكتلات البحرية والحجر الجيري. ويقع طريق طرابلس ٥ على تشكيلتين مختلفتين بالتساوي، وهما العصر الميوسيني (mcg) والرباعي (q).

أما لناحية وضع المياه السطحية والجوفية، فقد أظهرت الدراسة أن الطريق ٥ يقطع نهر أبو علي عند دوار أبو علي - طرابلس / حد زغرنا. كما، ويحد قناة نهر أبو علي، بدءًا من دوار أبو علي وتتجه شرقًا لأكثر من نصف طولها. النهر شديد التلوث بسبب التصريف المستمر لمياه الصرف الصحي الخام والنفايات الصلبة البشرية المنشأ. الجدير بالذكر أن محطة معالجة مياه الصرف الصحي ذات المستوى الثانوي تقع مباشرة في الشمال عند مصب نهر أبو علي. المصنع مزود بمصعب بحري ويخدم حاليًا منطقة طرابلس الساحلية والقلمون وبعض أقسام قضاء الكورة وزغرنا بالإضافة إلى المناطق الساحلية البداوي ودير عمار والمنية.

كما تم الحصول على بيانات تتعلق بمستويات تلوث الهواء في المنطقة، والتي أظهرت بأن البيانات التي جمعتها محطات وزارة البيئة لجميع معايير ملوثات الهواء في عام ٢٠١٨ للمنطقة المدروسة تقع ضمن المعايير الوطنية لجودة الهواء المحيط التي حددها قرار وزارة البيئة رقم ١/٥٢. ومع ذلك، تم جمع قياسات TSP و PM بواسطة مرصد طرابلس للبيئة والتنمية (TEDO) في عام ٢٠٠٨، مما أظهر أن قيم TSP تجاوزت المعيار الوطني اليومي البالغ ١٢٠ ميكروغرام/م^٣ بحوالي ٢٥ ضعف من أصل ١٠٥ قياسات. علاوة على ذلك، كان متوسط PM2.5 في وسط مدينة طرابلس (٣٤,٦ ميكروغرام / متر مكعب) والتي كان أعلى باستمرار من قيم PM2.5 في محطة الواجهة البحرية (٢٣,٦ ميكروغرام / متر مكعب)، ويعود ذلك أساساً إلى ازدحام حركة المرور في وسط مدينة طرابلس.

فيما يتعلق بالموائل الطبيعية والتنوع البيولوجي، ونظرًا لطبيعة المشروع، فإن منطقة التأثير المباشر تتعلق بالطرق الحالية. وبالتالي، تم إجراء تقييم بيولوجي سريع لرسم الصورة البيئية للمناطق المجاورة للطرق المعنية لتقييم الموائل والأنواع المعرضة لخطر إضافي من المشروع المقترح. لم يهدف البحث الميداني إلى إجراء جرد شامل للتنوع البيولوجي لمنطقة المشروع ولكن هدف إلى تكوين نظرة عامة على الأنواع الحالية (النباتات بشكل أساسي) والموائل.

بشكل عام، تدهورت البيئة الطبيعية في منطقة الدراسة بسبب التمدد العمراني الكثيف مع النشاط الزراعي المحدود ولم تعد تحتوي على موائل نقية ذات أهمية حماية خاصة. وبشكل أكثر تحديداً، يغطي الغطاء الطبيعي على طول الطريق ٤ (طريق القلمون الساحلي) ما مجموعه ٢٨% من مساحة ٥٠ مترًا من كلا جانبي الطريق ويتكون في الغالب من الأراضي العشبية (١١,٤%)، والأراضي خضراء مع شجيرات صغيرة (١٠,٩%)، والأراضي خضراء مع شجيرات صغيرة مع أشجار أكبر متفرقة (٦,٢%). أما بالنسبة للطريق ٥، فإن الغطاء النباتي الطبيعي يغطي ٠,٢% فقط من المنطقة ويتكون من أراضي عشبية. الغطاء النباتي المتبقي على طول هذا الطريق زراعي بطبيعته ويتكون من الزيتون وأشجار الحمضيات. وعليه، فإنه من مجمل منطقة الدراسة يوجد ٥,٢,١٤% أشجار زيتون و ٤% أشجار حمضيات.

أخيرًا، تم إجراء تقييم اجتماعي اقتصادي في منطقة المشروع لرسم خريطة للظروف الأساسية الديموغرافية والاجتماعية والاقتصادية على مستوى قضاء طرابلس. وتم التحقيق في مجموعة من المؤشرات الاجتماعية بما في ذلك التوظيف وسبل العيش في عاليه وتوافر مؤسسات التعليم والصحة العامة والخاصة والوصول إلى المرافق العامة والخدمات المجتمعية وأنماط استخدام الأراضي وتأثيرات الأزمة السورية.

يبلغ عدد سكان القرى التي تخدمها الطرق حوالي ٤٢٨,١٤٠ نسمة. وفقًا لإحصاءات عام ٢٠١٦ من قبل المفوضية السامية للأمم المتحدة لشؤون اللاجئين، هناك حوالي ٩٦,٢٢٩ لاجئًا مسجلًا في منطقة طرابلس الحضرية مع ٣٣% (٣١,٧٩٧) لاجئون فلسطينيون.

أم فيما خص الطريق ٤ (طريق القلمون الساحلي) والطريق ٥ (دوار أبو علي - طرابلس / حد زغرنا) كلاهما محاطان بمناطق حضرية بها وحدات سكنية ومحلات تجارية. من السمات المميزة على امتداد ٧٠٠ متر من الطريق ٥ وجود الباعة الجوالين الذين يبيعون الخضار والفواكه والملابس على الرصيف الغربي لهذا الطريق. وفقًا لزيارة الموقع في أغسطس ٢٠٢٠، يقع هؤلاء البائعون على بعد ٥ أمتار من خط الحدود للطريق رقم ٥، لا يشغل أي منهم الطريق.

بالإضافة إلى ذلك، هناك العديد من مراكز الرعاية الصحية الأولية والمستشفيات والمدارس في طرابلس، ومع ذلك، لم يتم العثور على أي منها مباشرة على طول الطرق المقترحة. كما ولا توجد مواقع ذات أهمية للتراث الثقافي على تماس مباشر على طول الطرق المراد إعادة تأهيلها.

أما في سياق حجم حركة المرور، تمت مراقبة متوسط حركة المرور اليومية (ADT) للطريقين بواسطة محطات المرور. حركة المرور على الطريق ٤ (طريق القلمون الساحلي) أعلى ٢,٥ مرة من تلك الموجودة على الطريق ٥ (دوار أبو علي - طرابلس / حد زغرنا)، كونها رابطًا مهمًا إلى طرابلس وعكار، حيث يستخدم الطريق ٤ حوالي ٢٥,٤٥٠ مركبة في اليوم على كلا الجانبين ويستخدم الطريق ٥ حوالي ١٠,١٢١ مركبة في اليوم.

وصف الآثار المحتملة للمشروع

تعتبر مرحلة إعادة التأهيل لأي تطوير مرتبطة بإحتمال حدوث آثار سلبية على العديد من المؤشرات بما في ذلك حركة المرور وجودة الهواء ومستوى الضوضاء ومخلفات البناء وجودة المياه والتربة والمناظر الطبيعية والتلوث البصري واستهلاك الموارد والأضرار التي تلحق بالمرافق القائمة والصحة والسلامة، فضلًا عن الأثر الاقتصادي والاجتماعي.

خلال مرحلة إعادة التأهيل ، تكون هذه التأثيرات مؤقتة مع كون معظمها طفيفاً أو سلبياً إلى حد ما (الجدول ١). أثناء التشغيل وبعد إتمام التأهيل ، تحدث زيادة طبيعية في حجم أسطول المركبات، مما سيؤدي إلى زيادة حجم حركة المرور ، وبالتالي ، فإن التأثيرات النموذجية المرتبطة بزيادة حركة المرور ستكون حتمية على المدى الطويل. ومع ذلك ، سيؤدي تحسين تدفق حركة المرور على الطرق المعاد تأهيلها إلى تحسين كفاءة انبعاثات الوقود وتحسين أداء المحرك ، وبالتالي تقليل انبعاثات المركبات وصيانتها.

كما ويمكن أن تؤدي الطرق المعاد تأهيلها إلى تحسين المناظر الطبيعية والتلوث البصري ، وإن كان هناك بعض الزيادة في وهج الضوء. أخيراً ، يمكن أن يقلل تصميم السلامة المحسن للطرق من احتمالية وقوع الحوادث.

الجدول ١. ملخص للأثار المحتملة للطرق المقترحة في قضاء طرابلس

فترة التشغيل		فترة التأهيل	الأثار المحتملة
إلى تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي قوي	سير
إلى تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي متوسط	نوعية هواء
إلى تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي متوسط	ضجيج
لا أثار		لا أثار	تنوع بيولوجي
لا أثار		تأثير سلبي قوي	ردميات
تأثير سلبي خفيف إلى معدوم		تأثير سلبي متوسط	تربة ومياه جوفية وسطحية
لا أثار		تأثير سلبي متوسط	إستعلاك مواد أولية
تأثير إيجابي	لا أثار	تأثير سلبي خفيف	بنى تحتية موجودة
إلى تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي خفيف	تلوث نظري
إلى تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي متوسط	السلامة والصحة
تأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي متوسط	الوضع الإقتصادي والاجتماعي
إتأثير إيجابي	تأثير سلبي خفيف	تأثير سلبي متوسط	باعو متجولين علالطريق رقم ٥
لا أثار	تأثير سلبي خفيف	تأثير سلبي خفيف	الأثار والإرث الثقافي
لا أثار	لا أثار	لا أثار	الإستملاك / التهجير القصري

بالنسبة للتأثيرات الاجتماعية والاقتصادية خلال مرحلة إعادة التأهيل، فإنه من المتوقع أن تكون إيجابية لناعية توفير فرص العمل وقد تكون سلبية إلى حد ما من حيث الزيادة المؤقتة في وقت للتنقل وإعاقة الوصول إلى المساكن / الأعمال والصحة والسلامة المحتملة و التوترات الاجتماعية التي يمكن أن تؤدي إلى سوء المعاملة والمضايقة.

فيما يتعلق بالباعه الجوالين المتأخرين للطريق رقم ٥، فإنه من المهم الإشارة إلى أنه من المحتمل أن يتؤدي أعمال التأهيل إلى أثار إيجابية على الظروف الاجتماعية والاقتصادية للباعه، كونه قد تنشط أعمال الشراء منهم أثناء أعمال إعادة التأهيل من قبل عمال وإدراي المشروع.

أما خلال مرحلة التشغيل، من المتوقع أن يكون لإعادة تأهيل الطرق أثار إيجابية من خلال تحسين الوصول إلى المناطق النائية وتقليل أوقات التنقل وتقليل الازدحام المروري والحوادث وتعزيز فرص كسب العيش.

خطة الإدارة البيئية

خطة التدابير التخفيفية

بينما يرتبط إعادة تأهيل الطريق ببعض الأثار السلبية المحتملة ، إلا أنه يمكن التخفيف من معظمها يتضمن الجدولين الثاني والثالث ملخصاً للتدابير البيئية والجدول الرابع لتدابير التخفيف الاجتماعية التي ينبغي اعتمادها للقضاء على هذه الأثار أو تقليلها

الجدول ٢. خطة التخفيف البيئي والاجتماعي لطرق منطقة طرابلس خلال مرحلة إعادة التأهيل

الكلفة التقديرية	مسؤولية المراقبة المباشرة	مسؤولية التخفيف	تدابير التخفيف المقترحة	آثار محتملة
هي جزء من أنشطة البناء والإشراف. مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المنعهد	<ul style="list-style-type: none"> جدولة نقل مواد البناء في غير أوقات الذروة وأثناء الليل. عادة ما تكون ساعات الذروة المرورية من ٧ إلى ١٠ صباحاً ومن ٣ إلى ٦ مساءً. تطوير إستراتيجيات توجيه لحركة المرور المتعلقة بالبناء لتجنب المستقبلات الحساسة إطلاع الجمهور على الجدول الزمني لأنشطة إعادة التأهيل الحفاظ على الوصول إلى الأعمال التجارية على جانب الطريق وجامعة البلمدن والمساكن عبر الطرق الالتفافية وخصائص الوصول المؤقتة ضمان التحذير الملائم ، والتوقيع ، والتخطيط ، والتوجيه على الأقل لمسافة ٥٠٠ متر من موقع البناء. توفير موظفين لإدارة حركة المرور في موقع إعادة التأهيل ، بدعم من شرطة البلدية إذا لزم الأمر تجنب أوقات ذروة حركة المرور عند رصف الأسفلت والقيام بجدولة أنشطة البناء خارج ذروة الموسم السياحي الصيفي مع الحفاظ دائماً على جزء من الطريق سالكاً لتتمكن الوصول إليه، خاصة الطريق ٥ بالقرب من سوق الخضار والطريق الساحلي ٤ خلال فصل الصيف حيث توجد العديد من المنتجعات البحرية 	التأخير والازدحام المروري
هي جزء من أنشطة البناء والإشراف. مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	-	<ul style="list-style-type: none"> ضمان الصيانة المناسبة للآلات البناء والمركبات ؛ الحفاظ على ممارسات التدبير الترتيب الجيدة التي تحافظ على نظافة الموقع ومحيطه ضمان جودة وقود الديزل المستخدم مع المعدات الموجودة في الموقع إيقاف تشغيل جميع المعدات عندما لا تكون قيد الاستخدام رش المياه في موقع العمل في الأيام العاصفة لتفادي تولد الغبار وحسبه في الرياح التأكد من أن الأتربة المحفورة ومواد البناء المخزنة في الموقع هي مخزنة في موقع مناسب بعيداً عن اتجاه الرياح وأنه يتم ترطيبها أو تغطيتها بالكامل بواسطة أغطية غير نافذة عندما لا تكون قيد الاستخدام التعامل مع الأسمنت بشكل صحيح حافظ على طرق السحب خالية من الغبار وتنظيفها بانتظام ضمان استخدام الوقود بنوعية جيدة في الشاحنات التي تنقل مواد البناء من وإلى الموقع ضمان النقل المنتظم لمواد البناء لتقليل تخزين الأكوام الكبيرة في الموقع وتقليل رحلات الشاحنات. تغطية جميع مركبات النقل التي يحتمل أن تنبعث منها انبعاثات غبار زائدة ؛ 	انبعاثات الهواء

			<ul style="list-style-type: none"> تقييد سرعات المركبات والشاحنات إلى ٢٥ كم / ساعة على الطرق غير المعبدة 	
<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	المنعهد	<ul style="list-style-type: none"> استخدم معدات قليلة الضجيج / وجيدة الصيانة الحافظ على المعدات بانتظام وإيقاف تشغيلها عند عدم استخدامها استخدم كواتم الضوضاء التشغيلية حصر أنشطة البناء في ساعات العمل المحددة بموجب القرار رقم ١٦٣/٢ - ١٩٩٥/١/٣١ 	ارتفاع نسبة الضجيج
<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	المنعهد	<ul style="list-style-type: none"> مراقبة حركة العمال وأنشطتهم لتجنب التعدي على النظم البيئية المجاورة بما في ذلك المناطق الزراعية. إرشاد العمال لحماية النباتات والحيوانات عندما يكون ذلك ممكناً وكذلك حماية موائهم. منع إلقاء النفايات الصلبة والسائلة في البيئة الطبيعية 	التنوع البيولوجي
<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	المنعهد	<ul style="list-style-type: none"> التقليل من توليد نفايات البناء فرز نفايات البناء بشكل مناسب لإزالة أي مواد خطيرة إعادة استخدام النفايات الخاملة كمواد ردميات في إعادة بناء الطرق حيثما أمكن ذلك التنسيق مع البلدية ومحافظة لبنان الشمالي لتأمين مواقع مناسبة للتخلص من نفايات البناء 	إنتاج محلفات البناء

<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>المنعقد</p>	<ul style="list-style-type: none"> ● التقليل من استخدام المواد الكيميائية (مواد التشحيم والزيوت والمذيبات) ● ضمان التخزين المناسب لمواد البناء والأسفلت والزيوت والمواد الكيميائية في الموقع في مناطق خاضعة لسيطرة جيدة وبعيداً عن ضفاف الأنهار ● عدم تصريف مياه الصرف الصحي في الأنهار أو التربة ● عدم تفريغ نفايات الزيوت في الأنهار أو التربة ● على المقاول توفير مرحاض متصلة بشبكة الصرف الصحي الحالية. وفي حال عدم وجود شبكة صرف صحي داخل منطقة العمل ، يتم توصيل المرحاض بخزان من البولي إيثيلين يتم إفراغه عند ملئه في أقرب شبكة صرف صحي. ● بالنسبة للسيارات والمعدات ، سيتعين على المقاول استئجار أرض ضمن منطقة المشروع. يجب أن ينشأ سور للحماية وتستخدم لأغراض وقوف السيارات فقط. لا يجوز للمقاول إجراء أي أعمال صيانة في الموقع ويلتزم بتنفيذ صيانة المركبات والمعدات في ورشة إصلاح ويفضل أن تكون موجودة داخل منطقة المشروع. ● لا يجوز ضخ أو التخلص من النفايات أو المياه المحتوية على نفايات كيميائية مثل مواد الكيماوية تستخدم في الإسمنت والزيوت والمشروبات الروحية في مجاري مياه الأمطار أو المجاري الصحية أو في الأرض. ● على المتعهد القيام بتغطية أي مواد بناء مخزونة بحيث يكون الغطاء غير منفذ للمياه. ● يجب تخزين الديزل في خزانات مخصصة بعيداً عن موقع صيانة الطرق وخنادق الصرف. كما يجب أن يكون على قاعدة خرسانية مرتفعة لمنع تلوث التربة أو المياه في حالة الانسكاب العرضي في موقع التخزين المحدد. ● يجب إجراء جميع عمليات التزود بالوقود خارج الموقع. ● يجب التقليل من استخدام المياه ● يجب المحافظة على تصريف المياه السطحية ● يجب التأكد من أنه في حالة حدوث أي تسرب وقود أو انسكاب مواد كيميائية فسيم العناية بالمنطقة المصابة وإزالة التربة العلوية للتخلص منها. كما ويجب وضع خطة للاستجابة للانسكاب وتدريب جميع العمال على تنفيذها. ● يجب مراقبة عملية نقل المواد الخطرة ● يجب تنظيف الموقع بشكل دوري ● يجب تمييز كل وعاء بالاسم التقني الصحيح للمادة التي يحتويها. ● لا يجوز وضع المواد الخطرة في الحاويات العامة. ● يجب تخزين الوقود المستعمل أو النفايات أو النفايات الكيميائية الأخرى في منطقة معزولة حتى يتم جمعها للتخلص منها خارج الموقع بواسطة مقاول نفايات معتمد. 	<p>تلوث مصادر المياه والتربة</p>
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			<ul style="list-style-type: none"> ● غسل السيارات والمعدات يجب أن يتم فقط في مناطق محددة بعيدة عن الطريق لحماية جودة المياه والتربة في المنطقة. ● يجب توفير نظام تجميع تحت أي آلات أو معدات قد تتسبب في تسرب الوقود (مثل المولدات المتنقلة). ● التحكم في جميع العمليات التي تنطوي على استخدام الخرسانة لتجنب التسرب إلى مصادر المياه. ● توفير صناديق في الموقع للتخلص من النفايات غير المتعلقة بالبناء ● العمل مع البلدية لتضمين الموقع في مسار جمع النفايات الصلبة الحالي ● التقليل وقت تعرض التربة للملوثات ● إنشاء جدران الحماية الإسمنتية قبل البدء في حفر خنادق الصرف للتقليل تآكل التربة ● إجراء أعمال الحفر لقنوات الصرف بدقة تامة ونقل التربة المحفورة الناتجة إلى مواقع خارج الموقع للتخلص منها بالشكل المناسب في حالة التلوث. ● التقليل الوقت الذي تبقى فيه قنوات الصرف المحفورة غير مدعومة ● الحفاظ على الغطاء النباتي عبر إزالة الحد الأدنى منه وتشجيع إعادة الغطاء النباتي فور انتهاء نشاط البناء في المواقع التي تمت فيها إزالة الغطاء النباتي 	
هي جزء من أنشطة البناء والإشراف. مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المنعهد	<ul style="list-style-type: none"> ● استبدال طرق التنظيف الرطب بأساليب التنظيف الجاف كلما كان ذلك عملياً (كنس ، تفريغ لجمع الغبار ، مسح ... إلخ) ، مع الأخذ بعين الاعتبار التقليل تولد الغبار. ● وضع لافتات بالقرب من الأجهزة التي تستخدم المياه لتشجيع الحفاظ على المياه. ● استخدام أغطية مقاومة للماء لتغطية الخرسانة بعد المعالجة بالماء للحفاظ على الرطوبة وتقليل التبخر الذي يؤدي إلى تقليل كميات المياه المستخدمة ● القيام بإيقاف تشغيل الأجهزة عند عدم استخدامه ● صيانة الآلات والمولدات بانتظام وتشغيلها بطريقة فعالة. ● عدم ترك المركبات في وضع الخمول لفترات طويلة. ● يجب عزل مكاتب الموقع بشكل جيد للاحتفاظ بالحرارة أو التبريد ، واستخدام المصابيح الموفرة للطاقة وأنظمة التبريد الموفرة للطاقة. ● يجب إعادة استخدام المواد المحفورة كلما أمكن ذلك ● استخدام مواد بناء مستخرجة من مواقع مقالع مرخصة لها فقط 	إستهلاك الموارد
هي جزء من أنشطة البناء والإشراف.	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المنعهد	<ul style="list-style-type: none"> ● التشاور مع مهندسي البلدية للحصول على معلومات حول البنية التحتية الموجودة قبل البدء بالشروع في الأعمال. القيام بتنفيذ الحفر التجريبية في حالة عدم توفر المعلومات بسهولة فقط إذا لزم الأمر 	بنى تحتية موجودة

<p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>			<ul style="list-style-type: none"> • وضع إجراءات للإخطار السريع للبلدية والوزارة المعنية ، في حالة تعطل أي مرفق موجود، إلى جانب متطلبات المساعدة الفورية في إعادة التشغيل ، والمتابعة الدقيقة مع الجهات المعنية 	
<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>المنعهد</p>	<ul style="list-style-type: none"> • توثيق الظروف القائمة قبل الشروع في الأعمال • الحفاظ على النباتات الموجودة عندما يكون ذلك ممكناً • استعادة الغطاء النباتي عن طريق إعادة زراعة الأشجار المستوطنة (الصنوبر والبلوط وما إلى ذلك) حيث يكون القطع ضرورياً أثناء إعادة التأهيل. • القيام بإخلاء جميع المعدات وأكوام الردميات والمخلفات والمواد الأخرى بعد البناء • التأكد من أن مصدر ضوء الشارع لديه الحد الأدنى من الشدة المطلوبة. 	<p>تلوث نظري</p>
<p>هي جزء من أنشطة البناء والإشراف.</p> <p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>المنعهد</p>	<ul style="list-style-type: none"> • اتباع لوائح السلامة والصحة والبيئة الصادرة عن مجلس الإنماء والإعمار والبنك الدولي • التأكد من أن مواقع البناء مغلقة تماماً وتقييد دخول غير الموظفين • إنشاء مناطق عازلة حول الموقع وتوفير طرق للمشاة • التأكد من سهولة المرور في مناطق التأهيل • القيام بتركيب إشارات تحذير واضحة • توفير مساحة كافية للتحميل والتفريغ داخل الموقع نفسه • توفير معدات الحماية الشخصية المناسبة لعمال البناء ، بما في ذلك الخوذات وواقبات الأذن) • توفير مجموعة إسعافات أولية في الموقع بمحتوى كافٍ (على سبيل المثال ، بما في ذلك سائل مطهر ، وشاش ، وقطن ، وما إلى ذلك ، وغيرها من العناصر اللازمة للتعامل مع أي جروح وكدمات) • تأمين الحوادث للعاملين • القيام بإبلاغ البنك الدولي عن جميع الحوادث خلال ٤٨ ساعة 	<p>الصحة والسلامة</p>
<p>هي جزء من أنشطة البناء والإشراف.</p>	<p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>	<p>المنعهد</p>	<p>التوترات الاجتماعية</p> <ul style="list-style-type: none"> • تطوير معايير واضحة لاختيار الوظائف وتخصيصها وإبلاغ للعامة، مع الانتباه إلى نسبة العاملين من المجتمع السوري واللبناني ، وعدم التمييز والمعاملة العادلة لجميع العمال بما في ذلك المساواة في الأجور / المزاي 	<p>الوضع الإقتصادي الإجتماعي</p>

<p>مهندس المقاول في الموقع لتنفيذ الصحة والسلامة والبيئة من بين مهام أخرى</p> <p>مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى</p>			<p>التعاقدية وظروف العمل وأنواع الوظائف والوظائف المحصورة على اللبنانيين المواطنين. وكذلك مراعاة مخصصات المجموعات الصغيرة داخل المجتمعات المختلفة.</p> <ul style="list-style-type: none"> • التأكد من استيفاء متطلبات تصريح العمل وفقاً لأنظمة وزارة العمل • التواصل الواضح مع جميع العمال المتأثرين وألية معالجة المظالم القوية ضرورية للتخفيف من المخاطر المحتملة للتوترات الاجتماعية أو عدم الرضا بين العمال السوريين واللبنانيين. <p>عمالة الأطفال</p> <ul style="list-style-type: none"> • لن يتم السماح بعمل الأطفال بموجب هذا المشروع من خلال عملية توظيف شفافة تحتفظ بسجل للتحقق من تصاريح العمل والعمر. • من الضروري إيلاء اهتمام خاص لمنع عمالة الأطفال من خلال الاحتفاظ بسجل عمل ومراقبته من أجل عملية التحقق من السن قبل تعيين العمال المحتملين. <p>تدقيق العمالة</p> <ul style="list-style-type: none"> • تزويد العمال بالتدريب الضروري وجلسة رفع الوعي حول القضايا المتعلقة الاعتداء والاستغلال والتحرش الجنسيين قبل التوقيع على مدونة قواعد السلوك. • إلزام الموظفين بحضور دورة تدريبية تمهيدية قبل بدء العمل في الموقع للتأكد من أنهم على دراية بالتزامات الشركة للتصدي للعنف القائم على النوع الاجتماعي ، على وجه التحديد والإساءة الجنسية والاستغلال والتحرش ومدونة قواعد السلوك للمشروع. • تكرار التدريب وزيادة الوعي بشكل منتظم حيث يبدأ الموظفون الجدد العمل في المشروع. • إعلام العمال بالقوانين الوطنية التي تقاضي مرتكبي جرائم الإساءة الجنسية والاستغلال. • توفير مدونة قواعد السلوك بلغة يفهمها العمال الذين سيوقعون على مدونة قواعد السلوك. • التأكد من أن المتطلبات في مدونة قواعد السلوك مفهومة بوضوح من قبل أولئك الموقعين عليها. • التأكد من أن العقوبات المنصوص عليها في مدونة قواعد السلوك مفسرة بوضوح. • التأكد من أن العمال في موقع إعادة التأهيل يوقعون على مدونة قواعد السلوك التي تستهدف مخاطر العنف القائم على النوع الاجتماعي ، وتحديد الاستغلال الجنسي / الاستغلال الجنسي الناجم عن تدفق العمالة ، ومعاينة مرتكبي جرائم العنف والاستغلال الجنسي. 	
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			<ul style="list-style-type: none"> • التحقق من أن آلية معالجة المظالم (راجع القسم ٨,٣) يتم تنفيذها بشكل مناسب لتسجيل الشكاوى من المجتمعات المحيطة والعاملين في الموقع ، لإيجاد الحلول المناسبة وتنفيذ الإجراءات التصحيحية. <p>الوصول إلى الخدمات</p> <ul style="list-style-type: none"> • يجب على المقاول ضمان التواصل الجيد وفي الوقت المناسب مع البلديات المعنية ونشر جدول العمل المتعلق بالمشروع مع المجتمع المحيط. • يجب إبلاغ المجتمعات المجاورة بالتوقيت الدقيق للأنشطة قبل بدء الأعمال. • لا ينبغي إجراء أعمال إعادة التأهيل خلال ساعات الذروة المرورية لضمان عدم إعاقة الوصول إلى المستقبلات الحساسة والمناطق السكنية المحيطة. • أثناء إعادة تأهيل الطرق الطويلة ، يجب على المقاول العمل على جزء صغير واحد في كل مرة ، لتجنب اضطراب المستقبلات الحساسة المحيطة لفترة طويلة من الزمن. • التواصل الواضح مع جميع الأشخاص المتأثرين بالمشروع وتنفيذ آلية قوية لآلية معالجة المظالم ونشرها بشكل مناسب. <p>حركة المرور</p> <ul style="list-style-type: none"> • من المهم ملاحظة أنه لن يتم إغلاق الطرق بالكامل لأن جميع عمليات الإغلاق ستكون ذات طبيعة جزئية ؛ سوف تتكون التحويلات من مجرد تحويلات مؤقتة. • إطلاع الجمهور على الجدول الزمني لأنشطة إعادة التأهيل • الحفاظ على الوصول إلى الأعمال التجارية والمسكن على جانب الطريق عبر الطرق الالتفافية وخصائص الوصول المؤقتة • تجنب أوقات الذروة عند وضع الإسفلت وإلى أقصى حد ممكن ، قم بجدولة أنشطة البناء خارج ساعات الذروة مع الحفاظ دائمًا على جزء من الطريق يمكن الوصول إليه خاصة الطريق ٥ بالقرب من سوق الخضار والطريق الساحلي ٤ خلال فصل الصيف حيث توجد العديد من المنتجعات البحرية. <p>باعة الشوارع على شارع ٥ (امتداد ٧٠٠ م)</p> <ul style="list-style-type: none"> • التنسيق مع البلدية في الجدول الزمني لأنشطة إعادة التأهيل قبل تنفيذ أي عمل في الموقع مع مراعاة الإجراءات الخاصة التالية: • يجب عدم تنفيذ أعمال إعادة التأهيل خلال ساعات عمل البائعين (من الساعة ٨ صباحًا حتى الساعة ٥ مساءً). يوصى بشدة بتنفيذ أنشطة أعمال إعادة التأهيل في الصباح الباكر و / أو بعد نهاية ساعات العمل وتجنب العمل أثناء الليل. 	
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			<ul style="list-style-type: none"> • نشر جدول العمل المتعلق بالمشروع مع البائعين بلغات مناسبة ثقافياً ومكتوباً بطريقة واضحة ومفهومة • ينبغي تنفيذ آلية خارجية قوية لآلية معالجة المظالم ونشرها على نحو ملائم باللغات الملائمة ثقافياً وكتابتها بطريقة واضحة ومفهومة. تأكد من أن البائعين سيتمكنون من الوصول إلى آلية معالجة المظالم هذه. • الانتهاء في الوقت المناسب من مرحلة إعادة التأهيل
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الجدول ٣. خطة التخفيف البيئي والاجتماعي لطرق منطقة طرابلس خلال مرحلة التشغيل

أثار محتملة	تدابير التخفيف المقترحة	مسؤوليات	مسؤولية الإشراف المباشر	الكلفة التقديرية
التأخير والإزدحام المروري	• صيانة البنية التحتية للسلامة على الطرق	وزارة الأشغال العامة والنقل	البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
ارتفاع نسبة الضجيج	• توفير إشارات للحد من السرعة في المواقع الحساسة وفرض حدود السرعة • صيانة الطرق بانتظام	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
التنوع البيولوجي	• الرجوع إلى مرحلة إعادة التأهيل • تركيب محطات السرعة واللافتات مرتبطة بجدم الضجيج	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
نوعية مصادر المياه والتربة	• صيانة أنظمة تصريف المياه السطحية	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
إستهلاك الموارد	• استخدام معدات ترشد استخدام للمياه أثناء عمليات الصيانة لتجنب الإفراط في استخدام المياه	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
تلوث بصري	• التأكد من إطفاء الأضواء وفقاً لتوقيت زمني مبرمج أو يدوياً عند عدم الحاجة إليها.	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل
الصحة والسلامة	• اتباع لوائح السلامة والصحة والبيئة في مجلس الإنماء والإعمار والبنك الدولي أثناء أعمال الصيانة • الإدارة السليمة للطرق واللافتات والصيانة	وزارة الأشغال العامة والنقل البلدية	وزارة الأشغال العامة والنقل البلدية	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل

أثار محتملة	تدابير التخفيف المقترحة	مسؤوليات	مسؤولية الإشراف المباشر	الكلفة التقديرية
الوضع الإقتصادي الإجتماعي	<p>من المتوقع أن تكون التأثيرات الاجتماعية والاقتصادية أثناء التشغيل إيجابية (بسبب تحسن السلامة العامة على الطرق). ومع ذلك ، فإن بعض التدابير ضرورية لضمان تعظيم الآثار الإيجابية. تشمل هذه التدابير ما يلي:</p> <ul style="list-style-type: none"> ● التأكد من قيام العمال أثناء مرحلة الصيانة بالتوقيع على مدونة قواعد السلوك التي تستهدف مخاطر العنف القائم على النوع الاجتماعي وتعاقب مرتكبي هذا النوع من العنف. ● التأكد من فعالية آلية آلية تقديم الشكاوى لتلقي أي مخاوف عامة خلال هذه المرحلة ومعالجة الشكاوى المستلمة ضمن الإطار الزمني المحدد (المحدد في القسم ٨.٢) <p>مع العلم أن أي أنشطة الصيانة قد تكون مطلوبة خلال فترة الضمانة لمدة سنة واحدة إذ تعتبر جزء من الأعمال المنجزة خلال مرحلة إعادة التأهيل، فستم تطبيق تدابير تخفيفية كما هو مذكور في الجدول ٦-١</p> <p>من المهم أيضًا ملاحظة أنه من المتوقع أن تكون الصيانة المحتملة خلال هذه الفترة ، إذا اعتبرت ضرورية ، محدودة للغاية من حيث المدة والتأثير فيما يتعلق بالأعمال المماثلة أثناء إعادة التأهيل.</p>	المنعهد	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	هي جزء من أنشطة البناء والإشراف لفترة الضمانة لممتدة لعام واحد أثناء التشغيل

خطة المراقبة

نظرًا لأن المشروع مصنف في فئة B من قبل لبنك الدولي، فإن أنشطة المراقبة لمثل هذه المشاريع تعتمد بشكل أساسي على الملاحظة البصرية والتوثيق بالصور على الرغم من أن قياسات بعض المؤشرات (عدد حركة المرور وجودة الهواء / الماء ومستوى الضوضاء) يمكن إجراؤها بناءً على شكاوى الجمهور. يتحمل الاستشاري المشرف على المشروع مسؤولية مراقبة الأنشطة خلال مرحلة إعادة التأهيل لضمان تنفيذ المقاول للخطة التخفيفية. وبناءً على الشكاوى العامة، يمكن أيضًا تعيين طرف ثالث من قبل مجلس الإنماء والإعمار لإجراء مراقبة دورية بقياسات المؤشرات البيئية اعتمادًا على طبيعة الشكوى. يقدم الجدول رقم ٤ ملخصًا لمؤشرات / أنشطة المراقبة خلال مرحلة إعادة التأهيل.

خلال مرحلة التشغيل، تعتبر أنشطة المراقبة جزءًا من واجبات ومسؤوليات البلديات المحلية وأصحاب المصلحة في المشروع (السكان). على غرار مرحلة إعادة التأهيل، وبناءً على شكاوى الجمهور، يمكن أيضًا تعيين طرف ثالث من قبل مجلس الإنماء والإعمار (حتى عامين بعد اكتمال المشروع) لإجراء مراقبة دورية بقياسات المؤشرات البيئية اعتمادًا على طبيعة الشكوى (الجدول رقم ٥).

خلال مرحلة إعادة التأهيل يجب على الاستشاري المشرف تقديم تقرير ربع سنوي حول أنشطة المراقبة إلى مختلف أصحاب المصلحة بما في ذلك مجلس الإنماء والإعمار والبلديات. يجب أن تكون هذه التقارير متاحة بسهولة أو في متناول الجمهور عند تقديمها. كما ويجب أن يعكس محتوى التقرير النموذجي مؤشرات خطة التخفيف مع توثيق مناسب مع الصور والإجراءات المتخذة في حالة وقوع حوادث أو مخاوف أو شكاوى.

الجدول ٤ خطة المراقبة البيئية والاجتماعية لطرق منطقة طرابلس خلال مرحلة إعادة التأهيل

آثار محتملة	أعمال المراقبة	مسؤولية المراقبة	الفترة الزمنية / التكرار	الموقع	طريقة المراقبة	الكلفة التقديرية
التأخير والازدحام المروري	الإشراف المستمر مع التوثيق الدوري مع صور لتدابير: <ul style="list-style-type: none"> التخفيف الازدحام المروري تعطيل حركة المرور خفض ومراقبة حدود السرعة حصر ساعات العمل بالاقاات المسموحة وجود شرطة مرور وعامل بناء في الطرق الالتفافية 	الاستشاري المشرف	يوميًا	في موقع إعادة التأهيل	المراقبة البصرية والتوثيق بالصور	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى
إنبعاثات الهواء	الإشراف المستمر مع التوثيق الدوري مع صور لتدابير التخفيف: <ul style="list-style-type: none"> انبعاثات المركبات وأعمال الحفر إيقاف تشغيل المعدات غير المستخدمة صيانة المعدات نوع الوقود المستخدم في الموقع وفي شاحنات النقل حدود السرعة نظافة الموقع رش المياه ظروف التخزين من التربة ومواد البناء الدقيقة ساعات العمل الجدول الزمني لنقل المواد 	الاستشاري المشرف	يوميًا	في موقع إعادة التأهيل	المراقبة البصرية والتوثيق بالصور	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى
	إجمالي الجسيمات العالقة (TSP) ، PM10 ، PM2.5 (حيثما كان ذلك ممكناً) ، أكاسيد الكبريت ، أكاسيد النيتروجين ، وثاني أكسيد الكربون	الاستشاري المشرف	بناء على شكوى عامة	المستقبلات الحساسة على بعد ١٠٠ متر من الموقع	قياسات لمدة ساعة ، ومراقبة بصرية لتشتت الغبار (المقياس والاتجاه)	2000 دولار / للفحص
ارتفاع نسبية الضجيج	الإشراف المستمر مع التوثيق الدوري مع صور لتدابير التخفيف: <ul style="list-style-type: none"> كاتمات صوت المعدات صيانة المعدات إيقاف تشغيل المعدات عند عدم استخدامها حدود السرعة 	الاستشاري المشرف	يوميًا	في الموقع وفي	المراقبة البصرية والتوثيق بالصور	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى

					<ul style="list-style-type: none"> • ساعات العمل • كما وقياسات المؤشرات في حالة وجود شكاوى عامة
500 دولار / للفحص	عينة واحدة لكل موقع (متوسط ساعة قراءة - فواصل زمنية ١٥ دقيقة) خلال الصباح (٧-٨ صباحاً) ، في المساء (١-٢ مساءً) والليل (٤-٥ مساءً)	المستقبلات الحساسة على بعد ١٠٠ متر من الموقع	بناء على شكوى عامة	الاستشاري المشرف	Lmax و Lmin و Leq
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	<p>الإشراف المستمر مع التوثيق الدوري مع صور لتدابير التخفيف:</p> <ul style="list-style-type: none"> • حركة العمال ونشاطهم • التخلص من النفايات ، إلخ
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في الموقع وفي المستقبلات الحساسة على بعد ١٠٠ متر من الموقع	يوماً	الاستشاري المشرف	<p>الإشراف المستمر مع التوثيق الدوري مع صور لتدابير التخفيف مع الاحتفاظ بسجل لتوليد النفايات وجمعها وفصلها وتخزينها ونقلها والتخلص منها من حيث النوع والكمية ومكان التخلص من النفايات المتولدة</p>
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	<p>الإشراف المستمر مع الوثائق الدورية مع الصور حول:</p> <ul style="list-style-type: none"> • استخدام المواد الكيميائية وتخزينها • استخدام المياه • تصريف المياه العادمة من المراحيض المتنقلة / المحمولة وصهاريج التخزين إلى شبكة الصرف الصحي الحالية أو الأقرب • مستويات التخلص من النفايات الصلبة • إدارة الانسكابات النفطية • التحقق من القنوات خاصة بعد أحداث هطول الأمطار
1000 دولار للفحص	إجمالي المواد الصلبة العالقة ، BOD ، COD ، الزيت والشحوم		بناء على شكوى عامة	الاستشاري المشرف	تحليل جودة المياه

مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	الإشراف المستمر مع التوثيق الدوري مع صور إعادة استخدام المواد المحفورة وممارسات الحفاظ على المياه والطاقة وعناصر التصميم	إستهلاك الموارد
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	الإشراف المستمر مع التوثيق الدوري مع صور الحفريات والاستجابة لتعطل المرافق تحت الأرض	بنى تحتية موجودة
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في نهر قريب / مجرى	يوماً	الاستشاري المشرف	الإشراف المستمر مع التوثيق الدوري مع صور التقييب وإعادة الزراعة / إعادة الغطاء النباتي أثناء التحقق من المجاري المائية وخاصة بعد أحداث هطول الأمطار	تلوث نظري
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	الإشراف المستمر مع الوثائق الدورية بالصور على: <ul style="list-style-type: none"> • معدات الوقاية الشخصية • إحاطة الموقع ، والمناطق العازلة • علامات التحذير • مجموعة الإسعافات الأولية والتأمين ضد الحوادث • الاحتفاظ بسجل للإصابات / الحوادث يحدد السبب والموقع 	الصحة والسلامة
مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى	المراقبة البصرية والتوثيق بالصور	في موقع إعادة التأهيل	يوماً	الاستشاري المشرف	الإشراف المستمر مع التوثيق الدوري مع صور لتدابير التخفيف مع الاحتفاظ بسجل التوظيف والتظلم ، ومشاركة جدول البناء مع الجمهور ، والوصول إلى الأعمال التجارية والمساكن على جانب الطريق ، وسجل الشكاوى. توثيق التدريب ورفع مستوى الوعي بشأن الاستغلال الجنسي والاعتداء الجنسيين وتوقيع مدونة السلوك وكذلك سجل التحقق من العمر ضد عمالة الأطفال.	الوضع الإقتصادي الإجتماعي

الجدول ٥. خطة المراقبة البيئية والاجتماعية لطرق منطقة طرابلس خلال مرحلة التشغيل (حتى عام بعد اكتمال المشروع)

آثار محتملة	أعمال المراقبة	مسؤولية المراقبة	الفترة الزمنية / التكرار	الموقع	طريقة المراقبة	الكلفة التقديرية
جودة الهواء	إجمالي الجسيمات العالقة (TSP) ، PM10 ، PM2.5 (حيثما كان ذلك ممكناً) ، أكاسيد الكبريت ، أكاسيد النيتروجين ، وثاني أكسيد الكربون	الاستشاري المشرف	بناء على شكوى عامة	في الموقع وفي المستقبلات الحساسة على بعد ١٠٠ متر من الموقع	قياسات لمدة ساعة ، ومراقبة بصرية لتشتت الغبار (المقياس والاتجاه)	2000 دولار / للفحص
الضوضاء	Leq و Lmin و Lmax	الاستشاري المشرف	بناء على شكوى عامة	في الموقع وفي المستقبلات الحساسة على بعد ١٠٠ متر من الموقع	عينة واحدة لكل موقع (متوسط ساعة قراءة - فواصل زمنية ١٥ دقيقة) خلال الصباح (٧-٨ صباحاً) ، في المساء (١-٢ مساءً) والليل (٤-٥ مساءً)	500 دولار / للفحص
ماء	إجمالي المواد الصلبة العالقة ، BOD ، COD ، الزيت والشحوم	الاستشاري المشرف	بناء على شكوى عامة	في الأنهر القريبة / مجارى المياه الشتوية	التحليل لعينة واحدة	1000 دولار / للفحص
السلامة على الطرق	الحوادث: عددها وتواريخها وتكرارها وأسبابها	الاستشاري المشرف	سنوياً	على طول الطرق الأربع	غير قابل	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى
الرضى الاجتماعي	شكاوى العمال الشكاوى الخارجية أو المظالم توثيق التدريب ورفع الوعي بشأن SEA / H وتوقيع مدونة السلوك سجل التوظيف.	الاستشاري المشرف	يوميياً	على طول الطرق المعنية	لمراقبة البصرية والتوثيق بالصور الشكاوي والسجلات الواردة	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى
عمالة الأطفال	عمر العمال	الاستشاري المشرف	شهرياً	سجل العمل والتحقق من السن	غير قابل	مهندس استشاري في الموقع مسؤول عن الإشراف على الصحة والسلامة والبيئة من بين مهام أخرى
				التحقق من قانون العمل		

استشارة عامة

عقد اجتماع تشاوري عام بتاريخ ١٨ كانون الأول ٢٠١٩ في بلدية طرابلس. وبلغ عدد الحضور ٢٢ شخص بينهم ١٥ اناث. حضر رئيس بلدية طرابلس وعضوان من مجلس إدارة البلدية وموظفون من مختلف الإدارات البلدية المتعلقة بتخطيط وتنفيذ البنية التحتية وممثل عن المنظمات غير الحكومية ولجنة الشؤون الاجتماعية في البلدية وممثل عن مجلس الإنماء والإعمار وثلاث ممثلين من TEAM International. توجد قائمة الحضور الكاملة في الملحق هـ. وقد أثّرت عدة قضايا خلال الاجتماع بما في ذلك

- معايير الاختيار المطبقة في تحديد الطريق ليست واضحة وشفافة ويوجد طرق أخرى بحاجة إلى إعادة تأهيل. وقد اقترحت البلدية مثل هذه الطرق ذات الأهمية المماثلة للنظر في مجلس الإنماء والإعمار في المرحلة الثانية من المشروع.
- اشتكى الكثيرون من عدم علمهم بهذا المشروع حتى الآن على الرغم من مناقشة المشروع مع البلدية قبل الانتخابات البلدية الأخيرة.
- رأى البعض أن هناك مشاريع بنية تحتية في طرابلس أهم من إعادة تأهيل هذه الطرق وكان ينبغي إعطاؤها الأولوية.
- أشار العديد إلى أن بعض أجزاء الطريق رقم ٥ خضعت مؤخراً لأعمال إعادة تأهيل. لذا تم السؤال عن إمكانية تحويل الميزانية المخصصة لأعمال إضافية على طول الطرق المقترحة؟
- أبدى موظفو البلدية اهتمامهم بفحص خرائط التصميم لإبداء رأيهم في عناصر إعادة التأهيل المقترحة. وذكر أنه يمكن إجراء ذلك في الاجتماعات اللاحقة بناءً على طلب البلدية إما مع المهندس الاستشاري أو مع المقاول قبل الشروع في أنشطة البناء.
- أكد البعض على ضرورة إعادة تأهيل الأسوار والأرض على طول نهر أبو علي (طريق ٥) وهو أمر حيوي لاستقرار الطريق.
- وأكدوا كذلك على الحاجة إلى إعادة تأهيل القسم الأول من جسر الملولي في بداية الطريق ٥ (أي دوار أبو علي).
- طرح بأن طريق القلمون رقم ٤ به مشاكل صرف يجب أخذها في الاعتبار عند التصميم.
- تنفيذ جدول البناء في الوقت المناسب.
- تضمين عناصر التصميم التي تضمن الوصول إلى الأشخاص ذوي الإعاقة (الأشخاص ذوي الإعاقة)
- يجب احترام الاهتمامات العامة أثناء تنفيذ المشروع.
- استخدام مواد بناء ذات نوعية جيدة ولا تتلف بسرعة.
- المقاول يعطي الأولوية في العمل للسكان المحليين من المدينة وخاصة من الأحياء المجاورة حيث سيتم إعادة تأهيل الطرق.

