REPUBLIC OF LEBANON

COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

Consultancy Services For
Roads Routine Maintenance
And Rehabilitation of Remaining Roads
For Lot1 (Jbeil Caza)

CDR Contract No. 20832

Final Tender Documents
For
Roads Routine Maintenance

Environmental and Social Management Plan
(ESMP)

January 2023

DAR AL HANDASAH NAZIH TALEB & PARTNERS
دار الهندسة نزيه طالب وشركاه

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Abbreviations and Acronyms

BNR	Bentael Nature Reserve
CAE	Child Abuse and Exploitation
CDR	Council for Development and Reconstruction
CoC	Code of Conduct
CoM	Council of Ministers
DGA	Directorate General of Antiquities
EHS	Environment Health and Safety
ESHS	Environmental, Social, Health and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GBV	Gender Based Violence
GOL	Government of Lebanon
GRM	Grievance Redress Mechanism
H&S	Health and Safety
IBA	Important Bird Area
IFC	International Finance Cooperation
ILO	International Labour Organization
LULC	Land Use Land Cover
MoA	Ministry of Agriculture
MoC	Ministry of Culture
MoE	Ministry of Environment
MoWE	Ministry of Water and Energy
MoIM	Ministry of Interior and Municipalities
MoL	Ministry of Labor
MoPH	Ministry of Public Health
MoPWT	Ministry of Public Works and Transportation
MoSA	Ministry of Social Affairs
NGOs	Non-Governmental Organizations
OP	Operational Plan
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Administration
PAPs	Project Affected Persons
PHS	Public Health and Safety
PIU	Project Implementation Unit
PM	Particulate Matter
KPI	Key Performance Indicator
REP	Roads and Employment Project
RPF	Resettlement Policy Framework
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
WB	World Bank
WBG	World Bank Group

EXECUTIVE SUMMARY

Introduction

The Lebanon Roads and Employment Project (REP) is a World Bank (WB) funded project that aims through its first component to improve transport connectivity along select paved road sections and create short-term jobs for the Lebanese and Syrians. The project is implemented by the Council for Development and Reconstruction (CDR) in coordination with the Ministry of Public Works and Transport (MoPWT), noting that all the roads under the REP are under the jurisdiction of the MoPWT.

More specifically, the first component of the REP "Roads Rehabilitation and Maintenance "consists of rehabilitating and maintaining of about 500 km of primary roads (including International roads/ Highways) throughout Lebanon.

Considering that the anticipated civil works will result in environmental and social impacts, an Environmental and Social Management Plan (ESMP) shall be prepared under the requirements of OP4.01, which classifies the project as Category B to reduce the footprint of REP's operations in Jbeil. Accordingly, Dar Al Handasah Nazih Taleb & Partners, which was assigned by CDR to prepare all the tender documents needed for the rehabilitation and maintenance works of the roads located within Jbeil Caza (lot 1), developed in year 2020 an ESMP covering roads that were selected by the Lebanese Government for full rehabilitation works. The ESMP was consulted upon, cleared by the WB and disclosed on the CDR and the WB websites. In this report a second ESMP was developed for Jbeil Caza covering this time 21 candidate primary roads for routine maintenance activities. Routine maintenance activities are typically small in scale compared to rehabilitation activities, but widely dispersed.

Similarly, to the ESMP prepared in 2020 that examined the environmental and social baseline conditions of each road to be rehabilitated under the REP, assessed all site-specific environmental and social aspects and put in place environmental and social management and monitoring plans to ensure the appropriate implementation of all safeguard requirements , this ESMP will assess the potential impacts of routine maintenance activities on the local environment and community of Jbeil Caza and consult relevant stakeholders to prepare adequate management and monitoring plans. The objective is to ultimately achieve REP Environmental, Social, Health and Safety (ESHS) requirements. Noting that the Project was signed before October 2018, date of effectiveness of the Environmental and Social Framework (ESF).

Project Description

The project consists of routine maintenance activities for a period of two years in Lot 1- Jbeil Caza namely for primary roads (including International roads/ Highways). More particularly, 21 primary roads with a total length of 263 km are candidate for maintenance activities. These activities include incidental repair works, pavement repair works, concrete repair works, installation of traffic control and safety devices, and maintain/repair the damaged expansion joints of highway bridges. The purpose of this task consists of maintaining the existing level of service for the concerned roads.