تمت مناقشة فرص العمل لكل من العمال اللبنانيين والسوريين، بحيث يساهم العمال السوريون بشكل كبير في قطاع البناء في جميع أنحاء لبنان بما في ذلك قضاء طرابلس، كما وأن البلديات تلجأ إلى العمالة السورية في هذا القطاع بشكل خاص. لذلك تم اقتراح تقسيم في أنواع الوظائف بين المجتمعات المحلية، بحيث تكون الوظائف التي تحتاج لمهارات ويشغلها بشكل رئيسي القوى العاملة اللبنانية والعمالة التي لا تحتاج إلى مهارات ويشغلها بشكل أساسي العمال السوريون. أدى هذا التقسيم إلى التقليل من حدوث توترات محتملة أو الصراع بين المجتمعات

فيما يتعلق باختيار الطرق ضمن نطاق المشروع ، أوضح الإستشاري أن الحكومة أعطت الأولوية للطرق بناءً على الطلبات الرسمية للبلديات إلى جانب العديد من المعايير الفنية. كما وتم التوضيح أنه لا يمكن اقتراح طرق بديلة في هذه المرحلة من المشروع.

أما، فيما يتعلق بالمخاوف الفنية التي تم الكشف عنها خلال الاجتماع بما في ذلك قضايا التصميم والمواد الخام ، فإن الاستشاري سوف يضمن إيصال هذه الملاحظات إلى المهندس المصمم وسيضمن إرسال خرائط تصميم الطريق إلى البلديات المعنية حسب الطلب.

أخيراً ، فيما يتعلق بقضايا التوظيف ، أوضح الإستشاري بأن خطة الإدارة البيئية والاجتماعية هذه ستوصي المقاول بتوظيف عمال محليين مع توزيع عادل للوظائف بين اللبنانيين والسوريين.

على الرغم من أن الإستشاري وممثل مجلس الإنماء والإعمار ، طلبا عقد اجتماع جانبي مع النساء المشاركات في الجلسة، فقد طلبت الحاضرات تخطيطه للأسباب التالية: (أ) تحديد الوقت منذ الجلسة التي استغرقت حوالي ساعتين ؛ (ب) التزاماتهم الشخصية والعملية ؛ (ج) كانوا يمثلون الأغلبية (١٥ من ٢٢) في الاجتماع ؛ و (د) أعربوا بثقة وبصورة عالية عن مخاوفهم طوال الاجتماع.

أما بالنسبة لاستشارات المنظمات غير الحكومية ، فقد استهدفتم خطة الإدارة البيئية والاجتماعية بحسب موقعهم في لبنان. وهي تتكون من مستويين على النحو التالي: (١) محلي: خاص بكل قضاء. مهمتهم هي معالجة الاهتمامات والقضايا المختلفة بين المجتمع المحلي بما في ذلك الاجتماعية ، والاقتصادية ، والمساواة بين الجنسين ، والبيئة ، والفقر ، وتمكين المرأة ، وما إلى ذلك و (٢) الدولية: فهي تغطي البلد بأكمله وسيتم تطبيق استشاراتهم على الجميع خطط الإدارة البيئية والاجتماعية الخاصة بالتقرير. عندما اندلعت الأزمة في سوريا في أوائل عام ٢٠١١ ، استجابت العديد من المنظمات غير الحكومية الدولية للأزمة الإنسانية

تشمل المنظمات غير الحكومية المحلية المدعوة مؤسسة رينيه معوض ، وجمعية اللقاء النسائي ، وجمعية رواد التنمية، أما بالنسبة للمنظمات غير الحكومية الدولية المدعوة ANERA و DRC . ولم يحضر أي اجتماع تشاركية أي من بين جميع المنظمات غير الحكومية المدعوة.

إن آلية لمعالجة المظالم (GRM) هي وجدت للسماح لأصحاب المصلحة بالتعبير عن مخاوفهم خلال مراحل المشروع: ما قبل البناء والتشييد والتشغيل. تم تصميم آلية معالجة المظالم لإتاحة حل للمخاوف في الوقت المناسب وطمأنة أصحاب المصلحة أنه تم الاستماع إلى المظالم وأن الآلية ستؤدي إلى نتيجة عادلة ونزيهة. علاوة على ذلك ، فإن آلية معالجة المظالم قابلة للتطبيق على كل من العمال اللبنانيين والسوريين مع خيار عدم الكشف عن هويتهم عند تقديم شكوى لتشجيع العمال على التحدث علانية دون خوف محتمل من التذاعيات. تم تقديم مفهوم آلية معالجة المظالم ونقلها خلال المشاركة العامة.

استشارة فردية مع بائعي الشوارع الجوالين

مع إنتشار COVID-19 والقلق المتزايد من خطر انتشار الفيروس ، لم يكن من الممكن إجراء استشارة جماعية للباةة الجوالين على طول الطريق رقم ٥ في بلدية طرابلس. لذلك، وفقاً لقنوات الاتصال البديلة المقترحة في "الملاحظة الفنية: المشاورات العامة ومشاركة أصحاب المصلحة في العمليات التي أعدها البنك الدولي عندما تكون هناك قيود على عقد الاجتماعات العامة" ، تم إجراء عشرين مقابلة فردية بشكل عشوائي خلال زيارة الموقع في آب ٢٠٢٠ وبما أن السوق يسيطر عليه الرجال ، فإن جميع الباعة الذين تمت مقابلتهم كانوا من الرجال.

تمت استشارة الباعة بشأن أنشطة إعادة تأهيل الطرق وإبلاغهم بآلية إعادة إعمار الشوارع ذات الصلة التي سيتم تنفيذها خلال مدة المشروع. وسلطت المشاورة الضوء على الأثر الإيجابي لتقرير التمديد على الظروف الاجتماعية والاقتصادية للبائعين كذلك. كان الشاغل الرئيسي للبائعين الذين تمت مقابلتهم هو إخطارهم في وقت مبكر فيما يتعلق بالجدول الزمني والمدة التقريبية لأنشطة العمل. ورد الإستشاري على مخاوف البائعين بالقول إن المقاول لن يبدأ أي نشاط دون إبلاغهم من خلال البلدية. تم إبلاغ الباعة الجائلين أنه يمكنهم تقديم شكوى في حالة وجود المزيد من المخاوف من خلال رابط CDR التالي

http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm أو عن طريق الاتصال بمجلس الإنماء والإعمار على ٠١٩٨٠٠٩٦ فرعي ٣١٧.

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LIST OF ABBREVIATIONS

AREC	American University of Beirut Advancing Research Enabling Communities Center
AUB	American University of Beirut
CDR	Council for Development and Reconstruction
CoC	Code of Conduct
DoA	Department of Antiquities
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ESC	Environmental and Social Consideration
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FI	Financial Intermediary
GIS	Geographic Information Systems
GOL	Government of Lebanon
GRM	Grievance Redress Mechanism
IBA	Important Bird Area
IEE	Initial Environmental Examination
LARI	Lebanese Agricultural Research Institute
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
MoIM	Ministry of Interior and Municipalities
MoL	Ministry of Labor
MoPWT	Ministry of Public Works and Transport
MSL	Mean Sea Level
NGO	Non-Governmental Organization
OP	Operational Policy
PHC	Primary Healthcare Center
PIU	Project Implementation Unit
REP	Lebanon Roads and Employment Project
SEA/H	Sexual Abuse and Exploitation and Harassment
WBG	World Bank Group

LIST OF NOMENCLATURES

%	Percent
µg	Microgram
g	Gram
kg	Kilograms
km	Kilometers
Leq	Average equivalent noise levels
Lmin	Minimum noise level
Lmax	Maximum noise level
MJ	Mega Joules
min	Minutes
mm	millimeter
hr	Hour
ha	Hectare
m ²	Square meter
m ³	Cubic meter
ppm	Parts per million
s	Seconds

1 INTRODUCTION

1.1 Project background

The Government of Lebanon (GOL) has solicited and obtained World Bank (WB) financing for the Roads and Employment Project (REP). The Council for Development and Reconstruction (CDR) is acting as the executing agency on behalf of the GOL and its Council of Ministers (COM). The REP seeks to improve transport connectivity along select paved road sections and create short term employment opportunities for local communities. These road sections were categorized into six lots (1, 2, 3, 4, 5, and 6), with each lot covering several cazas¹ and each caza encompassing at least one road or more.

The REP involves rehabilitation activities that are confined within the alignments of existing roads with no road widening. Therefore, under Lebanese regulations, the REP does not fall under either Annex I (projects requiring a full EIA) or Annex II (projects requiring an Initial Environmental Examination (IEE) of the EIA Decree No. 8633/2012 on the Fundamentals of Environmental Impact Assessment (EIA) in Lebanon. However, the REP triggered the World Bank Operational Policy OP 4.01 requiring Environmental and Social assessment. As such, an Environmental and Social Management Framework (ESMF) was prepared for the REP through CDR with support from the WB (CDR, 2018). The ESMF concluded that the REP activities are not expected to have significant environmental impacts and classified the REP under WB category B projects that require the preparation of an Environmental and Social Management Plan (ESMP) that is normally not associated with further screening or scoping studies for the various roads under consideration. Besides no significant environmental impacts, the ESMF equally anticipated no impacts on physical and cultural resources or natural habitats, no involuntary resettlement, and no land acquisition. Accordingly, a series of ESMPs were stipulated to be prepared at the caza level and put together in packages for bidding purposes. In this context, CDR awarded the contract number 20379 to TEAM International, hereinafter referred to as the Consultant, to prepare the assessment, design and ESMPs of Lot 5 encompassing the of Cazas of Batroun, Bcharre, Koura and Tripoli and Lot 6 encompassing the Cazas of Baalbeck and Hermel under the REP.

This ESMP is concerned with the following roads within the Tripoli district (Caza) of the North Lebanon governorate (Mohafazah):

¹ The Lebanese territory is administratively divided into eight governorates (mouhafazah). These governorates are further divided administratively into 25 districts (cazas). The cazas are further divided into municipalities. Two or more municipalities can form a federation of municipalities. The project covers selected roads in the 25 cazas throughout Lebanon with an expected total length of 835 km grouped in the six lots.

- ❑ Road 4: Qalamoun seaside road extending for 3.46 Km
- ❑ Road 5: Starts at Abou Ali Roundabout and extends to eastward for 2.82 Km, along the Southern side of the Abou Ali river till the caza limit of Tripoli-Zgharta

Refer to Chapter 3- Project Description for details on these roads.

1.2 Project Rationale

The ESMF (CDR, 2018) provided the main rationale behind the REP by elaborating about Lebanon's largely adequate extent and coverage of the road network, but with a substantial percentage in poor condition, hindering local and economic development particularly in rural and lagging underserved regions where the condition of the main network is worse than the national average. The ESMF attributed these poor conditions to several factors including years of underinvestment, inefficient spending, weak capacity in road agencies and the absence of asset management tools. The ESMF stressed that this situation was aggravated by the influx of Syrian refugees which has substantially increased traffic demand and the utilization of the road network. Hence, the general objectives of the REP are to improve transport connectivity along select paved road sections and create short term jobs for Lebanese and Syrians through specific components that encompass rehabilitation and maintenance, improvement of emergency response capacity, and capacity building and implementation support.

1.3 Report Objectives

Pursuant to the World Bank OP 4.01 (Environmental Assessment), this ESMP report seeks to satisfy the following objectives:

- ❑ Providing a sound basis for decision-making about the design of the Project components that takes environmental and social considerations into account.
- ❑ Ensuring that the Project is implemented with full awareness of environmental and social factors.
- ❑ Developing the ESMP for the rehabilitation and operation phases of the Project,
- ❑ Informing the public when and how the project implementation may affect their environment, and
- ❑ Facilitating the public participation in the decision-making process.

More specifically, the report aims to:

- ❑ Establish environmental and socio-economic baseline
- ❑ Set the legal, institutional, standards & policies frameworks

- ❑ Identify the responsible authorities and assign roles for different organizations in the efficient implementation of this ESMP.

It is worth mentioning here that Decree No. 8633/2012 about Fundamentals of Environmental Impact Assessment (EIA) is not relevant to the Project since this latter is not categorized under either Annex I or II of the EIA Decree.

1.4 Methodology

In order to achieve the ESMP objectives outlined above, we have reviewed relevant project designs and studies particularly the ESMF prepared for the project. In addition, we:

- ❑ Examined the national legislation and World Bank safeguard policies relevant to the project
- ❑ Conducted field visits in 2019 and in 2020 to observe and document baseline conditions and collected data from the relevant municipality
- ❑ Reviewed relevant literature including the project ESMF, which was cleared by the WB and disclosed on the CDR website
- ❑ Synthesized and processed information related to coverage using the geographic information systems (ArcGIS Desktop Version 10.61 by ESRI, License type: Advanced) to prepare baseline maps
- ❑ Assessed environmental and social impacts associated with the project at various stages of the project using factors such as health and safety as well as the natural environment
- ❑ Wherever relevant, defined mitigation measures to alleviate or reduce potential adverse impacts
- ❑ Developed a monitoring plan with emphasis on the rehabilitation phase when impacts are expected with estimated implementation resources
- ❑ Documented public consultation and opinions with potentially affected stakeholders
- ❑ Development of grievance redress mechanisms (GRM) for the project

Note that since the project is category B under the World Bank guidelines, no field measurements of environmental indicators were anticipated (i.e. traffic, air quality, noise levels, water quality) under this contract. Instead, we relied on data from existing studies wherever available. We equally used a worst case condition approach that would form an envelope of the maximum possible impact which when judged to be minor or moderate reflect an acceptable project impact. Details of such an approach are outlined when assessing a specific indicator below (i.e. air quality and noise).

1.5 ESMP Report Structure

Besides the above introductory Chapter, the scope of work implemented in the preparation of the ESMP includes the following:

- ❑ Definition of the existing legal and administrative framework (Chapter 2)
- ❑ Description of the proposed project (Chapter 3)
- ❑ Definition of baseline environmental and social conditions (Chapter 4)
- ❑ Identification of potential environmental and social impacts (Chapter 5)
- ❑ Identification of environmental and social mitigation measures (Chapter 6)
- ❑ Development of the environmental and social mitigation and monitoring plan (Chapter 7)
- ❑ Soliciting public participation including grievance redress mechanisms (Chapter 8)

2 LEGAL, INSTITUTIONAL, STANDARDS AND POLICIES FRAMEWORKS

2.1 Legal Framework

Several laws, decrees, and decisions in Lebanon define the environmental standards and regulations to be met while implementing projects. The most basic and general law is Law No. 444 (Environment Protection Law) dated 8 August 2002. Table 2-1 presents a list of selected legislation relevant to the Project.

Table 2-1. List of selected legislation relevant to the Project

<i>Legislation²</i>	<i>Date of Issue</i>	<i>Subject</i>	<i>Relevance to the project</i>
<i>Environment-related legislation</i>			
<i>Law 80</i>	10/10/2018	Integrated solid waste management law	The requirements of the law shall be adhered to for the management of solid wastes generated from the project.
<i>Law 78</i>	13/04/2018	Law for the protection of air quality	The requirements of the law shall be adhered to for the management of air emissions from the project.
<i>Law 77</i>	13/04/2018	Water Resources Law	Penalizes unauthorized discharges or disposal of any kind of waste in water resources
<i>MOE Decree 8803/2002 and its amendments</i>	04/10/2002	Organizes the activity of quarries and crushers, licensing procedures, as well as the operation, management and rehabilitation of quarries.	Ensures the provision of construction material and the disposal of construction waste comply with the decree
<i>Law 444</i>	29/7/2002	Environmental protection framework law. Includes the general provisions for the protection of the environment.	Ensures project activities are in line with the requirements of the Law, particularly the articles in Chapter 5 on the protection of environmental media (air, coast, water, noise, facilities, natural resources, etc.)
<i>MOE Decision 8/1</i>	30/1/2001	Updates Decision 1/52 and in setting of the National Standards for Environmental Quality by the MOE	Ensures project activities comply with national environmental standards

² Lebanon's legislative body is represented by the Lebanese Parliament that approves and issues Laws. Lebanon's executive body is represented by the Council of Ministers (COM) and is headed by the Presidency of the Council of Ministers. The COM enacts regulations in the form of Decisions (denoted COM Decision Number) and Decrees. Decisions are issued by a specific minister and are limited to the affairs of the ministry that promulgated it. Ministerial Decisions are subject specific.

<i>Legislation²</i>	<i>Date of Issue</i>	<i>Subject</i>	<i>Relevance to the project</i>
<i>MOE Decision 1/52</i>	12/9/1996	Setting of the National Standards for Environmental Quality by the MOE	Ensures project activities comply with national environmental standards
<i>Law 558</i>	24/07/1996	Law for the protection of forests	The requirements of the law shall be adhered to for the protection of forests.
<i>Decree 2761</i>	19/12/1933	Guidelines related to wastewater management and disposal	Ensures waste management activity comply with the decree
<i>Decree Law 8735</i>	23/08/1974	Maintaining general cleanliness	Ensures project activities adhere to this decree particularly in terms of waste disposal
<i>Cultural heritage related legislation</i>			
<i>Decree law 166</i>	7/11/1933	Antiquity law	Defines chance find procedures that should be followed in case antiquities were identified in the project site
<i>Urban/ rural planning and construction-related legislation</i>			
<i>Law 58</i>	29/05/1991	Expropriation Law	Adhere to provisions in case the project requires expropriation.
<i>Law 118</i>	30/06/1977	Municipalities Law. It stipulates the role of the Municipalities and Municipalities councils.	Defines the roles of municipalities in the provision of environmental services such as solid waste management, wastewater management, etc.
<i>Labor-related legislation</i>			
<i>Decision 29/1</i>	2018	Businesses, professions, trades, and jobs that should be restricted to Lebanese only	Restricts significant number of jobs to Lebanese only and allows Syrians to occupy jobs that are not restricted to Lebanese especially in the construction sector
<i>Decree 3791</i>	30/06/2016	Sets minimum wage for employees and workers	Adhere to the requirements of this decree with regards to wages of employees on this project.
<i>Decree 8987</i>	29/09/2012	Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals	Adhere to the requirements of this decree with regards to employment for this project.
<i>Decree 11802</i>	30/01/2004	Organizes prevention, safety and occupational health in all institutions subject to the Labor Law	Adhere to the requirements of this decree in terms of occupational health of staff working on the project
<i>Law 400</i>	05/06/2002	Allows the Government to ratify the Minimum Age Convention C-138, 1973	Adhere to the provisions of the convention in terms of prohibition of work to children less than 15 years of age
<i>Law 335</i>	02/08/2001	Allows the Government to ratify the Worst Forms of Child Labor Convention C-182, 1999	Adhere to the provisions of the convention in terms of prohibition of work which is likely to harm the health, safety or morals of children

<i>Legislation²</i>	<i>Date of Issue</i>	<i>Subject</i>	<i>Relevance to the project</i>
<i>Labor Law</i>	23/09/1946	Labor law and its amendments	Adhere to provisions of the law and its amendments related to employment contracts, employment of children and women; work hours and holidays, wages, dismissal, inspection, health and safety.
<i>Penal Code</i>	01/03/1943	Penal code	Abide by Article 522
<i>Traffic-related legislation</i>			
<i>Law 243</i>	25/10/2012	New traffic law	Adhere to requirements of this Law with regards to traffic movement of construction-related equipment, re-routing schemes, design of road signage, etc.

2.2 Institutional

Several ministries and government bodies are responsible for transport and traffic related activities in Lebanon including the:

- ❑ Council for Development and Reconstruction (CDR)
- ❑ Ministry of Public Works and Transportation (MoPWT)
- ❑ Ministry of Interior and Municipalities (MoIM)
- ❑ Ministry of Environment (MoE)
- ❑ Ministry of Culture (MoC) – Department of Antiquities (DoA).
- ❑ Ministry of Energy and Water/ Water Establishments/ Electricite du Liban
- ❑ Ministry of Agriculture (MoA)
- ❑ Ministry of Labor (MoL)

A statement of the transport/traffic related mission of each including aspects related to road-highway construction is summarized in Table 2-2. At this stage, it is expected that the proposed project will involve primarily the CDR. Since some proposed roads may pass near sensitive areas, close coordination with relevant ministries is also anticipated in the event any finds are made. At the completion of the project, the road becomes under the jurisdiction of the MoPWT for the purpose of maintenance and rehabilitation whenever required.

Table 2-2. Summary of functional responsibilities of transport/traffic involved ministries/agencies

Agency	Mission	Role in project
<p><i>Council for Development & Reconstruction (CDR)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Plan and arrange for financing of projects including relations with donors and loan management <input type="checkbox"/> Execute projects in all sectors <input type="checkbox"/> Manage contracts in all sectors, including the transportation sector, which involve planning, design, construction, and supervision of construction 	<ul style="list-style-type: none"> <input type="checkbox"/> Monitors activities of construction contractors to ensure delivery as per contracts, which will include mitigation and monitoring measures identified in the ESMP
<p><i>Ministry of Public Works and Transportation (MoPWT)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Organize and supervise land, maritime and air transport <input type="checkbox"/> Construct, equip, manage and exploit publicly owned transport modes and facilities and develop them in harmony with the social and economic development and according to the needs of the country <input type="checkbox"/> Supervise the safety of transport means and facilities, its maintenance, modernization, and development <input type="checkbox"/> Prepare plans and conduct techno-economic studies aiming at operating transport means and facilities <input type="checkbox"/> Implement laws and regulations related to the transport and public maritime property <input type="checkbox"/> Exercise tutelage authority over the autonomous authorities and public enterprises in the public transport sector <input type="checkbox"/> Exercise control over transport concessions <input type="checkbox"/> Control and periodically update transport tariffs <input type="checkbox"/> Collect and analyze relative data and statistics and operate a road materials lab <input type="checkbox"/> Perform and oversee road design <input type="checkbox"/> Perform and supervise road studies and execution <input type="checkbox"/> Perform road maintenance <input type="checkbox"/> Take care of traffic safety in cooperation with other ministries/government agencies <input type="checkbox"/> Develop master and detailed plans for cities and villages, and establishing land use regulations <input type="checkbox"/> Develop road and street plans within cities and villages 	<ul style="list-style-type: none"> <input type="checkbox"/> Responsible for operating and maintaining these roads following project completion.
<p><i>Ministry of Interior and Municipalities (MoIM)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Manage vehicle registration and inspection, and driver licensing <input type="checkbox"/> Enforce law, including that of the Traffic Code <input type="checkbox"/> Organize and manage civil defense activities and traffic related functions <input type="checkbox"/> Contribute to strengthening decentralization and activation of local government <input type="checkbox"/> Supervise municipal government units and ensure conformity with administrative and financial regulations <input type="checkbox"/> Coordinate among municipal units <input type="checkbox"/> Provide technical assistance and support to municipal governments <input type="checkbox"/> Cooperate and coordinate with other administrations on issues related to municipal and rural affairs 	<ul style="list-style-type: none"> <input type="checkbox"/> Municipalities involved in the project have a role in collaborating with the contractor to implement environmental management related measures including solid waste management, wastewater management, traffic management, etc.

<i>Agency</i>	<i>Mission</i>	<i>Role in project</i>
<i>Ministry of the Environment (MoE)</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Monitor and control of environmental protection, preservation of natural sites and amenities <input type="checkbox"/> Prevent pollution, protect wildlife, and preserve environmental balance <input type="checkbox"/> Set environmental standards, specifications and guidelines <input type="checkbox"/> Manage natural resources and amenities <input type="checkbox"/> Coordinate and encourage environmental awareness programs 	<ul style="list-style-type: none"> <input type="checkbox"/> Compliance of ESMP with the Lebanese environmental standards and regulations issued by MoE
<i>Ministry of Culture (MoC) –Department of Antiquities</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Manage archeological finds <input type="checkbox"/> Review and approve project specific “Archaeological Chance Find” procedures which would be used by construction contractors, consulting engineer and archaeological consultants to address actions to be taken if unrecorded archaeological materials are encountered during the course of project implementation 	<ul style="list-style-type: none"> <input type="checkbox"/> In case of archaeological chance finds, review and approve project specific “Archaeological Chance Find” procedures which would be used by construction contractors, consulting engineer and archaeological consultants to address actions to be taken if unrecorded archaeological materials are encountered during the course of project implementation
<i>Ministry of Energy and Water (MOEW)</i>	<ul style="list-style-type: none"> <input type="checkbox"/> In charge of electricity, water, wastewater, irrigation and stormwater drainage projects. <input type="checkbox"/> Authorities acting under its auspices are: 4 Water Establishments (Beirut & Mount Lebanon, North, South and Bekaa), the Litani River Authority and Electricite du Liban (EdL) 	<ul style="list-style-type: none"> <input type="checkbox"/> Coordinate with relevant authorities under the MOEW in case of accidental damage to water and electricity related infrastructure during project implementation.
<i>Ministry of Agriculture (MoA)</i>	<ul style="list-style-type: none"> <input type="checkbox"/> In addition to being in charge of the agricultural sector, the MOA is in charge of protecting and promoting the sustainable management of natural and genetic resources, including forests 	<ul style="list-style-type: none"> <input type="checkbox"/> Coordinate with MOA in case of the need for tree cutting
<i>Ministry of Labor (MoL)</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Responsible for labor and employment issues. 	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure labor laws are adhered to <input type="checkbox"/> Issue work permits for foreign labor

2.3 Environmental Standards

National environmental standards were issued by the MOE under Decision 1/52 of 1996 and Decision 8/1 of 2001. The latter overrides Decision 1/52 of 1996 and cancels Annexes 1, 2, 6, 7, 8, 9, 11 12, and 13 of Decision 1/52. The three most relevant standards to the current project are the maximum limits of ambient air quality (Table 2-3), the permissible ambient noise levels (Tables 2-4 and 2-5), and the wastewater discharge standards (Tables 2-6 and 2-7). This is because air and noise emissions as well as wastewater effluents are potential impacts associated with the rehabilitation of roads and should be mitigated to meet the national standards.

2.3.1 Air quality

Table 2-3. Maximum allowable ambient air quality concentrations as per MOE Decision 1/52

<i>Pollutant</i>	<i>Maximum limits ($\mu\text{g}/\text{m}^3$)</i>	<i>Avg period</i>
Sulfur Dioxide (SO ₂)	350 120 80	1 hour 24 hours 1 year
Nitrogen Dioxide (NO ₂)	200 150 100	1 hour 24 hours 1 year
Ozone (O ₃)	150 100	1 hour 8 hours
CO	30,000 10,000	1 hour 8 hours
PM ₁₀	120	24 hours
Lead	1.0	1 year
Benzene	5 ppb	1 year

2.3.2 Noise levels

Table 2-4. Lebanese noise guidelines in different zones as per MOE Decision 1/52

<i>Area classification</i>	<i>Maximum accepted noise level dBA</i>		
	<i>Day¹</i>	<i>Evening²</i>	<i>Night³</i>
Business district	55 – 65	50 – 60	45 – 55
Residential area with few construction sites, commercial activities or on highway	50 – 60	45 – 55	40 – 50
Urban residential area	45 – 55	40 – 50	35 – 45
Residential suburb	40 – 50	35 – 45	30 – 40
Rural residential, hospital, public garden	35 – 45	30 – 40	25 – 35
Industrial zone	60 – 70	55 – 65	50 – 60

¹ 7 a.m. to 6 p.m. ² 6 p.m. to 10 p.m. ³ 10 p.m. to 7 a.m.

Note that the Lebanese noise standards were adopted primarily from the World Health Organization (WHO) standards, which are based on threshold levels for health impacts. Such standards are typically difficult if not impossible to meet near road projects and therefore abatement criteria promulgated by the US Federal Highway Administration (FHWA, 1997) (Table 2-5) are more commonly relied upon for noise impact assessments near road projects.

Table 2-5. Summary of FHWA noise abatement criteria

Land use category	FHWA Standard Leq (dBA)	Description of land use category
A	57 (exterior)	Land where serenity and quiet are of extraordinary importance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreational areas, playgrounds, parks.
C	72 (exterior)	Developed lands, properties or activities not included in A and B
D		Undeveloped land
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: FHWA (1997)

As for the national occupational noise exposure standards in work areas, they are far higher and include the following:

- ❑ 90 dB(A) for a duration of 8 hrs
- ❑ 95 dB(A) for a duration of 4 hrs
- ❑ 100 dB(A) for a duration of 2 hrs
- ❑ 115 dB(A) for a duration of 0.25 hrs

2.3.3 Wastewater discharge

Table 2-6. Limit values for wastewater discharged into surface water as per MOE Decision 8/1

Parameter	ELV for existing facilities	ELV for new facilities
pH	5 – 9	6 – 9
Temperature	30°C	30°C
BOD ₅ mgO ₂ /L	100	25
COD mgO ₂ /L	250	125
Total Phosphorous mgP/L	16	10
Total Nitrogen, mgN/L ³	40	30
Suspended Solids mg/L	200	60
AOX	5	5
Detergents mg/L	3	3
Coliform Bacteria 37°C in 100 ml ⁴	2,000	2,000
Salmonellae	absence	absence
Hydrocarbons mg/L	20	20
Phenol index mg/L	0.3	0.3
Oil and Grease mg/L	30	30
Total Organic Carbon (TOC) mg/L	75	75
Ammonia (NH ₄ ⁺) mg/L	10	10
Silver (Ag) mg/L	0.1	0.1

³ Sum of Kjeldahl-N (organic N + NH₃), NO₃-N, NO₂-N

⁴ For dischargers in close distance to bathing water a stricter ELV could be necessary

<i>Parameter</i>	<i>ELV for existing facilities</i>	<i>ELV for new facilities</i>
Aluminium (Al) mg/L	10	10
Arsenic (As) mg/L	0.1	0.1
Barium (Ba) mg/L	2	2
Cadmium (Cd) mg/L	0.2	0.2
Cobalt (Co) mg/L	0.5	0.5
Chromium total (Cr) mg/L	2	2
Hexavalent Chromium (Cr ^{VI}) mg/L	0.5	0.2
Copper total (Cu) mg/L	1.5	0.5
Iron total (Fe) mg/L	5	5
Mercury total (Hg) mg/L	0.05	0.05
Manganese (Mn) mg/L	1	1
Nickel total (Ni) mg/L	2	0.5
Lead total (Pb) mg/L	0.5	0.5
Antimony (Sb) mg/L	0.3	0.3
Tin total (Sn) mg/L	2	2
Zinc total (Zn) mg/L	5	5
Active Cl ₂ mg/L	1	1
Cyanides (CN ⁻)mg/L	0.1	0.1
Fluoride (F ⁻) mg/L	25	25
Nitrate (NO ₃ ⁻) mg/L	90	90
Phosphate (PO ₄ ³⁻) mg/L	5	5
Sulphate (SO ₄ ²⁻) mg/L	1,000	1,000
Sulphide (S ²⁻)mg/L	1	1

Table 2-7. Limit values for wastewater discharged into the sewage network as per MOE Decision 8/1

<i>Parameter</i>	<i>ELV for existing and new facilities</i>
pH	6 – 9
Temperature	35°C
BOD ₅ mgO ₂ /L ⁵	125
COD mgO ₂ /L ⁶	500
Total Phosphorous mgP/L ⁷	10
Total Nitrogen, TN mg/L ⁸	60
Suspended Solids mg/L	600
AOX	5
Salmonellae	absence
Hydrocarbons mg/L	20
Phenol index mg/L	5
Oil and Grease mg/L	50
Total Organic Carbon (TOC) mg/L	750
Ammonia (NH ₄ ⁺) mg/L ⁹	-

⁵ Assuming an outlet concentration of 25 mg/l and a cleaning capacity of 80 percent

⁶ Assuming an outlet concentration of 125 mg/L and a cleaning capacity of 75 percent

⁷ Assuming an outlet concentration of 2 mg/l and a cleaning capacity of 80 percent

⁸ Assuming connection to a biological waste water treatment plant. Performance of waste water treatment plant related to the concentration in the inflow: 70 – 80 percent, ELV at outlet: 15 mg/L N

⁹ Assuming connection to a biological waste water treatment plant. Performance of waste water treatment plant related to the concentration in the inflow: 70 – 80 percent, ELV at outlet: 15 mg/l N

<i>Parameter</i>	<i>ELV for existing and new facilities</i>
Silver (Ag) mg/L	0.1
Aluminium (Al) mg/L	10
Arsenic (As) mg/L	0.1
Barium (Ba) mg/L	2
Cadmium (Cd) mg/L	0.2
Cobalt (Co) mg/L	1
Chromium total (Cr) mg/L	2
Hexavalent Chromium (Cr ^{VI}) mg/L	0.2
Copper total (Cu) mg/L ¹⁰	1
Iron total (Fe) mg/L	5
Mercury total (Hg) mg/L	0.05
Manganese (Mn) mg/L	1
Nickel total (Ni) mg/L ¹¹	2
Lead total (Pb) mg/L ¹⁰	1
Antimony (Sb) mg/L	0.3
Tin total (Sn) mg/L	2
Zinc total (Zn) mg/L ¹⁰	10
Cyanides (CN ⁻)mg/L	1
Fluoride (F ⁻) mg/L	15
Nitrate (NO ₃) mg/L ¹¹	-
Phosphate (PO ₄ ³⁻) mg/L ¹¹	-
Sulphate (SO ₄ ²⁻) mg/L	1,000
Sulphide (S ²⁻) mg/L	1

2.3.4 Gap analysis for national environmental standards

The national environmental standards were compared to their corresponding standards in the World Bank Group (WBG) Environmental Health and Safety General Guidelines (WB/IFC, 2007). For ambient air quality, the WBG guidelines adopt the WHO ambient air quality guidelines. These guidelines are either the same or stricter than the maximum limits defined by the MOE.

Table 2-8. Comparison of national ambient air quality standards to WHO guidelines

¹⁰ ELV of 0.5 mg/L must be kept at the outlet of WWTP.

¹¹ ELV of 0.5 mg/L must be kept at the WWTP outlet.

¹¹ ELV for total nitrogen and total phosphor has to be kept

<i>Pollutant</i>	<i>National standards as per Decision 1/52</i>		<i>WHO guidelines</i>	
	<i>Maximum limits ($\mu\text{g}/\text{m}^3$)</i>	<i>Avg period</i>	<i>Maximum limits ($\mu\text{g}/\text{m}^3$)</i>	<i>Avg period</i>
Sulfur Dioxide (SO ₂)	350 120 80	1 hour 24 hours 1 year	500 20	10 minutes 24 hours
Nitrogen Dioxide (NO ₂)	200 150 100	1 hour 24 hours 1 year	200 40	1 hour 24 hours 1 year
Ozone (O ₃)	150 100	1 hour 8 hours	100	1 hour 8 hours
CO	30,000 10,000	1 hour 8 hours	NA	1 hour 8 hours
PM ₁₀	120	24 hours	50 20	24 hours 1 year
PM _{2.5}	NA	NA	25 10	24 hours 1 year
Lead	1.0	1 year	NA	NA
Benzene	5 ppb	1 year	NA	NA

For noise levels, the WBG guidelines set the one-hour Leq at 55 dBA during daytime and 45 dBA during nighttime for residential, institutional and educational areas. These are stricter than the FHWA standard (67 dBA) but comparable to the national standards for residential area with few construction sites, commercial activities or on highway (50-60 dBA) and less strict than the national standards for rural areas (35-40 dBA).

As for the wastewater discharge, the WBG EHS provides standards for discharge of treated sewage from an industrial facility to surface water. This does not apply to this project. National limit values for wastewater discharge into surface water and into the sewage network are more detailed in terms of parameters and will be adopted when necessary.

2.4 World Bank Policies

In addition to the Lebanese legislation, two safeguards policies apply to Lebanon Road and Employment Project (1) OP 4.01 Environmental Assessment and OP 4.12 and (2) Involuntary Resettlement.

2.4.1 Safeguard Policies

OP 4.01 Environmental Assessment.

The ESMP for the selected roads in Tripoli should comply with the safeguard policy of the World Bank, specifically, the OP/BP 4.01 regarding Environmental Assessment. The OP 4.01 is triggered as the project could have impacts on the environment due to the rehabilitation of roads infrastructures and associated civil works.

Under the requirements of OP4.01, the proposed project is classified as Category B (impacts are localized, short-term, and reversible and have no severe effects on the environment). Simple and low/moderate cost mitigation measures will be sufficient to restore the potential damage or keep it to the lowest possible) since the environmental impacts are expected to be minimal, during the rehabilitation phase, and can be mitigated via an environmental management plan.

OP 4.12 Involuntary Resettlement.

Despite that OP 4.12 was triggered by this project, in the case of Tripoli and in accordance with site specific design plans, involuntary resettlement or land acquisition will not take place. In other words, the project will be implemented primarily within the existing “right of way” there will be no displaced persons by the project activities (this includes local, street vendors and Syrian refugees).

2.4.2 Access to Information (AI) policy

Introduced in 2010, the World Bank’s Policy on Access to Information (AI Policy) has made the Bank a more effective development partner. Based on the concept that any information in the Bank’s possession is public, except for that which falls under a defined list of exceptions, the AI Policy remains the standard for international development institutions. It has also provided the basis for the accompanying open initiatives—including Open Data, Open Finances, the Open Knowledge Repository, and the Open Archives—all of which make the Bank’s work more transparent, accessible, and accountable.

2.4.3 Consultation and Disclosure Policy

According to OP/BP 4.01, a public consultation with project-affected people and local nongovernmental organizations (NGOs) must be conducted for all projects under Category A and Category B. The aim of the consultation is to present to the public the components of the project along with potential environmental and social impacts and take their comments and concerns into consideration.

Accordingly, the Consultant organized a public consultation at Tripoli Municipality on December 18, 2019 and individual interviews with street vendors during August 2020 (see more details in section 8.1). In addition, this ESMP will be disclosed on the CDR website on the following link <https://cdr-lebanon.com/en-US/Studies-and-reports/Roads-and-Employment.aspx>

2.4.4 EHS guidelines

The preparation of this ESMP considered the WBG Environmental Health and Safety General Guidelines which are consistent with the CDR Safety, Health, and Environmental Regulations for Construction Projects (Annex C).

2.5 International treaties and conventions

Lebanon has ratified several international conventions related to the environment in general. Selected laws of relevance to the project impact assessment are summarized in Table 2-9 and Table 2-10.

Table 2-9. International laws and conventions signed by Lebanon

<i>Date & Place Signed</i>	<i>Treaty</i>	<i>Relevance to the project</i>
<i>1994 Rio de Janeiro ratified via Law 359 dated 1/8/1994</i>	UN framework convention on climate change with the aim to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.	Considers greenhouse gas emissions
<i>1992 Rio de Janeiro ratified via Law 360 dated 1/8/1994</i>	UN framework convention on Biological Diversity: Conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits from the use of genetic resources, including appropriate access to such resources and transfer of relevant technologies	Considers terrestrial biodiversity in the vicinity of the project.

Table 2-10 Labor Conventions

<i>ILO Convention</i>	<i>Name</i>	<i>Entry into force</i>	<i>Ratification Date</i>	<i>Description</i>	<i>Relevance to Project</i>
ILO no. 29	Convention Concerning Forced or Compulsory Labor	01/05/1932	25/06/1977	Its object and purpose are to suppress the use of forced labor in all its forms irrespective of the nature of the work or the sector of activity in which it may be performed. With some exceptions such as military service.	This project should abide by this convention to protect employees from being forced into any type of work activity that they do not want to engage in.
ILO no. 105	Abolition of Forced Labor Convention	17/01/1959	25/06/1977	Aims at the elimination of forced labor and cancels certain forms of forced labor still allowed under the Forced Labor Convention of 1930	This project should comply with the guidelines of this convention in order to protect employees from being forced into any type of work activity without their will.
ILO no. 111	Discrimination (Employment and Occupation) Convention	15/06/1960	25/06/1977	Enable legislation which prohibits all discrimination and exclusion on any basis including of race/color, sex, religion, political opinion, national or social origin in employment.	This project should abide by this convention to ensure a healthy environment between the employees and between the employer and employees in the work place by enforcing equality and respect between them.
ILO no. 122	Employment Policy Convention	09/07/1965	25/06/1977	Aim at ensuring that there is freedom of choice of employment and the fullest possible opportunity for each worker to qualify for, and to use his skills and endowments in, a job for which he is well suited, irrespective of race, color, sex, religion, political opinion, national extraction or social origin.	This project should comply with the guidelines of this convention to ensure that employees are given the right opportunities, based on their qualifications, irrespective of their origin, affiliations.
ILO no. 138	Minimum Age Convention for Admission to Employment and Work	19/06/1976	25/06/1977	It stipulates that States should progressively raise the minimum age to a level consistent with the fullest physical and mental development of young people. It establishes 15 as the minimum age for work in general and 18 as the minimum age for hazardous work.	This project should abide by this convention in order to abolish the employment of children below the specified minimum age.

3 PROJECT DESCRIPTION

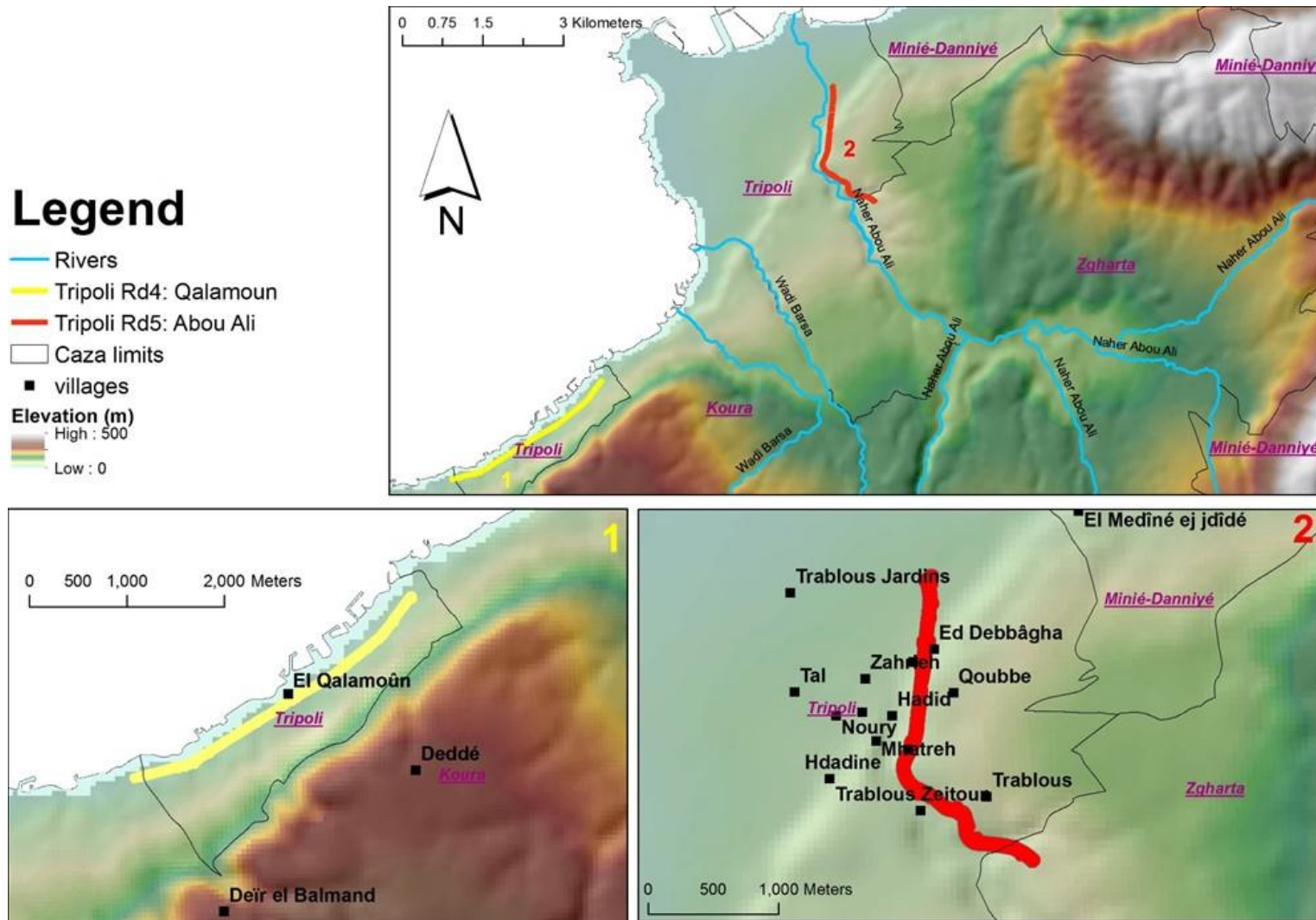
As stated above, the GOL solicited and obtained WB financing for the REP being implemented by CDR towards improving transport connectivity along select paved road sections and create short term employment opportunities for local communities (skilled Lebanese and poor Syrian refugees). The selection of road sections was based on a number of criteria that considers the pavement and safety condition of the road, the level of traffic, the balancing of roads between regions and communities, the balancing of road sections by categories (primary, secondary, and tertiary), and the labor creation potential with broader socioeconomic impacts. Using these criteria, several roads were selected in the Tripoli Caza for rehabilitation, maintenance, and minor construction. The land acquisition did not occur during the design of any road under study. Activities to be performed vary between one road and the other, depending on the road rating in terms of the condition of the pavement, shoulders, potential flooding and drainage, potential landslide/soil erosion and retaining walls, and/or pedestrian walkways.

3.1 Location

A general layout of the proposed roads for rehabilitation in the Tripoli Caza (Roads 4 and 5) is presented in Figure 3-1. The location and coordinates of the proposed roads in addition to key characteristic features or potential sensitive receptors are presented in Table 3-1 and the alignment of each road is shown in Figures 3-2 to 3-4.

- Road 4 in Tripoli Caza starts at the Sea Side Road at Las Perlas Beach and extends south for 3.5 km towards the southern borders of the town of Qalamoun.
- Road 5 in Tripoli Caza starts at the Abou Ali roundabout and extends east for 2.8 km till it reaches the Tripoli-Zgharta Caza limits connecting with the existing Tripoli-Zgharta main road along the south side of Abou Ali River

Figure 3-1. Location overview and elevation of proposed roads within the Tripoli district



Source: Layers by CNRS

Table 3-1. Location and characteristics of Tripoli district proposed roads

<i>Road code</i>	<i>Villages From to</i>	<i>Coordinates</i>		<i>Classification</i>	<i>Length (Km)</i>	<i>Width range (m)</i>	<i>Elevation range (m)</i>	<i>Key features</i>
		<i>Start</i>	<i>End</i>					
<i>Road 4</i>	Qalamoun seaside road	34°22'54.7"N 35°46'15.2"E	34°23'57.2"N 35°48'04.9"E	Primary	3.46	10-14	0-8	Sea side road, hotels, beaches, restaurants, gas stations
<i>Road 5</i>	Abou Ali roundabout - till Caza limit of Tripoli Zgharta + South side of Abou Ali river	34°26'44.3"N 35°50'52.6"E	34°25'35.1"N 35°51'19.2"E	Primary	2.83	10-14	12-33	Tripoli-Zgharta main road, dense residential and commercial facilities

Projected Coordinate System: WGS_1984_UTM_Zone_63N

Figure 3-2. Road alignment of Tripoli Road 4 (Qalamoun Seaside Road) with contour elevations

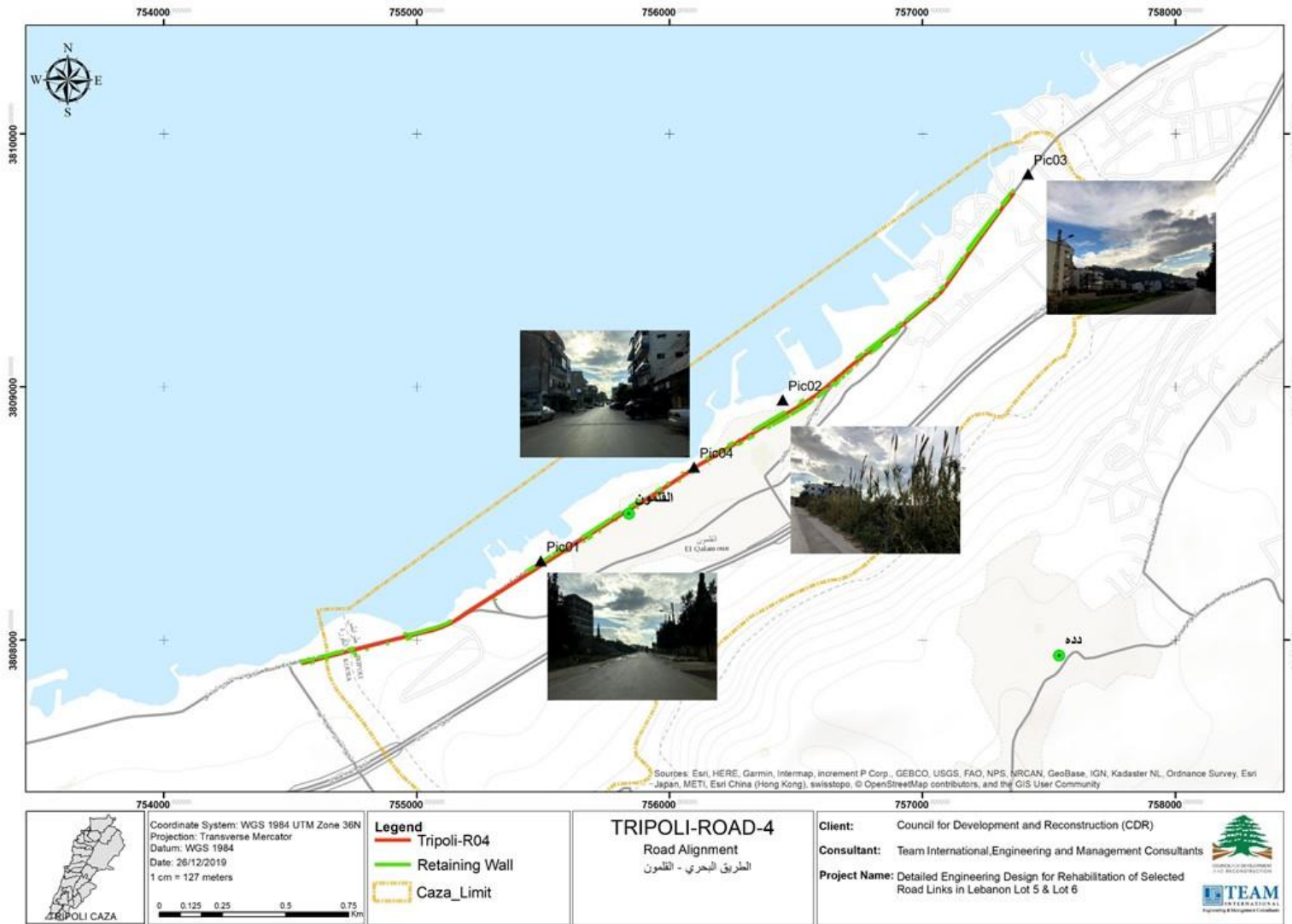
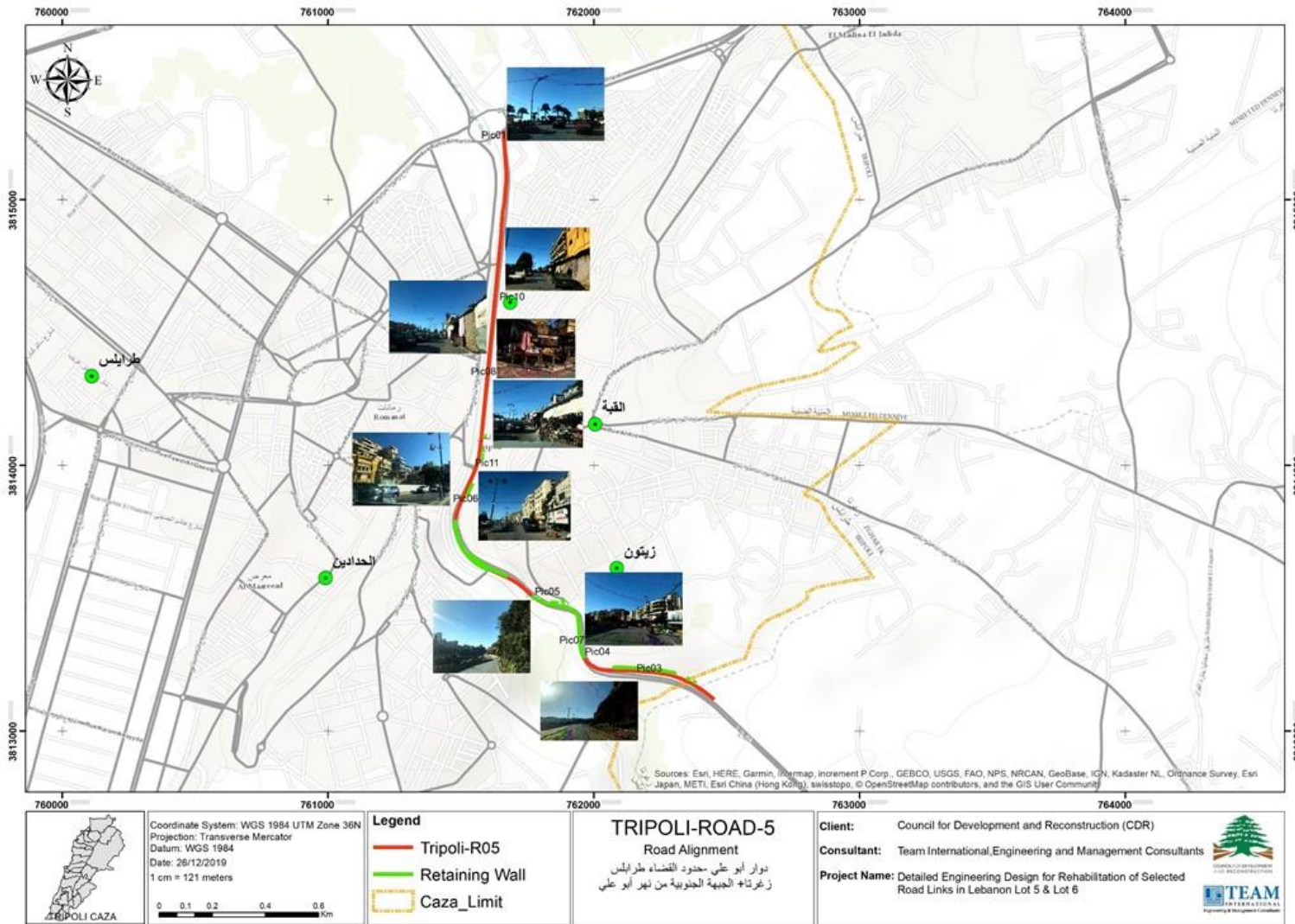


Figure 3-3. Road alignment of Tripoli Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) with contour elevations



3.2 Project activities

The main civil works which are expected to take place in general under the REP including the Tripoli caza may include:

- ❑ Construction and reconstruction of retaining walls/footwalls;
- ❑ Pavement reconstruction (aggregate base course, bituminous base course, ...);
- ❑ Pavement rehabilitation (Milling & overlay, deep & shallow pothole patching, crack sealing);
- ❑ Structural concrete repair;
- ❑ Sidewalk repairs and construction;
- ❑ Pedestrian Crossings (grade separation/at grade);
- ❑ Improvement of the median barrier (construction and repairs);
- ❑ Median/Side lighting system and all related electrical and civil works;
- ❑ Road marking & signing;
- ❑ Storm water drainage improvement (construction and repairs);
- ❑ Safety barriers: New Jersey/ Texas barrier and steel guard rail;
- ❑ Relocation/Expansion of existing utilities as applicable;
- ❑ Other ancillary and associated works including traffic management during rehabilitation;
- ❑ Reinstatement of roads disturbed by the works and tapering to the existing roads as necessary.

During the execution of rehabilitation activities, roads will not be closed or shutdown. Works will be executed on the road right of way/passageway only and will not use or undermine any existing adjacent facilities. In addition, the rehabilitation activities will maintain a passing corridor within the alignment to grant access to nearby properties.

In case the works imply any temporary closure of the road, traffic will be secured by the project Contractor via alternative routes to reach relevant destinations. Detours and diversions were not included in the design. Therefore, before the execution of rehabilitation works, the Contractor, based on the schedule of works and if needed, will secure the access and traffic movement via other alternative routes and means in coordination with the related Municipality. Accordingly, all detours will be on existing alternative roads (public domain properties) and there is no need to use or rent some land to create the detour. The duration of the project is 18 months with a one - year liability period.

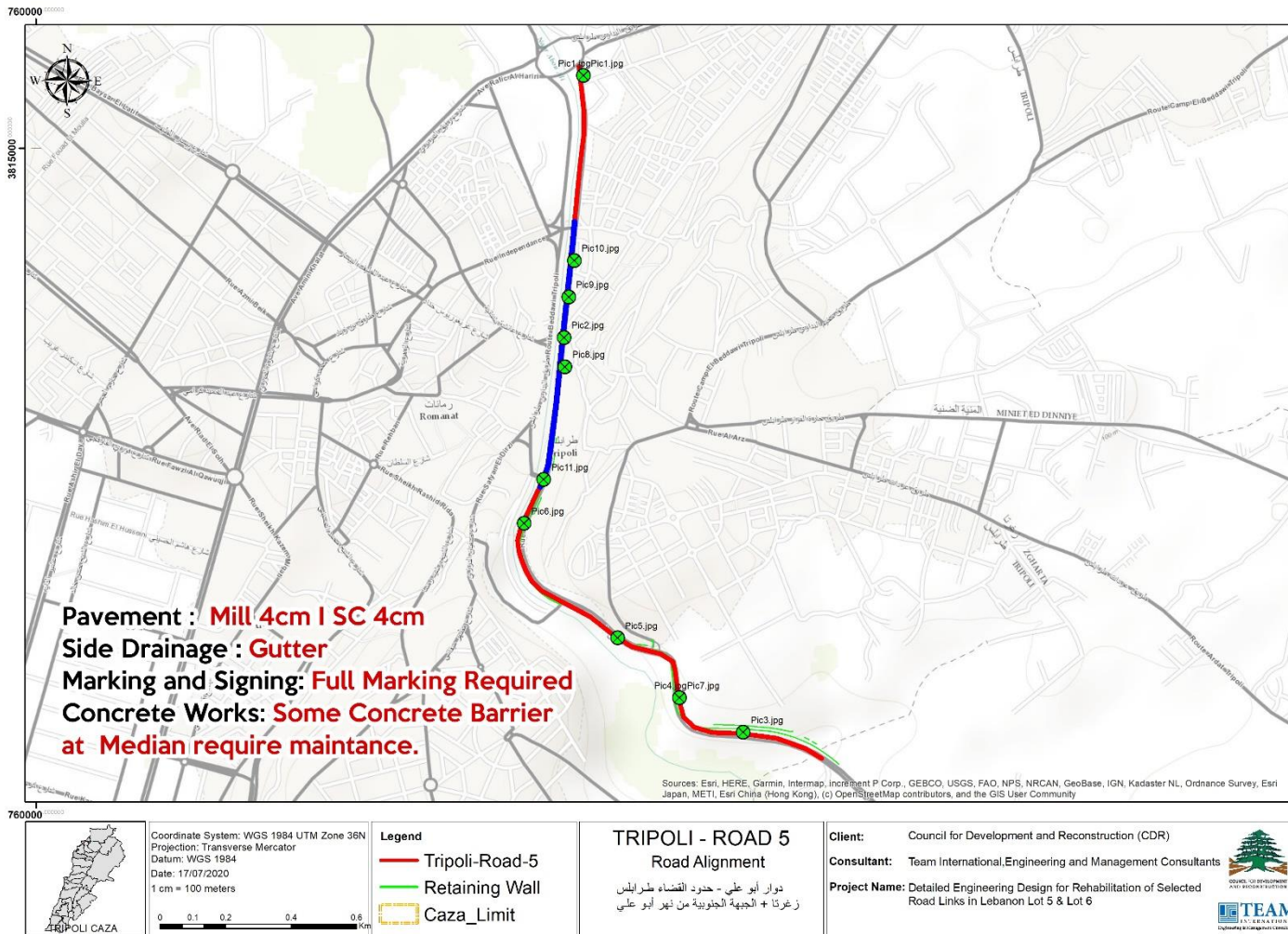
Table 3-2 summarizes the main design elements to be executed along the roads in Tripoli Caza, in addition to asphaltting, along with the quantities of construction material needed. Note that the excavations will not exceed 40 cm in depth minimizing potential interference with existing infrastructure such as water supply. As for Road 5 (Abou Ali Roundabout-Tripoli/Zgharta limit) and in particular the 700 m stretch where the street vendors exist on its western sidewalk, the

rehabilitation activities will be limited to the pavement, side drainage, marking and signing and concrete works for the median (see Figure 3-4). According to our communication with contractors, the required activities for completion of works are minor. Therefore, onsite execution will require minimal time and a relatively low presence of machinery and equipment.

Table 3-2. Design elements along proposed Tripoli district roads with estimated construction material

<i>Road code and villages</i>	<i>Excavation depth From – to (cm)</i>	<i>Excavation Volume (m³)</i>	<i>Retaining walls No. and length (m)</i>	<i>Culverts Number</i>	<i>Sidewalks Length (m)</i>	<i>Construction Material needed</i>			
						<i>Reinforced Concrete (m³)</i>	<i>Reinforcing Steel (ton)</i>	<i>Crushed Aggregate Base Course (m³)</i>	<i>Asphalt (m³)</i>
<i>Tripoli Road 4 Qalamoun Seaside Road</i>	20-40	1400	10-900	5	1000	70	7	0	1628
<i>Tripoli Road 5 Abou Ali roundabout-Tripoli/Zgharta limit</i>	20-40	1100	5-500	1	1000	56	5.6	0	1379

Figure 3-4 Rehabilitation works along Road 5 at street vendors alignment in Blue



3.3 Material and Equipment

The following are the types of construction equipment which may be used. Other equipment may be added as needed by the site activities.

- JCBs
- Excavators with jack hammers
- Milling machines
- Bobcats
- Pavers
- Rollers
- Graders
- Shovels
- Soil Compactors
- Pickup trucks
- Trucks
- Pickup trucks with integrated small cranes
- Bitumen tanks with spreaders
- Air Compressors
- Power generators
- Asphalt saw cutters.

The Contractor will not install on-site any plants for asphalt and concrete batch.

3.4 Site Staffing

At this stage, the final number of workers needed for the REP in Caza of Tripoli is based on estimation since the total volume of each activity as per the bill of quantities of the tender documents is not prepared yet by the awarded Contractor. Therefore, it is assumed that an estimate total number of workers shall range between 150 and 250.

3.5 Site Facilities

The Project site will not include on-site facilities such as site offices for Engineers and for the Contractor, laborers camps, lodging on site, containers, power generators and repair garages.

During the rehabilitation phase, which is expected to last 18 months, the Contractor will have to rent a flat located in the Project area to serve as Project Offices. These offices will be used by the Contractor Engineers, technical skilled workers and Supervising Consultants. The flat will be equipped with toilets, kitchen (including drinking water and appliances), lockers and other supplies

needed for the daily administrative activities. It might also serve as a meeting point for all Project workers at the start and end of their shifts.

The work implementation will also require unskilled workers (laborers) needed to perform earthworks on-site. The Contractor will be encouraged to hire laborers from the local community living in the Project area. During working hours, laborers will be entitled with a one-hour break on-site. Usually, every laborer brings from home his own food and drinking water. The on-site rest point will be decided by the Contractor at the time of works.

The Contractor will have to service the on-site staff with portable cabin toilet. The porta cabin will be mobile, and its placement depends on the length of the work zone. Accordingly, the Contractor will have to move it based on the progress of rehabilitation works. The Contractor should link the porta cabin toilet to the existing wastewater network. In case the network is not available within the work zone, the Contractor will need to link it to a polyethylene storage tank and the Supervising Consultant shall inspect it on a regular basis and ensure emptying the tank when filled into the nearest wastewater network.

For vehicles and equipment, the Contractor will have to rent a land within the Project area. This land should be fenced and used for parking purpose only. The Contractor shall not perform any repair on site and is obliged to execute vehicles and equipment maintenance in a repair shop preferably located within the Project area.

4 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

The preparation of the ESMP report included field surveys to observe and document baseline conditions. Information related to coverage deemed important in the context of the ESMP was synthesized and processed to prepare the maps presented in this report. Field observations coupled with reported literature form the basis for defining the physical, biological, and socio-economic characteristics of the general project area as outlined below.

4.1 Physical environment

4.1.1 Topography

The two proposed roads in the Tripoli Caza pass over the coastal plane with elevations between sea-level up to 67 m ASL. Road 4 (Qalamoun Seaside Road) is a coastal road that is a section of the old seaside road, and is therefore relatively flat with a constant elevation of 10 m ASL. Mild slopes are encountered along the entire stretch of Road 4. As for Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit), it starts at the Abou Ali roundabout at an elevation of around 14 m ASL and moves east with a relatively steady increase in slope for 2.8 km to an elevation of around 67 m ASL. Steep slopes saddle Road 5 as it traces the natural valley created by the Abou Ali River. Slopes as high as 50 degrees are in proximity to the road towards the Tripoli/Zgharta limit. Figure 4-1 shows the two road layouts as a function of the slopes they cross through. The general topographic map of the proposed roads and their surroundings is shown in Figures 4-2 and 4-3.

Figure 4-1. Slopes in the Tripoli area along with the two proposed district roads

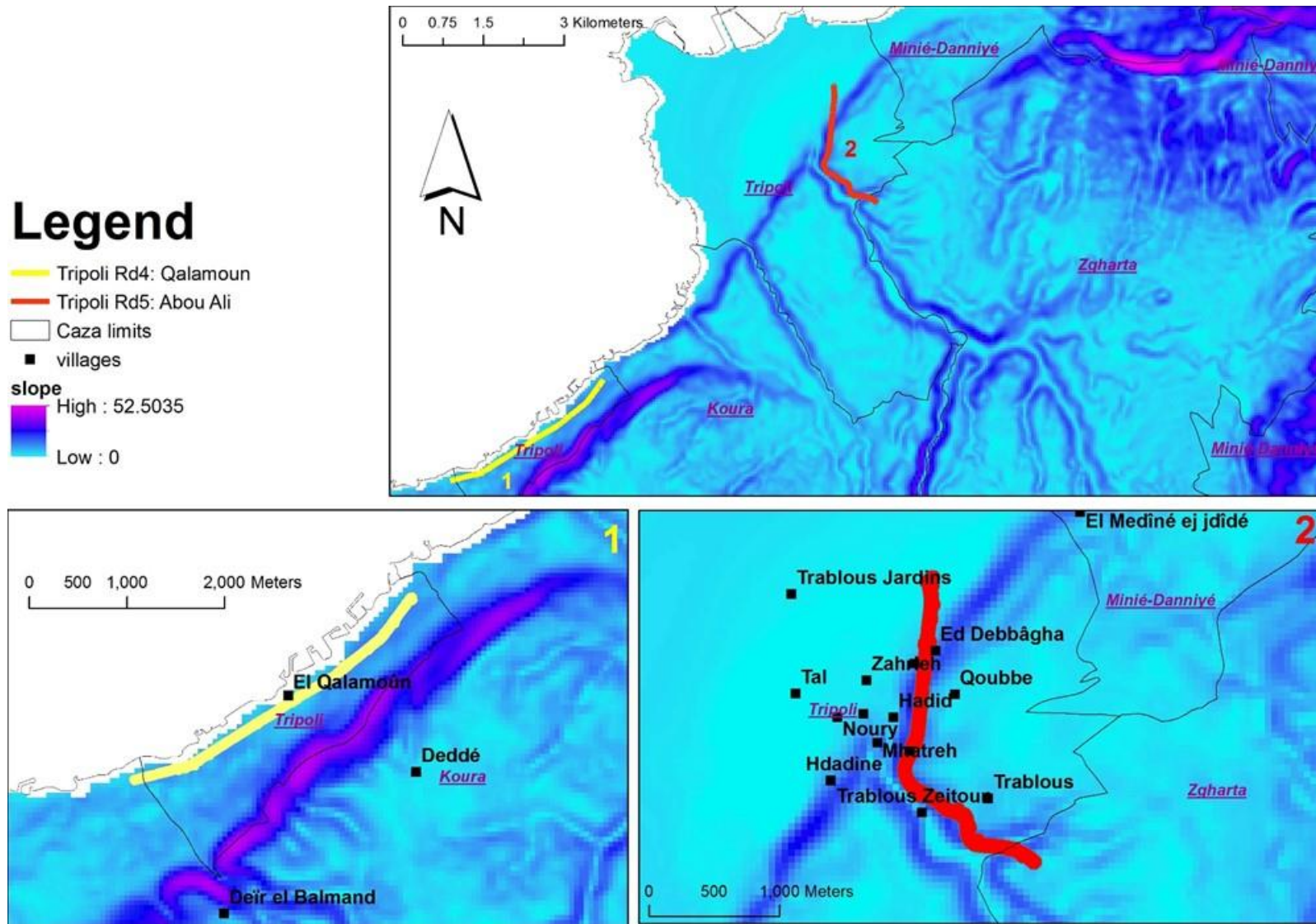
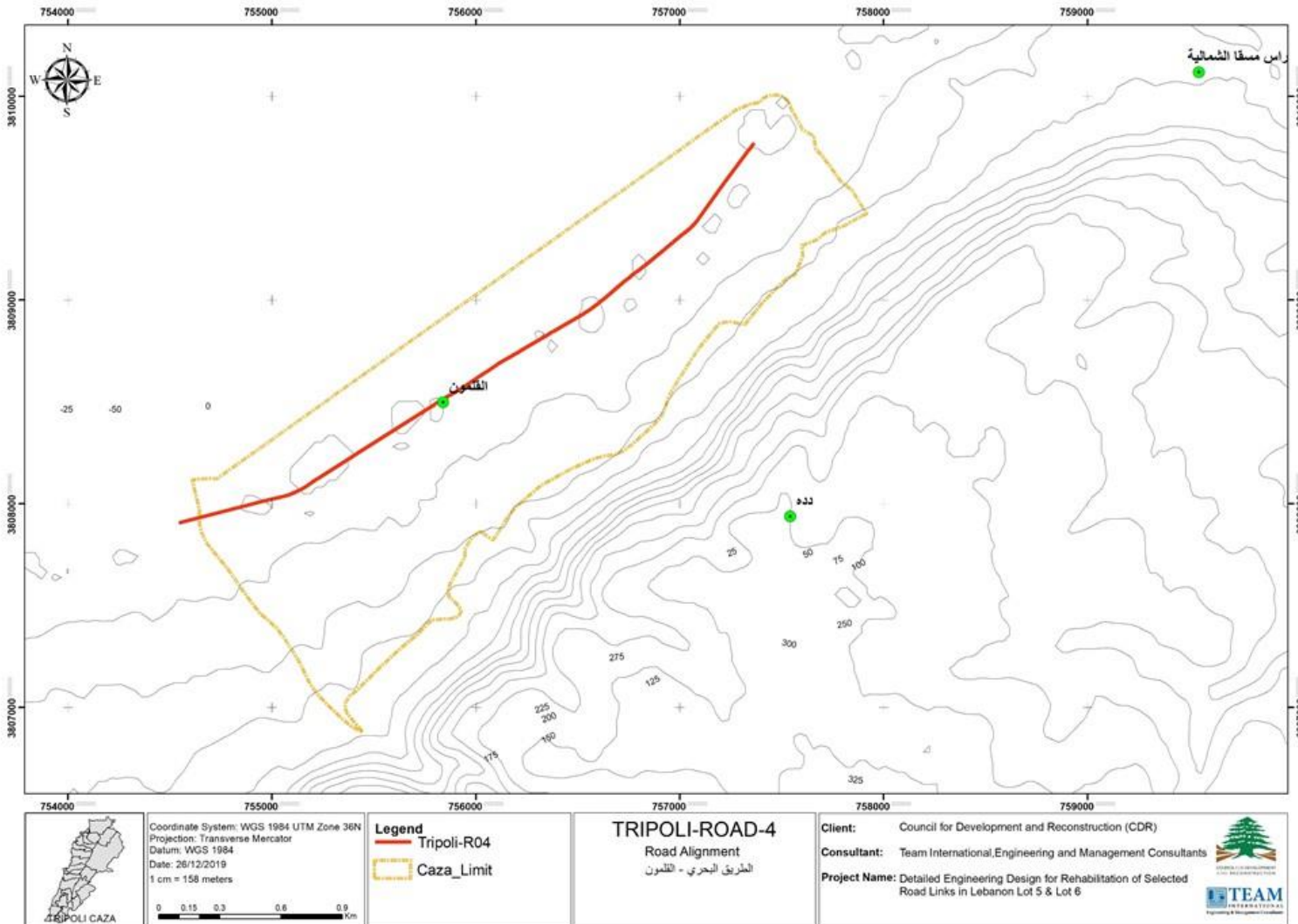
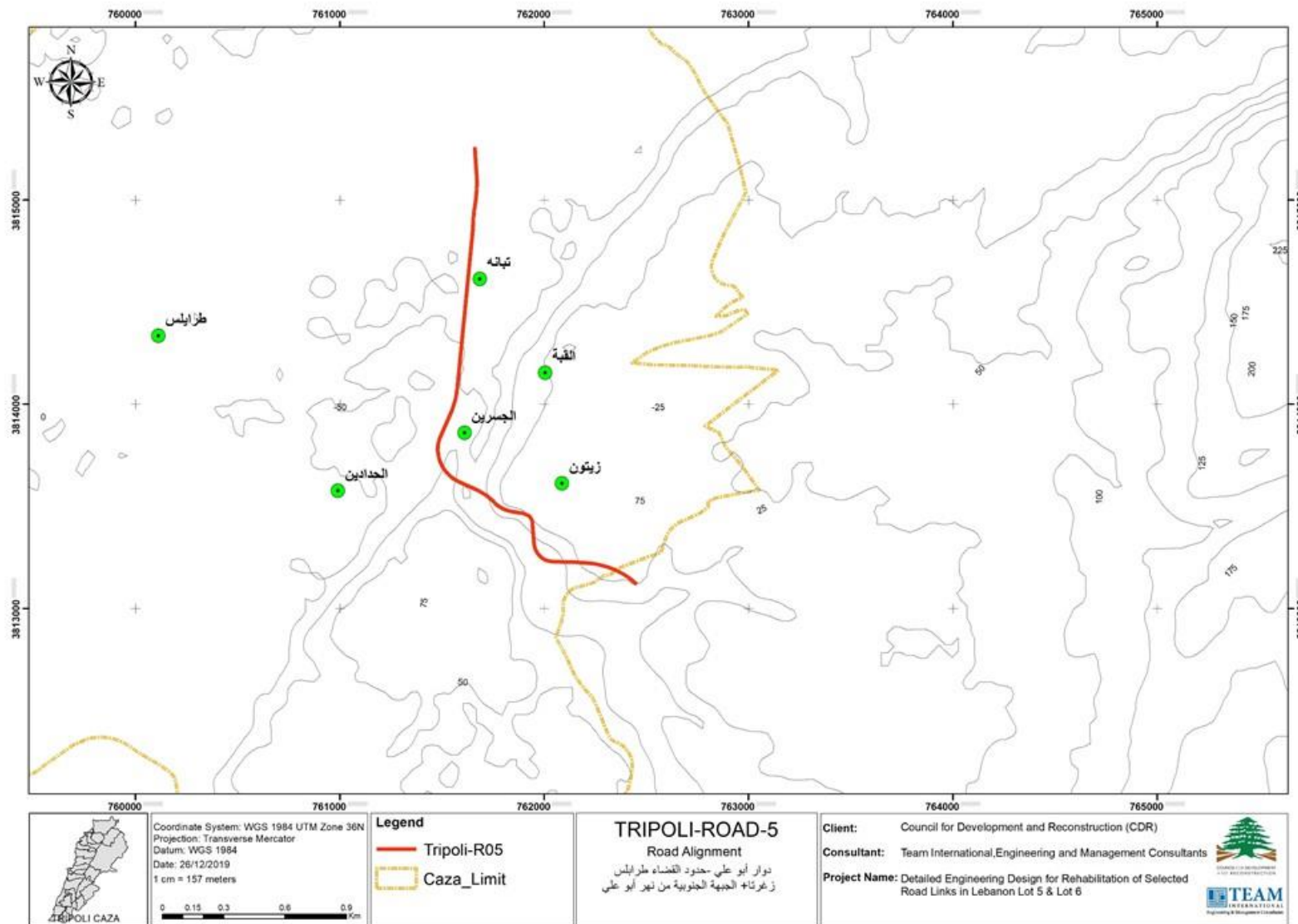


Figure 4-2. Contour maps for the proposed roads in the Tripoli district



Road 4 (Qalamoun Seaside Road)



Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit)

4.1.2 Geology

4.1.2.1 Lithology and main geological formations

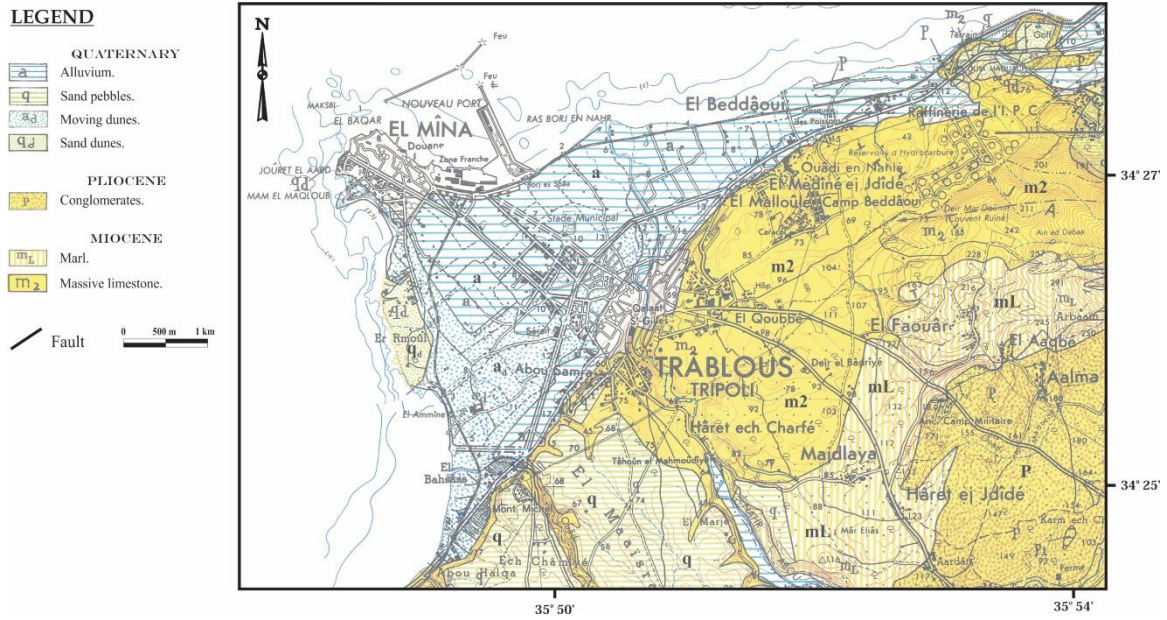
The main city of Tripoli and its suburbs are mostly flat with minor relief contrasts. The city of Tripoli is covered by a series of quaternary deposits mainly of alluvial origin (Figure 4-3). It shows lithological variations composed of sand pebbles, sand dunes, and sequences of gravel, sand, silt and clay. A major accumulation of fluvial conglomerates occurs to the south as well. Heading eastward, the area is occupied by three major geological formations of the Neogene period (Figure 4-3). They are made up of massive limestone cliffs (the Miocene Vindobonian Formation “m2”), lacustrine marl with interstratifications of limestone beds (the Miocene Pontian Formation “mL”), and marl and limestone beds (the Pliocene Formation “P”). At a larger scale, the Tripoli and the coastal regions of Koura are predominantly made of quaternary deposits. These include the continental deposits found in the Koura and the Zgharta Basin and marine deposits along the coast. The Kousba-Zgharta basin can be described as a lowered structure formed by multiple faults. The tertiary layer in the study area includes Pliocene Marl, Miocene conglomeratic deposits, and the Eocene marl. The Eocene deposits are comparable with the Senonian (C6) marl, which is an aquiclude. The Eocene is around 300 m in thickness and the lacustrine marl, which is part of the Miocene, is around 50 m. Note that the Pliocene is a whitish limestone with sandy marl lenses. With regards to the Cretaceous areas, they are located in the upper end and it ranges from Marl, which is an aquitard (Senonian C6) that is made of around 200 m and Limestone dolomite (Turonian Cenomanian C4-C5). It is considered to be an excellent aquifer. Note that the latter sometimes can reach thicknesses up to 600 m for example when it outcrops along the Koura Basin and Amioun outcrop (Khayat, 2001).

The main lithology and formations crossed by the two roads are presented in Figure 4-4. Moreover, the distribution of these formations within a 50 m buffer of the roads are shown in Table 4-1. As can be seen in the table, Road 4 (Qalamoun Seaside Road) crosses exclusively in the Miocene conglomerates/limestones. On the other hand, Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) passes through the Miocene conglomerates/limestones and the quaternary recent deposits equally. The road transitions from the Miocene to the quaternary deposits as it moves closer to the sea and city.

Table 4-1. Main lithology and formations crossed by proposed roads

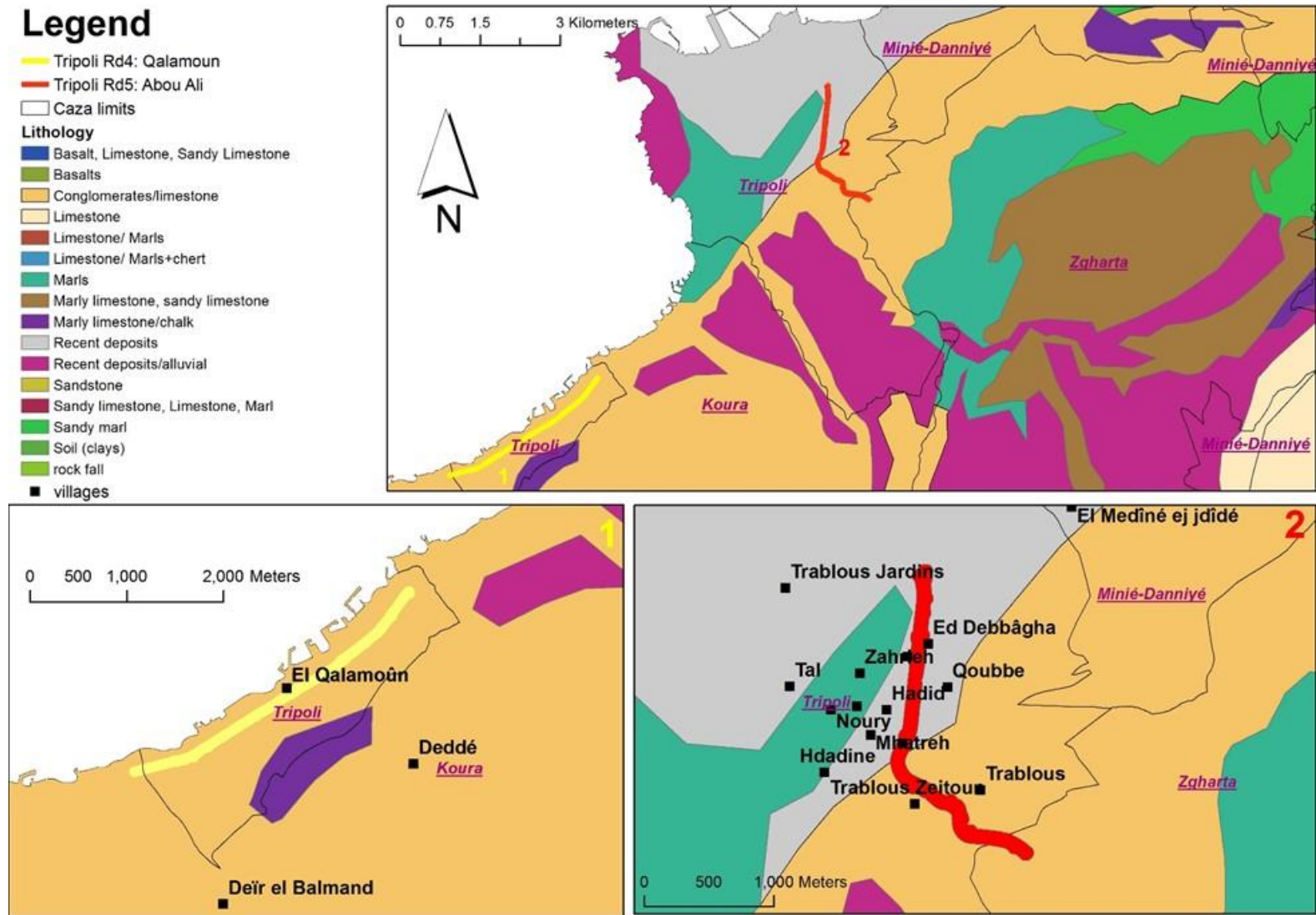
<i>Road</i>	<i>Name</i>	<i>Lithology</i>	<i>Formation</i>	<i>Area (m2)</i>	<i>Percentage (%)</i>
Road 4	Miocene	Conglomerates/limestone	m _{cg}	403,844	100%
Road 5	Miocene	Conglomerates/limestone	m _{cg}	181,499	51%
	Quaternary	Recent deposits	q	171,883	49%

Figure 4-3. Geological map of the Tripoli area, north Lebanon.



Adapted from Wetzel 1945 (For illustrative purposes)

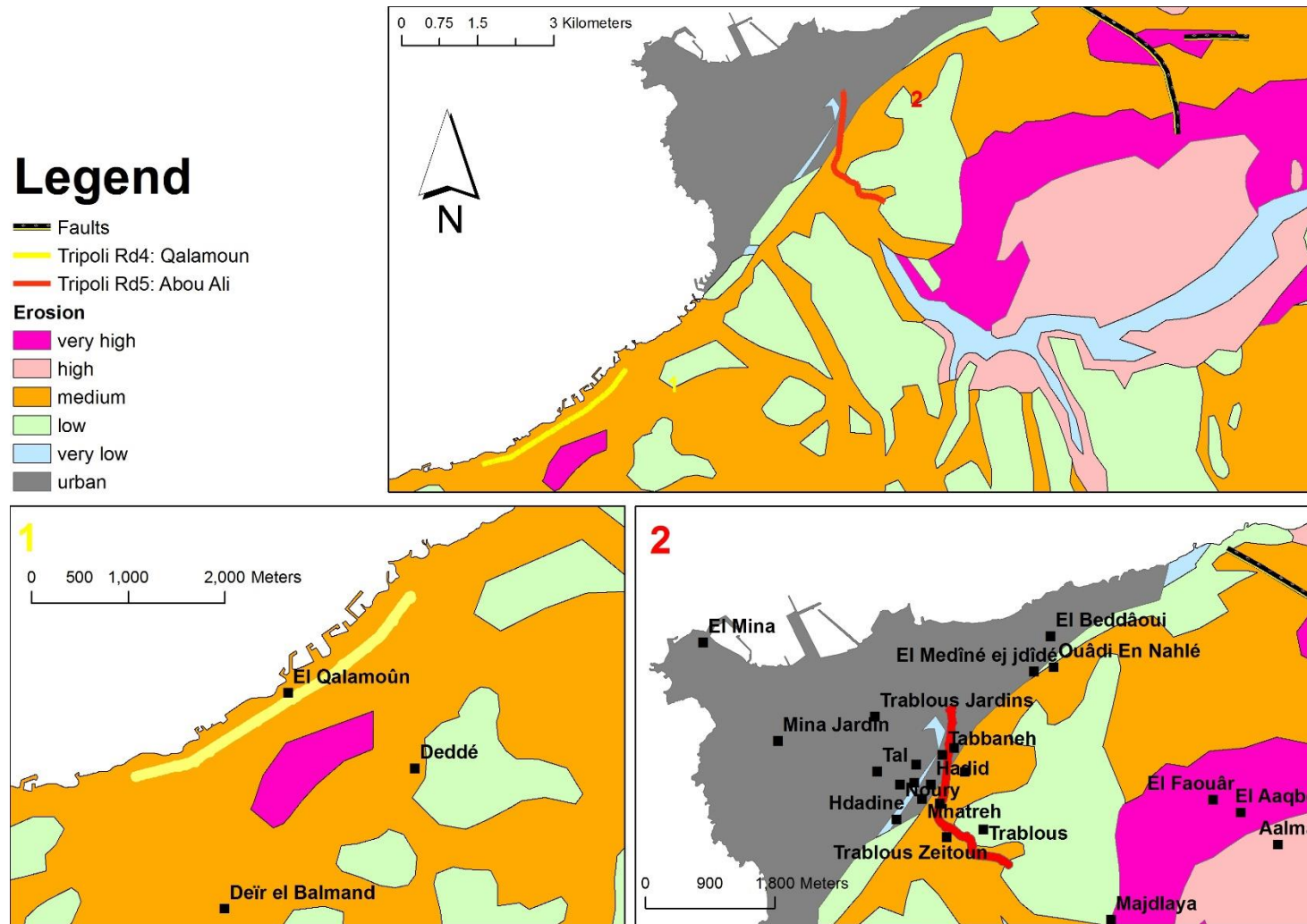
Figure 4-4. Lithology of the Tripoli district and along the proposed roads



4.1.2.2 Faults, erosion, landslides, and earthquakes

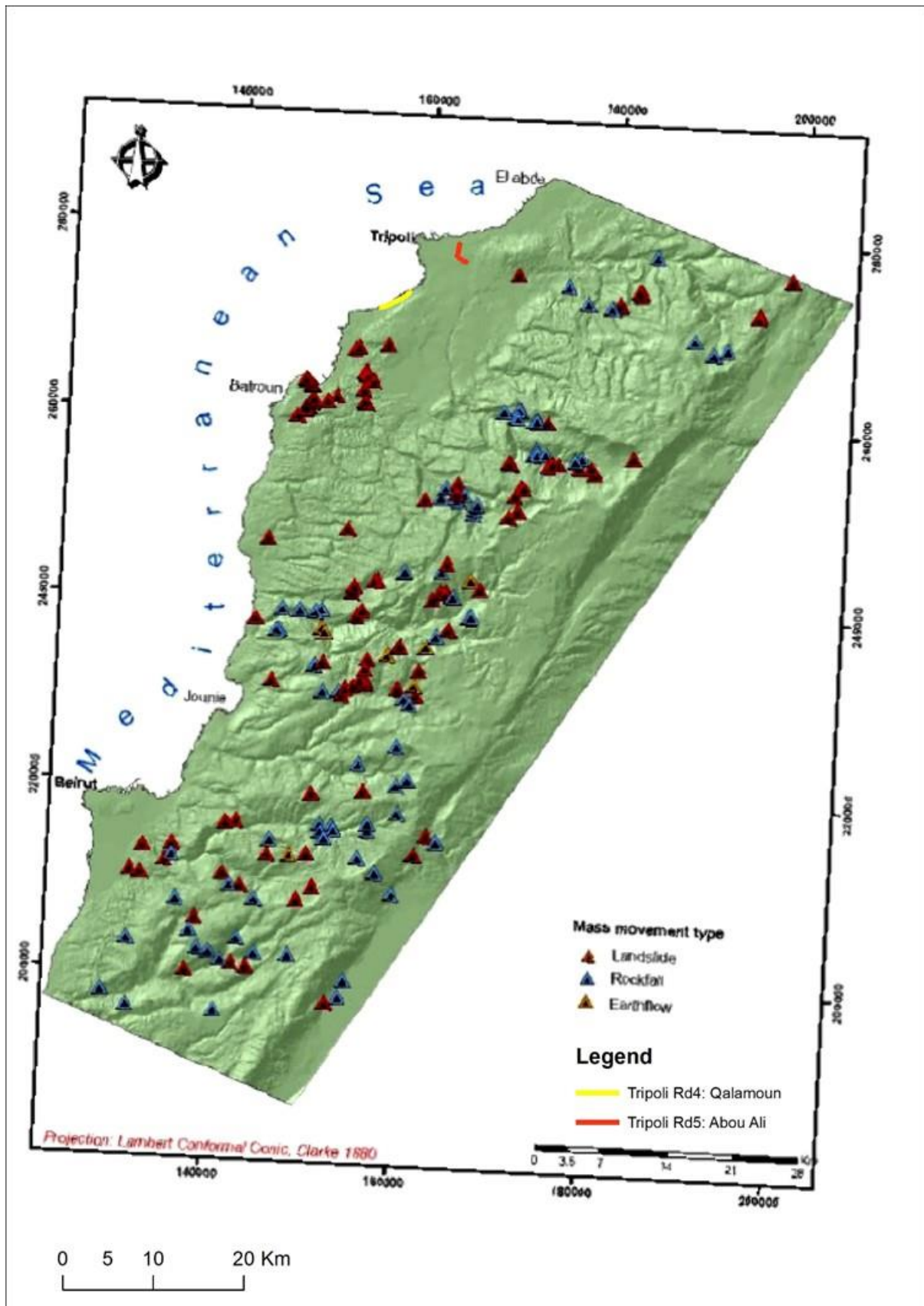
Figure 4-5 shows typical soil erosion in the Tripoli Caza. As can be seen, Road 4 (Qalamoun Seaside Road) passes through regions of medium erosion risk. Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) passes also almost exclusively through regions of medium erosion risk, although some parts of it near Trablous Zeitoun and Mhatreh are considered to have low risks. Seismic risks in the study area exist, given that it lies along the 1,000-km-long left-lateral Levant fault system (LFS). This fault system is responsible for a significant number of seismic events in the eastern Mediterranean (Hujeir et al., 2011). Note that no earthquakes were recorded in the Tripoli caza between 2001 and 2010; yet two earthquakes with a magnitude of 3.5 on Richter's scale were recorded in Koura, namely the Bechmezzin earthquake on May 6 2006 and the Majdel El Koura earthquake on 7 June 2003 (MOE, 2011). Moreover, the nearest fault to both roads is more than 6 km away. For the study area, the EZ-FRISKTM model developed by Hujeir et al. (2011) predicts that the 10% probability of peak ground accelerations (PGA) exceedance in 100 years, ranges between 0.3 and 0.35 g. With these levels of seismic hazards, civil engineering projects such as bridges should adopt reinforcement (in reinforced concrete structures) of "high seismic hazard" as established in international codes of practice (Hujeir et al., 2011). None of the two road sections appear to be prone to landslides, rock fall, or to earthflow risks (Figure 4-6).

Figure 4-5. Faults and erosion risk in the Tripoli district



Source: CNRS Soil Erosion database and Faults database

Figure 4-6. Landslides, rockfall sites, and earthflows



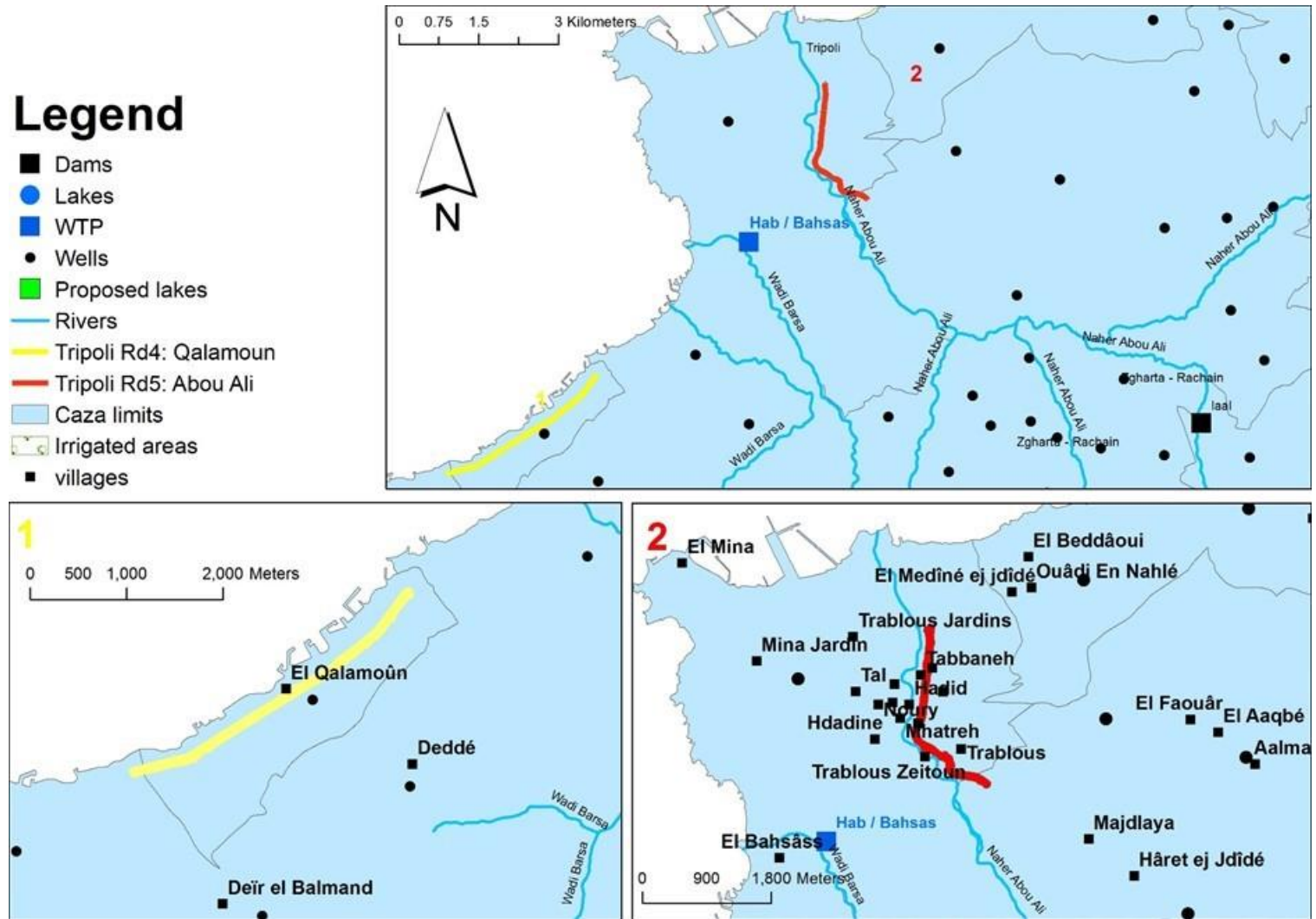
Source: Adapted from Abdallah 2007

4.1.3 Hydrology

The study area is characterized by the presence of the Abou Ali River that crosses alongside Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit). Few groundwater wells have been reported in the area as shown in Figure 4-7. Flows in the Abou Ali River have been estimated to range between 0.83 m³/sec and 19.5 m³/sec, depending on the season (UNDP, 2014). The average annual discharge rate of the river has been estimated to be around 262 million m³ (MOE, 2001). The river overall has a length of 44.5 km, while its 484 km² basin encompasses nearly 236 towns and villages distributed among several northern cazas (Massoud, 2006). The funnel shape of the basin makes it prone to flooding in its lower portion, with significant floods reported between 1942 and 1955, causing extensive property damage and loss of life. As a result, by the end of 1968, the downstream river course was reengineered and an artificial, near rectangular concrete channel was constructed with vertical lateral retaining walls (\approx 5 m high). The channel has a total length of approximately 3 km and its width varies between 24 and 29 m (Massoud, 2006). The channel capacity was designed for flows of 1500 m³/s, which allows for the safe routing of a 1000-year flood event in combination with the upstream retention basin. Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) borders the Abou Ali River channel, starting from the Abou Ali Roundabout and moving east for more than half its length.

Unfortunately, many residents in the area still use the flood channel for wastewater discharge and trash disposal resulting in the accumulation of refuse on both sides of the channel (Massoud, 2006). As a result, that section of the river has the highest levels of contaminants across the entire basin. Samples collected by Massoud (2006) along the Abou Ali river section have reported Fecal and Total coliform bacteria ranging between 1700–650,000 MPN/100 ml and 3500–880,000 MPN/100 ml, respectively. Note the sampling was conducted both during the dry season (mid-October 2002 and 2003) and the end of the wet season (mid-March 2003 and 2004). Moreover, the study also reported high levels of BOD₅, Chlorides (Cl⁻), Ammonia (NH₃-N) and orthophosphates (O-PO₄³⁻). A recent study by Jabali (2017), reported high levels of Polycyclic Aromatic Hydrocarbons (PAHs) and pesticides in surface water samples collected in the lower reaches of the Abou Ali River. A wastewater plant with secondary level treatment is located immediately to the north of the Abou Ali river. The plant is equipped with a sea outfall and is currently serving Tripoli coastal area, Al Qalamoun, some sections of the Districts of Koura and Zgharta, in addition to the coastal areas of Beddaoui, Deir Aamar and Minieh.

Figure 4-7. Hydrology and water resources surrounding proposed roads in the Tripoli district



Source: GIS layers by MOEW 2012

Figure 4-8. Extent of Abou Ali River concrete channel along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit)

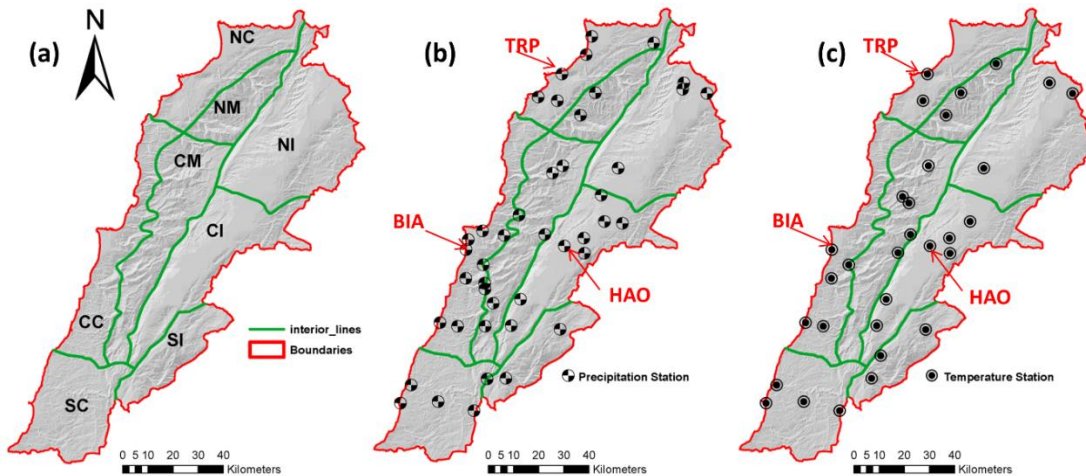


4.1.4 Climate and meteorology

The climate and meteorological parameters play an important role in the transport and dispersion of pollutants in the atmosphere. Moreover, climate and meteorology play a role in the timing of construction activities and potential road closures during both the rehabilitation and operational phases. As such, meteorological data on precipitation, temperature, wind direction and speed are important for the assessment of environmental impacts. Wind speeds and wind directions are responsible for carrying pollutants from the proposed roads to nearby communities both during the rehabilitation and operation phases. On the other hand, precipitation controls the rates of runoff. Meteorological data for the study region are best represented through long term monitoring stations in that region. While there are no monitoring stations in the immediate vicinity of the proposed roads, data from the entire of Lebanon (Figure 4-9) have recently been synthesized in the context of climate change modeling (El-Samra et al., 2018) which can be relied upon to some extent to provide general guidelines of what to expect in terms of meteorology in the project area (present and future). The duration, quality, and exhaustiveness of several climatic data sources (Atlas Climatique du Liban; NOAA's National Climatic Data Center, Lebanese National Meteorological Services (LNMS), Lebanese Agricultural Research Institute (LARI), American University of Beirut Advancing Research Enabling Communities Center (AREC)) were assessed to identify the spatial and temporal climatic data that can be relied upon albeit the variation in span and quality.

Figure 4-9. (a) Lebanon geoclimatic regions, (b) 43 rain gauges locations, (c) 31 temperature stations locations with records of both daily average and/or maximum and minimum temperatures, per geoclimatic region

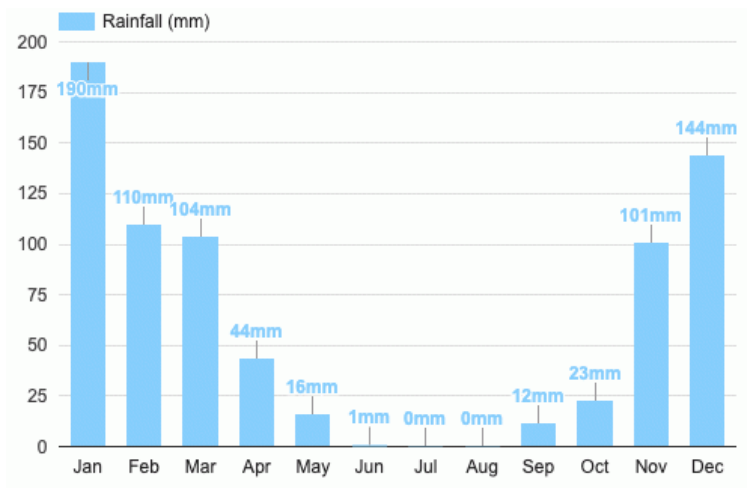
Stations used to calculate the anomaly (BIA, TRP and HAO) score are indicated in red



Source: El-Samra et al. 2018

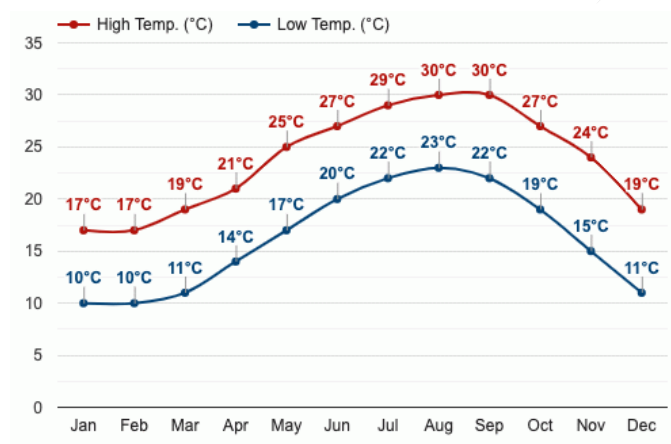
The closest station to the proposed roads is in Tripoli. Long-term average representative precipitation and temperature for the Tripoli Caza are presented in Figures 4-10 and 4-11, respectively. While precipitation is negligible in the summer season between the months of June and September, the highest precipitation is recorded for the month of January. The total precipitation in Tripoli, like the rest of Lebanon, shows large variability across years and locations. The wettest month precipitation is the month of January with an average rainfall of 190 mm (Figure 4-10). The total number of rainy days amounts to around 82 per year. No snow is recorded in the Tripoli caza. As for temperature, the lowest is recorded in January (average at 10°C) and the highest in August (average at 30°C) (Figure 4-11). With respect to wind, the closest weather station equipped with a functional anemometer is in Tripoli. The windrow over a 7-year period from that station is shown in Figure 4-11. Predominant wind blows from the West (20 percent of the time) and South-West (10 percent of the time). Wind speed varies throughout the year from a low of 2.5 m/s to a high of 4.15 m/s.

Figure 4-10. Average monthly rainfall values for Tripoli district



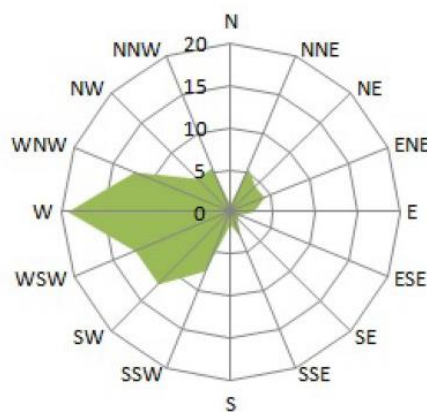
Source: <https://www.weather-atlas.com/en/lebanon/tripoli-climate>

Figure 4-11. Average monthly temperature values for Tripoli district



Source: <https://www.weather-atlas.com/en/lebanon/tripoli-climate>

Figure 4-12. Wind speed and wind direction from the Tripoli weather station over a 7-year period (2010–2016)



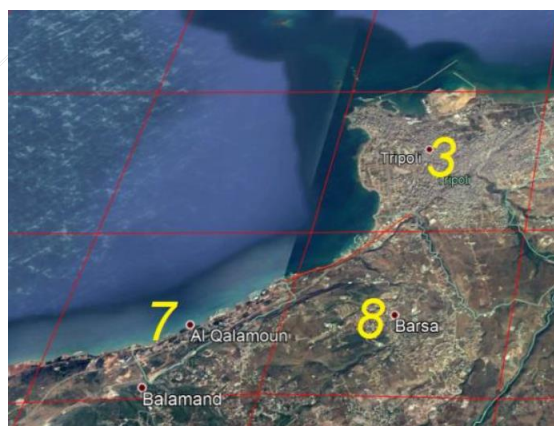
Source: Kassem et al. 2019

4.1.5 Ambient air quality and noise levels

Traffic emissions represent the main source of air pollution in the project area with generators constituting another source in residential areas at times of electricity disconnection. Major air pollutants induced by traffic include Carbon monoxide (CO), Nitrogen Oxides (NO_x), Sulfur oxides (SO_x), Hydrocarbons (HC), and Particulate matter (PM). These pollutants are associated with potential adverse health impacts with long-term exposure to atmospheric concentrations exceeding threshold limits. Air quality monitoring in Lebanon in general is weak and adhoc with no systematic continuous monitoring. It is based mostly on individual efforts at academic institutions with a recent effort through the MoE that acquired several stations spread throughout Lebanon, particularly in urban areas. Unfortunately, the stations have stopped because of lack of resources and the existing data is not reliable because of lack of equipment calibration, to the best of our knowledge.

Annual average ambient air quality data were reported by JICA (2018) for part of the Koura and Tripoli Cazas (Figure 4-13). Data were obtained from data gathered from the MOE/ UNDP project, 'Air quality assessment in an East Mediterranean country: the case of Lebanon, 2014' which monitored criteria air pollutants. Data for Cells 3 and 7 are considered to be representative, being close to this study area in terms of distance as well as prevalent socio-economic activities, with Cell 7 representing Road 4 (Qalamoun Seaside Road) and Cell 3 representing Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit). Table 4-2 shows that the annual concentrations for all criteria air pollutants for cells 3 and 7 are below the national ambient air quality standards defined by MOE Decision 52/1. Overall, the concentrations of air pollutants in Cell 3, where Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) extends are higher than those of Cell 7, given the higher urbanization level and lower dilution potential in that cell.

Figure 4-13. Air quality cells as per the JICA (2018)



Source: JICA 2018

Table 4-2. Average annual ambient concentrations of air pollutants in the Tripoli district

Pollutant	Annual average concentration ($\mu\text{g}/\text{m}^3$)		National ambient air quality standards (MOE Decision 52/1)
	Cell 3	Cell 7	
PM _{2.5}	30.9	18.4	80 $\mu\text{g}/\text{m}^3$
PM ₁₀	36.3	24.5	120 $\mu\text{g}/\text{m}^3$
CO	852.2	438.7	10,000 $\mu\text{g}/\text{m}^3$
SO ₂	41.2	33.7	80 $\mu\text{g}/\text{m}^3$
NO ₂	60.2	28.4	100 $\mu\text{g}/\text{m}^3$
O ₃	55.9	75.8	100 $\mu\text{g}/\text{m}^3$

Source: JICA 2018

Alternatively, air quality monitoring data for Tripoli was reported in the State of the Environment Report (MOE, 2010) as per the Tripoli Environmental and Development Observatory (TEDO), which has been monitoring air pollutants since 2000. Based on TSP and PM measurements in downtown Tripoli collected in 2008 over a six-month period in 2008, out of 105 sampling days, TSP readings exceeded the Daily National Standard of 120 $\mu\text{g}/\text{m}^3$ 25 times (24%). Similarly, PM₁₀ values exceeded the Daily National Standard of 80 $\mu\text{g}/\text{m}^3$ 38 times out of 84 sampling days (45%). Mean PM_{2.5} in downtown Tripoli (34.6 $\mu\text{g}/\text{m}^3$) was consistently higher than PM_{2.5} values at the seafront station (23.6 $\mu\text{g}/\text{m}^3$), principally due to heavier traffic in downtown Tripoli.

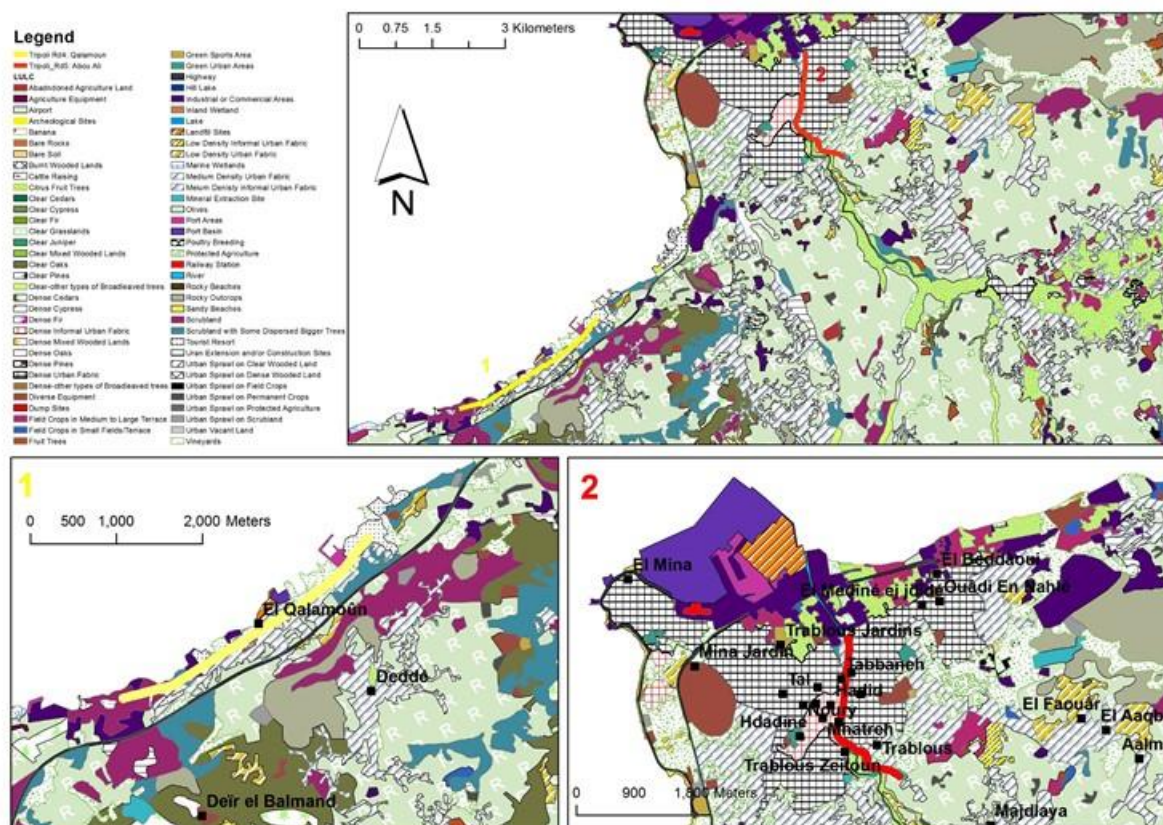
Similarly, vehicles and some generators in residential areas constitute the main source of noise. While no noise measurements are available along the proposed roads, various studies have been conducted on noise measurements in specific projects / studies although no systematic noise monitoring in the country exists. The proposed roads are considered to extend through urban residential areas. Accordingly, it is expected that the baseline average continuous A-weighted noise levels during the daytime will vary between 68 to 75 dBA depending on time of day, traffic conditions and proximity to the roads, with an average of 71 dBA. This range was deduced from noise measurements conducted in 2017 along segments of a nearby roads of similar nature in the Tripoli Caza (JICA 2018). Note that these levels exceed the national standards of 50-60 dBA for residential area with few construction sites, commercial activities or on highway. However, as mentioned earlier, the national standards are very stringent and hard to meet along roads. Hence, it is more realistic to consider the FHWA (1997) noise criterion of 67 dBA for residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreational areas, playgrounds, parks.

4.1.6 Land use land cover

The land use and land cover in an area refers to both natural landscape and anthropogenic activities occupying the regions. The two proposed roads in the Tripoli Caza pass through a varying terrestrial

cover that is largely urban in nature. Figure 4-14 shows the main land use land cover of the Tripoli Caza as well as those in the immediate vicinity of the 2 proposed roads. Table 4-3 summarizes the main land use land cover within 50 m of the proposed roads in the Tripoli Caza.

Figure 4-14. Land use and land cover map of selected roads in the Tripoli Caza



Source: CNRS 2017 LULC map

Table 4-3. Main land use land cover areas along proposed roads in the Tripoli district (within 50 meters)

Road	Land use land cover	Area (m ²)	Percent of area per road (%)
Tripoli Road 4 Qalamoun Seaside Road	Clear Grasslands	46,196	11.44
	Fruit Trees	8,503	2.11
	Industrial or Commercial Areas	16,451	4.07
	Medium Density Urban Fabric	188,677	46.72
	Olives	41,719	10.33
	Port Areas	1,406	0.35
	Scrubland	41,138	10.19
	Scrubland with Some Dispersed Bigger Trees	25,197	6.24
	Tourist Resort	34,545	8.55
	Total	403,834	100
Tripoli Road 5 Abou Ali roundabout- Tripoli/Zgharta limit	Citrus Fruit Trees	14,274	4.04
	Clear Grasslands	719	0.20
	Dense Informal Urban Fabric	4,554	1.29
	Dense Urban Fabric	170,438	48.23
	Medium Density Urban Fabric	50,485	14.29
	Medium Density Informal Urban Fabric	1,842	0.52
	Mineral Extraction Site	5,721	1.62
	Olives	50,403	14.26
River	54,946	15.55	
Total	353,383	100.00	

As evident from Figures 4-14 and 4-15, Road 4 (Qalamoun Seaside Road) in the Tripoli Caza is predominantly urban residential in nature with a medium density urban fabric covering 47 percent of the area 50 from the road. It also encompasses a small industrial or commercial area (4 percent) and tourist resorts facing the sea (9 percent). The natural vegetative cover along Road 4 (Qalamoun Seaside Road) covers a total of 28 percent of the area 50 m from the road and consists of grasslands, scrublands, and scrublands with some dispersed bigger trees. Olive trees cover an additional 10 percent of the area. Figure 4-16 shows the urban fabric while Figure 4-17 shows the limited vegetative cover along Road 4 (Qalamoun Seaside Road).

Figure 4-15. Aerial view of land use land cover along Road 4 (Qalamoun Seaside Road)

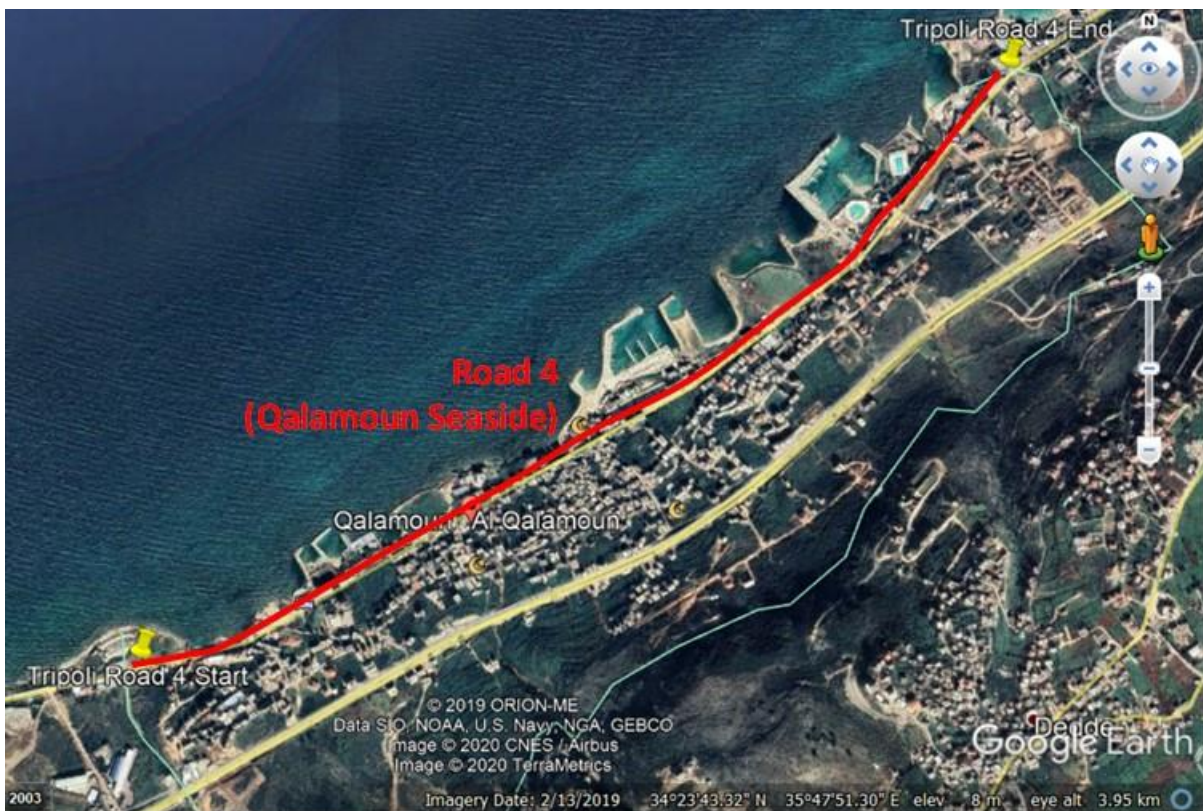


Figure 4-16. Medium density urban fabric along Road 4 (Qalamoun Seaside Road)



Road 4- Qalamoun (34°23'16.4"N 35°47'07.8"E)



*Road 4- Qalamoun (34°23'16.4"N 35°47'07.8"E)
A. Maalouf, A. Chehab, M. El-Fadel (Jan, 2019)*

Figure 4-17. Limited vegetative cover along Road 4 (Qalamoun Seaside Road)



*Road 4- Qalamoun (34°23'24.7"N 35°47'21.8"E)
A. Maalouf, A. Chehab, M. El-Fadel (Jan, 2019)*

As for Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit), it has a higher urbanized nature than Road 4, with a dense urban fabric covering around 48 percent of the area 50 m from the road, and a medium density urban fabric covering an additional 14 percent (Figure 4-14 and 4-18). As for vegetation, it is mainly agricultural, consisting of olive trees (14.3 percent) and citrus fruit trees (4 percent) and it is mainly observed in the sections closer to the Tripoli-Zgharta caza limits. The Abou Ali riverbed borders the southern side of the carriageway of Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) and occupies around 15 percent of the area 50 m from the road. Figure 4-19 shows the vegetative cover while Figure 4-20 shows the urban fabric along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit).

Figure 4-18. Aerial view of land use land cover along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit)



Figure 4-19. Vegetation along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit)



Road 5- Tripoli - Zgharta section ($34^{\circ}25'47.6''N$ $35^{\circ}50'55.3''E$)
A. Maalouf, A. Chehab (Oct, 2019)

Figure 4-20. Medium density urban fabric along Road 4 (Qalamoun Seaside Road)



A. Maalouf, A. Chehab, M. El-Fadel (Jan, 2019)

4.2 Biological Environment

Both roads in the Tripoli Caza extend within an altitude ranging between sea level and 67 m ASL, and are thus lying within the thermo-mediterranean vegetation zone, which extends between 0 and 500 m altitude. Overall, the natural environment in the study area is degraded by heavy urbanization with limited agricultural activity and does not harbor pristine habitats of particular conservation importance. More specifically, the natural cover along Road 4 (Qalamoun Seaside Road) covers a total of 28 percent of the area 50 m from both sides of the road and consists predominantly of grasslands (11.4 percent), scrublands (10.9 percent), and scrublands with some dispersed bigger trees (6.2 percent). As for Road 5, natural vegetation covers only 0.2 percent of the area and consists of grasslands. The vegetative cover along this road is mainly agricultural in nature and consists of olives (14.2 percent) and citrus trees (4 percent).

4.2.1 Flora

In the very few natural areas bordering the roads, one can identify the thermo-mediterranean vegetation zone (0-500 m ASL). Typical flora in scrublands includes various types of garrigue vegetation, discontinuous bushy associations of the Mediterranean calcareous plateaus, dominated by Kermes oak (*Quercus calliprinos*) and dwarfshrubs (*Poterium spinosum*) (JICA, 2018). As for shrubs, they include false plumed-thistle (*Onopordum carduiforme* Boiss.), viscous inula (*Inula viscoa*) and thorny-broom (*Callicotome villosa*).

4.2.2 Fauna

Due to the heavy anthropogenic influence along both roads and the degraded natural ecosystem, no fauna of concern or need for protection are expected to be present within the study area.

4.2.3 Ecologically Sensitive Areas

As mentioned earlier, the two roads proposed for rehabilitation are influenced by anthropogenic activities and do not pass in the proximity of ecologically sensitive area.

4.3 Socioeconomic Environment

The below sub-sections present the relevant socioeconomic background for the Caza of Tripoli.

4.3.1 Demographic Profile

The proposed two roads in Tripoli serve all four towns in the Caza, namely Qalamoun, El-Mina, Beddawi and Tripoli, as illustrated in Figure 3-1. Hence, when considering the demographic profile of the study area, the population of all the towns in the Tripoli Caza was considered. According to the statistics provided by the UN-Habitat (2016), the total population in the Caza for 2010-2011 is estimated at 428,170. The average household size in the Tripoli Caza is 4.4 persons, which is higher than the national average of 3.8 (CAS & ILO, 2019). Around 65 percent of the population is between 15 and 64 years old and 8.5 percent is aged above 65 years. The average dependency ratio is high, reaching 54 percent. School enrollment in the Tripoli Caza is 86.2 percent and the illiteracy rate among the population aged 10 years and above is 14.2 percent (MOPH, 2016). The reported numbers exclude Palestinian camps and Syrian refugees.

Table 4-4. Population size in the Tripoli Caza in 2019

<i>Village</i>	<i>Population</i>
Beddawi	40,476
El-Mina	72,133
Tripoli	311,212
Qalamoun	4,319 ^a
<i>Total</i>	428,140

^a based on the number of registered electorates in 2010 reported online: <http://www.localiban.org/tripoli-district>

(UN-HABITAT, 2016)

According to the 2016 statistics by UNHCR, there are around 96,229 registered refugees in the Tripoli urban area with 33% (31,797) being Palestinian refugees. The Syrian refugees (64,432) can be considered mainly post-2011 incomers driven by the Syrian crisis (UN-Habitat, 2016).

As shown in the following table, Syrian and Palestinian Refugees live in Tripoli. Syrian refugees are integrated in the community, whereas, 69.9% of the Palestinians live in camps. The nearest Palestinian refugee camp is Baddaoui Camp that is located around 1.4 km away from the closest point of Tripoli Road 5. Hence, refugee camps do not exist in the surrounding area of the roads to be rehabilitated in Tripoli and the existing refugees in Beddaoui Camp will not be affected by the project.

Table 4-5 Living distribution of refugees with respect to their total population in Tripoli (UNHCR, 2016)

Refugees	Living in Camps	Integrated in the community	Total
Palestinian	69.9 %	30.1%	100%
Syrian	0	100%	100%

Regarding other vulnerable groups (poor, disabled...), specific data to Tripoli is not publicly available.

4.3.2 *Social Activities*

Tripoli offers various social outlets and activities including public gardens and parks, movie theaters, public libraries, as well as cultural, commercial, industrial, and educational centers (schools and universities), coastal resorts, numerous hospitals and clinics, restaurants, and religious buildings etc. It offers an environment rich with cultural heritage with people visiting from inside and outside the city. Concurrently, many communities in various part of the city, suffer from serious poverty and unemployment, perhaps one of the highest rates in the country. A detailed social survey at the level of all towns was not conducted. To the extent available and accessible, data was extracted from reported literature to provide a brief socio-economic overview as outlined below.

4.3.3 *Economic Activities*

Tripoli is considered one the poorest cities not only in Lebanon but in the region. The city (on all geographic definitions) now manifests some of the highest poverty rates nationally. It was estimated that 51% of Tripoli’s residents live in extreme poverty, on an income of less than 6,000 Lebanese pounds (LBP)/day for a household of five. This compares to the national minimum monthly wage of 675,000 LBP, or about 22,500 LBP/day (UN-Habitat, 2016). The unemployment rate in the Tripoli Caza is 14.5 %, which is higher than the national average of 11.4 % (CAS & ILO, 2019). It reaches 35 % in the Tripoli city.

Table 4-5 shows the sectoral makeup of the urban area in the Tripoli Caza. The services sector employs about 20% of the cities’ working population (comprising >14% in services and >6% in tourism) in Tripoli. Education services and health services are the major activities in this sector, accounting for 10% and 4% respectively of the economically active population in Tripoli. The overwhelming majority of workers are engaged in the category ‘Trade’ (54% of working population). The concentration in trade and services is positive in principle, but the figures do not factor in the high unemployment rates among the work age population, known to be high. Tripoli is known as the major industrial area of the North, ranking second for industrial activity nationally behind Mount Lebanon. The major industry type in Tripoli is furniture. Handicrafts (gold and silver, copper, furniture and wooden crafts, traditional clothing, blown glass, pottery, leather works, soap, sweets), in which Tripoli has a local specialization, is combined with manufacturing (a sugar plant, arabic sweets production, blossom and rose water distillation, salt refining plant etc.) that comprises a mere 2% of the active workforce.

Table 4-6. Economic sectors in Tripoli Caza by percent of economically active people and % of companies (UN-Habitat, 2016)

<i>Sector</i>	<i>% of economically active people</i>	<i>% of companies</i>
Trade	54	58
Services	>14	23
Industry	14	19
Manufacturing and handicraft	2	<1
Construction	10	1
Tourism	>6	<1

4.3.4 *Street Vendors on Road 5 (700 m stretch)*

A particular socioeconomic feature on Road 5 is the presence of street vendors. These are located on a 700 m stretch on the western sidewalk of the road at least 5 m away from the road borderline. They use stall and offer goods for sale to the public without having a permanently and fixed built structure but with a temporary structure.

To assess their baseline socioeconomic status, the Consultant reviewed publicly available studies and reports. The major constraint on conducting a socio-economic survey to assess the baseline conditions of the street vendors (including their gender, availability of vulnerable groups and others) was the outbreak and spread of COVID-19 all over the country and in Tripoli Caza too. Such survey may pose risks of virus transmission, particularly through social interactions between the Consultant team and street vendors.

According to the survey conducted by CDR in 2016 under Cultural Heritage and Urban Development Project, 402 vendors were located on both the Eastern and Western banks of Abou Ali River. The total number of the stalls was 280 and the majority was concentrated in the eastern bank of the river where Road 5 is located (223 are located on the river's eastern bank and 57 are located on the river's western bank which is out of REP scope). These vendors sell several types of goods. In the eastern bank surrounding Road 5, the vendors mainly sell vegetables and fruits. Other vendors selling clothes, used shoes and other items such as household decorative item can be found as well.

Further, the survey indicated that the beneficiaries of the stalls and flea markets were self-dependent and each one of them has one owner. However, some of them rent their location to local residents or foreigners on a daily basis at a rent rate ranging from 7,500 LBP to 15,000 LBP per day depending on the location of the stall (CDR, 2016). Vendors earned between 350,000 LBP. and 500,000 LBP per month.

Previously in 2012, two categories of vulnerable groups namely, women and children/adolescents below age of 16, used to be identified as vendors. They had to work due to the absence of the head of the family for several reasons such as sickness, death and others (CDR, 2016). However, the survey conducted in 2016, revealed that children and adolescents below the age of 16 are no more available as a vulnerable group in the market. Therefore, the only vulnerable category identified are women that are less than 3.6% (10) of the vendors and almost 89% of them are vegetable vendors (CDR, 2016).

While taking appropriate precautions¹² from COVID-19, the above information was validated on site through: (a) visit made during August 2020 and (b) a focal point that guided the Consultant around this stretch during the visit.

The visit to Road 5 indicated that there are around hundred detachable stalls located on the western sidewalk at least 5 m away from the borderline (Figure 4-21). Mobile stalls are not existing on Road 5. The street vendors market is dominated by men and the stalls mostly consist of selling vegetables, fruits and clothes (Figure 4-22).

Figure 4-21 Distance away from the road (*Geoflint Team, August, 2020*)



¹² Wearing mask, maintaining a distance of 1.5 meters, cleaning hands, etc.

Figure 4-22 Street Vendors



Geoflint Team, August, 2020

The stalls existing on the western sidewalk of Road 5 are made from wooden and/or metal and covered by steel and/or textile panels. The location of street vendors at the western borderline of Tripoli Road 5 is indicated through the blue segment shown in the below Figure.

Figure 4-26 Location Overview of Street Vendors on 200 m stretch of Road 5



4.3.5 Educational Services

In terms of educational services, the Tripoli Urban Area encompasses 38 private schools, 26 private free schools and 108 public schools. None were encountered directly along the proposed roads.

4.3.6 Touristic Sites and Heritages

Tripoli's historic and cultural sites are varied and distinct. They include a few Crusader and Mamluk towers in the al-Mina area, the St. Gilles citadel, and a series of madrassas, hammams, khans and mosques in the historic core (or what is today known as Mamluk Tripoli). More modern cultural edifices comprise of the Maarad area, designed by Oscar Neimeyer. Qalamoun also includes historical buildings such as Bahr Mosque and Ayn el-Jami'i prayer house, both of which date back to the Crusaders' rule. There are no sites of cultural heritage significance that are located directly along the proposed roads.

4.3.7 Traffic Assessment

Finally, the current average daily traffic (ADT) for the two proposed roads is summarized in Table 4-6. Traffic on Road 4 (Qalamoun Seaside Road) is 2.5 times higher than that on Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit), being an important link to Tripoli and Akkar, with Road 4 exhibiting an ADT of 25,450 vehicles per day on both sides and Road 5 exhibiting an ADT of 10,121 vehicles per day.

Table 4-7. Traffic indicators for Tripoli district proposed roads

Road code and villages	Existing Traffic Volume (ADT)	Vehicle Fleet Composition	Vehicle Speed (kms/hr)
Tripoli Road 4 Qalamoun Seaside Road	25,450	85% light vehicles 7 % Medium 8% Heavy	50km
Tripoli Road 5 Abou Ali roundabout-Tripoli/Zgharta limit	10,121	83% light vehicles 9 % Medium 8% Heavy	50km

4.3.8 Healthcare Services

Healthcare services in the Tripoli Caza include 24 Primary Healthcare Centers (PHCs) and 11 hospitals across the Tripoli urban area (Figure 4-21). The latter have a combined bed capacity of 1,169 (UN-Habitat, 2016). None were encountered directly along the proposed roads.

4.3.9 Road Sensitive receptors

Categories considered as sensitive receptors during road rehabilitation are schools, churches, hospitals, mosques, closest residential buildings and commercial shops, and other archeological features.

As evident from Figure 4-21 and from Figure 4-23 both roads pass through urbanized areas. The predominant urban fabric along the Road 4 (Qalamoun Seaside Road) is medium density covering 47 percent of the area 50 m from the road (Figure 4-22), with residential units and commercial shops bordering the road. Tourist resorts cover 8.6 percent and olive groves cover 10.3 percent of the area 50 m from Road 4 (Qalamoun Seaside Road) (Figure 4-23).

Figure 4-23. Residences on the sides of Road 4 (Qalamoun Seaside Road)



Road 4- Sea Side(34°23'52.8"N 35°48'00.7"E)



*Qalamoun Seaside RoadRoad 4- Qalamoun
(34°23'16.4"N 35°47'07.8"E)
A. Maalouf, A. Chehab (Jan, 2019)*

Figure 4-24. Aerial view of Road 4 (Qalamoun Seaside Road) showing the sensitive receptors



As discussed earlier, Road 5 (Abou Ali Roundabout-Tripoli/Zgharta limit) passes through a dense urban fabric covering around 48 percent of the area 50 m from the road, and a medium density urban fabric covering an additional 14 percent. Residential buildings and commercial shops are identified along the road. The 700 m stretch of this road also harbors on its western sidewalk street vendors. As per the site visit of August 2020, those vendors are located at 5m distant from the borderline of Road 5. None of them is located or occupying the street. Figure 4-23)

Figure 4-25 Road 5 Surroundings (Abou Ali roundabout-Tripoli/Zgharta limit)



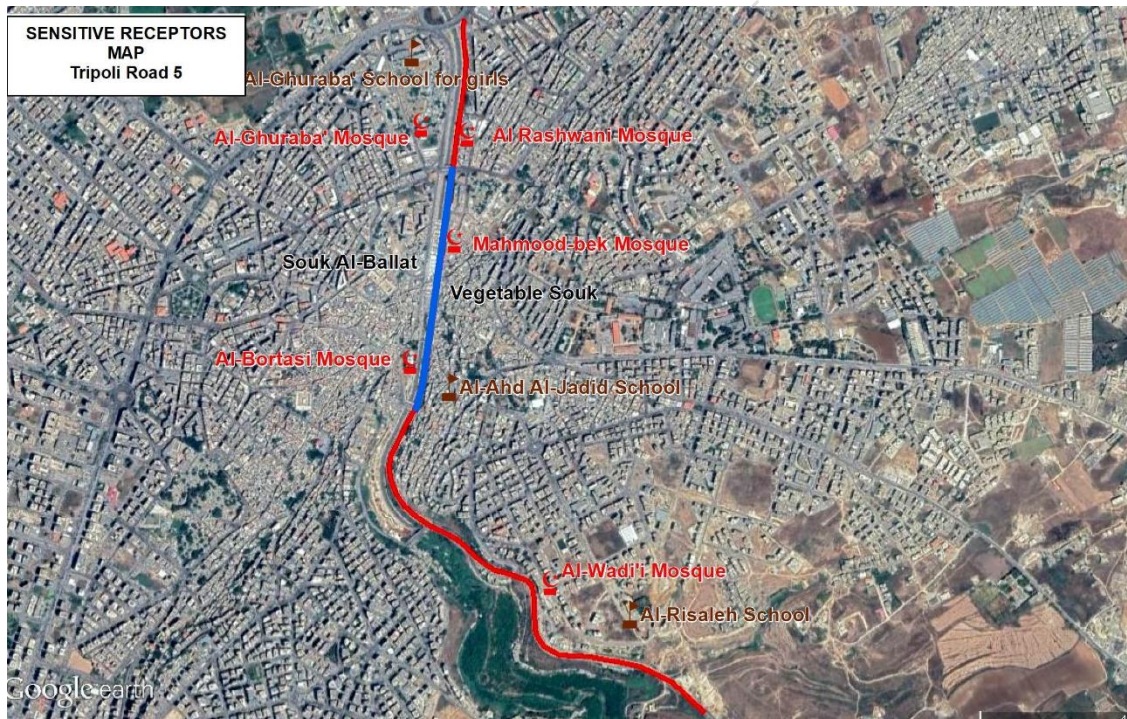
A. Maalouf, A. Chehab (Jan, 2019)



Geoflint Team (August,2020)

The below figure illustrates the sensitive receptors existing on Road 5 including Mosques (Labeled in red), Schools (Labeled in brown), street vendors (along the blue line).

Figure 4-26 Aerial view of Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) showing the sensitive receptors



5 POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS

This chapter describes the environmental and social impacts that are likely to result from the rehabilitation of the roads. Due to the rehabilitation nature of the activities, the anticipated negative environmental and social impacts are expected to be minor to moderate during the rehabilitation phase and of temporary nature including dust, noise, waste generation, disruption to traffic and movement and possible damage to existing utilities; and of little consequence during the long-term operational phase. Such impacts can be minimized by implementing the environmental and social management plan.

The assessment methodology is attached in Annex A.

5.1 Potential positive impacts during rehabilitation

During rehabilitation, the REP is expected to have positive socio-economics impacts. Local businesses and shops, including stalls of the street vendors along Road 5, may benefit from rehabilitation activities. Their economic activity will possibly boost as they will sell the contractor raw materials, equipment, machinery, and goods while workers will buy snacks, food and drinks. Being labor intensive, REP will result in job creation and in business opportunities for local contracting companies, skilled and unskilled labor among local residents and Syrian refugees, such as construction labor and the supply of construction material and provision of food to the construction workers. Based on the past experience of construction work in the country, there is a higher probability of Syrians-refugees to apply and work in unskilled and low-skilled labor positions. However, given that the percentage of poverty in Tripoli is high (58% as per UNHCR, 2016) and it has been exacerbated by the latest country's economic crisis and by the restrictions due COVID-19 outbreak, there is a high possibility that Lebanese workers residing in Tripoli (unskilled and skilled) will also be desperate to apply for jobs under REP. The number of jobs created for roads rehabilitation within the Tripoli Caza could not be estimated at this stage, however compared to other similar projects, the project shall require between 150 and 200 workers.

5.2 Potential Environmental impacts during the rehabilitation phase

5.2.1 Air quality

During the rehabilitation phase, air quality can be negatively affected, mainly due to emissions from the on-site usage of construction equipment and to particulate matter released as a result of shallow excavation and leveling works, transport vehicles delivering construction materials, and disturbances to material stockpiles by local winds and material handling.

Road rehabilitation in general is a source of dust emissions that may have temporary adverse impacts on local air quality. Dust emissions often vary substantially from day to day, depending on

the level of activity, the specific operations, and the prevailing meteorological conditions. For this phase, it is expected that negative impacts on air quality will occur in and around the immediate locality of the site under construction. However, dust emissions are not expected to be significant, especially that excavation activities are limited to 20 to 40 cm. In order to quantify this impact, construction emissions and corresponding ambient particulate matter levels can be estimated using simple models (Annex B). Results showed that the predicted total PM concentration at a road segment site is expected to range between $38.5 \mu\text{g}/\text{m}^3$ under typical conditions, and $7,780 \mu\text{g}/\text{m}^3$ under worst-case conditions. Hence, under typical conditions, the expected PM concentrations are below the national 24-hr standard ($120 \mu\text{g}/\text{m}^3$) within a 100 m wide corridor. As for worst-case conditions, the expected PM concentrations significantly exceed the national 24-hr standard. The road section Tripoli Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) where the high density of residential and commercial areas that border the road will be affected the most. On the other hand, the relatively open nature of land along Road 4 (Qalamoun Seaside Road) will favor dilution. Accordingly, the significance of such an impact is considered to be moderate. Furthermore, as stated, such an impact is temporary and can be minimized with proper management measures adopted as outlined below.

In agricultural areas along both roads, emissions from construction equipment and excavation activities may deposit on nearby plants and vegetation along the road, causing a reduction in pigmentation in plant leaves at times, which could affect photosynthesis and plant growth rate. However, as mentioned above, dust emission rates are expected to be low, since road excavations are limited to 20-40 cm in depth. Furthermore, since these emissions are at ground level, large dust particles are not expected to be transported very far from the roads. Finally, agricultural areas along both roads are limited.

The overall impact on air quality during rehabilitation is temporary in nature and expected to be of medium consequence. Hence, its significance is considered to be moderate.

5.2.2 *Noise*

The use of heavy machinery during rehabilitation increases noise levels which may create stress on local inhabitants, workers, street vendors and tourists in the close vicinity to road works. Noise from construction is different from noise from other sources because it is caused by many types of equipment, and the resulting adverse effects are temporary since rehabilitation activities are relatively short term. In order to assess the extent of potential noise impacts during the rehabilitation of the proposed project, a noise model specific for construction operations can be applied (Annex B). The total L_{eq} for the site was estimated at 80.8 dBA. This noise level is slightly above the maximum noise levels measured in the vicinity of the site (59.6-78.7 dBA). It exceeds the FHWA standards for the Category B classified areas (67 dBA). However, this value was lower than the

OSHA standard for an 8-hr exposure (90 dBA). In this case, the exposure of workers to noise during their work shift is acceptable. The simulated noise levels at different radii away from the site indicated clearly that the daytime Lebanese standard for rural areas (50-60 dBA) will be reached beyond a radius of 700 m from the construction area. As for the FHWA standard, it is reached at a radius of 305 m. As such, residential and commercial units in the vicinity of the site will experience temporary periods of high noise levels, typical of any construction activity. The area that may be potentially impacted would typically be limited to a 150 m wide corridor along a road.

The likelihood of occurrence of this impact is considered to be ‘possible’ and its consequence is ‘medium’ since it is temporary and intermittent, but with many receptors close to the road. Accordingly, the significance of this impact is considered as moderate.

5.2.3 Biodiversity

Given that the project activities are limited to the rehabilitation of existing roads, direct negative effects on wildlife include the creation of a variety of emissions and disturbances such as noise, dust, light, and pollutants in the soil and vegetation. However, these impacts are temporary in nature and can be easily mitigated.

Since the area along both roads are under heavy anthropogenic influence, the impact of the proposed roads on biodiversity in the area is considered to be null.

5.2.4 Construction and excavation waste

Waste generation is closely associated with the rehabilitation phase of the project. The generated wastes will result from the excavation and ground cleaning activities. The estimated volume of spoil to be generated is around 2,500 m³ composed mainly of asphalt, limestone, dolomite rock, and residual soils. Other wastes that will arise as a normal part of extensive construction works include metals, plastics, packaging material, drilling mud, and blasting wastes. The potential viable options for reuse and disposal of such materials are discussed in the mitigation plan. Improper disposal of solid wastes from construction activities can potentially lead to the contamination of soils and watercourses. This impact’s likelihood is ‘certain’ and its consequence is “medium”, resulting in a “major” impact that requires adequate mitigation.

5.2.5 Water and soil quality

During the rehabilitation phase, runoff from site working areas may contain significant amounts of suspended particles and contaminants. Potential water pollution sources from construction activities include: runoff and erosion from site surfaces, drainage channels, earth working areas and stockpiles; wash water from dust control; in addition to fuel, oil, solvents and lubricants from

maintenance of construction machinery and equipment, in case of improper or careless handling. Runoff containing significant amounts of asphalt and cement-derived material may cause primary chemical and physical effects such as increasing turbidity, change in color, and elevation in pH. Sewage from construction workers is not expected to cause negative impacts since, as mentioned earlier, the Contractor will be encouraged to hire labor from the local community living in the Project area. Furthermore, the Contractor will have to service the staff on-site with portable cabin toilet. The porta cabin will be mobile and its placement depends on the length of the work zone. Accordingly, the Contractor will have to move it based on the progress of rehabilitation works. The Contractor should link the porta cabin toilet to the existing wastewater network. In case the network is not available within the work zone, the Contractor will need to link it to a polyethylene storage tank which will be emptied on a regular basis and ensure into the nearest wastewater network. This impact is considered to have a ‘possible’ likelihood and a ‘medium’ consequence, resulting in a ‘moderate’ significance.

5.2.6 Resources consumption

The rehabilitation of the roads will require both fill and construction material as well as water. Table 5-3 provides an estimation of the quantities of material needed for the two roads.

Table 5-1. Estimated quantities of construction material based on the preliminary engineering design

Roads	Construction Material needed			
	Reinforced Concrete (m ³)	Reinforcing Steel (tonne)	Crushed Aggregate Base Course (m ³)	Asphalt Concrete (m ³)
Tripoli Road 4 Qalamoun Seaside Road	70	7	0	1628
Tripoli Road 5 Abou Ali roundabout- Tripoli/ Zgharta limit	56	5.6	0	1379
Total	126	12.6	0	3007

Although excavated material appears to suffice for backfilling, some additional amount of fill and other construction material might be needed. This will be mainly obtained from permitted quarries that should be monitored during the rehabilitation process, introducing additional stress on this natural resource. Quarrying has a multitude of impacts such as landscape scarring, degradation of existing ecosystems, creation of holes and open craters that pose health and safety hazards, emissions (dust, noise, and vibrations), and transport of uncovered quarried material which can pose hazard to road users.

As for freshwater, it will be used for construction activities (curing of concrete, moisturizing temporary stockpiles, etc.) and for cleaning and dust suppression. Water consumption varies with

construction activities, number of workers per day, working days per year, etc. Although construction activities will consume moderate volumes of water, it will only be for a relatively short, finite period.

During the rehabilitation phase, total pavement reconstruction will require the use of several construction vehicles and equipment. According to (Salem et al., 2014), activities such as total asphalt reconstruction and pavement milling and overlay require an average of 73.81 MJ and 26.56 MJ of energy respectively per square meter of rehabilitated road. Table 5-4 presents an estimate of average energy consumption per proposed road assuming all the roads will require total asphalt construction. The total estimated energy consumption ranges between 2.3 and 3.2 x 10⁶ MJ. The energy used during rehabilitation will contribute to the depletion of fossil fuel resources. However, the rehabilitation phase will be relatively short-term.

Table 5-2. Average energy consumption for total asphalt construction per road

<i>Road code and villages</i>	<i>Length (Km)</i>	<i>Width (m)</i>	<i>Surface area (m²)</i>	<i>Energy consumption (MJoules)</i>
<i>Tripoli Road 4 Qalamoun Seaside Road</i>	3.46	5 - 7	17,300-24,220	1,276,913-1,787,678
<i>Tripoli Road 5 Abou Ali roundabout-Tripoli/ Zgharta limit</i>	2.83	5 - 7	14,150-19,810	1,044,411-1,462,176

This impact is considered as ‘certain’ to occur and of ‘low’ consequence, hence an impact of ‘moderate’ significance.

5.2.7 Landscape and visual intrusion

Visual intrusion at working sites is expected during the rehabilitation phase. In addition to soil erosion, excavation activities may result in the depletion of the vegetative cover on the side roads and an evident visual impact on the landscape. However, these impacts are expected to be minimal and temporary since the existing condition of the proposed roads does not require significant reconstruction work. Vegetative cover is very limited less than 18% of the whole study area and negligible in the vicinity of the proposed roads (refer to section 4.1.6. Accordingly, the likelihood of occurrence of this impact is considered as ‘possible’ with a ‘low’ consequence, resulting in impacts of minor significance.

5.3 Potential Socio-economic impacts

During the rehabilitation phase. the proposed project will undoubtedly contribute positively from a socio-economic perspective through the creation of job opportunities and the investment in the road infrastructure. This impact is considered as ‘certain’ to occur with ‘medium’ significance and

hence is considered a ‘moderate’ positive impact. Concurrently, this phase can be associated with several potentially negative impacts of temporary nature as outlined below.

5.3.1 Traffic

The REP rehabilitation works will not close or shutdown any road under study. During the rehabilitation phase, traffic capacity along the roads under rehabilitation will be reduced temporarily, resulting in increased travel times and in traffic disturbance from possible detours. This might be of concern along both roads due to the density of the urban fabric including residential and commercial areas along the roads and measured traffic volume. In addition to the impact of road detours, the transport of construction material to the sites will generate traffic due to truck-trips. Considering the worst-case scenario where none of the generated construction and excavation waste will be re-used on site, it was estimated that an average of one 20-m³ trucks carrying construction material and one 16-m³ trucks carrying construction waste will commute every other day during the rehabilitation phase. This is not expected to have a significant impact on traffic congestion in the caza, however, knowing that the nature of road rehabilitation works forces contractors to make detours, traffic congestion will worsen given the already high traffic volume and narrow road. Hence, since both roads have a relatively high traffic flow (Table 4-7) with sensitive receptors directly along the roads, the likelihood of occurrence of this impact is considered as ‘certain’ and the consequence is considered as ‘major’ over short-term. Hence, the overall significance of the impact on traffic during rehabilitation is considered to be major.

5.3.2 Existing infrastructure

Infrastructure such as water and sewage networks, telephone lines, and underground cables often exist under the road pavement. Random digging and milling of deteriorated road pavement, without prior investigation of possible existence of underground infrastructure, may interfere with existing infrastructure that is possibly serving nearby residents. Damage to infrastructure can cause several undesirable impacts such as cutting off water or internet supply, generation of bad smells, and attraction of water borne diseases and vectors due contaminated water accumulation etc.

This impact is considered as ‘likely’ to occur and of ‘medium’ consequence, hence an impact of ‘minor’ significance.

5.3.3 Social tensions

Potential social tensions and conflict over jobs or dissatisfaction with the allocation of project-generated jobs can often occur if not properly managed, leading to negative publicity, delays, political interferences as well as potential discrimination or harassment. There needs to be transparency, good communication and outreach, and robust GRM during project implementation

to prevent, minimize or mitigate this perception. This impact is considered as ‘possible’ to occur with ‘medium’ significance and hence is considered a ‘moderate’ impact.

5.3.4 Child labor

Child labor is common occurrence amongst refugee and poor communities often resulting in a high potential for abuse and exploitation. This impact will not be allowed to happen with the proper implementation and monitoring of the verification process in place.

5.3.5 Potential Labor influx

Potential labor influx may induce Sexual Abuse and Exploitation and Harassment (SEA/H) towards women. Contractors are expected to be sensitive to hire locally first both Lebanese and Syrians. Influx of additional labor is not expected because the Syrian workforce is already present in the area in good numbers. In the event contractors bring in additional workers from outside the area (with proper justification such as the lack of certain technical field workers), proper integration of these additional workers is necessary. . It is necessary that all assigned workers sign the CoC. This impact is considered as ‘possible’ to occur with ‘medium’ significance and hence is considered a ‘moderate’ impact.

5.3.6 Access to services & Economic Activity

During the rehabilitation activities, roadside businesses as well as roadside residences and some of the trade and supply flows of goods will be disturbed in the project area due to the possible detours and diversions (these will be implemented by the Contractor before work execution as they are not included in the design), possible change of accessibility, the presence of excavation activities and heavy machinery near those shops and visitors. This can induce traffic disturbance particularly in the summer along the coastal road 4 along which many resorts are located and along road 5 neighboring the street vendors. This impact is considered as ‘possible’ to occur with ‘medium’ significance which when ensuring accessibility is considered a ‘moderate’ impact.

On the other hand, as mentioned previously in Section 5.1, local businesses and shops, including stalls of the street vendors along Road 5, will possibly benefit from the rehabilitation activities as workers will buy food and drinks from these shops. Therefore, the community affected by the roads under study is not expected to experience neither an economic displacement (loss of assets or loss of access to assets that leads to loss of income sources or means of livelihood) nor any physical impacts or any potential damage to the existing facilities.

5.3.7 Street Vendors on Road 5

As mentioned previously in section 5.1, the REP project will result in positive impacts on street vendors. Potential impacts might result from the REP on street vendors. These can be disturbance from noise and from the activities of machinery and air pollution as the rehabilitation activities can temporarily affect local air quality.

Those impacts will have a minor effect on street vendors due to the following reasons:

1. The street vendors are located at 5m distant from the road borderline on the western sidewalk of the road (see Figure 4-26). In this area, REP rehabilitation works are not planned and foreseen.
2. The rehabilitation works along the alignment surrounded by vendors are on the road right of way and are limited to pavement, side drainage, marking and signing and concrete works for the median.

Accordingly, street vendors will not experience neither an economic displacement (loss of assets or loss of access to assets that leads to loss of income sources or means of livelihood) nor any physical impacts or any potential damage to the existing facilities.

However, adequate measures are recommended in Table 6-1 to be implemented by the Contractor in order to avoid any disturbance of vendors.

5.3.8 Health and safety impacts

Health and safety at construction sites are considered primarily in terms of potential exposure and accident occurrence (direct and indirect) to workers on-site, pedestrians, and vehicle operators or passengers. Construction activities pose potential risk on the safety of workers as well as the general public either through the possible danger from passing traffic or negligence-careless use of heavy equipment. Common causes of fatalities and serious injuries among workers include, pedestrian workers struck by passing traffic, by construction machinery, or by objects (tools, materials, parts of equipment, trees, etc.), equipment / vehicle rollovers, falls, overexertion, etc. Similarly, pedestrian passers-by may be at risk of injury getting struck by construction machinery or by objects. Passing traffic may also be at risk of accidents if not aware of presence construction site and road detours. This impact is considered as 'possible' to occur and of 'medium' consequence, hence an impact of 'moderate' significance.

5.4 Potential environmental impacts during the operation phase

5.4.1 Air quality

During the operation phase, vehicle emission factors will be a function of the expected traffic conditions along the roads as well as the general characteristics of the vehicle fleet. Moreover, traffic redistribution will influence the exposure of residents to vehicular emissions. In the long term, improved road conditions will increase traffic volume through the road and result in increased pollutants emissions from vehicles. On the other hand, improved traffic flow leads to improved fuel efficiency and better engine performance, thereby reducing vehicle emissions. Hence the net impact could be slightly positive or slightly negative.

Table 5-5 presents the projected traffic volume on the proposed roads in 20 years. It is important to note that the increase in future flow, which amounts to around 81 percent, is attributed mostly to population growth. It is difficult to quantitate the contribution of the REP to this increase.

Table 5-3. Projected traffic volume along the Tripoli district proposed roads (20 years)

<i>Road code and villages</i>	<i>Existing Traffic Volume (ADT)</i>	<i>Future Traffic Volume ADT (20 Years)</i>	<i>Vehicle Fleet Composition</i>
<i>Tripoli Road 4 Qalamoun Seaside Road</i>	25,450	45,963	85% light vehicles 7 % Medium 8% Heavy
<i>Tripoli Road 5 Abou Ali roundabout- Tripoli/Zgharta limit</i>	10,121	18,279	83% light vehicles 9 % Medium 8% Heavy

The two roads were simulated using a line source Gaussian plume model (Annex A). The results showed that impacts would be low¹³; this is mainly due to the relatively moderate projected traffic volumes, and the high potential for atmospheric dispersion within the project area.

The impact on air quality during the operation phase is confined in nature and expected to be of low consequence. Hence, its overall significance is considered to be minor.

5.4.2 Noise

At the operational level, vehicular traffic is the main source of noise emissions. Although the road rehabilitation maintained the existing design speed of 50 km/hr, improved road conditions allow higher traffic speed that can also increase noise levels along the roads. Noise levels are primarily a function of the car fleet characteristics, traffic volume and speed, as well as pavement surface design. A typical methodology to carry a quantitative assessment is outlined in Annex B. The area that may be potentially impacted by noise levels exceeding 67 dBA would typically be limited to a 180 m wide corridor along Road 4 (Qalamoun Seaside Road) where the future traffic projections are around 46,000 vehicle/day) and a 110 m corridor along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) where the future traffic projections are around 18,300 vehicle/day). It is important to note that the increase in future flow, is not directly attributed to the project, but will occur naturally due to population growth and tourism development. It is difficult to quantify the exact contribution of the REP to this increase. Accordingly, the noise impacts during the operation phase will be limited to the immediate buffer region along the road. The occurrence of this impact is considered to be ‘likely’ and its consequence is ‘medium’ since it is long-term, but few sensitive receptors are found along most roads. Accordingly, the significance of this impact is considered as minor. Note that in semi-urban areas, noise impacts are expected to be more significant and long

¹³ The maximum future CO concentration under the worst-case scenario in terms of meteorology was slightly higher along Road 4 (Qalamoun Seaside Road) given it has higher current and projected traffic volumes. It was estimated at 369 µg/m³, which is well below the national ambient air quality standard for CO of 10,000 µg/m³ for an 8-hr average. In fact, it was an improvement to the current CO emissions estimated at 527 µg/m³.

term particularly when commercial and residential areas are located in the immediate vicinity of both roads. These impacts are expected to materialize with increased development of the general area, irrespective of the road rehabilitation project.

5.4.3 Biodiversity

Impacts on biodiversity during the operation phase are expected to be null as no additional roads are being built and the natural lands along both roads are limited.

5.4.4 Water and soil quality

During the operational phase, highway runoff can cause contamination to surface and ground waters, but this is relatively insignificant unless associated with a spill. In concept, it is unavoidable to transport hazardous goods (fuel, gasoline, industrial raw materials) on the roads when in operation. Thus, accidents may happen and accidental spills of hazardous materials may cause a serious problem to nearby water bodies as well as groundwater sources. Hence the significance of this impact is considered as minor but not much different than the existing conditions without the project implementation. In fact, it is expected that with proper rehabilitation and signage, the roads can be safer with less potential for accidents.

5.4.5 Resources Consumption

The project will require electrical power for supplying lighting and any traffic signals, if available. In general, the increase in energy demand will contribute to the depletion of fossil fuel resources, as well as to the emissions of greenhouse gas emissions. Water will be utilized for cleaning purposes, however, the required quantities during operation are not expected to contribute to the increase in the demand for water resources. Accordingly, impacts of the consumption of natural resources are considered as moderate for energy and negligible for water.

5.4.6 Visual amenity

Moderate light pollution is expected after improving the street lighting conditions. This might affect project surroundings, considering that some of the existing inhabited surroundings are residential. However, this impact is expected to be minor being 'likely' and of 'medium' significance.

5.4.7 Health and safety impacts

During operation, maintenance activities pose potential risk on the safety of workers as well as the general public either through the possible danger from passing traffic or negligence-careless use of heavy equipment. Furthermore, potential deaths, injuries, and damage to property resulting from car accidents are a public health problem and a cost to the economy but not much different than the existing conditions without the project implementation. In fact, it is expected that with proper

rehabilitation and signage, the roads can be safer with less potential for accidents. Proper traffic management can reduce road safety risks. This is considered as 'likely' to occur with a 'medium' consequence, and hence is considered of minor significance.

5.5 Potential positive impacts during the operation phase

The REP is expected to have positive impacts on socio-economics and several environmental indicators (traffic; air quality; noise; visual intrusion; health and safety) as described below. Note that most indicators may exhibit both minor negative impacts as well depending on how they are examined.

5.5.1 Traffic and air quality

Improved traffic flow on rehabilitated roads will lead to improved fuel efficiency and better engine performance, thereby reducing vehicle emissions.

5.5.2 Landscape and visual intrusion

During operation, the impact is expected to be positive as the roads will be refurbished and will have an improved appearance.

5.5.3 Health and safety impacts

During operation, it is expected that, with proper rehabilitation and signage, the roads can be safer with less potential for accidents. Proper traffic management can reduce road safety risks.

5.5.4 Archaeology and cultural heritage

As mentioned in section 4.3, no cultural heritage sites are present directly along the roads. However, in case some unrecognized archaeological deposits were present, the impact of project execution varies with the nature of the construction activity. Areas where no disturbance of the ground is planned should not interfere with archeological deposits. The same is also true for areas where development is taking place over previously disturbed ground. As such, roads rehabilitation and improvement of transport infrastructure that already exists should not impact on preserved archeological deposits. This impact is considered as 'likely' to occur and of 'medium' consequence, hence an impact of 'minor' significance.

5.5.5 Socio-economics

During operation, improved road conditions will improve accessibility of people, goods and services. This will lead to an improvement in local economic and social development and enhanced livelihood opportunities in the rural areas the roads are servicing, due to reduced trip times and less traffic congestion. Furthermore, the enhanced safety design of the rehabilitated roads will result in

a reduction in traffic accidents. In addition, smoother road surfaces may lead to fewer vehicle repairs thereby resulting in longer vehicle life and lower maintenance expenditures. Finally, the new rehabilitated road will in turn lead to the employment of workers for additional maintenance works during the 1 year liability period.

5.6 Summary of impacts analysis

The rehabilitation phase of any development is known to have potential adverse environmental and social impacts. Inadequate construction standards can increase environmental degradation. The potential environmental and social impacts during the both phases of the project were assessed to range from minor to major negative, with the majority being moderate negative.

Table 5-4 summarizes the significance of impacts associated or expected with both the rehabilitation and operation phases. Negative impacts are mostly temporary or not significant in nature with similar size projects.

Table 5-4. Summary of potential impacts of proposed roads in Tripoli district

<i>Potential Impact</i>	<i>Rehabilitation phase</i>		<i>Operation phase</i>	
<i>Traffic</i>	Major negative		Minor negative to	Positive
<i>Air quality</i>	Moderate negative		Minor negative to	Positive
<i>Noise</i>	Moderate negative		Minor negative to	Positive
<i>Biodiversity</i>	Neutral		Neutral	
<i>Construction Waste</i>	Major negative		Neutral	
<i>Soil and water</i>	Moderate negative		Minor negative to Zero	
<i>Resources consumption</i>	Moderate negative		Neutral	
<i>Existing infrastructure</i>	Minor negative		Neutral to Positive	
<i>Visual Intrusion</i>	Minor negative		Minor negative to	Positive
<i>Health and Safety</i>	Moderate negative		Minor negative to	Positive
<i>Socio-Economic</i>	Moderate negative	to Positive	Positive	
<i>Street Vendors on Road 5</i>	Minor negative	to Positive	Positive	
<i>Archaeology / Cultural Heritage</i>	Minor negative		Neutral	
<i>Expropriation/involuntary resettlement</i>	Neutral		Neutral	

6 MITIGATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

Mitigation measures are typically recommended whenever the potential impact is moderately significant with the ultimate purpose to eliminate or reduce the potential negative impacts of the proposed project. Mitigation measures are highly dependent on the significance of the predicted impact, the nature of the impact (permanent vs. temporary), or the phase of the project (rehabilitation vs. operation). Possible measures to mitigate potential impacts described in the previous section are outlined below, particularly during the rehabilitation phase. The operation phase will experience mostly general socio-economic improvements which is the purpose of the project although minor impacts are inevitable such as the increase of noise and vehicle emissions due to traffic increase.

6.1 Environmental and Social Mitigation Measures during rehabilitation

Table 6-1. Environmental and Social Mitigation Plan for the Tripoli district roads during the rehabilitation phase

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Traffic delays and congestion	<ul style="list-style-type: none"> ❑ Schedule transportation of construction materials during off-peak traffic hours and during nighttime. Generally peak traffic hours are from 7 to 10 am and from 3 to 6 pm. ❑ Develop routing strategies for construction-related traffic to avoid sensitive receptors ❑ Inform the public about the schedule of rehabilitation activities ❑ Maintain access to roadside businesses, residences, and resorts via detours and temporary access features ❑ Ensure adequate warning, signing, delineation and channeling at least 500 m down and up-gradient from the construction site. ❑ Provide personnel to manage traffic at the rehabilitation site, supported by Municipal police if need be ❑ Avoid peak traffic times when laying asphalt and to the extent feasible, schedule construction activities outside peak hours 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p>while always keeping part of the road accessible particularly road 5 near the vegetable market and the coastal road 4 during the summer where many sea resorts are located.</p> <ul style="list-style-type: none"> ❑ Clear communication with PAPs and a robust GRM is needed to mitigate the traffic impact 			
Air emissions	<ul style="list-style-type: none"> ❑ Ensure adequate maintenance and repair of construction machinery and vehicles; ❑ Maintain good housekeeping practices that keep the site and its surroundings clean ❑ Ensure good quality of diesel fuel used with on-site equipment ❑ Turn off all equipment when not in use ❑ Sprinkle water on the construction site on windy days to hamper the generation of dust and its entrainment in the wind ❑ Ensure that excavated soil and fine construction material that are stored on site are properly sited away from the dominant wind direction and that they are watered and/or covered entirely by impervious sheeting when not in use ❑ Handle cement material properly ❑ Keep hauling routes free of dust and regularly cleaned ❑ Ensure good quality of fuel is used in trucks transporting construction material to and from site ❑ Ensure optimum and regular transportation of construction materials to minimize storage of large heaps on-site and to minimize concentrated truck-trips. ❑ Cover all vehicles hauling materials likely to give off excessive dust emissions; ❑ Restrict vehicle speeds to 25km/h on unpaved roads and trucks 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Increased noise levels	<ul style="list-style-type: none"> <input type="checkbox"/> Use quiet/well-maintained equipment <input type="checkbox"/> Regularly maintain equipment and turn them off when not in use <input type="checkbox"/> Use operational noise mufflers <input type="checkbox"/> Limit construction activities to working hours designated by decision number 2/163 – 31/1/1995 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Biodiversity	<p>Induced negative impacts of road projects on biodiversity are negligible knowing that the two roads do not occupy rich or critical natural ecosystems (valleys, forests, rivers...etc). However, if any important features are found during initiation of works, then some of the measures might include:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Workers' movement and activities should not infringe on the nearby ecosystems. <input type="checkbox"/> Workers should be instructed to protect flora and fauna when feasible as well as their habitats. <input type="checkbox"/> Solid and liquid waste should not be dumped into the natural environment. 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks
Generation of construction waste	<ul style="list-style-type: none"> <input type="checkbox"/> Minimize the generation of construction waste <input type="checkbox"/> Adequately sort construction waste to remove any hazardous substances <input type="checkbox"/> Reuse inert waste materials as filling material for road reconstruction where feasible <input type="checkbox"/> Establish an arrangement with the municipality and the North Lebanon Governor to secure suitable locations for construction waste disposal <input type="checkbox"/> Maintain equipment in dedicated repair shops 	<input type="checkbox"/> Contractor	Supervision Consultant	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Pollution of soil and water resources	<ul style="list-style-type: none"> ❑ Minimize usage of chemicals (lubricants, oil, solvents) ❑ Ensure the proper storage of building materials, asphalt, oil and chemicals on-site in well-controlled areas and away from riverbanks ❑ Do not discharge wastewater into river or on soils ❑ Do not discharge waste oil into rivers or on soils ❑ Contractor to provide mobile/portable cabin toilet linked to the existing wastewater network. When the latter is absent within the work zone, the toilet is linked to a polyethylene storage tank that is emptied when full into the nearest wastewater network. ❑ For vehicles and equipment, the Contractor will have to rent a land within the Project area. This land should be fenced and used for parking purpose only. The Contractor shall not perform any repair on site and is obliged to execute vehicles and equipment maintenance in a repair shop preferably located within the Project area. ❑ Waste material or water containing waste chemicals such as thinners, oil, and mineral spirits shall not be disposed of into storm water drains, sanitary sewers or into the ground. ❑ Cover any stockpiled construction material covered with an impermeable layer. ❑ Store diesel in designated tanks away from the road maintenance site and drainage ditches. Place it on an elevated concrete base to prevent soil or water pollution in case of accidental spill at the specified storage location. ❑ Conduct all refueling operations off-site. Fuel vehicles up before arriving to the road section. ❑ Decrease water usage ❑ Maintain surface water drainage ❑ Ensure that in the event of any fuel or chemical spills, the affected area is attended to and that the top soil is removed for 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p>disposal. A spill response plan shall be in place and all workers should be trained on its implementation.</p> <ul style="list-style-type: none"> ❑ Control over vehicle hauling hazardous materials ❑ Clean the site periodically ❑ Each receptacle should be marked with the correct technical name of the substance it contains. ❑ Incompatible materials shall not be placed in common containment. ❑ Used or waste fuel or other waste chemicals shall be stored in an isolated area until collected for off-site disposal by an approved waste contractor. ❑ Vehicle and equipment wash-down should only be done in designated areas away from the road under rehabilitation to protect water and soil quality in the area. ❑ A collection system shall be provided under any machinery or equipment that may leak hydrocarbons (e.g. mobile generator). ❑ Control all operations involving the use of concrete to avoid leaching into water sources. ❑ Provide bins on-site for the disposal of non-construction related wastes ❑ Work with the municipalities to include the site on the current solid waste collection route ❑ Minimize soil exposure time ❑ Install retaining walls before starting with drainage ditch excavations to block soil erosion ❑ Carry out excavations for drainage channels in complete precision and transport resulting excavated soil to offsite locations for proper disposal in case of contamination. ❑ Reduce the time excavated drainage channels remain unsupported ❑ Keep vegetation clearing to a minimum and encourage re-vegetation immediately after construction activity finishes, at 			

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	sites where vegetation is removed			
Resources consumption	<ul style="list-style-type: none"> ❑ Replace wet cleaning methods with dry clean-up methods whenever practical (sweeping, dust collection vacuum, wiping...etc.), while taking into consideration dust generation. ❑ Install signs near water-using appliances to encourage water conservation. ❑ Use appropriate water proof sheeting to cover the concrete after water curing to preserve moisture and reduce the evaporation that leads to decrease water quantities used ❑ Turn off equipment when not in use ❑ Regularly maintain machinery and generators and operate them in an efficient manner. ❑ Do not leave vehicles idle for long periods. ❑ Site offices shall be well insulated to retain heat or cool, utilize energy efficient bulbs and energy efficient cooling systems. ❑ Reuse excavated material whenever feasible ❑ Accept construction material only from permitted quarrying sites 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>
Existing infrastructure	<ul style="list-style-type: none"> ❑ Avoid damaging any possible existing infrastructure by contacting municipality engineers to obtain information on existing shallow infrastructure prior initiation of works. Execute trial pits in case information is not readily available and only if necessary ❑ Develop procedures for rapid notification of the concerned municipality/ ministry, in the case of disruption of any existing utility, along, with requirements for immediate assistance with reinstatement, and close follow-up with concerned authorities 	<ul style="list-style-type: none"> ❑ Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Visual intrusion	<ul style="list-style-type: none"> <input type="checkbox"/> Document existing conditions prior to initiation of the works <input type="checkbox"/> Preserve existing vegetation when feasible <input type="checkbox"/> Restore depleted vegetative cover by replanting with endemic trees (pine, oak, etc.) where cutting is necessary during rehabilitation. <input type="checkbox"/> Clearance all equipment, spoil heaps, and other materials after construction <input type="checkbox"/> Ensuring that the street light source is has the minimum intensity needed. 	<ul style="list-style-type: none"> <input type="checkbox"/> Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>
Health and safety	<ul style="list-style-type: none"> <input type="checkbox"/> Follow CDR's and WBG's safety, health and environmental regulations and guidelines <input type="checkbox"/> Ensure the construction sites are completely enclosed and restrict entrance to construction personnel <input type="checkbox"/> Create buffer zones around the site and provide pedestrian walk ways <input type="checkbox"/> Ensure traffic by-passes in working areas <input type="checkbox"/> Install clear warning signs <input type="checkbox"/> Provide adequate loading and off-loading space within the site itself <input type="checkbox"/> Provide appropriate personal protective equipment to construction workers, including helmets and earmuffs) <input type="checkbox"/> Provide on-site first aid kit with adequate content (ex. including antiseptic fluid, gauze, cotton etc. and other items that are needed to deal with any cuts and bruises) <input type="checkbox"/> Provide accident insurance for workers <input type="checkbox"/> Report incidents to the WB within 48 hours <input type="checkbox"/> Coordinate with the Municipality in order to provide adequate number of police men to ensure workers' security and physical safety. 	<ul style="list-style-type: none"> <input type="checkbox"/> Contractor 	Supervision Consultant	<p>Included as part of the construction and supervision activities.</p> <p>Contractor on-site engineer for HSE implementation amongst other tasks</p> <p>Consultant on-site engineer responsible for HSE supervision amongst other tasks</p>

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Socio-economics	<p>Social Tensions</p> <ul style="list-style-type: none"> Develop and communicate clear criteria for job selection and allocation, with attention to ratio of Syrian and Lebanese community workers, non-discrimination and fair treatment of all workers including equal contractual wages/benefits and working conditions, types of positions and jobs restricted to Lebanese citizens, and consideration also for sub-group allocations within different communities. Ensure work permit requirements are satisfied in accordance to the Ministry of Labor regulations Clear communication with all affected workers and a robust GRM are essential to mitigate the potential risk of social tensions or dissatisfaction among Syrian and Lebanese workers. <p>Child Labor</p> <ul style="list-style-type: none"> Child labor under this project will not be allowed through a transparent hiring process that maintains a registry of verification about work permits and age. Particular attention is essential to prevent child labor by maintaining and monitoring a labor registry for age verification process prior to hiring potential workers. <p>Labor Influx</p> <ul style="list-style-type: none"> Providing workers with the necessary training and awareness raising session on issues regarding SEA/H, prior to signing the CoC (refer to Annex D). Obliging employees to attend an induction training 	<input type="checkbox"/> Contractor	Consultant on-site engineer responsible for HSE supervision amongst other tasks	Included as part of the construction and supervision activities. Contractor on-site engineer for HSE implementation amongst other tasks Consultant on-site engineer responsible for HSE supervision amongst other tasks

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p>course prior to commencing work on site to ensure they are familiar with the company's commitments to address GBV, in specific, SEA/H and the project's CoC.</p> <ul style="list-style-type: none"> • Repeating training and awareness raising on a regular basis as new staff commence work on the project. • Informing laborers regarding national laws that prosecute perpetrators of SEA/H • Providing CoC in a language understood by the workers who will sign the CoC. • Ensuring requirements in CoCs are clearly understood by those signing it. • Ensuring that the sanctions embodied in the CoC are be clearly explained. • Ensuring that workers at the rehabilitation site sign the CoC (refer to Annex D) that targets GBV risks, specifically SEA/H induced by labor influx, and penalizes the perpetrators of SEA/H. • Verifying that GRM (refer to section 8.3) is adequately implemented to record complaints from the surrounding communities and workers onsite, to find adequate resolutions and implement corrective actions. <p>Access to Services</p> <ul style="list-style-type: none"> • The Contractor should ensure adequate and timely communication with the concerned municipalities and dissemination of project-related work schedule with the surrounding community. • Nearby communities should be informed of the exact timing of activities prior to the commencement of works. • The rehabilitation works should 			

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p>not be performed during peak traffic hours to ensure that access to surrounding sensitive receptors and residential areas is not hindered, specifically.</p> <ul style="list-style-type: none"> • During rehabilitation of long roads, the Contractor should work on one small segment at a time, to avoid disturbance of the surrounding sensitive receptors for a long period of time. • Clear communication with all PAPs and a robust GRM should be adequately implemented and disseminated. <p>Traffic</p> <ul style="list-style-type: none"> • It is important to note that full road closures won't be done as all closures will be of partial nature; detours will comprise of merely temporary diversions. • Informing the public about the schedule of rehabilitation activities • Maintaining access to roadside businesses and residences via detours and temporary access features • Avoid peak traffic times when laying asphalt and to the extent feasible, schedule construction activities outside peak hours while always keeping part of the road accessible particularly road 5 near the vegetable market and the coastal road 4 during the summer where many sea resorts are located. 			

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility of mitigation</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
	<p style="text-align: center;">Street Vendors along Abou Ali River (Road 5)</p> <p>Coordinate with the Municipality the schedule of rehabilitation activities before the execution of any work onsite taking into consideration the below special measures:</p> <ul style="list-style-type: none"> o The rehabilitation works should not be performed during working hours (8 a.m. to 5 p.m.) of the vendors. It is highly recommended to execute the rehabilitation work activities in the early morning and/or after the end of working hours and avoid working during night time. o Dissemination of project-related work schedule with the vendors i.n culturally appropriate languages and written in clear and understandable manner o A robust external GRM should be adequately implemented and disseminated. in culturally appropriate languages and written in clear and understandable manner. Make sure that vendors will have access to this GRM. o Timely completion of the rehabilitation phase <ul style="list-style-type: none"> • 			

6.2 Environmental and Social Mitigation Measures during Operation

Table 6-2- Environmental and Social Mitigation Plan for the Tripoli district roads during the operation phase

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Traffic congestion & delays	<input type="checkbox"/> Maintain road safety infrastructure	<input type="checkbox"/> MOPWT	<input type="checkbox"/> Municipality	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Noise	<input type="checkbox"/> Provide speed limit signs at critical locations and enforce speed limit <input type="checkbox"/> Regularly maintain the roads	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Water and soil quality	<input type="checkbox"/> Maintain surface water drainage systems especially before rainy season	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Resource consumption	<input type="checkbox"/> Using water-efficient equipment during maintenance operations to avoid excessive and overuse of water	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Visual intrusion	<input type="checkbox"/> Ensuring that lights are turned off by a timer or manually when they are not needed.	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.
Health and safety	<input type="checkbox"/> Follow CDR's and WB's standard safety, health and environmental regulations during maintenance works <input type="checkbox"/> Proper road management, signage and maintenance	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	<input type="checkbox"/> MOPWT <input type="checkbox"/> Municipalities	Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation.

<i>Potential Impacts</i>	<i>Proposed Mitigation Measures</i>	<i>Responsibility</i>	<i>Responsibility of direct supervision</i>	<i>Estimated Cost</i>
Socio-economics	<p>Socio-economic impacts during operation are expected to be positive (due to improved overall road safety). However, some measures are necessary to ensure that positive impacts are maximized. These measures include the following:</p> <ul style="list-style-type: none"> • Ensure that workers during the maintenance phase sign the CoC that targets GBV risks and penalizes the perpetrators of GBV. • Ensure that GRM mechanism is functional to receive any public concerns throughout this phase and to address the received complaints within the set timeframe (specified in section 8.2) <p>Knowing that any maintenance activities that might be required within the One Year Liability Period are considered a subset of the works done during the rehabilitation phase, the corresponding mitigation measures are presented in Table 6-1.</p> <p>It is also important to note that possible maintenance during this period, if any is deemed necessary, is expected to be very limited in terms of duration and impact with respect to similar works during rehabilitation.</p>	<input type="checkbox"/> Contractor	<input type="checkbox"/> Consultant on-site engineer responsible for HSE supervision amongst other tasks	<p>Included as part of the construction and supervision activities for a one-year Defect Liability Period during operation</p>

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

7.1 Institutional Setup

7.1.1 National Institutions

Effective mitigation and monitoring plans require the presence of adequate capacity for environmental management at the national level. For the REP, the CDR plays a major role in ensuring the implementation of environmental mitigations by:

- ❑ Supervising design works at the design stage and ensuring that contracts for design works bear clauses requiring Design Teams to plan for and allocate resources for impact mitigation.
- ❑ Ensuring that ESMPs are integrated wholly into design reports.
- ❑ Ensuring that Technical Specifications of Contracts for Civil works will bear clauses binding respective contractors to undertake impact mitigation as per the Design Report, in line with the World Bank Safeguards Procedures for Inclusion in the Technical Specifications of Contracts
- ❑ Monitoring activities of contractors to ensure delivery as per contracts through its field officers and mainly through dedicated supervision consultants

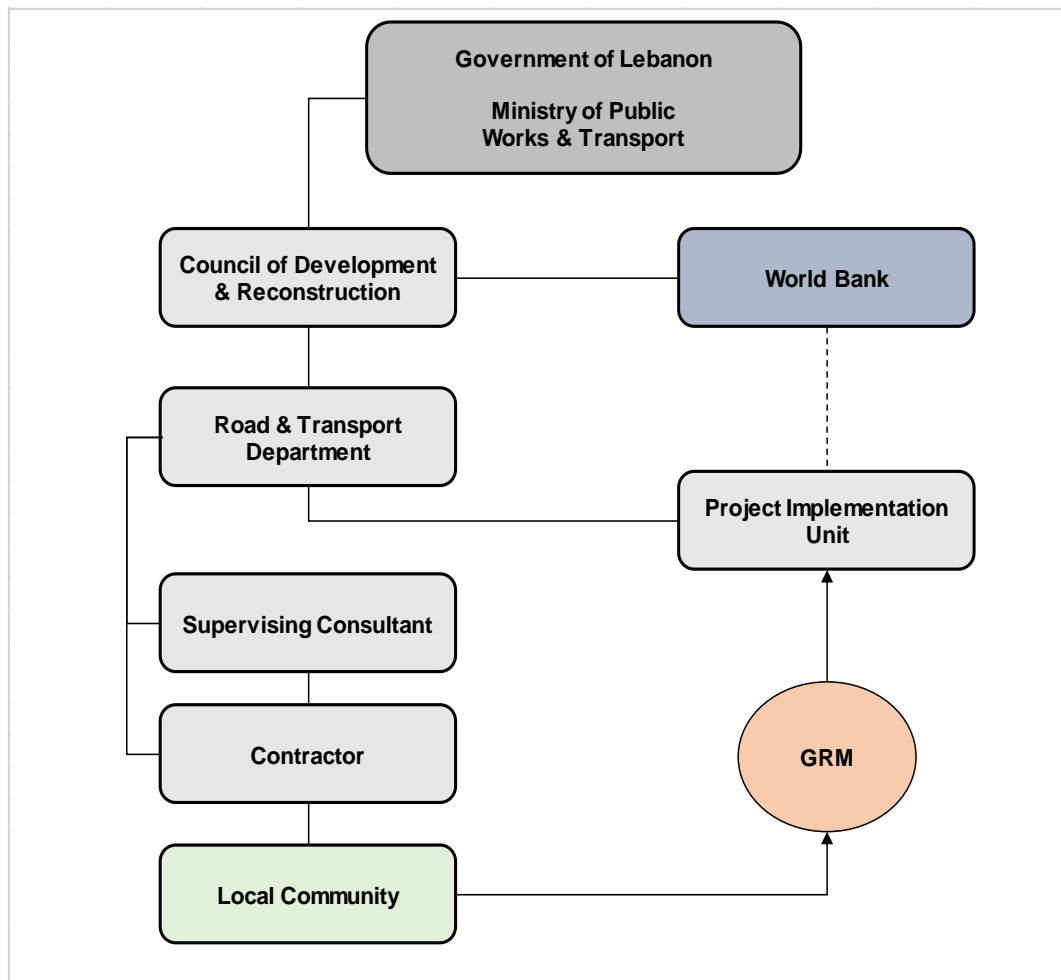
The Project Implementation Unit (PIU) at the CDR will be responsible for providing the overall policy direction, technical assistance, review and endorsement of environmental and social assessment and management plans, capacity building for effective safeguards management to the implementing agencies, monitoring of environmental compliance and progress reporting to the World Bank. The responsibility of day to day planning, implementation and supervision of environmental/social safeguards by the PIU will be coupled with the role of focal point(s) for environmental and social safeguards who will be in charge of ensuring timely and sound application of the ESMPs to the planned investments. The environmental/social focal points will work closely with the PIU environmental/social consultant to ensure harmonization and coordination of activities according to the ESMP requirements. In addition, at the field level, it is expected that the PIU will require the engineering and technical firms to recruit specialized staff in environment, social development and health and safety to conduct continuous supervision on field activities and prepare non-compliance reports on which the PIU will investigate and take action. In this context, the PIU may also conduct periodic field supervision to check on compliance with the ESMP mitigation measures.

As for the contractors, they are required to implement mitigation measures during the rehabilitation phase as per the signed Contract for Civil Works. Implementation of the ESMPs will largely be the contractor's responsibility and therefore the contractor will have to nominate qualified environmental, health and safety consultant and a social development consultant (if needed) in

order to ensure compliance with the ESMPs during rehabilitation.

During the operation phase, the contractor will still be bound to undertake impact mitigation alongside routine repair for a one-year Defect Liability Period. Beyond the Defect Liability Period, all mitigation will fall on the Municipality. Figure 7-1 below illustrates the institutional setup for project implementation.

Figure 7-1. Institutional setup for project implementation



7.1.2 Training

In the context of the proposed project that encompasses simple rehabilitation activities, environmental management during the rehabilitation and operation activities are relatively simple to ensure environmental protection. This can be accomplished through competent personnel with appropriate educational and professional background and instituting a periodic training program and site-specific plans that are adequate for protecting the general public and the environment as well as contributing to the mitigation of potential environmental impacts. Thus, contractor's personnel who will be involved in the construction of the proposed project as well as personnel

who will be involved in monitoring activities from the supervising Consultant may attend an environmental training workshop prior to the initiation of project activities. Relevant staff from the concerned municipalities are encouraged to attend, as they will be indirectly supervising the works on the ground. The objective of this training is to ensure appropriate environmental awareness, knowledge and skills for the implementation of environmental mitigation measures. Environmental training sessions will be conducted twice a year for a period of one day during the construction phase. The training program will emphasize on pollution prevention measures and techniques during both phases. The cost and schedule of this training program will be 2,000 USD per day including material preparation. Repeat workshops will be at 1,000 USD per day. The training program will cover at least the following topics:

- ❑ Environmental laws, regulations, and standards
- ❑ Pollution health impacts
- ❑ Pollution prevention measures
- ❑ Sampling techniques and environmental monitoring guidelines (air, noise, water)
- ❑ Protection of cultural heritage in developmental projects
- ❑ Traffic and pedestrian safety measures
- ❑ Code of conduct for laborers and interactions with nearby communities
- ❑ Awareness sessions about internal GRM for workers

7.1.3 Reporting

Progress reporting on safeguards compliance will take place as indicated in the ESMF (CDR, 2018) and listed below:

- ❑ Contractor's environmental compliance reports to the Environmental Supervision Consultant on monthly basis;
- ❑ Environmental Supervision Consultant reviews and approves the contractor reports and submits to the PIU at the CDR Roads and Transport Department on monthly basis
- ❑ PIU environmental/social progress reports to the WB, on a quarterly basis.

7.2 Monitoring Plan

7.2.1 Monitoring Plan Implementation

Monitoring should be conducted to evaluate the impact analysis, check on the implementation and the effectiveness of mitigation measures, respond to unanticipated environmental and social impacts, and improve environmental and social controls. Since the project is a category B, monitoring activities for such projects rely primarily on visual observation and documentation with

photos although measurements of certain indicators (traffic count, air / water quality and noise level) can be conducted when public complaints are raised. The project supervising consultant holds the direct responsibility of monitoring activities during the rehabilitation phase to ensure the implementation of the mitigation plan by the contractor. Upon public complaints, a third party (consultant) can also be appointed by CDR to conduct periodic monitoring with measurements of environmental indicators depending on the nature of the complaint. Table 7-4 presents a summary of monitoring indicators / activities during the rehabilitation phase.

During the operation phase, regular monitoring activities become more part of the duties and responsibilities of local municipalities and stakeholders. Similar to the rehabilitation phase, upon public complaints, a third party (consultant) can also be appointed by CDR to conduct periodic monitoring with measurements of environmental indicators depending on the nature of the complaint. (Table 7-5).

Table 7-1. Environmental and Social Monitoring Plan for the Tripoli district roads during the rehabilitation phase

<i>Impact</i>	<i>Monitoring activities</i>	<i>Responsibility</i>	<i>Frequency/ Duration</i>	<i>Location</i>	<i>Methods</i>	<i>Estimated Cost¹</i>
<i>Traffic</i>	Continuous supervision with periodic documentation with photos of mitigation measures (congestion, traffic disruption, speed limits, working hours, the presence of a traffic police and construction worker at detours)	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Air quality</i>	Continuous supervision with periodic documentation with photos of mitigation measures (vehicle and excavation emissions, turning off of equipment not in use, equipment maintenance, type of fuel used on site and in hauling trucks, speed limits, cleanliness of site, water spraying, storage conditions of soil and fine construction material, working hours, schedule of material transportation)	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	Total Suspended Particles (TSP), PM ₁₀ , PM _{2.5} (wherever feasible), SO _x , NO _x and CO	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	1-hr measurements, and visual observation of dust dispersion (scale and direction)	2000\$/event

<i>Noise</i>	Continuous supervision with periodic documentation with photos of mitigation measures (equipment mufflers, equipment maintenance, equipment turned off when not in use, speed limits, working hours) and measurements of indicators in case of public complaints	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	L_{eq} , L_{min} and L_{max}	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	Single sample per location (average 1hr reading-15min intervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	500\$/ event
<i>Construction and other solid waste</i>	Continuous supervision with periodic documentation with photos of mitigation measures while maintaining a record of waste generation, collection, segregation, storage, transportation and disposal in terms of type, quantity, and disposal location of generated waste	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Runoff water/ drainage</i>	Continuous supervision with periodic documentation with photos (chemical usage, chemical and material storage, water usage, wastewater discharge from mobile/portable toilets and storage tanks into existing or nearest sewage network, bins for solid waste disposal, oil spill management) while checking on culverts particularly following rainfall events	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
	Water quality analysis	Supervising Consultant	Upon public complaint	At nearby river/ stream	Totals suspended solids, BOD, COD, Oil and grease	1000\$/ event

<i>Resource consumption</i>	Continuous supervision with periodic documentation with photos of reuse of excavated material, water and energy conservation practices and design elements	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Existing infrastructure</i>	Continuous supervision with periodic documentation with photos of excavation and response to disruption of underground utilities	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Visual intrusion</i>	Continuous supervision with periodic documentation with photos of excavation and re-planting / re-vegetation while checking on culverts particularly following rainfall events	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Health and Safety</i>	Continuous supervision with periodic documentation with photos (PPE, site enclosure, buffer zones, warning signs, first aid kit, accident insurance), while maintaining a record of injuries / accidents specifying cause and location	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks
<i>Socio-economic</i>	Continuous supervision with periodic documentation with photos of mitigation measures while maintaining a record of employment and grievance, sharing construction schedule with the public, access to roadside businesses, vendors and residences, and grievance record. Documentation of training and raising awareness for SEA/H and signing of the CoC as well as record of age verification against child labor.	Supervising Consultant	Daily	At rehabilitation site	Visual observation and documentation with photos	Consultant on-site engineer responsible for HSE supervision amongst other tasks

Table 7-2. Environmental and Social Monitoring Plan for the Tripoli district roads during the operation phase (up to one year after project completion)

<i>Impact</i>	<i>Monitoring activities</i>	<i>Responsibility</i>	<i>Frequency/ Duration</i>	<i>Location</i>	<i>Methods</i>	<i>Estimated Cost</i>
<i>Air quality</i>	Total Suspended Particles (TSP), PM ₁₀ , PM _{2.5} (wherever feasible), SO _x , NO _x and CO	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	1-hr measurements, and visual observation of dust dispersion (scale and direction)	400\$/event
<i>Noise</i>	L _{eq} , L _{min} and L _{max}	Supervising Consultant	Upon public complaint	At site and at sensitive receptors within 100 m from site	Single sample per location (average 1hr reading-15min intervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	500\$/ event
<i>Water</i>	Totals suspended solids, BOD, COD, Oil and grease	Supervising Consultant	Upon public complaint	At nearby river/ stream	Single sample analytical analysis	1000\$/ event
Road Safety	Accidents: number, dates, frequency, and causes	Annually	Along the four concerned roads	Visual inspection (of accident logs containing the mentioned data)	N.A.	Included in rehabilitation Cost
Social Satisfaction	External complaints or grievances	Supervising Consultant	Upon public complaint	Along the concerned roads	Received complaints and records	Included in rehabilitation Cost
Child labor	Labor's age	Monthly	Laborers' records	Labor registry and age verification Labor law verification	N.A.	Included in rehabilitation Cost

7.2.2 Documentation and Reporting

During the rehabilitation phase, the Supervising Consultant shall submit a monthly report about the monitoring activities to various stakeholders including the CDR and the municipalities. These reports shall be made readily available or accessible to the public upon submittal. The content of a typical report should mirror the indicators of the mitigation plan with proper documentation with photos and actions taken in the event of accidents, concerns or complaints. The report would include an executive summary in Arabic for the use of the municipalities

7.2.3 Guidelines for Health and Safety Plan during rehabilitation

During rehabilitation, the contractor shall abide by the CDR Safety, Health, and Environmental Regulations for Construction Projects (Annex C) as well as the WBG Environmental Health and Safety General Guidelines.

8 CONSULTATION, DISCLOSURE AND GRIEVANCE REDRESS MECHANISM

8.1 Public Consultation

A public consultation meeting was conducted on December 18, 2019 at the Municipality of Tripoli. The number of attendees was 22, including 15 females. The attendees consisted of the Head of the Tripoli Municipality, 2 municipal board members, staff from the various municipal departments related to infrastructure planning and implementation, and a representative of the social affairs committee at the Municipality. Invited local NGOs are presented in Table 8-1, As for international NGOs, ANERA, and DRC were invited. Out of all invited NGOs, none attended the meeting. The complete attendance list is presented in Annex E.

Figure 8-1. Public participation session with Tripoli Caza stakeholders



In particular, for NGOs Consultation, this ESMP has targeted them according to their position in Lebanon. They consist of two levels as follows:

- a) Local NGOs: they are specific to each Caza. Their mission is to address different concerns and issues among the local society including social, economic, gender equality, environment, poverty, women empowerment, etc. Local NGOs were invited to the public hearings. Table 8-1

represents the name of the invited NGOs and their field of activity. Those local NGOs may play a role of advocates to reduce projects' social and environmental risks.

Table 8-1 Contacts with local NGOs and stakeholders

<i>Organization</i>	<i>Person</i>	<i>Position</i>	<i>Comments</i>	<i>Phone</i>
Rene Mouawwad Foundation	Khoulood Al Ali	RMF Center Manager, Bab El Tebbaneh	Have current projects in Bab El Tebbaneh near Road 5	+961 70 115487
Alliqaa' Alnissa'i Al Khairi Association	Rouba Shaarani	Manager	Social development with a focus on women empowerment Syrian labour available in Tripoli district and paid mostly in cash	+961 76 415800
Rouwwad Al Tanmia Association	Sarah Al-Sharif	Manager	Syrian labour available in Tripoli district and paid mostly in cash	+961 3 198516
Al Ittiad Al Nissa'i Al Taqaddoumi	Inaam Al Mahmoud	Manager	Social development with a focus on women empowerment Syrian labour available in Tripoli district and paid mostly in cash	+961 3 980547
Utopia	Chadi Nashabeh	Office Manager Tripoli	Syrian labour available in Tripoli district and paid mostly in cash	+961 3 988099
Rene Mouawwad Foundation	Natasha Marashelian	Director, Main Office, Beirut	Works throughout Lebanon including the Tripoli district. Had many sub-contractors with construction activities	+961 3 850 692

b) International NGOs: they are covering the whole country and their consultation will be applied to all the ESMPs of the REP. They provide relief and developmental aid to many developing countries. They support the society in responding to crises and helps people whose lives and livelihoods are shattered by conflict and disaster to survive, recover and gain control of their future. When the crisis in Syria erupted in early 2011, numerous International NGOs responded to the humanitarian crisis and worked directly with the Syrian in Lebanon by providing aid and responding to their critical situation.

This ESMP consulted International NGOs (see Table 8-2) to inform them about the Project, disseminate it, ask them to circulate its impacts and activities among Syrian and tell them that they

can inquire about additional information and/or submit a complaint (if any) by contacting the Grievance Redress Mechanism (GRM) Unit on 01980096 ext:317 or send an Email to rstephan@cdr.gov.lb or register by hand an official letter at the CDR

In Tripoli Caza, the total number of registered Syrian is 64,432 individuals (UNHCR, 2018). They were contacted through the International NGOs to seek their feedback about the Project. Accordingly, this ESMP did not receive any concern about the Project.

Table 8-2 Consulted International NGOs and their Activities

<i>NGO Name</i>	<i>Contacts</i>	<i>Intervention Sector(s)</i>	<i>Comments</i>
ANERA Lebanon	Mrs. Dima Zayat Deputy Country Director T: 01382590 (ext: 105) M: 70051813 E: dzayat@aneralebanon.org	<ul style="list-style-type: none"> • Children & Youth • Development • Education • Relief Services • Water sanitation and hygiene 	Mrs. Zayat received the Project information sheet and explained that recently Anera operations in Lebanon have grown substantially to cope with the Syrian crisis. they have six offices throughout Lebanon. She welcomed the idea of the Project and will disseminate it across her organization.
Danish Refugee Council (DRC)	Mr. Rickard Hartmann Country Director T: 01339052 (ext: 201) E: rickard.hartmann@drc.ngo	<ul style="list-style-type: none"> • Direct Assistance • Protection • Shelter • Community Empowerment and Livelihoods 	Mr. Hartmann received the Project information sheet and explained that DRC is working with Syrian on many sectors in different locations across Lebanon including Beirut, Tripoli, Kobayat and Zahle. He welcomed the idea of the Project and will disseminate it across his organization.

The session started with a welcome note from Dr. Riyad Yamak, the Head of the Municipality of Tripoli. This was followed by a presentation by Dr. Mutasem El-Fadel, the environmental expert from TEAM International who explained the components of the overall REP, displayed the layout of the selected roads in the Tripoli Caza, and discussed the proposed ESMP, which included the idea that proper permits should be obtained through local municipalities whereby inert waste materials (excluding asphalt) can be used as filling material for local road reconstruction projects within the caza or disposed of at local sites like quarries, only if designated / approved for that purpose. Dr. El-Fadel also gave contact numbers for the TEAM and CDR for any further questions

or future complaints or grievances. Dr. El-Fadel emphasized that the selected roads have been approved by a Ministerial Decision following much discussions with various stakeholders at many levels, and hence they cannot be changed at this stage. The main issues raised by the attendees were as follows.

- ❑ The selection criteria applied for road selection are not clear and transparent. It seems that political considerations played a significant role, as there are roads that are in need of rehabilitation more than the proposed ones. The municipality will prepare a list of additional roads that require rehabilitation and will communicate it with the consultant and with CDR for consideration in a phase 2 of the project.
- ❑ Many complained that they were not aware of this project until now. However, it was explained that the project was discussed with the outgoing municipal heads, serving before the latest municipal elections.
- ❑ Many believed that there are infrastructure projects in Tripoli that are equally or more important than the rehabilitation of these roads and that should have been given similar priority.
- ❑ There are some sections of the proposed roads that have recently undergone rehabilitation works. Could the allocated budget be transferred to additional works along those roads?
- ❑ The staff at the Municipality want to see the roads design maps to provide their opinion on the proposed rehabilitation elements. It was agreed that this can be accommodated in subsequent meetings upon the request of the Municipality either with the Consultant's Engineer and with the Contractor prior to initiation of construction activities.
- ❑ Reinforcement of the walls and the ground base of the Abou Ali River along Road 5 as they are in bad condition and will affect the foundations / stability of the rehabilitated road.
- ❑ Rehabilitation of the first section of the Mallouli bridge in the immediate vicinity of the start of Road 5 at the Abou Ali Roundabout.
- ❑ Qalamoun Road 4 has drainage issues which need to be considered in the design.
- ❑ Enforcing construction schedule in a timely fashion.
- ❑ Including design elements that ensure access to persons with disability (PWD)
- ❑ Public concerns should be respected during project execution.
- ❑ Using construction material that is of good quality and that does not deteriorate rapidly, as per the agreed terms of reference.
- ❑ Contractor to give priority employment to local people from the towns where the roads rehabilitation is taking place.
- ❑ Employment opportunities were discussed for both Lebanese and Syrian workers. The latter contributes significantly in the construction sector throughout Lebanon including the Tripoli District. Besides private entities, the municipalities are resorting to Syrian labor in this sector in particular. There appears to be a clear split in job types between local communities. The delineation line is between skilled jobs (mainly taken by the Lebanese workforce) and unskilled labor (filled primarily by Syrian workers). This split has resulted in a control of potential tensions or conflict between the communities.

In relation to the selection of roads within the scope of REP, the consultant explained that the Government prioritized roads based on municipalities' official requests beside several technical criteria. It was explained that no alternative roads can be suggested at this stage of the project. Further, regarding the technical concerns that were revealed during the meeting including design and raw materials issues, the consultant ensures to communicate these remarks to the consultant engineer. Finally, the consultant will ensure that the road design maps will be sent to the concerned municipalities as requested.

Although the Consultant and the CDR representative requested a side meeting with the women participating in the session, female attendees have asked to skip it due to the following reasons: (a) time limitation since the session took about two hours; (b) their personal and work obligations; (c) they were the majority (15 out of 22) in the meeting; and (d) they have confidently and highly voiced their concerns throughout the session.

8.2 Individual Interviews with Street Vendors

With the outbreak of COVID-19 and the growing concern about the risk of the virus spread, group public consultation was not possible, knowing that there are 14 cases of COVID-19 among the employees of the Municipality of Tripoli¹⁴ as well as a wide spread of the virus in the city. Therefore, in accordance with the suggested alternative channels of communication in the "Technical Note: Public Consultation and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings", individual interviews¹⁵ with street vendors were performed randomly during the site visit in August 2020 for the 700 m stretch on Road 5 (Figure 8-2). During the interview, the Consultant took the appropriate precautions from COVID-19 including wearing mask, maintaining a distance of 1.5 meters, and cleaning hands using alcohol-based hand rub.

Twenty street vendors were asked about their opinion and concerns regarding the road rehabilitation activities and were informed about the related GRM to be implemented during the project's phases. . Since the market is dominated by men all the interviewed vendors were men. The individual interviews highlighted on the positive impact of the REP on the socioeconomic conditions of the vendors as well. The main concern of the interviewed vendors was to be notified ahead of time regarding the schedule and to be informed about the approximate duration of the work activities. Negative concerns were not raised at the time of the interviews.

¹⁴ <https://corona.ministryinfo.gov.lb/news/show/3621/>

¹⁵ Individual Interviews were considered as the appropriate approach to conducting consultations with the street vendors of Road 5 in view of the street context and general situation caused by the outbreak of COVID-19.

The consultant responded to the vendors concerns by saying that the Contractor will not start any activity without informing them through the Municipality. The Consultant explained to the vendors the procedure for work execution as follows:

- The Contractor in coordination with the Municipality will prepare a schedule of works before the execution of any work onsite
- The rehabilitation works will not be performed during the street vendors working hours (8 a.m. to 5 p.m.).

Finally, the street vendors were informed that they can complain in case they have more concerns through the following CDR link <http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm> or by contacting the CDR on 01980096 ext.317.

Figure 8-2 Individual interview with a street vendor



Geoflint Team, August, 2020

8.3 Grievance Redress Mechanism

The ESMP revealed mostly minor to moderate environmental and social impacts associated with the project activities particularly during the rehabilitation phase. While these impacts were discussed during the Public Consultation meeting, certainly not all potential stakeholders were or can be reached during this process. Therefore, an accessible Grievance Redress Mechanism (GRM) is warranted whereby various stakeholders can voice their concerns during all phases of the project implementation phases: pre- rehabilitation, rehabilitation, and operation. The GRM should be designed to permit a timely resolution of concerns, assuring stakeholders that their grievances have been heard and that the institutionalized mechanism will yield a fair and impartial outcome.

The CDR has developed the GRM for the REP and it was shared with the participants during public participation. There are two mechanisms for filing a grievance, one for the surrounding

communities and one for the workers. Anonymous grievances will be addressed in both levels and the maximum anticipated time needed to close a GRM case is 45 days.

8.3.1 GRM for Communities

The GRM will be accessible to all relevant stakeholders who can use this mechanism to send their suggestions, concerns and complaints related to the PIU. The complaints, suggestions and concerns can be sent by email, mail, phone (through a hotline), in person and other means such as a grievance compliant logging sheet where grievances are registered in writing and maintained as a database. The phone number, e-mail address, and address for receiving complaints will be disclosed among the population and will be posted at the rehabilitation sites in Tripoli Caza, before commencement of project implementation. Moreover, the information on how to access the GRM should be available on CDR website.

The GRM levels of the project are the following:

- Level 1: If any person has any complaint, concern or suggestion regarding the project implementation, he or she can lodge an oral or written grievance through e-mail (GRM.REP@cdr.gov.lb@cdr.gov.lb), phone call or text message (01980096 ext:317), or website link (<http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm>) to the site engineer or manager of the roads to be rehabilitated in Tripoli Caza. In case an oral complaint is made, it should be written on paper by the receiving unit. The above issue will be resolved within a maximum duration of one week.
- Level 2: If the person is not satisfied with the action of the site manager's Office, he or she can bring the complaint to the attention of the Environmental and Social Specialist of the PIU for the project through e-mail (rstephan@cdr.gov.lb), phone call or text message (01980096 ext:317), or website link (<http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm>). The issue shall be resolved within a maximum of two weeks.
- Level 3: If the person is not satisfied with the decision of the Environmental and Social Specialist of PMU, he or she can bring the complaint to the attention of the PMU Director's Office through e-mail (elieh@cdr.gov.lb), phone call or text message (01980096 ext:159), or website link (<http://www.cdr.gov.lb/study/RoadsEmp/RoadsEmp.htm>). Once the PIU Director receives the complaint, it needs to be resolved within a maximum of two weeks.

Meanwhile, it is recommended that the aggrieved party is consulted and be informed of the course of action being taken, and when a result may be expected.

Moreover, reporting of the complaints to the PIU should be done regularly. The designated person at each level should report to the PIU on the number and subject of new complaints received, and the status of the already existing complaints, if any. The report should also inform the PIU of complaints that could not be resolved at the lower levels and are being elevated to the PIU Director's attention. The PIU aggregates information received into a status report each quarter, indicating the number and subject of complaints. The quarterly status report also provides up-to-date information on the number and subject of complaints that have been resolved, and the manner in which they have been resolved. This information will be shared with the Bank.

The Complaints Register form (refer to Annex F) includes the following:

- i) details and nature of the complaint
- ii) the complainant name and their contact details
- iii) date
- iv) Corrective actions taken in response to the complaint.

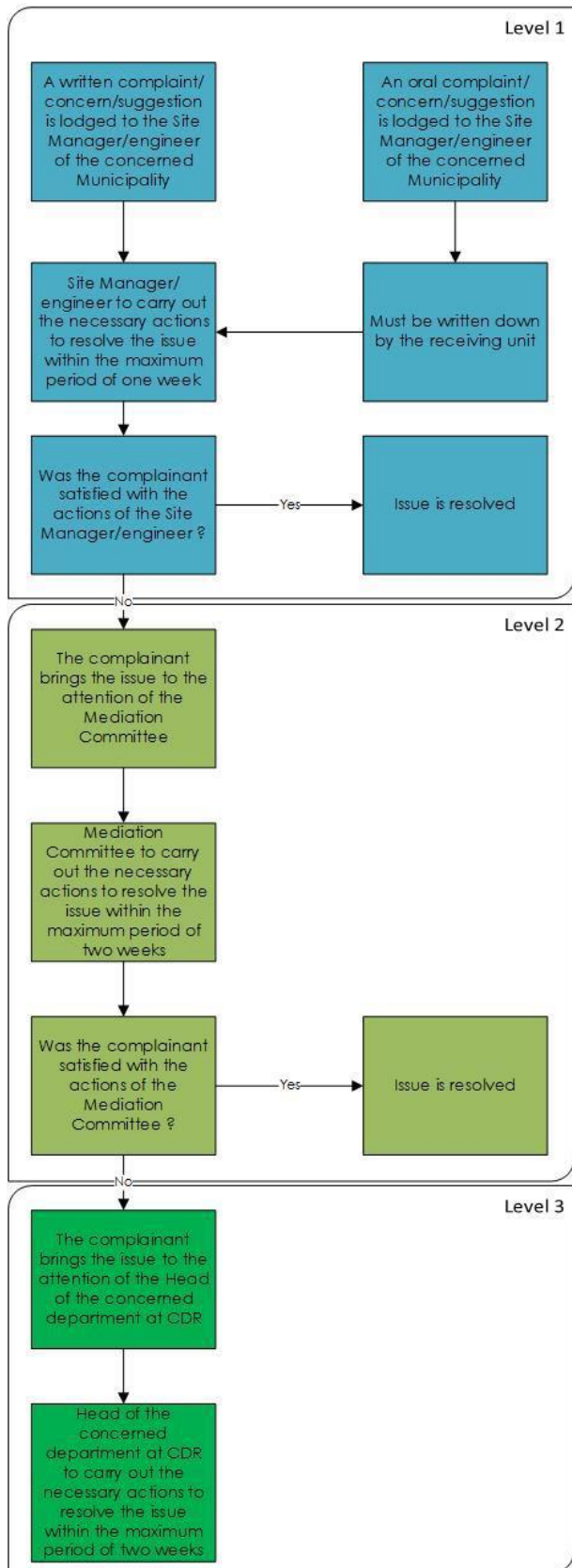
The GRM does not exclude the formal legal process of the national law. If a grievance remains unresolved following application of the project GRM process, the affected person can initiate legal proceedings in accordance with national law and may have recourse to the Appeals Court as warranted.

Figure 8-3 (overleaf) presents a detailed flowchart describing the process of grievance starting from reception of grievance to implementation of corrective measures.

8.3.2 *GRM for Workers*

A GRM for internal employees, namely the laborers onsite are also necessary. It aims to allow laborers to report any wrongdoings in their favor or important concerns they might have. This internal GRM is similar in nature to the one previously discussed (in terms of accessibility, reporting means, etc...). The only main difference is the contact people for each level. In this context, the first level involves reporting to the health and safety officer and has a duration of one week. The second level involves reporting to the PMU Director and should be resolved within one week. It also follows the Complaints Register form (refer to Annex F).

Figure 8-3 Typical grievance redresses mechanism for the REP



Source: CDR, 2018

9 CONCLUSION

The ESMP revealed that the REP within the Tripoli Caza will have positive socio-economic impacts both during rehabilitation, through the creation of jobs for both skilled and unskilled workers, and during operation by improving accessibility in the caza as well as livelihoods. However, its implementation is associated with a variety of environmental and social impacts that are reversible and can be controlled through mitigation measures all while ensuring proper environmental monitoring during both the construction and operation phases. The ESMP outcome is consistent with the ESMF (CDR, 2018) that concluded that the REP activities are not expected to have significant environmental impacts and equally no anticipated impacts on physical and cultural resources or natural habitats, no involuntary resettlement, and no land acquisition.

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ANNEXES

- A. Impact Assessment Methodology and Methodology for estimating impact on air quality**
- B. Methodology for estimating impact on noise levels**
- C. CDR Safety, Health, and Environmental Regulations**
- D. Code of Conduct**
- E. Public Participation**
- F. Complaints Register form**

Annex A –Impact Assessment Methodology and Methodology for estimating impact on air quality

Impact Assessment Methodology

The process of impact assessment is undertaken taking into consideration direct, indirect, planned or unplanned (accidental) impacts during the Project’s construction (rehabilitation) and operation phases. Identified potential impacts are assessed for overall significance based on consequence and likelihood ranking where the impact significance is expressed as the product of the consequence and likelihood of occurrence of the activity as outlined below.

$$\text{Significance} = \text{Consequence} \times \text{Likelihood}$$

Where “Consequence” is the resultant effect (positive or negative) of an activity’s interaction with the legal, natural and/or socio-economic environments. “Likelihood” is the possibility that an impact will occur.

The assignment of the level of consequence and potential likelihood depends on the professional experience and judgment of the study team. This judgement followed the consequence categories defined in Table 5-1. The potential overall consequence is then combined with the “Likelihood” to give the impact significance as presented in Table 5-2, which illustrates the likelihood scores and the resulting significance based on consequence-likelihood interaction.

Consequence scores

<i>Consequence Score</i>	<i>From Planned Activities</i>	<i>From Unplanned/ Accidental Activities</i>
5 <i>(Severe)</i>	Severe environmental damage or severe nuisance extending over a large area and continuous emission or permanent change over more than 5 years. Likely major breach in compliance resulting in prosecution. Stakeholders concern is triggered on an international level.	Certain (event likely to occur more than once on the facility)
4 <i>(High)</i>	Continuous emission or permanent change over less than 5 years leading to a major impact. Possible major regulatory noncompliance. Stakeholders concern is triggered on a national level.	Possible (could occur within the lifetime of the development)
3 <i>(Medium)</i>	Regular over short-term (less than 3 years) or intermittent over long-term (more than 3 years) leading to repeated breaches of statutory limit. Spontaneous recovery of limited damage within one year. Possible regulatory noncompliance. Stakeholders concern is triggered on a regional level.	Unlikely (event could occur within the life of 10 similar facilities, has occurred at similar facilities)
2 <i>(Low)</i>	Minor magnitude effect on the environment but no permanent effect. Regulatory terms or corporate policy set defined conditions. Stakeholders concern is triggered on a local level.	Remote (similar event has occurred somewhere with similar projects but not likely to occur with current practices and procedures)
1 <i>(Negligible)</i>	Local environmental damage within the fence and within systems with negligible severity. No specific statutory control. Stakeholders concern is triggered on an individual level.	Extremely remote (has never occurred within similar projects but theoretically possibly)
0 <i>(None)</i>	No impact.	-
+ <i>(Positive)</i>	Beneficial impact that enhances the environment. No public interest or improves aspect of community importance.	-

Significance categories based on consequence-likelihood interaction

<i>Significance = Consequence x Likelihood</i>							
<i>Consequence</i>	<i>Likelihood</i>						<i>Significance</i>
	5	4	3	2	1	0	
	<i>Certain</i>	<i>Possible</i>	<i>Likely</i>	<i>Unlikely</i>	<i>Extremely Remote</i>	<i>Will Not Occur</i>	
5	25	20	15	10	5	0	Severe
4	20	16	12	8	4	0	Major
3	15	12	9	6	3	0	Moderate
2	10	8	6	4	2	0	Minor
1	5	4	3	2	1	0	Negligible
0	0	0	0	0	0	0	No Impact
+							Positive Impact

Methodology for estimating impact on air quality

Rehabilitation phase

Heavy construction is a source of dust emissions that may have substantial temporary impact on local air quality. Road construction is an example of a construction activity with high emissions potential. Emissions during the construction of a road in general, and the REP in particular, are a function of the excavation scheme, building demolition and the machinery used on-site. Emissions will consist primarily of particulate dust matter released as a result of earth removal activities, and to a lesser extent of emissions from the on-site usage of heavy construction equipment. Dust emissions often vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing meteorological conditions. A large portion of the emissions results from equipment traffic over temporary roads at the construction site. For this phase, it is expected that negative impacts on air quality will occur in and around the immediate vicinity of the site under construction. In order to quantify this impact, the total construction emissions and the corresponding ambient particulate matter concentration were estimated as described below.

Step 1: Estimation of the total construction emissions using the area wide method.

In this method, the quantity of particulate matter emissions from construction operations is considered proportional to the area being worked and to the level of construction activity. Emissions from heavy construction operations are positively correlated with the silt content of the soil (particles with a diameter <75 micrometers [µm]), as well as with the speed and weight of the average vehicle, and negatively correlated with the soil moisture content. An approximate aerial emission factor (EF) for the construction activities that is used in the estimation of total emissions (USEPA, 1995) is:

$$EF = 0.3 \text{ Kg/m}^2/\text{month of activity}^{16}$$

Assuming the road rehabilitation will take place in phases and that a 500 m road section will be rehabilitated per phase, the temporal emission factor for the total construction area of 2500-3500 m² and a duration of 2 month of activity, considering 22 working days/month and 8 hours/day of work is:

$$S = 0.3 \times (2500-3500) / (2 \times 22 \times 8 \times 3600)$$

¹⁶ The value is most applicable to construction operations with (1) medium activity level, (2) moderate silt contents, and (3) semiarid climate.

$$S = 0.000592 - 0.000829 \text{ Kg/s} = 592,000 - 829,000 \text{ } \mu\text{g/s}$$

Note that a better method is to estimate construction emissions for a particular construction site, the construction process be broken down into component operations, each involving traffic and material movement. However, due to the random nature of construction activities, and lack of design data, the extent of PM impact cannot be quantified using this method.

Step 2: Summary of key meteorological parameters with regard to air pollution dispersion namely, mixing height, inversion height, and mean annual wind speed (Table A1).

Table A1. Summary of key meteorological parameters

Parameter	Typical scenario	Worst case scenario
Mixing height	1,000 ^a m	1 m
Average wind speed	2.5 ^b m/sec	1 m/sec
Wind direction	west	west

^a De Nevers, 1995

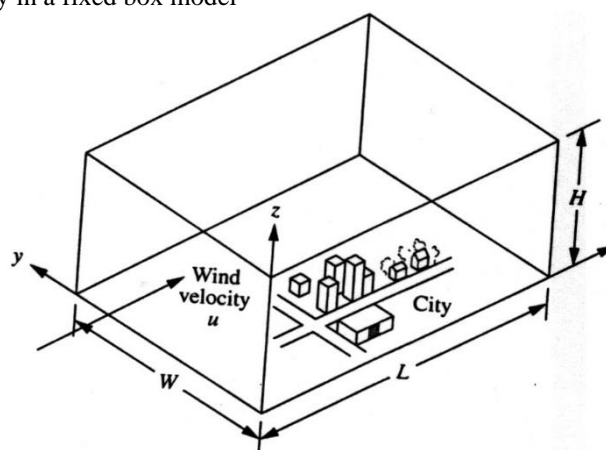
^b Refer to the windrose in Figure 4-13.

Step 3: Application of the Fixed Box Model to calculate ground-level concentration of PM

To compute the air pollutant concentration using this model, the site was represented by a parallelepiped and the following simplifying assumptions were made (DeNevers, 1995)

- The mixing of pollutants occurs within a layer of height H, confined from above by a layer of stable air.
- The concentration of pollutant in the entire city is constant and uniform, and equals to c.
- The wind velocity is constant and independent of time, elevation, and height above the ground.
- The concentration of pollutant entering the city (at x = 0) is constant, and equals to the base line measured PM concentration, b.
- No pollutant enters or leaves the top of the box, nor the sides that are parallel to the wind direction.
- The destruction rate inside the box is zero.

Figure A1. Rectangular city in a fixed box model



$$c = b + \frac{SL}{WLuH} \quad (A1)$$

- Where,
- c = Concentration of PM in the entire site ($\mu\text{g/m}^3$)
 - b = Background PM concentration ($\mu\text{g/m}^3$)
 - S = Emission rate of PM ($\mu\text{g/s}$)
 - L = Site length (m)
 - W = Site width (m)
 - H = Mixing height (m)
 - u = Wind speed (m/s)

The input data for the site under study are summarized in Table A2, taking into consideration two scenarios: the typical scenario and the worst-case scenario.

Table A2. Input data for the box model

<i>Parameter</i>	<i>Typical scenario</i>	<i>Worst case scenario</i>
W	107 m	55 m
L	500 m	1000 m
H	1,000 m	1 m
b	36.3 $\mu\text{g}/\text{m}^3$	36.3 $\mu\text{g}/\text{m}^3$
u	2.5 m/s	1 m/s
S	592,000 $\mu\text{g}/\text{s}$	829,000 $\mu\text{g}/\text{s}$

By direct substitution of the values in Equation A1, the predicted total PM concentration at a road segment site is expected to range between 38.5 $\mu\text{g}/\text{m}^3$ under typical conditions, and 7,780 $\mu\text{g}/\text{m}^3$ under worst-case conditions. For typical conditions, the expected PM concentrations are below the national 24-hr standard (120 $\mu\text{g}/\text{m}^3$) and WHO 24-hr guideline (50 $\mu\text{g}/\text{m}^3$). As for worst-case conditions, the expected PM concentrations significantly exceed the national 24-hr standard and WHO 24-hr guideline. Note that this impact is typically temporary and confined to the immediate site vicinity, particularly if proper management measures are adopted as described in the impact mitigation section.

Operation phase

During the operation phase, air emissions in the project area will be a function of the anticipated traffic volumes, in addition to the vehicle fleet attributes. In order to assess the potential magnitude of the project on the ambient air quality in the project area, the highway was modeled using a line source Gaussian plume model, as described below.

Step 1: calculation of uniform emission rate along the road ‘q’

Current and projected vehicle volumes are presented in Table A3. The design speed along the proposed roads is 50 km/hr.

Table A3. Current and future traffic projections and fleet characteristics

<i>Road code and villages</i>	<i>Existing Traffic Volume ADT</i>	<i>Future Traffic Volume ADT (20 Years)</i>	<i>Vehicle Fleet Composition</i>
<i>Tripoli Road 4 Qalamoun Seaside Road</i>	25,450	45,963	85% light vehicles 7 % Medium 8% Heavy
<i>Tripoli Road 5 Abou Ali roundabout-Tripoli/Zgharta limit</i>	10,121	18,279	83% light vehicles 9 % Medium 8% Heavy

Pollutant emissions from vehicles vary depending on vehicle characteristics, and ambient conditions such as temperature, humidity, altitude, and wind. Emission factors are strongly influenced by the average speed. These factors increase sharply at low average speed, typical of highly congested stop and go urban driving. Emissions are minimized in free-flow traffic at moderate speed, as expected to be along the proposed highway. The major characteristics of the Lebanese fleet that were used in the calculation of pollutant emissions include an average fleet age of 14 years and a value of 10% of the fleet subject to regular inspection and maintenance.

The equations for emission factors of the Lebanese fleet as a function of speed as described by Sbayti (2000),

using MOBILE5B and regression analysis, were deduced for the years 2019 and 2039¹⁷, as shown below in Table A4.

Table A4. Vehicular emissions at different speeds (Sbayti, 2000)

Year	Pollutant	Equation	Speed (mph)	EF (g/mile)
2019	CO	$EF = 701.61S^{-0.8697}$	31	35.4
2039	CO	$EF = 268.15S^{-0.8657}$	31	13.7

Where EF is the emission factor in g/mile, and S the average speed in mph.

A uniform emission rate q, in $\mu\text{g}/\text{m}\cdot\text{sec}$, along the road length can be estimated as follows:

$$q = EF \cdot \text{vehicle volume}$$

Accordingly, current and future emission rates along the proposed roads are presented in Table A5.

Table A5. Current and future traffic projections and fleet characteristics

Road code	Existing Traffic Volume ADT (vehicle/day)	2019 Emission rate q ($\mu\text{g}/\text{m}\cdot\text{sec}$)	Future Traffic Volume ADT (20 Years) (vehicle/day)	2039 Emission rate q ($\mu\text{g}/\text{m}\cdot\text{sec}$)
Tripoli Road 4 Qalamoun Seaside Road	25,450	6,482	45,963	4,536
Tripoli Road 5 Abou Ali roundabout- Tripoli/Zgharta limit	10,121	2,578	18,279	1,804

Step 2: calculation of dispersion coefficients ‘ σ_z ’ and ‘ σ_y ’

The general equations for the dispersion coefficients as given by Cooper (1996) are,

$$\sigma_y = aX^b$$

$$\sigma_z = cX^d + f$$

Where a, b, c, d, and f are constants that are dependant on the stability class and on downwind distance X as given in Table A6.

Table A6. Constants for calculating dispersion coefficients as a function of downwind distance and atmospheric stability

Stability class	a	b	$X < 1 \text{ km}$			$X > 1 \text{ km}$		
			c	d	f	c	d	f
A	213	0.894	440.8	1.941	9.27	459.7	2.094	-9.6
B	156	0.894	106.6	1.149	3.3	108.2	1.098	2
C	104	0.894	61	0.911	0	61	0.911	0
D	68	0.894	33.2	0.725	-1.7	44.5	0.516	-13
E	50.5	0.894	22.8	0.678	-1.3	55.4	0.305	-34
F	34	0.894	14.35	0.74	-0.35	62.6	0.18	-48.6

Tables A7 and A8 present the values of dispersion coefficients at different downwind distances, for various

¹⁷ The emission factors for the year 2015 under the do-nothing scenario in terms of emissions reduction were used. For 2019, the emission factor was assumed to be equivalent to the 2015 emission factor under the ‘basic conditions’ strategy. For 2039, the emission factor was assumed to be equivalent to the 2015 emission factor under the ‘advanced inspection and maintenance’ strategy.

stability classes.

Table A7. σ_y at different downwind distances, for various stability classes

Stability class	Downwind distance (m)									
	100	200	300	400	500	600	700	800	900	1000
A	29.49	54.79	78.73	101.82	124.31	146.31	167.93	189.22	210.23	231.00
B	19.91	37.00	53.17	68.76	83.95	98.81	113.41	127.79	141.98	156.00
C	13.27	24.67	35.45	45.84	55.96	65.87	75.61	85.19	94.65	104.00
D	8.68	16.13	23.18	29.97	36.59	43.07	49.43	55.70	61.89	68.00
E	6.45	11.98	17.21	22.26	27.18	31.99	36.71	41.37	45.96	50.50
F	4.34	8.06	11.59	14.99	18.30	21.54	24.72	27.85	30.94	34.00

Table A8. σ_z at different downwind distances, for various stability classes

Stability class	Downwind distance (m)									
	100	200	300	400	500	600	700	800	900	1000
A	14.32	28.66	51.86	83.72	124.07	172.81	229.86	295.12	368.54	450.07
B	10.86	20.07	30.03	40.50	51.37	62.57	74.06	85.79	97.75	109.90
C	7.49	14.08	20.37	26.47	32.44	38.30	44.08	49.78	55.42	61.00
D	4.55	8.64	12.17	15.39	18.39	21.22	23.94	26.54	29.06	31.50
E	3.49	6.36	8.78	10.95	12.95	14.83	16.60	18.30	19.93	21.50
F	2.26	4.01	5.54	6.93	8.24	9.48	10.67	11.82	12.92	14.00

Step 3: Model scenarios

For each future traffic volume two scenarios will be considered in order to calculate the expected CO concentrations. The first scenario (worst case scenario) will consider the minimum wind speed (1 m/sec) and the highest stability class (class F), in this scenario the dispersion coefficients will be minimum, thus higher ground level concentrations will be encountered. On the other hand, the second scenario will consider the maximum wind speed (4 m/sec) and the most unstable class (class A); this will represent a high degree of dispersion, therefore minimum ground level concentrations.

Step 4: Model application

Vehicle emissions were modeled using a line source Gaussian model (Figure A1) which is basically an infinite array of point sources.

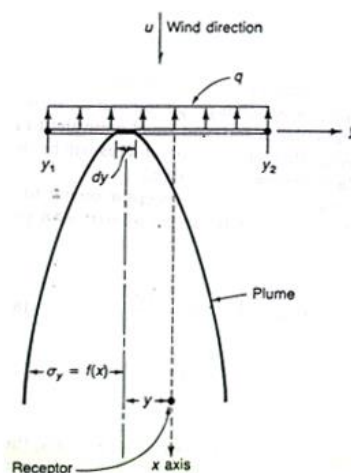


Figure A1. Finite line source Gaussian plume model

The general equation for a finite line source is:

$$C = \frac{q}{2\pi u \sigma_z \sigma_y} \left(\exp \frac{-(z-H)^2}{2\sigma_z^2} + \exp \frac{-(z+H)^2}{2\sigma_z^2} \right) \int_{y_1}^{y_2} \exp \left(-\frac{1}{2} \frac{y^2}{\sigma_y^2} \right) dy \quad (A2)$$

- Where,
- C = Concentration of pollutant ($\mu\text{g}/\text{m}^3$)
 - q = Uniform emission rate ($\mu\text{g}/\text{m}\text{-sec}$)
 - σ_z, σ_y = Dispersion coefficients
 - z = Receptor height (m)
 - H = Source height (m)
 - u = Wind speed (m/s)

For an infinite line source ($y_1 \rightarrow -\infty$ and $y_2 \rightarrow \infty$), ground level receptor ($z=0$), and $H=0$ (for most vehicles), equation A2 becomes:

$$C = \frac{2q}{\sqrt{2\pi} (u \sigma_z \sigma_y)} \quad (A3)$$

Figures A2 to A9 present the expected downwind CO concentrations during the operation phase of the three proposed roads for the years 2019 and 2039 under the typical and worst-case scenarios.

Figure. A2. CO concentrations at various downwind distances Road 4 (Qalamoun Seaside Road) in 2019

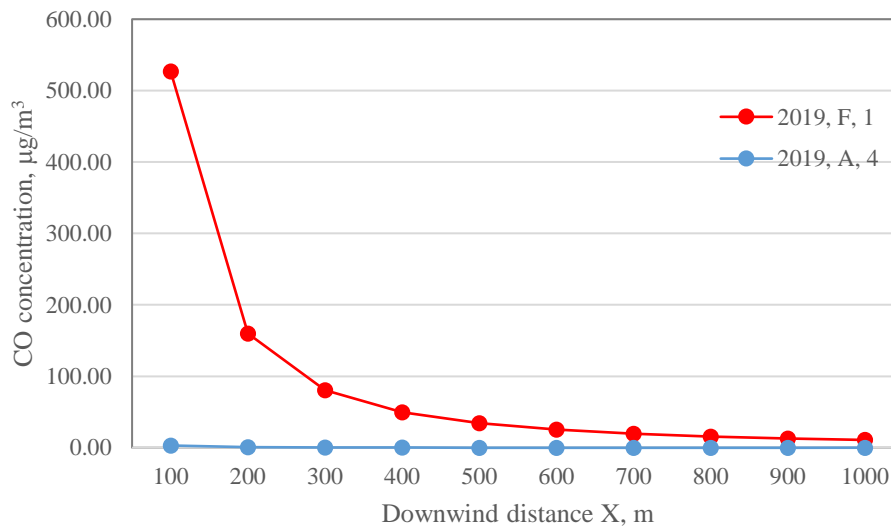


Figure. A3. CO concentrations at various downwind distances Road 4 (Qalamoun Seaside Road)

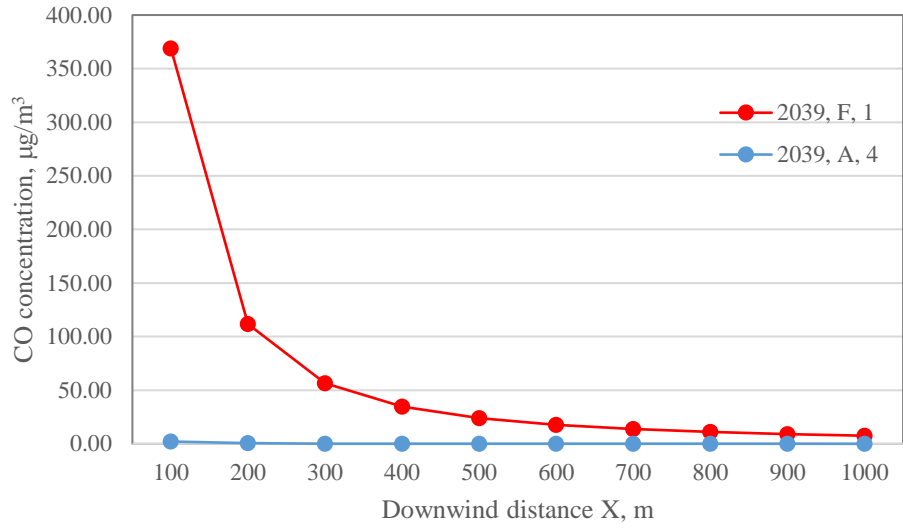


Figure. A4. CO concentrations at various downwind distances along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) in 2019

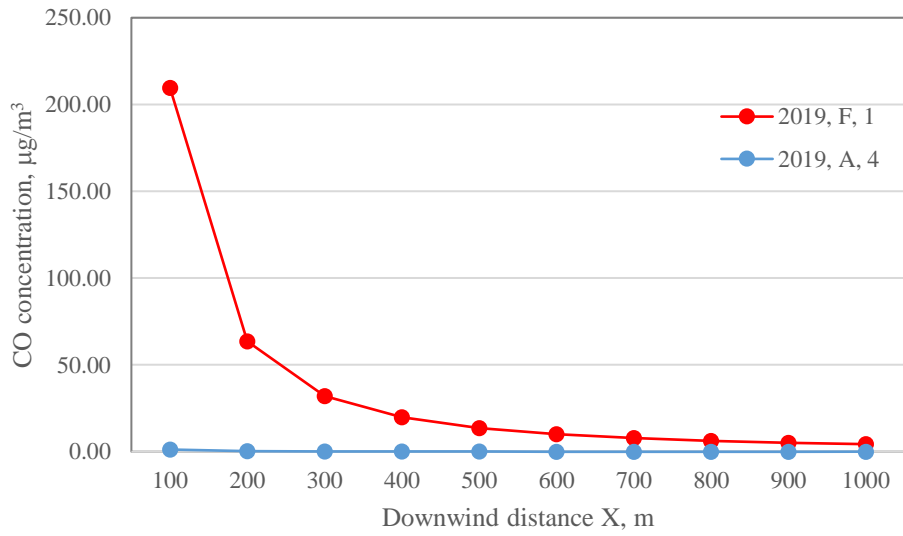
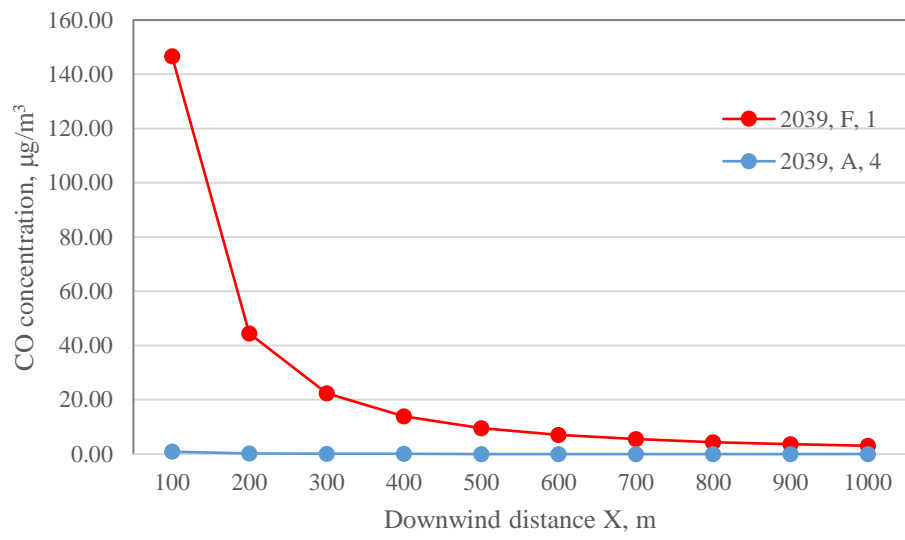


Figure. A5. CO concentrations at various downwind distances along Road 5 (Abou Ali roundabout-Tripoli/Zgharta limit) in 2039



Annex B – Typical methodology for estimating impact on noise levels

Rehabilitation phase

Noise levels during the rehabilitation phase are a function of the construction scheme and the machinery used on-site. Table B1 shows typical energy-equivalent noise levels associated with various work phases at a building construction site, when all pertinent equipment are present.

Table B1. Typical noise levels at construction sites (USEPA cited in Canter, 1996)

<i>Phase</i>	<i>Noise level (dBA)</i>
Ground clearing	84
Excavation	89
Foundations	78
Erection	87
Finishing	89

The first step in the noise quantification was the determination of the total site L_{eq} from various operations as expressed in Equation B1.

$$L_{eq} = 10 \text{Log} \left[\frac{1}{T} \sum_{i=1}^N T_i (10)^{L_i/10} \right] \quad (B1)$$

Where	L_i	=	L_{eq} for the i th phase (Table B1)
	T_i	=	Total time duration for the i th phase
	T	=	Total time of operation from the beginning of the initial phase ($i=1$) to the end of the final phase ($i=N$)
	N	=	Number of phases

Noise levels during the rehabilitation phase are a function of the construction scheme and the machinery used on-site. Table B1 shows typical energy-equivalent noise levels associated with various work phases at a road construction site, when all pertinent equipment is present.

Noise from construction operations is different from noise from other sources for two main reasons:

- ❑ It is caused by many types of equipment.
- ❑ The resulting adverse effects are temporary because the operations are relatively short term.

In order to assess the extent of potential noise impacts during the construction of the proposed REP, a noise model specific for construction operations was applied. It allows the preparation of sound contours for construction noise.

Taking into consideration the five rehabilitation phases listed in Table B1, with each having an estimated average duration of 1 week for a 500 m stretch of road, the total L_{eq} for the site was estimated at 80.8 dBA. This noise level is slightly above the maximum noise levels measured in the vicinity of the site (59.6-78.7 dBA). It exceeds both the IFC noise standard for residential areas (55 dBA) the FHWA standards for the Category B classified areas (67 dBA). However, this value was lower than the OSHA standard for an 8-hr exposure (90 dBA). In this case, the exposure of workers to noise during their work shift is acceptable.

To determine the propagation of noise levels at various radial distances from the construction site, L_{eq} was corrected using Equation B2:

$$L_{eq \text{ adjusted}} = -20 \text{Log}(x + 250) + 48 \quad (B2)$$

The resulting noise levels at different radii away from the site are presented in Figure B1.

Figure B1. Noise levels at different radii around the site

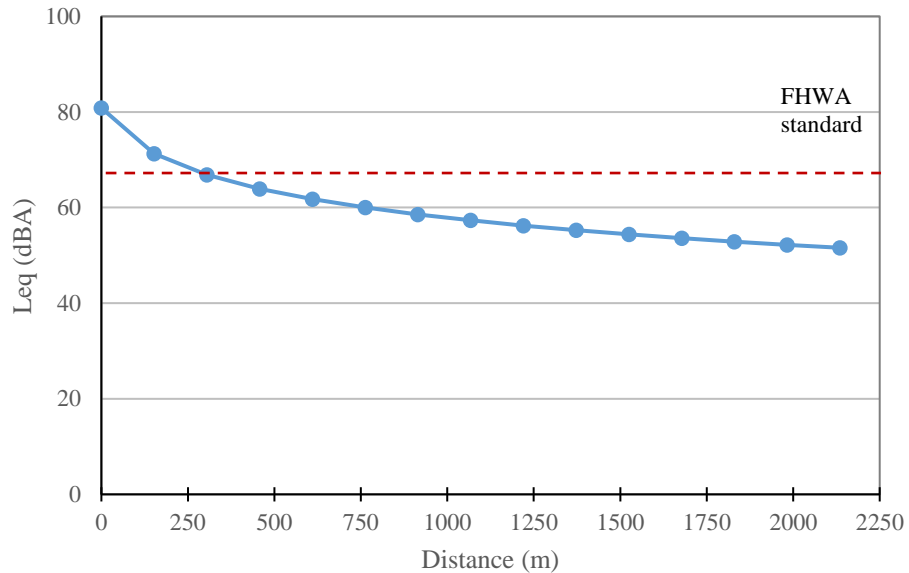
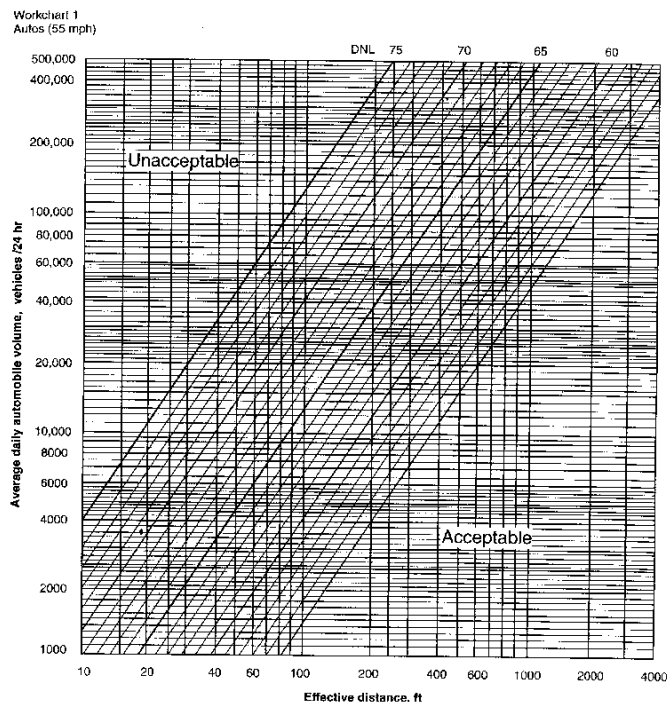


Figure B1 shows that the daytime Lebanese standard for residential area with few construction sites, commercial activities or on highway (50-60 dBA) can be reached beyond a radius of 700 m from the construction area. The FHWA standard (72 dBA) is reached at a radius of 305 m.

Operation phase

At the operational level, noise levels at distances adjacent to roads can be estimated using Figure B2 by U.S. Department of Housing and Urban Development (Canter, 1996). The Day-Night Average Sound Level (DNL) noise metric is used to reflect a person's cumulative exposure to sound over a 24-hour period, expressed as the noise level for the average day of the year on the basis of annual vehicle operations. DNL is equivalent to Leq.

Figure B2. Typical noise levels adjacent to roads and highways



Annex C. CDR Safety, Health, and Environmental Regulations

STANDARD BIDDING DOCUMENTS

**Safety, Health and
Environmental
Regulations**

**Council for Development and Reconstruction
Beirut, Lebanon**

June 1996

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Safety, Health and Environmental Regulations

**Council for Development and Reconstruction
Beirut, Lebanon**

Issue June 1996

Appendix 1

Safety, Health and Environmental Regulations

Table of Contents

Drafting Notes¹

Preamble

PART I - General Safety, Health and Environmental Regulations

PART II - Supplementary Safety, Health and Environment Regulations

¹ The reference to "Drafting Notes" should not be incorporated in the bidding documents; include following page.

Appendix 1

Safety, Health and Environmental Regulations

Table of Contents

Preamble

PART I - General Safety, Health and Environmental Regulations

PART II - Supplementary Safety, Health and Environment Regulations

Drafting Notes²

² These drafting notes are intended to assist those preparing the Safety, Health and Environmental Regulations. These drafting notes should not be incorporated in the bidding documents.

1 These CDR Safety ... Regs, Issue June 96 (c:\wp51\docs\Safety\CDRRRegs) can be used with all CDR Standard Conditions of Contract.

2 The CDR Safety, Health and Environmental Regulations are in two parts:

- PART I - General Safety, Health and Environmental Regulations;
- PART II - Supplementary Safety, Health and Environmental Regulations.

3 PART I, General Safety, Health and Environmental Regulations, together with the front cover page and pages i to iii, shall be included as printed, **without amendment**.

The pages of PART I are set up for, and should be photocopied on, double sided paper.

4 PART II, Supplementary Safety, Health and Environmental Regulations, will comprise changes, modifications and additional requirements to PART I, applicable to the Sector and/or the contract for which the Regulations are being prepared. PART II should be prepared by the Consultant responsible for preparation of the bidding documents in conjunction with the SIU.

PART II has priority over PART I (see Preamble).

If no changes, modifications or additional requirements are included in PART II, the page for PART II should be included with the addition of the following below the Table of Clauses:

"NONE"

The name of the contract should be added to the footer of pages, PART II.

5 In PART I, the amounts to be withheld in the event of non-compliance (Sub-Clause 3.2.2) are expressed in USD. PART II includes provision for contracts in currencies other than USD (eg Lebanese Pounds).

6 The Regulations should be included as Appendix 1 to the Conditions of Contract³.

Sample clause for inclusion in the Conditions of Contract³:

X Safety, Health and Environmental Regulations

XX The Contractor shall comply with the requirements of CDR Safety, Health and Environment Regulations. The regulations and requirements, and specific measures and actions available to the Employer and the Engineer in the event of non-compliance by the Contractor, are attached as Appendix 1 to these Conditions of Contract.

³ The positioning and numbering of the above Clause varies according to the Conditions of Contract being

used:

- for CDR Integrated Conditions of Contract for Works of Civil Engineering Construction: Part I - Standard Conditions, Sub-Clause 19.1;
- for CDR Conditions of Contract for Works of a Civil Engineering Construction: Part II - Conditions of Particular Application, Sub-Clause 78.1;
- for CDR Standard Bidding Documents, Procurement of Works, Smaller Contracts: Section 3, Conditions of Contract, Clause 19.2.

For other Conditions of Contract the Sub-Clause should be positioned and numbered as appropriate.

7 Throughout the Regulations the term "Engineer" is used.

However, in the CDR Standard Bidding Documents, Procurement of Works, Smaller Contracts the term "Engineer" is replaced by "Project Manager".

When "Engineer" is used in the bidding documents, the first alternative page iii "Preamble" should be included. When "Project Manager" is used in the bidding documents, the second alternative page iii, "Preamble", should be included.

Preamble

The Safety, Health and Environmental Regulations are in two parts:

PART I - General Safety, Health and Environmental Regulations;

PART II - Supplementary Safety, Health and Environmental Regulations.

PART II shall have priority over PART I.

Preamble

The Safety, Health and Environmental Regulations are in two parts:

PART I - General Safety, Health and Environmental Regulations;

PART II - Supplementary Safety, Health and Environmental Regulations.

PART II shall have priority over PART I.

Whenever the term "Engineer" is used in these Safety, Health and Environmental Regulations, it shall be construed as meaning "Project Manager" as defined in the Conditions of Contract.

Part I

General Safety, Health and Environmental Regulations

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4	General Requirements	PI/6
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6	Environmental and Health Requirements	PI/20
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6.5	Noise Control.....	PI/22
7	Additional Requirements for Work in Public Areas	PI/23
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Annex 1 Sample Excavation Permit

Annex 2 Sample Street Closure Permit

Annex 3 Sample Contractor's Site Check List

Part I

General Safety, Health and Environmental Regulations

1 Introduction

- 1.1 The prevention of injury and/or illness to site personnel and the public, damage to the Works and to public and private property, protection of the environment, and compliance with applicable laws, are primary objectives of CDR (the Employer). Because of the importance CDR places on meeting these objectives, selected minimum requirements are outlined in these Safety, Health and Environmental Regulations with which Contractors shall comply while working on CDR contracts. Given that these Regulations cannot cover every eventuality, the Contractor shall be expected to exercise good judgement in all such matters, even though not mentioned in these Regulations, and shall take any and all additional measures, as required or necessary, to meet his responsibility for safety, health and environmental matters during the period of the Contract.

CDR and its representatives shall not be held liable for any actions taken by the Contractor that are attributed to following the minimum requirements stated hereinafter.

- 1.2 The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:
- (a) have full regard for the safety of all persons on the Site and keep the Site and the Works in an orderly state appropriate to the avoidance of danger to any person;
 - (b) know and understand all laws governing his activities along with any site requirements and work site hazards. Such information shall be communicated by the Contractor to his personnel and subcontractors;
 - (c) take all necessary measures to protect his personnel, the Employer's personnel, other persons, the general public and the environment;
 - (d) avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of carrying out the Works.

2 Compliance with Regulations

- 2.1 The Contractor shall comply with the requirements of these Safety, Health and Environmental Regulations and all other applicable regulations or requirements under Lebanese laws, laid down by relevant authorities or issued by the Employer or the Engineer concerning safety, health and the environment, in force or introduced or issued from time to time during the period of the Contract.

In so far as these Regulations are applicable, they shall apply to sites and personnel outside the Site associated with the performance of the Contract.

- 2.2 The Regulations equally apply to subcontractors and all other parties engaged by the Contractor and their personnel. The Contractor shall ensure all such parties are fully aware of and comply with the Regulations.
- 2.3 The Contractor shall comply with all notifications and written or verbal instruction regarding safety issued pursuant to these Regulations by the Employer, Engineer or relevant authorities within the time specified in the notification or instruction.

Whenever the Contractor is required to obtain the approval, agreement, permission, etc of the Engineer, such approval, agreement, permission, etc shall not relieve the Contractor of his responsibilities and obligations under these Regulations or the Contract.

- 2.4 The Contractor shall adopt a positive approach, awareness and responsibility towards safety, health and the environment, and take appropriate action, by:
- (a) ensuring the Regulations are enforced and followed by the Contractor's personnel. Any failure by the Contractor's personnel to follow the Regulations, shall be regarded as a failure by the Contractor.
 - (b) paying attention to possible injury to unauthorised persons entering the site, particularly children.

- 2.5 Whenever in these Regulations the Contractor is required to provide test certificates for equipment and personnel or to comply the relevant authorities' requirements and no independent test facilities are available or no relevant authorities exist in Lebanon, the Contractor shall provide:

- a) in lieu of independent test certificates:
 - for equipment - details of the tests and the date of the tests that have been carried out by the Contractor and a written statement that the Contractor has satisfied himself that the item of equipment is fit and safe for use;
 - for personnel - details of the training and experience and a written statement that the Contractor has satisfied himself that the person has the required level of competency;
- b) in lieu of relevant authorities' requirements - details of the Contractor's own rules, regulations, requirements and procedures regarding safety, health and the environment.

If the Engineer is dissatisfied with the details provided by the Contractor, the Contractor shall provide further details or carry out further tests or provide further written statements as may be reasonably required by the Engineer.

When the Engineer has satisfied himself regarding the Contractor's own rules, regulations, requirements and procedures provided in accordance with (b) above, such rules, etc shall be deemed to form part of these Regulations and to which Clause 3 shall equally apply.

3 Failure to Comply with Regulations

3.1 General

3.1.1 Should the Contractor fail to comply with any of the Regulations or requirements:

- (a) the Engineer may suspend the Works or part of the Works until the Contractor has taken necessary steps, to the satisfaction of the Engineer, to comply with the regulations or requirements.
- (b) the Employer may, following written notice to the Contractor, carry out themselves or arrange for another contractor to carry out such measures as they consider appropriate on behalf of the Contractor. Any such actions by the Employer shall not affect or diminish the Contractor's obligations or responsibilities under the Contract.
- (c) the Engineer may, following written notice to the Contractor, deduct from payments to the Contractor the amounts stipulated in Sub-Clause 3.2. Such notice shall specify:
 - (i) the nature of the failure or failures;
 - (ii) the period after the date of the notice within which the Contractor shall remedy each failure; and
 - (iii) the amount to be deducted.

Such suspension of payment will remain in force until such time as the Contractor has rectified the breach or breaches to the satisfaction of the Engineer. No interest shall be paid on the suspended payments.

3.1.2 Failure to comply with the Regulations or requirements shall be considered a breach of contract by the Contractor and may result in termination of the Contract by the Employer.

3.1.3 In the event of the Employer or Engineer taking action based on Sub-Clause 3.1.1(a) or (b) or 3.1.2, the Contractor shall not be entitled to any additional costs or extension to the Contract Completion Date.

3.1.4 All costs incurred by the Employer pursuant to Sub-Clause 3.1.1(b) and the deductions from payments imposed on the Contractor by the Engineer under Sub-Clause 3.1.1(c) shall be deducted from amounts otherwise due to the Contractor.

3.2 Deductions from Payments

3.2.1 Failures by the Contractor to comply with the Regulations or requirements are classified as follows:

D1 - breaches of Sub-Clause 5.6 (personal protective equipment);
D2 - breaches of Clause 7 (work in Public Areas);
D3 - breaches other than D1 and D2.

3.2.2 The basic deduction from payment for each classification in Sub-Clause 3.2.1, is as follows:

for D1 - \$2000;
for D2 - \$10000;
for D3 - \$5000.

3.2.3 Deductions from payments will be applied as follows:

- (a) for the first breach of each regulation or requirement - the basic deduction. If the same or similar breaches occur in different situations or locations at the same time, the Engineer may apply deductions for each situation or location; this will not apply to breaches related to personal protective equipment.
- (b) for a second or subsequent breach of the same Regulation or requirement or failure to rectify a previous failure within the time specified by the Engineer - twice the basic deduction.

4 General Requirements

4.1 Preamble

4.1.1 All references to safety shall be deemed to include health and the environment.

4.2 Safety Officer

4.2.1 The Contractor shall appoint a competent Safety Officer who shall be responsible for safety, health and the environment. The Safety Officer shall be given sufficient time by the Contractor to carry out his duties; minimum requirements shall be as follows:

Workforce on Site of over 250	-	full time Safety Officer;
Workforce on Site of 100-250	-	50% of Safety Officer's time;
Workforce on Site below 100	-	as required for the Works but a minimum of 5 hours per week of Safety Officer's time where more than 20 workers.

4.2.2 The Contractor shall provide the Safety Officer with appropriate identification, including a white hard hat with red cross symbol and a identification badge. The appointment of the Safety Officer shall be in writing and copied to the Engineer. The appointment shall include specific instructions to enforce these Regulations and delegated authority to take any action, measure or to issue instructions regarding their enforcement. All persons on Site shall be made aware of the name and authority of the Safety Officer and instructed to comply with any instruction or direction on safety matters, verbal or in writing, issued by the Safety Officer.

4.2.3 The Safety Officer shall be provided with a mobile phone or other similar means of communication. The Safety Officer shall be accessible and available at all times including outside normal working hours.

4.3 Safety Training

4.3.1 The Contractor shall provide safety induction training for all site personnel upon starting on site.

4.3.2 The Contractor shall provide safety refresher/reinforcement training at regular intervals for his staff.

4.4 Safety Meetings

4.4.1 The Contractor shall hold regular safety meetings to provide safety instructions and receive feedback from site personnel on safety, health and environmental matters. A weekly Safety Meeting shall be chaired by the Safety Officer and minutes shall be taken of the meeting. The meeting/minutes shall cover all relevant issues including actions to be taken. A copy of the minutes shall be given to the Engineer. The Safety Officer should attend the Contractor's weekly site meetings and "Safety" should be an item on the agenda.

4.5 Safety Inspections

4.5.1 The Safety Officer shall make regular safety inspections of the work site. The Safety Officer shall prepare a report of each inspection. This report shall include details of all breaches of these Regulations and any other matters or situations relating to safety found during the inspection, instructions issued by the Safety Officer and actions taken by the Contractor. A copy of the Safety Officer's inspection reports shall be given to the Engineer.

4.6 Control of Substances Hazardous to Health

4.6.1 Hazardous materials shall be stored in approved safety containers and handled in a manner specified by the manufactures and/or prescribed by relevant Authorities (see Sub-Clause 2.5).

4.6.2 Only properly trained and equipped personnel shall handle hazardous materials.

4.7 Potential Hazards

4.7.1 The Contractor shall inform employees of potential hazards, take appropriate steps to reduce hazards and be prepared for emergency situations.

4.7.2 The Contractor shall make an assessment of every operation involving hazardous substances. The assessment shall be recorded on a Hazardous and Flammable Substances Assessment Method Statement which shall be submitted to the Engineer prior to the delivery and use of the substance on Site.

4.8 Accident Reporting

4.8.1 The Contractor shall report all accidents and dangerous occurrences to the Engineer. The Contractor shall prepare a report on each accident or dangerous occurrence and a copy of the

report, together with witness statements and any other relevant information, shall be submitted to the Engineer. A reportable accident or dangerous occurrence shall include any accident to any person on Site requiring medical attention or resulting in the loss of working hours or any incident that resulted, or could have resulted, in injury, damage or a danger to the Works, persons, property or the environment.

- 4.8.2 In the event of an accident or dangerous occurrence, the Contractor shall be responsible for completing all statutory notifications and reports. Copies of all statutory notifications and reports shall be passed to the Engineer.
- 4.8.3 All accidents and dangerous occurrences shall be recorded in a Site Accident Book. The Site Accident Book shall be available at all times for inspection by the Engineer.
- 4.8.3 The Contractor shall immediately rectify any situation or condition that could result in injury, damage or a danger to the Works, person, property or the environment. If the situation or condition cannot be corrected immediately, the Contractor shall provide temporary barriers and appropriate warning signs and devices and/or take other appropriate action necessary for the protection of persons, property and the environment.

4.9 Notices, Signs, Etc

- 4.9.1 All safety, health, environmental and other notices and signs shall be clearly displayed and written in both Arabic and either English or French. All requirements, instructions, procedures, etc issued by the Contractor concerning these Regulations shall be printed in both Arabic and English and displayed and readily available to Contractor's personnel.

4.10 First Aid and Medical Attention

- 4.10.1 The Contractor shall have comprehensive First Aid Kit(s) on Site at all times. First Aid Kits shall be conveniently located and clearly identifiable.
- 4.10.2 The Contractor shall have one employee on site trained in first aid for every 25 employees. Such persons shall be provided with appropriate identification, including a red hard hat with a white "red cross" symbol and a identification badge.
- 4.10.3 The Contractor shall make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name, address and telephone number of the Doctor and nearest hospital shall be prominently displayed in the Contractor's site office.

4.11 Employee Qualifications and Conduct

- 4.11.1 The Contractor shall employ only persons who are fit, qualified and skilled in the work to be performed. All persons shall be above the minimum working age.
- 4.11.2 Contractor's personnel shall use the toilet facilities provided by the Contractor.
- 4.11.3 The Contractor shall ensure:
- (a) that no firearms, weapons, controlled or illegal substances or alcoholic beverages are brought onto the Site and that no personnel under the influence of alcohol or drugs are permitted on Site.
 - (b) that all personnel obey warning signs, product or process labels and posted instructions.
 - (c) that drivers or operators of vehicles, machinery, plant and equipment follow the rules for safe operations. Drivers shall wear seat belts and obey all signs and posted speed limits.

5 Safety Requirements**5.1 Personal Protective Equipment**

- 5.1.1 The Contractor shall provide personal protective equipment, including hard hats, safety glasses, respirators, gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of Contractor's personnel.
- 5.1.2 Non-metallic hard hats shall be worn at all times by all personnel at the worksite with the exception of those areas where the Engineer has indicated it is not necessary to do so.
- 5.1.3 Safety glasses shall meet international standards and be available for use and worn in specified worksite areas. As a minimum, safety glasses shall be worn for the following types of work: hammering, chipping, welding, grinding, use of electrically powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists. Face shields and/or monogoggles shall be worn where possible exposure to hazardous chemicals, cryogenic fluids, acids, caustics, or dust exists and where safety glasses may not provide adequate protection.
- 5.1.4 When handling acids, caustics, and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.
- 5.1.5 Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.
- 5.1.6 The wearing of safety shoes with steel reinforced toes is recommended for all Contractor's personnel on site. In all cases, Contractor's personnel shall wear substantial work shoes that are commensurate with the hazards of the work and the worksite area.

- 5.1.7 Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels. Such protection shall also be provided for operators working with equipment exceeding such a level. This may include equipment such as excavators, shovels, jackhammers, saws, drills, grinders, and the like are being used.
- 5.1.8 The Contractor shall encourage employees to wear substantial work gloves whenever practical and safe to do so.

5.2 Fire Protection and Prevention

- 5.2.1 The Contractor shall comply with fire protection instructions given by the Authorities having jurisdiction in regard to fire protection regulations.
- 5.2.2 The Contractor shall, upon moving on site, provide to the Engineer and the Authorities a fire prevention and evacuation plan. This shall include drawing(s) showing the fire assembly points. The fire prevention and evacuation plan and drawing(s) shall be updated from time to time as the Works progress. The Contractor shall ensure all personnel are fully informed on escape routes and assembly points and any changes thereto.
- 5.2.3 Fuel storage will not be permitted in construction work areas. Contractors may establish fuel storage tanks in special areas set aside for the purpose and approved by the Engineer. Storage tanks shall be adequately banded to control spillage. Fire extinguishers shall be provided and installed in a suitable nearby location.
- 5.2.4 Highly combustible or volatile materials shall be stored separately from other materials and as prescribed by relevant authorities and under no circumstances within buildings or structures forming part of the permanent Works. All such materials shall be protected and not exposed to open flame or other situations which could result in a fire risk.
- 5.2.5 No combustible site accommodation shall be located inside or within 10 metres of a building or structure forming part of the permanent Works. Where units have to be used in these circumstances, they shall be constructed of non-combustible materials and have a half-hour fire rating inside to outside and outside to inside. Non-combustible furniture shall be used where practical.
- 5.2.6 All temporary accommodation and stores shall be provided with smoke detectors and fire alarms.
- 5.2.7 Smoking shall be banned in high risk areas.
- 5.2.8 Expanded polystyrene with or without flame retarding additive, polythene, cardboard and hardboard shall not be used as protection materials.
- 5.2.9 Plywood and chipboard shall only be used as protection on floors. Vertical protection shall be non-combustible. Debris netting and weather protection sheeting shall be fire retardant.
- 5.2.10 When using cutting or welding torches or other equipment with an open flame, the Contractor shall provide a fire extinguisher close by at all times. All flammable material shall be cleared

from areas of hot works, or work locations prior to welding or oxy/gas burning operations. All hot works shall cease half an hour before the end of a work shift to allow for thorough checking for fires or smouldering materials. Where appropriate, areas of hot works are to be doused in water before the shift ends.

- 5.2.11 An adequate number of fire extinguishers of types suited to the fire risk and the materials exposed shall be provided. These shall be placed in accessible, well-marked locations throughout the job site. Contractor's personnel shall be trained in their use. Extinguishers shall be checked monthly for service condition and replaced or recharged, as appropriate after use.
- 5.2.12 Only approved containers shall be used for the storage, transport and dispensing of flammable substances. Portable containers used for transporting or transferring gasoline or other flammable liquids shall be approved safety cans.
- 5.2.13 Fuel burning engines shall be shut off while being refuelled.
- 5.2.14 Adequate ventilation to prevent an accumulation of flammable vapours shall be provided where solvents or volatile cleaning agents are used.
- 5.2.15 Flammables shall not be stored under overhead pipelines, cable trays, electrical wires, or stairways used for emergency egress.
- 5.2.16 Paints shall be stored and mixed in a room assigned for the purpose. This room shall be kept under lock and key.
- 5.2.17 Oily waste, rags and any other such combustible materials shall be stored in proper metal containers with self-closing lids and removed every night to a safe area or off site. Every precaution shall be taken to prevent spontaneous combustion.

5.3 Electrical Safety

- 5.3.1 All temporary electrical installations, tools and equipment shall comply with current regulations dealing with on-site electrical installations.
- 5.3.2 The Contractor shall establish a permit-to-work system for work on or in proximity to energized circuits of any voltage. Contractor's personnel shall not commence work on such circuits unless a permit to work has been issued and adequate safety measures have been taken and the work operation has been reviewed and approved by the Engineer.
- 5.3.3 Only authorised personnel shall be allowed to work or repair electrical installations and equipment.
- 5.3.4 Portable tools and equipment shall be 110 volt, unless otherwise agreed by the Engineer.

- 5.3.5 When portable or semi-mobile equipment operates at voltages in excess of 110 volts, the supply shall be protected by a Residual Current Device (RCD) regardless of any such device fitted to the equipment. The RCD must have a tripping characteristic of 30 milliamps at 30 milliseconds maximum.
- 5.3.6 All static electrically powered equipment, including motors, transformers, generators, welders, and other machinery, shall be properly earthed, insulated, and/or protected by a ground fault interruption device. In addition, the skin of metal buildings and trailers with electric service shall be earthed. Metal steps, when used, shall be securely fixed to the trailer.
- 5.3.7 Lampholders on festoon lighting shall be moulded to flexible cable and be of the screw in type. Clip on guards shall be fitted to each lamp unit.
- 5.3.8 All tungsten-halogen lamps shall be fitted with a glass guard to the element. These lamps must be permanently fixed at high level.
- 5.3.9 Electrical equipment shall be periodically inspected and repaired as necessary by competent persons.
- 5.3.10 Any work on electrical equipment and systems shall be made safe through locking, tagging, and/or isolation of the equipment before work commences. Prior to the start of the work, the equipment or systems shall be tested to insure that they have been properly de-energized and isolated.
- 5.3.11 Electrical repair work on energized systems shall be avoided whenever possible.
- 5.3.12 Electrical trouble shooting shall be conducted only after getting written approval of the Engineer.
- 5.3.13 Unauthorized personnel shall not enter enclosures or areas containing high voltage equipment such as switch gear, transformers, or substations.

5.4 Oxygen/Acetylene/Fuel Gases/Cartridge Tools

- 5.4.1 Compressed oxygen shall never be used in the place of compressed air.
- 5.4.2 Flash-back (Spark) arrestors shall be fitted to all gas equipment.
- 5.4.3 Liquid Petroleum Gas (LPG) cylinders shall not be stored or left in areas below ground level overnight. Cylinders must be stored upright.
- 5.4.4 The quantity of oxygen, acetylene and LPG cylinders at the point of work shall be restricted to a maximum of one day's supply. Cylinders shall be kept in upright vertical rack containers or be safely secured to a vertical support.
- 5.4.5 Cartridge tools shall be of the low velocity type. Operators must have received adequate training in the safe use and operation of the tool to be used.

5.5 Scaffolding/Temporary Works

- 5.5.1 No aluminum tube shall be used, except for proprietary mobile towers, unless otherwise agreed with the Engineer.
- 5.5.2 Drawings and calculations shall be submitted to the Engineer, prior to commencement of work on site, for all Temporary Works, including excavations, falsework, tower cranes, hoists, services and scaffolding. Design shall conform to international standards.
- 5.5.3 The Engineer will not approve Temporary Work designs but the Contractor shall take account of any comments on such designs made by the Engineer.
- 5.5.4 The Contractor shall inspect and approve all Temporary Works after erection and before access, loading or use is allowed. Completed and approved Temporary Works shall be tagged with a scaff-tag or similar safety system and the Safe Structure insert displayed. For scaffolding, one tag shall be displayed every 32 m² of face area. A central record system shall be kept on all Temporary Work. Temporary Works shall be inspected weekly and similarly recorded.
- 5.5.5 All mobile scaffold towers shall be erected in accordance with the manufacture's instructions and a copy of these shall be submitted to the Engineer prior to any use on site. Additionally, all towers shall be erected complete with access ladder, safety rails and kick boards whatever the height.
- 5.5.6 The Contractor shall repair or replace, immediately, any scaffold including accessories, damaged or weakened from any cause.
- 5.5.7 The Contractor shall ensure that any slippery conditions on scaffolds are eliminated as soon as possible after they occur.
- 5.5.8 All scaffolds used for storing materials, for brick or block laying, for access to formwork or for any other purpose where materials may accidentally fall, shall be provided with wire mesh guards or guards of a substantial material, in addition to kick boards.

5.6 Use of Ladders

- 5.6.1 Manufactured ladders shall meet the applicable safety codes for wood or metal ladders. Metal ladders shall not be used where there is any likelihood of contact with electric cables and equipment. All metal ladders shall be clearly marked: "Caution - Do not use around electrical equipment".
- 5.6.2 Job made ladders shall not be permitted.
- 5.6.3 Extension or straight ladders shall be equipped with non-skid safety feet, and shall be no more than 12 m in height. The maximum height of a step ladder shall be 2 m. Ladders shall not be used as platforms or scaffold planks.
- 5.6.4 Ladders rungs and steps shall be kept clean and free of grease and oil.
- 5.6.5 Extension and straight ladders shall be tied off at the top and/or bottom when in use. Only one person shall be allowed on a ladder at a time.

5.6.6 Defective ladders shall be taken out of service and not used. Ladders shall not be painted and shall be inspected for defects prior to use.

5.7 Elevated Work

5.7.1 The Contractor shall provide all personnel, while working at an elevated position, with adequate protection from falls. Details of such protection shall be submitted to and approved by the Engineer.

5.7.2 The Contractor shall carry out daily inspections of all elevated work platforms. Defects shall be corrected prior to use.

5.7.3 Roofing & Sheet Material Laying

(a) A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Engineer prior to commencement of work on site.

(b) Mobile elevating work platforms or the equivalent shall be used to install roofing and sheet materials wherever practicable and a suitable base is available.

5.7.4 Erection of Structures

(a) A Method Statement detailing the procedures to be adopted shall be submitted and agreed with the Engineer prior to commencement of work on site.

(b) Safety harnesses and lines shall be provided by the Contractor for use by the erection personnel and worn at all times.

(c) Mobile elevating work platforms or the equivalent shall be used to erect structures wherever practicable and a suitable base is available.

5.7.5 Mobile Elevating Work Platforms

Operators shall be trained in the safe use of such platforms and hold a current Certificate of Competence (see Sub-Clause 2.5).

5.7.6 Hoists

(a) A copy of the current Test Certificate (see Sub-Clause 2.5) shall be submitted to the Engineer before any hoist (personnel or material) is brought into operation on the site. Where the range of travel is increased or reduced a copy of the revised Test Certificate shall be submitted.

(b) Each landing gate shall be fitted with a mechanical or electrical interlock to prevent movement of the hoist when any such gate is in the open position.

(c) Safety harnesses must be worn and used by personnel erecting, altering and dismantling hoists.

5.7.7 Suspended Cradles

- (a) Suspended cradles shall be installed, moved and dismantled by a specialist contractor.
- (b) Suspended cradles shall comply with local regulations.
- (c) All powered suspended cradles shall incorporate independent safety lines to overspeed braking devices and independent suspension lines for personal safety harness attachment.

5.8 Use of Temporary Equipment

- 5.8.1 The safe design capacity of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original factor of safety or capacity.
- 5.8.2 Mobile equipment shall be fitted with suitable alarm and motion sensing devices, including backup alarm, when required.
- 5.8.3 The Contractor shall ensure that the installation and use of equipment are in accordance with the safety rules and recommendations laid down by the manufacturer, taking into account the other installations already in place or to be installed in the future.
- 5.8.4 The Contractor shall inspect Equipment prior to its use on the Works and periodically thereafter to ensure that it is in safe working order. Special attention shall be given to such items as cables, hoses, guards, booms, blocks, hooks and safety devices. Equipment found to be defective shall not be used and immediately removed from service, and a warning tag attached.
- 5.8.5 Natural and synthetic fibre rope made of material such as manila, nylon, polyester, or polypropylene shall not be used as slings if approved by the Engineer.
- 5.8.6 Only trained, qualified and authorized personnel shall operate equipment. All drivers and operators shall hold a current Certificate of Training Achievement for the equipment being used (see Sub-Clause 2.5).
- 5.8.7 A safety observer shall be assigned to watch movements of heavy mobile equipment where hazards may exist to other personnel from the movement of such equipment, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept clear of mobile equipment and suspended loads.
- 5.8.8 When mobile or heavy equipment is travelling onto a public thoroughfare or roadway, a flagman shall insure that traffic has been stopped prior to such equipment proceeding. While the mobile or heavy equipment is travelling on a public roadway, a trailing escort vehicle with a sign warning of a slow-moving vehicle that is dangerous to pass shall be provided.
- 5.8.9 Cranes:

- (a) The Contractor shall give a minimum of 48 hours notice to the Engineer prior to bringing a mobile crane on site.
- (b) No cranes shall be erected on the site without the prior approval of the Engineer. The Engineer may direct the Contractor as to locations where cranes may not be located. The Contractor shall take such directions into account when submitting his proposals for crane location points, base footings, pick up points and swing radius. Compliance with any such direction shall not entitle the Contractor to any extension of the Period of Completion or to any increase in the Contract Price.
- (c) Safety harnesses shall be worn and used at all times by personnel engaged on the erection, alterations and dismantling of tower cranes.
- (d) The Contractor shall provide a copy of the current Test Certificate (see Sub-Clause 2.5) to the Engineer before any crane (tower or mobile) is brought into operation on the Site.
- (e) All lifting tackle must hold a current Test Certificate (see Sub-Clause 2.5). All lifting tackle must be thoroughly examined every 6 months and an inspection report raised.
- (f) All fibrous/web slings shall be destroyed and replaced 6 months after first use.
- (g) All crane drivers/operators shall hold a Certificate of Training Achievement for the class of crane operated (see Sub-Clause 2.5).
- (h) All banksman/slingers shall hold a Training Certificate from a recognized training agency (see Sub-Clause 2.5).
- (i) Only certified slingers/banksmen shall sling loads or guide crane/load movement.
- (j) The maximum weekly working hours of a crane driver or banksman shall be restricted to 60 hours.
- (k) Under no circumstances, shall a crane or load come within 4 m of any energized overhead power line or other critical structure.

5.9 Locking-out, Isolating, and Tagging of Equipment

- 5.9.1 Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or material prior to the start of work. Such equipment shall include circuit breakers, compressors, conveyors, elevators, machine tools, pipelines, pumps, valves, and similar equipment.
- 5.9.2 Where equipment is subject to unexpected external physical movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement.

5.9.3 Equipment which has been locked-out, immobilized, or taken out of service for repair or because of a potentially hazardous condition shall be appropriately tagged indicating the reason it has been isolated and/or taken out of service.

5.9.4 Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock.

5.10 Installation of Temporary or Permanent Equipment

5.10.1 During installation and testing the Contractor's specialist engineer shall be in attendance.

5.10.2 All control mechanism panel and wiring diagrams shall be available and printed in both Arabic and either English or French.

5.11 Laser Survey Instruments

5.11.1 Details of the types and use of laser instruments shall be submitted and agreed with the Engineer.

5.12 Working in Confined Spaces

5.12.1 Confined spaces, including tanks, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilation ducts, or other enclosures where known or potential hazards may exist, shall not be entered without prior inspection by and authorisation from the Site Safety Officer and the issuance of a Hazardous Work Permit.

5.12.2 Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any hazardous substances or materials which could cause an oxygen deficient atmosphere. All equipment that could become energized or mobilized shall be physically restrained and tagged. All lines going into the confined space shall be isolated and/or blanked.

5.12.3 Personnel working in a confined space where emergency escape or rescue could be difficult, shall wear a safety harness attached to a lifeline.

5.12.4 A qualified attendant(s), trained and knowledgeable in job-related emergency procedures, shall be present at all times while persons are working within the confined space. The attendant shall be capable of effecting a rescue, have necessary rescue equipment immediately available, and be equipped with at least the same protective equipment as the person making entry.

5.12.5 All equipment to be used in a confined space shall be inspected to determine its acceptability for use. Where a hazard from electricity may exist, equipment utilized shall be of low voltage type.

5.12.6 The atmosphere within the confined space shall be tested to determine it is safe to enter. Acceptable limits are:

- oxygen: 19.5% lower, 22% higher;
- flammable gas: not to exceed 10% of lower explosion limit;
- toxic contaminants: not to exceed the permissible exposure limit.

- (c) erect warning notices around the area affected that blasting operations are in progress,
- (d) carry out a thorough search of buildings and the area affected prior to blasting,
- (e) ensure that blasting is only carried out by experienced shot firers. Priming, charging, stemming and shot firing shall be carried out with greatest regard for safety and in strict accordance with the rules and regulations of the relevant authorities (see Sub-Clause 2.5).
- (f) ensure that explosive charges are not excessive, charged boreholes are properly protected and proper precautions are taken for the safety of persons and property,

5.14.7 The Contractor shall maintain an up-to-date inventory of all explosives and explosive devices and shall submit a monthly report to the Engineer, detailing the use of all explosives by date and location.

5.15 Excavation and Trenching

5.15.1 An excavation permit signed by the Engineer must be issued before excavation proceeds in any work location. The Contractor shall investigate and identify the location of existing services by study of the drawings, a visual/physical study of the site, sweeping by appropriate detection equipment and where necessary hand excavation of trial holes.

Following this investigation, the Contractor shall submit a written request for an excavation permit to the Engineer.

The Engineer will return the permit signed and dated to indicate:

- services which are to be maintained.
- services which are to be isolated.
- any special precautions to be taken.

A sample Excavation Permit is given in Appendix I.

5.15.2 The issue of an Excavation Permit by the Engineer shall not relieve the Contractor of his responsibilities under the Contract.

5.15.3 The side of all excavations and trenches exceeding 1.3 meters in depth which might expose personnel or facilities to danger resulting from shifting earth shall be protected by adequate temporary supports or sloped to the appropriate angle of repose.

5.15.4 All excavations, slopes and temporary supports shall be inspected daily and after each rain, before allowing personnel to enter the excavation.

5.15.5 Excavations 1.3 metres or more in depth and occupied by personnel shall be provided with ladders as a means for entrance and egress. Ladders shall extend not less than 1 metre above the top of the excavation.

3.15.6 The Contractor shall provide adequate barrier protection to all excavations. Barriers shall be readily visible by day or night.

5.15.7 Excavated or other materials shall not be stored at least 0.65 metres from the side of excavations.

5.16 Concrete Reinforcement Starter Bars

5.16.1 The Contractor shall ensure concrete reinforcement starter bars are not a danger to personnel. Where permitted by the Engineer, starter bars shall be bent down. Alternatively, the starter bars shall be protected using either hooked starters, plastic caps, plywood covers or other methods agreed with the Engineer.

6 Environmental and Health Requirements

6.1 Protection of the Environment

6.1.1 The Contractor shall be knowledgeable of and comply with all environmental laws, rules and regulations for materials, including hazardous substances or wastes under his control. The Contractor shall not dump, release or otherwise discharge or dispose of any such material without the authorisation of the Engineer.

6.1.2 Any release of a hazardous substance to the environment, whether air, water or ground, must be reported to the Engineer immediately. When releases resulting from Contractor action occur, the Contractor shall take proper precautionary measures to counter any known environmental or health hazards associated with such release. These would include remedial procedures such as spill control and containment and notification of the proper authorities.

6.2 Air Pollution

6.2.1 The Contractor, depending on the type and quantity of materials being used, may be required to have an emergency episode plan for any releases to the atmosphere. The Contractor shall also be aware of local ordinances affecting air pollution.

6.2.2 The Contractor shall take all necessary measures to limit pollution from dust and any wind blown materials during the Works, including damping down with water on a regular basis during dry climatic conditions.

6.2.3 The Contractor shall ensure that all trucks leaving the Site are properly covered to prevent discharge of dust, rocks, sand, etc.

6.3 Water Pollution

6.3.1 The Contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions in the city drainage system or watercourse, and shall not dump or bury garbage on the Site. These types of waste shall be taken to an approved disposal facility regularly, and in accordance with requirements of relevant Authorities. The Contractor shall also be responsible to control all run-offs, erosion, etc.

6.4 Solid Waste

6.4.1 General Housekeeping

- (a) The Contractor shall maintain the site and any ancillary areas used and occupied for performance of the Works in a clean, tidy and rubbish-free condition at all times.
- (b) Upon the issue of any Taking-Over Certificate, the Contractor shall clear away and remove from the Works and the Site to which the Taking-Over Certificate relates, all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave the said Works and Site in a clean condition to the satisfaction of the Engineer. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Liability Period.

6.4.2 Rubbish Removal and Disposal

- (a) The Contractor shall comply with statutory and municipal regulations and requirements for the disposal of rubbish and waste.
- (b) The Contractor shall provide suitable metal containers for the temporary storage of waste.
- (c) The Contractor shall remove rubbish containers from site as soon as they are full. Rubbish containers shall not be allowed to overflow.
- (d) The Contractor shall provide hardstandings for and clear vehicle access to rubbish containers.

- (e) The Contractor shall provide enclosed chutes of wood or metal where materials are dropped more than 7 metres. The area onto which the material is dropped shall be provided with suitable enclosed protection barriers and warning signs of the hazard of falling materials. Waste materials shall not be removed from the lower area until handling of materials above has ceased.
- (f) Domestic and biodegradable waste from offices, canteens and welfare facilities shall be removed daily from the site.
- (g) Toxic and hazardous waste shall be collected separately and be disposed of in accordance with current regulations.
- (h) No waste shall be burnt on Site unless approved by the Engineer.

6.4.3 Asbestos Handling and Removal

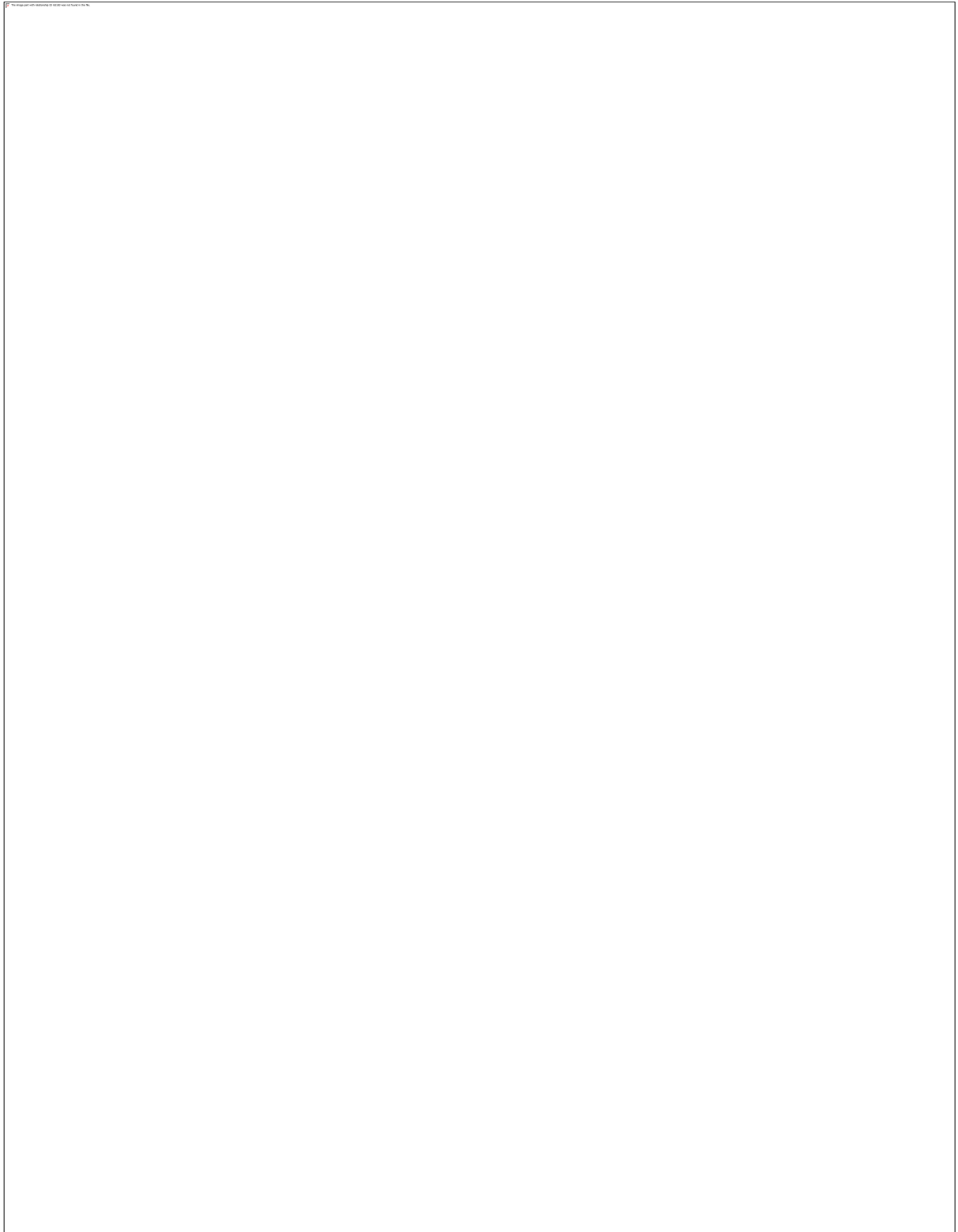
The Contractor shall comply with all local regulations regarding the handling of asbestos materials. In the absence of local regulations, relevant International Standards shall apply.

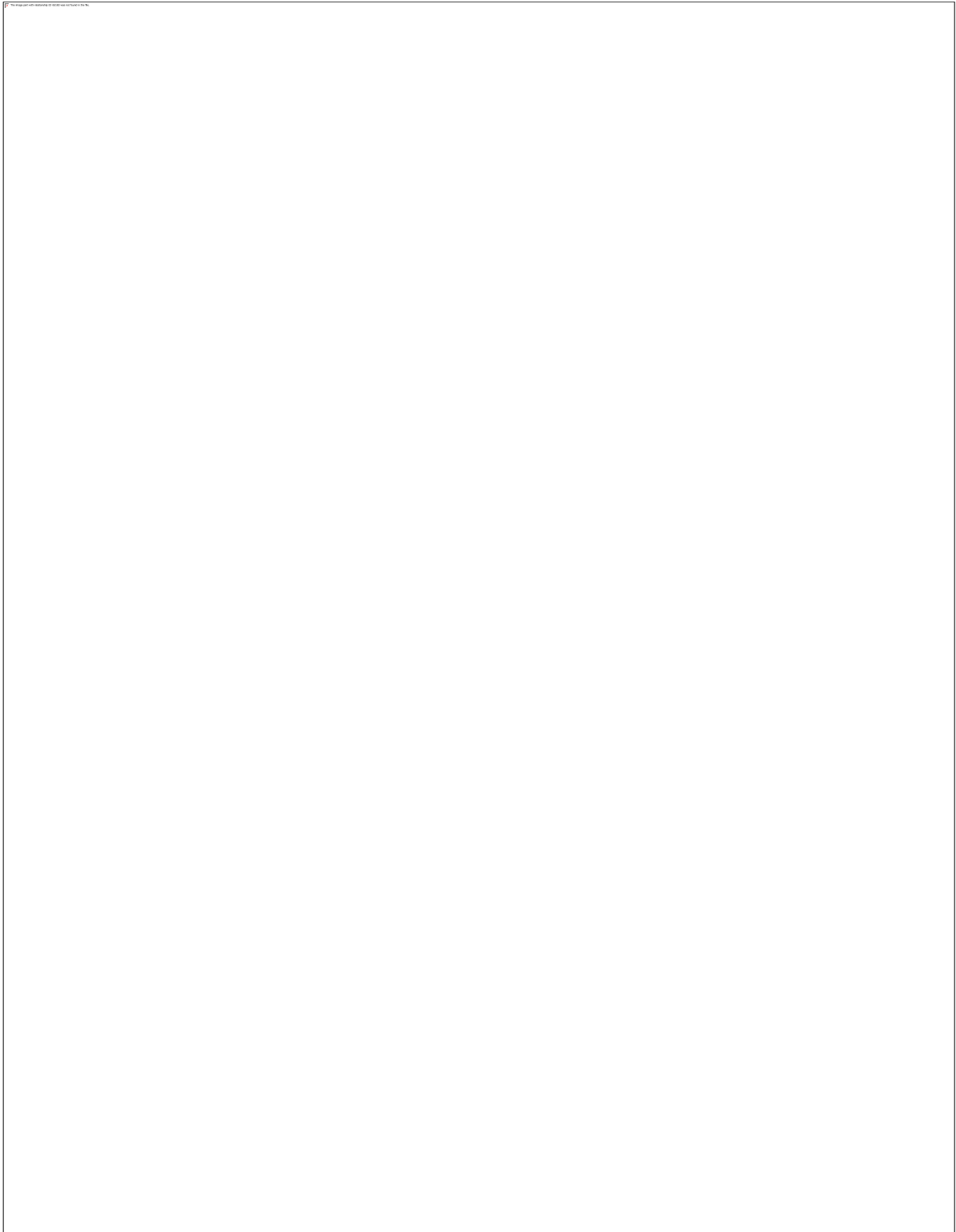
6.4.5 Pest Control

The Contractor shall be responsible for rodent and pest control on the Site. If requested, the Contractor shall submit to the Engineer, for approval, a detailed programme of the measures to be taken for the control and eradication of rodents and pests.

6.5 Noise Control

- 6.5.1 The Contractor shall ensure that the work is conducted in a manner so as to comply with all restrictions of the Authorities having jurisdiction, as they relate to noise.
- 6.5.2 The Contractor shall, in all cases, adopt the best practicable means of minimizing noise. For any particular job, the quietest available plant/and or machinery shall be used. All equipment shall be maintained in good mechanical order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. Stationary noise sources shall be sited as far away as possible from noise-sensitive areas, and where necessary acoustic barriers shall be used to shield them. Such barriers may be proprietary types, or may consist of site materials such as bricks or earth mounds as appropriate.
- 6.5.3 Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended by the manufacturers of the equipment. Pneumatic drills and other noisy appliances shall not be used during days of rest or after normal working hours without the consent of the Engineer.
- 6.5.4 Areas where noise levels exceed 90 decibels, even on a temporary basis, shall be posted as high noise level areas.





- not open more than one excavation within a radius of 250 metres;
- limit the length of trench excavation open at one time to 150 metres;
- maintain and alter or adapt all temporary works including supports to sides of excavations;
- remove all surplus excavated material the same day it is excavated;
- complete the works, including final reinstatement within ten days;
- where final reinstatement is not achieved within the required time, to carry out temporary reinstatement;
- ensure that any temporary reinstatement is maintained at the correct level until final reinstatement is achieved.

7.4.3 The above guidelines shall not relieve the Contractor of his obligations and responsibilities.

7.5 Safety Barriers

7.5.1 Safety barriers shall be provided to the perimeter of work areas and to trench and other types of excavations and to existing openings such as manholes, drawpits and the like. When exposed to the public, safety barriers shall be provided to both sides of trenches and around all sides of openings.

7.5.2 The Contractor shall provide details of the type or types of safety barriers for each excavation for the approval of the Engineer prior to commencing work. No work shall commence until the safety barriers are in place.

7.5.3 The type of safety barrier used shall be appropriate to the particular location and the potential risks to the public. Examples of different types of safety barriers are given below:

- Type 1 - excavated material;
- Type 2 - non-rigid barrier of rope or florescent tape strung between metal rods driven into the ground;
- Type 3 - rigid barrier of timber, steel or concrete. Such barriers could be in the form of horizontal rail(s) or sheet material secured to posts driven or concreted into the ground.

7.5.4 The following are guidelines on the type of safety barriers that could be used in differing situations. They apply particularly to trenches but also apply to other types of excavations, existing openings and to the perimeter of work areas:

- areas not subject to vehicular traffic - Types 1 or 2;

- roadways (low traffic speed) - Types 1 or 2;
- roadways (high traffic speed) - Types 1 or 3.

7.5.5 The above examples of the types of barriers and the guidelines on situations in which they could be used shall not relieve the Contractor of his obligations and responsibilities.

8 Contractor's Site Check List

- 8.1 A sample Contractor's Site Check List is included in Annex 3. This is included to assist contractors should they wish to introduce such a system as part of their site management procedures. The list is not exhaustive and further items will need to be added by the Contractor.
- 8.2 The list is issued for guidance only, and does not, in any way, revise or limit the requirements covered elsewhere in these Regulations.

Annex 1

Sample Excavation Permit

To: (Engineer)

From: (Contractor)

Date:

CDR Contract No:

Request for Excavation Permit No:

Please give approval for excavation to proceed in the following area:

Work to start on:

Existing services have been checked and identified by:

Drawings # Physical Survey #

Catscan # Trial Holes Excavation #

Signed (Contractor):

Approval of Engineer

The above excavation may proceed, subject to the following:

Services to be maintained:

Services to be isolated before work proceeds:

Other matters:

Signed (Engineer):

Date:

Annex 2

Sample Street Closure Permit

To: (Engineer)

From: (Contractor)

Date:

CDR Contract No:

Request for Street Closure Permit No:

Please give approval for the closure of the following street(s) from to (dates)

Street(s):

Reasons:

Proposed diversions:

Signed (Contractor):

Approval of the Engineer

The above street(s) may be closed for the periods stated subject to the following conditions:

Approval has been given by relevant authorities and the police;

Other:

Signed (Engineer):

Date:

Annex 3**Sample Contractor's Site Check List****Safe Access:**

- arrangements for visitors and new workers to the site
- safe access to working locations
- walkways free from obstructions
- edge protection to walkways over 2m above ground
- holes fenced or protected with fixed covers
- tidy site and safe storage of materials
- waste collection and disposal
- chutes for waste disposal, where applicable
- removal or hammering down of nails in timber
- safe lighting for dark or poor light conditions
- props or shores in place to secure structures, where applicable

Ladders:

- to be used only if appropriate
- good condition and properly positioned
- located on firm, level ground
- secure near top. If not possible, to be secured near the bottom, weighted or footed to prevent slipping
- top of ladder minimum 1 metre above landing place

Scaffolding:

- design calculations submitted
- proper access to scaffold platform
- properly founded uprights with base plates
- secured to the building with strong ties to prevent collapse
- braced for stability
- loadbearing fittings, where required
- uprights, ledgers, braces and struts not to be removed during use
- fully boarded working platforms, free from defects and arranged to avoid tipping or tripping
- securely fixed boards against strong winds
- adequate guard rails and toe boards where scaffold 2m above ground
- designed for loading with materials, where appropriate
- evenly distributed materials
- barriers or warning notices for incomplete scaffold (ie not fully boarded)
- weekly inspections and after bad weather by competent person
- record of inspections

Excavation:

CDR Safety, Health & Environmental Regs, June 96
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- underground services to be located and marked and precautions taken to avoid them
- adequate and suitable timber, trench sheets, props and other supporting materials available on site before excavation starts
- safe method for erecting/removal of timber supports
- sloped or battered sides to prevent collapse
- daily inspections after use of explosives or after unexpected falls of materials
- safe access to excavations (eg sufficiently long ladder)
- barriers to restrict personnel/plant
- stability of neighbouring buildings/risk of flooding
- materials stacked, spoil and vehicles away from top of excavations to avoid collapse
- secured stop blocks for vehicles tipping into excavations

Roof work:

- crawling ladders or boards on roofs more than 10 degrees
- if applicable, roof battens to provide a safe handhold and foothold
- barriers or other edge protection
- crawling boards for working on fragile roof materials such as asbestos cement sheets or glass. Guard rails and notices to same
- rooflights properly covered or provided with barriers
- during sheeting operations, precautions to stop people falling from edge of sheet
- precautions to stop debris falling onto others working under the roof work

Transport and mobile plant:

- in good repair (eg steering, handbrake, footbrake)
- trained drivers and operators and safe use of plant
- secured loads on vehicles
- passengers prohibited from riding in dangerous positions
- propping raised bodies of tipping lorries prior to inspections
- control of on-site movements to avoid danger to pedestrians, etc
- control of reversing vehicles by properly trained banksmen, following safe system of work

Machinery and equipment:

- adequate and secured guards in good repair to dangerous parts, eg exposed gears, chain drives, projecting engine shafts

- correct pins used in the props
- timberwork in good condition
- inspection by competent person, against agreed design before pouring concrete

Risks to the Public:

- identify all risks to members of the public on and off site, eg materials falling from scaffold etc., site plant and transport (access/egress) and implement precautions, eg scaffold fans/nets, banksmen, warning notices etc
- barriers to protect/isolate persons and vehicles
- adequate site perimeter fencing to keep out the public and particularly children. Secure the site during non-working periods
- make safe specific dangers on site during non-working periods, eg excavations and openings covered or fenced, materials safely stacked, plant immobilised, ladders removed or boarded

Fire - general:

- sufficient number and types of fire extinguishers
- adequate escape routes, kept clear
- worker awareness of what to do in an emergency

Fire - flammable liquids:

- proper storage area
- amount of flammable liquid on site kept to a minimum for the day's work
- smoking prohibited; other ignition sources kept away from flammable liquids
- proper safety containers

Fire - compressed gases, eg oxygen, LPG, acetylene:

- properly stored cylinders
- valves fully closed on cylinders when not in use
- adopt "hot work" procedures
- site cylinders in use outside huts

Fire - other combustible materials:

- minimum amount kept on site
- proper waste bins
- regular removal of waste material

Noise:

- assessment of noise risks
- noisy plant and machinery fitted with silencers/muffs
- ear protection for workers if they work in very noisy surroundings

Health:

- identify hazardous substances, eg asbestos, lead, solvents etc and assess the risks
- use of safer substances where possible
- control exposure by means other than by using protective equipment
- safety information sheets available from the supplier
- safety equipment and instructions for use
- keep other workers who are not protected out of danger areas
- testing of atmosphere in confined spaces; provision of fresh air supply if necessary. Emergency procedures for rescue from confined spaces

Manual handling:

- avoid where risk of injury
- if unavoidable, assess and reduce risks

Protective clothing:

- suitable equipment to protect the head, eyes, hands and feet where appropriate
- enforce wearing of protective equipment

Welfare:

- suitable toilets
- clean wash basin, hot/warm water, soap and towel
- room or area where clothes can be dried
- wet weather gear for those working in wet conditions
- heated site hut where workers can take shelter and have meals with the facility for boiling water
- suitable first aid facilities

Work in Public Areas

- all risks to the public identified
- method statement approved
- road closures approved
- temporary diversions in place
- safety barriers erected/maintained
- safety signs and lighting installed/maintained
- labour, materials, plant and other resources sufficient to meet programme
- temporary reinstatement completed and properly maintained

- permanent reinstatement completed at earliest possible date

Part II

Supplementary Safety, Health and Environmental Regulations

Clause No.

Sub-Clause 3.2.2 of Part I specifies deductions in USD. If the currency of payments for a contract is NOT USD, one of the following two alternative Sub-Clause should be included in Part II.

Alternative 1 should be included when the currency of payments is specified in the Contract (eg Lebanese Pounds). The amounts included in Alternative 1, for D1, D2 and D3, should be stated in the appropriate currency of payment based on the equivalent in that currency of the USD amounts in Part I.

Alternative 2 should be included when the currency of payments is not known at time of preparing the bidding documents (eg in the CDR Standard Bidding Documents for Smaller Contracts, the payment currency or currencies are specified by the Bidder as part of his Bid).

If the currency of payment is USD, neither of the alternatives need to be included in Part II.

Alternative 1

3.2.2 Delete text, and replace with the following:

The basic deduction from payment for each classification in Sub-Clause 3.2.1, is as follows:

for D1 - _____ [*insert currency and amount*];
 for D2 - _____ [*insert currency and amount*];
 for D3 - _____ [*insert currency and amount*].

Alternative 2

3.2.2 Add second paragraph as follows:

The deductions in paragraph 1 of this Sub-Clause, shall be in the currency or currencies to be paid to the Contractor. The amount in each currency shall be based on the USD amounts in PART I and the exchange rates for the payment currency or currencies stated in the Contract.

Annex D. Code of Conduct

Contractor Code of Conduct Form

Contractor Code of Conduct:

1. All employees, associates, and representatives commit to treating women, children (under the age of 18), and men with respect, regardless of race; color; language; religion; political or other opinion; national, ethnic or social origin; sexual orientation or gender identity; disability; birth or other status.
2. GBV constitutes acts of gross misconduct and is therefore grounds for sanction, which may include penalties and/or termination of employment. All forms of GBV are unacceptable, regardless of whether they take place on the worksite, the worksite surroundings, or off-site. In addition to the potential sanctions listed above, legal prosecution will be pursued, if appropriate, for any employees, associates, and representatives alleged to have committed GBV.
3. Demeaning, threatening, harassing, abusive, or sexually provocative language and behavior are prohibited among all company employees, associates, and representatives.
4. Sexual favors, making promises or favorable treatment dependent on sexual acts are prohibited.
5. Unless there is the full consent by all parties involved, sexual interactions between the company's employees (at any level) and members of the surrounding communities are prohibited. This includes relationships involving the withholding or promise of any kind of reward.
6. All employees, including volunteers and sub-Contractors are expected to report suspected or actual GBV by a fellow worker, whether in the same company or not. Reports must be made in accordance with GBV allegation procedures.
7. All employees are required to attend an induction training course prior to commencing work on site to ensure they are familiar with the GBV Code of Conduct.
8. All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV Code of Conduct.
9. All employees will be required to sign an individual code of conduct confirming their agreement to support GBV activities.

I do hereby acknowledge that I have read the foregoing GBV Code of Conduct, and on behalf of the company agree to comply with the standards contained therein. I understand my role and responsibilities to prevent and respond to GBV. I understand that any action inconsistent with this Code of Conduct or failure to act mandated by this Code of Conduct may result in disciplinary action.

Company Name:

Signed by:

Title:

Date:

Individual Code of Conduct Form

Individual Code of Conduct

- This individual Code of Conduct should be signed by all employees, from senior managers through the operational staff, and should also be required from any Contractor s working with the company.
- I, _____ acknowledge that preventing gender-based violence (GBV) is important, and that preventing it is my responsibility. At [Company], GBV activities constitute acts of gross misconduct and are therefore grounds for sanctions, penalties or potential termination of employment. All forms of GBV are unacceptable, be it on the worksite, the worksite surroundings, or in the community. Prosecution of those who commit GBV may be pursued if appropriate.
- I agree that while working on the [Project], I will:
- Consent to a police background check.
- Treat women, children (persons under the age of 18), and men with respect regardless of race; color; language; religion; political or other opinion; national, ethnic or social origin; sexual orientation or gender identity; disability; birth or other status.
- Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- Not request or engage in sexual favors—for instance, making promises or favorable treatment dependent on sexual acts.
- Understand that unless there is the full consent by all parties involved, sexual interactions between the company’s employees (at any level) and members of the surrounding communities are prohibited. This includes relationships involving the withholding or promise of monetary or non-monetary reward.
- Attend and actively partake in training courses related to HIV/AIDS and GBV as requested by my employer.
- Report through the GRM or to my manager any suspected or actual GBV by a fellow worker, whether in my company or not, or any breaches of this Code of Conduct.

Sanctions

[Company] has established a GRM for receiving, reviewing, and addressing allegations of GBV. If an employee has breached the Code of Conduct, the employer will take disciplinary action which could include:

- Informal warning
- Formal warning
- Additional training
- Loss of up to one week’s salary
- Suspension of employment (without payment of salary), for a minimum period of one month up to a maximum of six months
- Termination of employment

In addition to the above, if warranted, [Company] will report the employee to the police as per local legal regulations.

I understand that it is my responsibility to use common sense and avoid actions or behaviors that could be construed as GBV or breach this Code of Conduct. I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent and respond to GBV. I understand that any action inconsistent with this Code of Conduct or failure to act mandated by this Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Individual Name:

Signed by:

Title:

Date:

لائحة حضور جلسة مشاركة العامة لمشروع الطرق والعمالة في لبنان

الزمن: 18/12/2019

المكان: جلدية طرابلس

البريد الإلكتروني	الهاتف	العمر	الجنس	المنصب/المهنة	البلدة	الإسم الثلاثي
AlBouragini@e-govadl.com	03 281614	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input checked="" type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	رئيس سابق الدراس والخطوط	طرابلس	ي.أم. بوحنا نغوكي
Kamran.aldhahban@guwaib.com	٣ 348473	<input type="checkbox"/> أقل من 20 <input checked="" type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	مهندس مهندسين	طرابلس	قص الشنعمان
stephan@cdr.gov.lb	03940276	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	مجلس الوزراء ديبلوماسية	بيروت	ريتا اسطفاني
Karroum K @gmail.com	71672230	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input checked="" type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	مهندس طرق	بيروت شركة تيم	خضر محمد كرم



18/12/2019

بلدية طرابلس



البريد الإلكتروني	الهاتف	العمر	الجنس	المهنة/ التخصص	البلدية	الإسم الثلاثي
Hotmail hotmail.com	717288802	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input checked="" type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	تأهيل رئيس البلدية	طرابلس	جمال ربيع الوط
Taghrid.Hereshby@gmail.com	70702217	<input type="checkbox"/> أقل من 20 <input checked="" type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	مكتب التنمية	طرابلس	تفريد المبريني
Yakouling@hotmail.com	70320887	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input checked="" type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	درجة التجهيز مركبة مدني	طرابلس	زامل مسكان
Yama Gababa@outlook.com	71/801940	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input checked="" type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	رئيس دائرة البلدي	طرابلس	سنان حطون



18/12/2019

جديدة - طرابلس



البريد الإلكتروني	الهاتف	العمر	الجنس	المهنة/ المنصب	البلدة	الإسم الثلاثي
ayyafat@gmail.com	03.769616	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input checked="" type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	م.ب. علي العبد		عزة محمد عثمان صفت
raffayurimelhem@gmail.com	70/887360	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	مهندس		11. أميرة محمد الأندروجي
nah.din@yahoo.com	03/278538	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	مهندسة		13. نضر علفي بارودي
	71/022625	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	مدرسة		14. نزيال رجب لويصا

19/12/2019

جديدة - صوابي

البريد الإلكتروني	الهاتف	العمر	الجنس	المنصب/ المهنة	البلدة	الإسم الثلاثي
03/693918 @dmasni@gmail.com		<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	Topographe	صوابي	ديال دزسان الله
03163435 nissineayoubi@hotmail.com		<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	مهندس مدني رئيس بلدية رئيسة جامعة	طرابلس	سريعة الايوبى
71-542097 nivine_abbas@yahoo.com		<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	اتحاد جامعي (مهندسة مدنية)	طرابلس	نبغي عيسى مطرف
70_111601 nahraini.com		<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input checked="" type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input checked="" type="checkbox"/> أنثى	عضو في اللجنة المشكورين الاجتماعية في البلدية	صوابي	سما عبد الله اليسا

البريد الإلكتروني	الهاتف	العمر	الجنس	المهنة/المهنة	البلدية	الإسم الثلاثي
baKhache@hotmai.com	03-172319	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input checked="" type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input checked="" type="checkbox"/> ذكر <input type="checkbox"/> أنثى	عبد مفلس بلدية طرابلس	طرابلس	باسم عبد الوهاب بنجاشي
بلدية طرابلس	03/749160	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input type="checkbox"/> أنثى	مستشار بلدية طرابلس	طرابلس	21. - زاهية محمد علي
Puca1000@Roshmael.com	71-105266	<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input checked="" type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input type="checkbox"/> أنثى	طبيب بتراف بني دا براهيم البربرسي	طرابلس	22. لوسيان الكوكي
		<input type="checkbox"/> أقل من 20 <input type="checkbox"/> 20-30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> أكثر من 50	<input type="checkbox"/> ذكر <input type="checkbox"/> أنثى			24.



**مشروع الطرق والعمالة
في لبنان**

خطة الإدارة البيئية والاجتماعية

قضاء طرابلس- Lot 5

اجتماع تشاوري
عنوان: دكاك طرابلس
في 03 كانون الأول 2010



نقاط حوار الجسنة

- المقدمة
- وصف المشروع
- الجهات المعنية
- أهداف اللقاء
- تأهيل الفرق في قضاء طرابلس
- الوضع الحالي
- الآثار البيئية والاجتماعية الإيجابية والسلبية
- الإجراءات التكيفية الرصد والمراقبة وتقوية القدرات
- أسئلة ومناقشة

مقدمة

- تتبع شبكة الطرق في لبنان بنطاق وتغطية كالمين بشكل عام
- نعمة كبيرة من تلك الطرق في حالة معلة
- خاصة في المناطق الريفية التي تعتبر فيها حالة شبكة الطرق أدنى مستوى من
- حالة الطرق على المستوى الوطني ككل
- ما يؤدي إلى إعاقة التنمية المحلية والاقتصادية



مشروع الطرق والعمالة في لبنان

وصف المشروع

المكون الأول: إنشاء تهيئة وسبيلها	المكون الثاني: إعانة الإستعمارة لفرق الطرق	المكون الثالث: بناء الفرق وتمكينها
<ul style="list-style-type: none"> إعادة تهيئة وسبيل الطرق الأساسية لتعويض ترويض خطوط الطرق وحقق فروس تملك إعادة بناء القساطل الأساسية طبقات إسفلتية من الأسفلت اتصال تصريف المياه اتصال غايت الإمدادات عزلان القمام تعميرات على جوانب الطرق التي تسبب الكبات (الأرصفة وزوايا الأندجار) 	<ul style="list-style-type: none"> تعمير الفرق على التماس مع الفرار من المنطقة بالطرق، ولا سيما خلال عواصف الكوج بناء فيها المعدات (مركبات) والخدمات كوج وورشانات متج ومركبات دفع وباصي) 	<ul style="list-style-type: none"> بناء فرق التفتيش لقياسية في تخطيط وإدارة قطاع الطرق المساهمة في تدريب وبناء فرق الصيانة والتعاون والمعلمين على المشاريع حول تقنيات حديثة مستخدمة لتداه الطرق وسبيلها.

جهات المعنية

الجهة	الدعم
البنك الدولي	ممول المشروع
مجلس الاعماء والاعمار	إدارة وتكليف
TEAM International	استشاري هندسي
البلديات المعنية	وزارة الأشغال العامة - المديرية العامة للطرق والمواصلات

أهداف اللقاء

- إعلام الرأي العام بالمشروع لإبداء ملاحظاتهم وفقاً لمياسة ضمانات البنك الدولي (مياسة تشغيلية رقم 4.01)
- عرض لأهم الآثار لتنفيذ المشروع ومناقشة خطة الإدارة البيئية والاجتماعية للمشروع



تأهيل الطرقات في قضاء طرابلس

الوضع الحالي

**التقنية
القدرات**

**التوصيل
والمراقبة**

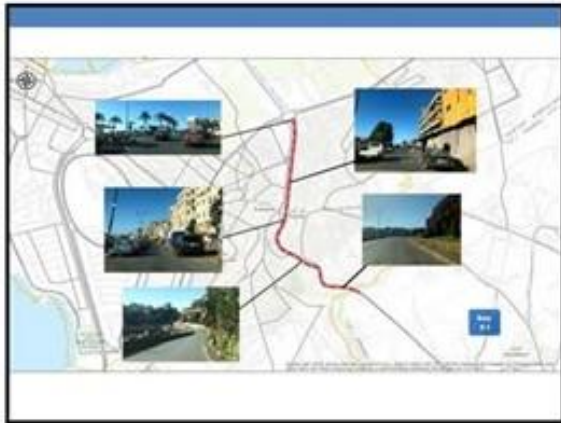
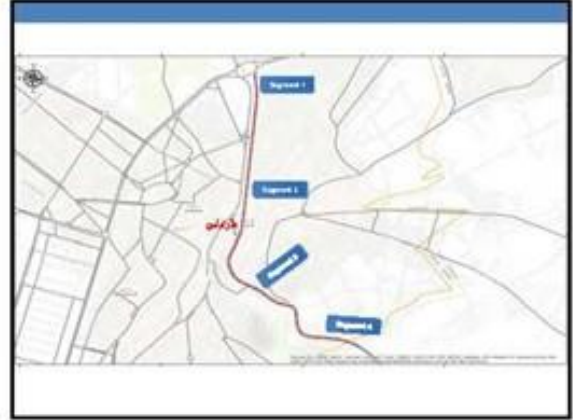
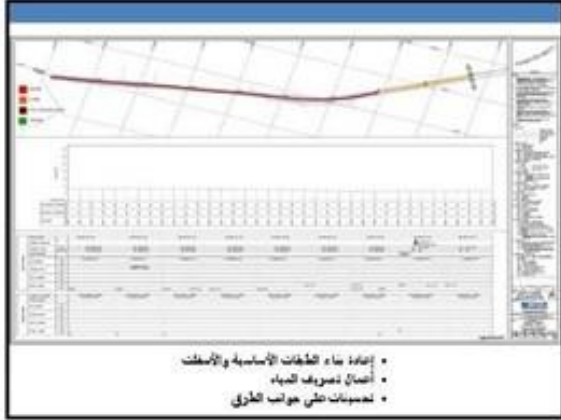
**الإجراءات
التأهيلية**

الآثار

4. الوضع الحالي: الطرق المقترحة في قضاء طرابلس

الرمز	الطريق (كم)	اسم الطريق
R4	3.5	طريق الصنوبر الخسوف
R5	3.3	طراز أبو علي - حارة قضاء طرابلس و زغرة - الجهة الجنوبية من نهر أبو علي





5. الآثار البنائية والاجتماعية الإيجابية للمشروع

- تحسين جودة الطرق
- الحد من الحوادث المرورية
- خلق فرص العمل للمواطنين المحليين
- مشاركة أوسع ومناخ للتراث والتشباب
- تعزيز الشعور بالتمسك المجتمعي والاحتمالي المحلي

6. الآثار البيئية والاجتماعية المحتملة للمشروع

الآثار	مرحلة الإنشاء	مرحلة التشغيل
حركة السير	-/-	++/+
لوعية الهواء	-	-/+
ضوضاء	-/-	-/+
مخلفات الإنشاء و الأشغال	--	0
المياه	-/-	+/0
نزح الغطاء النباتي الطبيعي	-	0
الصحة والسلامة العامة	-	-/+
الآثار الاقتصادية و الاجتماعية	+/-	++/+

6. الآثار البيئية والاجتماعية المحتملة للمشروع بشكل مؤقت



7. الإجراءات التخفيفية المقترحة (2)

الآثار	الإجراءات التخفيفية
مخلفات الإنشاء والأشغال	<ul style="list-style-type: none"> فصل كل من التراب ومخلفات البناء عن أماكن مخصصة معالجة النفايات الدورية لأعمال الإنشاء معالجة النفايات الدورية لمياه الصرف الصحي
المياه	<ul style="list-style-type: none"> الحد من تسرب مياه الجدران في البنية التحتية حفظ المياه في مواقع العمل توفير مياه شرب نظيفة للموظفين
نزع الغطاء النباتي الطبيعي	<ul style="list-style-type: none"> تجنب الأراضي التي تحتلها مساحات كبيرة من الغطاء النباتي إعادة زراعة الأشجار المثمرة أو ما تم اقتلاعها توفير الحماية للمناطق المحيطة بالمباني والمنشآت

7. الإجراءات التخفيفية المقترحة (1)

الآثار	الإجراءات التخفيفية
حركة السير	<ul style="list-style-type: none"> إعداد خطة لخدمة المرور اليومية على الطرق التي أعمال البناء لتجنب جميع صعوبات المرور الحد من حركة المرور والإزعاج إعداد خطة من برنامج إعادة تأهيل طرق وخطوط لخدمة المرور إعداد طرق بديلة و حصر موافقة لحوادث الحوادث و السكان المتضررين تقليل حركة المرور
نوعية الهواء	<ul style="list-style-type: none"> استخدام معدات ذات انبعاثات منخفضة في أعمال البناء وإحاطتها في برنامج صيانة رش المياه للحد من إنبعاثات الغبار تغطية عربات نقل المواد الأولية والمخلفات من وإلى مواقع البناء توجيه مصادر الانبعاثات بعيداً عن المساحات المخصصة
حرقاوات	<ul style="list-style-type: none"> استخدام معدات ذات انبعاثات منخفضة في أعمال البناء وإحاطتها في برنامج صيانة إشغال فراغ حرقاوات حصر الأفعال المسببة للحرقاوات بمناطق العمل النهارية وضع إشارات تحذير الحرقاوات زراعة الأشجار في المناطق الحساسة

7. الإجراءات التخفيفية المقترحة للمسؤوليات

- خلال الإنشاء
 - مسؤولية تطبيق ومراقبة تطبيق الإجراءات التخفيفية
 - المسؤول
 - الإستشاريون
 - مجلس الإنماء والإعمار
 - الجهات المختصة
- خلال التشغيل
 - مسؤولية تطبيق ومراقبة تطبيق الإجراءات التخفيفية
 - الجهات المختصة
 - الوزارات المعنية وإشغال عمال، نقل، بلدية وبلديات، قطاع طاقة ومياه فرع

7. الإجراءات التخفيفية المقترحة (3)

الآثار	الإجراءات التخفيفية
قضايا اجتماعية	<ul style="list-style-type: none"> التأكد من التزام الممارسين لخدمة و التوجهية للخدمة والسلامة المهنية وضع تعليمات لضمان السلامة أمن العاملين ومعدات لضمان سلامة العمال وضع حواجز وإشارات في منطقة العمل إعداد موافقة لجنة للسيارات في منطقة العمل
الآثار الاقتصادية والاجتماعية	<ul style="list-style-type: none"> الإسراع في تنفيذ إعادة تأهيل إعداد خطة من برنامج إعادة تأهيل طرق والشوارع مع توفير تمويل لفتح إعداد طرق بديلة و حصر موافقة لحوادث الحوادث و السكان المتضررين تقليل حركة المرور

7. خطة الرصد والمراقبة

التدابير	البيانات
• مراقبة المردم	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة ودعم تطوير مخطط النجوة وزيادة تطوير مطروح لمدة الأرباب المتصلة والتمهات الفنية من مرحلة الإنشاء وإعداد النظم
• نوعية الهواء	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة ودعم تطوير مخطط النجوة وإعداد النظم
• جودة المياه	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة وإعداد النظم
• تقليل تلوث الضواض	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة وإعداد النظم
• الأثر الاقتصادي والاجتماعي	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة وإعداد النظم
• سلامة الإنشاء والتشغيل	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة وإعداد النظم
• السلامة العامة	• المراقبة الجوية المطروح لضمان نظافة النجوة بالمرشحات الصخرية المطروحة وإعداد النظم

7. خطة الرصد والمراقبة

• المراقبة الدورية من خلال الملاحظة البصرية والتوثيق الفوتوغرافي.

• يتم قياس بعض المرشحات (عدد مرور المرشحات، نوعية المياه، نوعية الهواء، مستوى الضوضاء، الخ) عندما تثار الشكاوى من قبل العامة

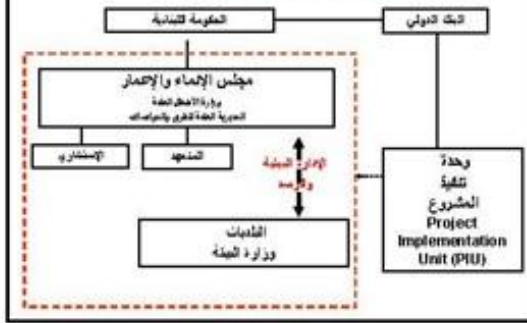
• مسؤولية المراقبة تقع على عاتق المهندسين في المواقع من قبل الإستشاري، والمسؤول عن الإشراف على الصحة والسلامة والبيئة

تقوية القدرات

• تدريبات بيئية للمتعلمين والممارسين حول:

- القوانين واللوائح والمعايير البيئية
- الآثار الصحية لتلوث
- تدابير منع التلوث
- تقنيات أخذ العينات وإرشادات المراقبة البيئية (الهواء، الضوضاء، المياه)
- حماية التراث الثقافي في المشاريع التنموية
- تدابير سلامة المرور والمشاة

تقوية القدرات الإدارية والمؤسسية



أسئلة ومناقشة عامة

يمكنكم إيداع رأيكم عبر الفواصل مع لركم
TEAM International
هاتف: 00961 (1) 804095
فكس: 00961 (1) 804034
بريد الإلكتروني: engineering@team-international.com

أو عبر الفواصل مع مشروع وحدة الامتلاء في مجلس الإنماء والإعمار
هاتف: 01-980096
مفسر: 317
بريد الإلكتروني: stenhan@cdp.gov.lb

شكراً
لحضوركم
ومشاركتكم

ANNEX F - Complaints Register form

Name, phone and address of Complainant	Date of the complaint	Complaint issue and action taken	Corrective Action	Name of employer/ representative notified of complaint	Type of Complaint	Date of close out