Legal Framework

This ESMP was conducted in accordance with the environmental and social standards and the Lebanese laws and regulations namely Law No. 444 (2002) for Environmental Protection. More specifically, routine maintenance activities will be done under OP 4.01 Environmental Assessment.

Consultation

This ESMP was publicly consulted with the main stakeholders to ensure that they agree on sensitive issues and that the project will not be subject to last-minute dispute.

An inclusive public participation meeting was arranged for Jbeil Caza. A total of 23 people attended, of which three were women. During the meeting that was held at the Union of municipalities of Jbeil on December 14, 2021, attendees (citizens, municipalities, and relevant local and national NGOs) were informed about the project objectives, project design, the identified natural, economic, and social resources of importance in the area, the project's possible risks, and the planned mitigation measures. Attendees were mainly worried about the monitoring process of routine maintenance works. In this context, the consultant and CDR representative explained the monitoring process for this project and highlighted the role of municipalities and local communities in monitoring the Contractor. Further, CDR explained that REP Grievance Redress Mechanism (GRM) has been established. Accordingly, REP GRM that is already accessible to all relevant stakeholders to send their project-related suggestions, concerns and complaints was disseminated. The GRM levels were explained and it was clarified that complaints can be sent by email, phone, or in person to CDR (phone: 01980096 ext:317, Email: GRM.REP@cdr.gov.lb, or official letter registered at the CDR (address: Tallet al Serail - Riad el Solh, Beirut – Lebanon). Moreover, attendees were informed that a specific GRM QR will be placed along each active road in Jbeil (project sign boards) and at concerned municipalities (public announcement letters at public boards) before the commencement of maintenance works. At the project signboards, a code will be added as well to direct the citizens to the designed IMPACT platform that will allow them to share their feedback. This will ensure addressing/responding to grievances and reporting to stakeholders as indicated in the ESMP (all complaints will be individually followed up). Lastly, attendees were also worried about the potential impacts of maintenance activities on their agricultural lands. In this context, the Consultant explained that strict precaution measures will be enforced to avoid impacting their produce.

It is worth mentioning here that all relevant municipalities will be informed upfront before the commencement of works about the Project since public consultation was conducted back in December 2021. In addition, a public notice will be posted at each relevant municipality including the GRM procedure. This will disseminate the Project and ensure that its activities are implemented in a transparent manner.

Baseline assessment

The assessment recorded the existing physical, biological and socioeconomic conditions within the area of influence prior the project implementation. This data was then analyzed for impact prediction and assessment.

The geology of the studied roads was investigated for outcropping formations, subsurface stratigraphy, hydrogeology and hydrology. The geospatial analysis that was performed to indicate the percentages distribution of hydrogeological classes along each road alignment showed that nearly all roads lie on a karstic formation characterized by its high transmissivity and can be easily exposed to contamination. Moreover, in terms of surface water, it was detected that Nahr Ibrahim river is crossed by roads JP1, JP2, JP3-1, JP4, and JP7, Wadi El Fidar is crossed by road JP-5, Wadi Mouhnane is crossed by JP11 and JP14, Wadi Bacchta is crossed by JP16, JP17, and JP19-2, Khalaf spring is crossed by road JP4, Ain Al Daia spring is crossed by road J-P7, and Al Kassis spring is crossed by road JP10.

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 and assess natural habitats that are at added risk from the proposed project. In general, roads under study involve a path that is already under anthropogenic influences. The majorities of roads are bordered by human settlements, agricultural lands, scrublands, open garrigue vegetation, and degraded ecosystems. These types of habitats do not provide a favorable environment for a large variety of plants and animals. However, some roads partly involve particular biotopes. These biotopes include rivers, riparian habitats, forests or maquis, rocky outcrops, and protected valleys.

Roads that involve particular biotopes and are in large extents surrounded by dense oak forests (e.g., JP3-1, JP9, and JP11) and mountainous roads that are mainly surrounded by rocky outcrops (JP2) are considered ecologically critical. Moreover, the assessment showed that one of these roads (JP11) is of high ecological criticality as it intersects in Bentael village with Bentael Nature Reserve (BNR) that is also an Important Bird Area (IBA).

Lastly, a socio-economic survey was conducted in the project area to map the demographic, social and economic baseline conditions at the level of Jbeil Caza. Sensitive receptors (churches, schools, and agricultural lands) were detected as well. Agricultural lands, which constitute a large portion of lands adjacent to the study roads (e.g., JP4, JP14, JP16, JP17) could be affected in case of mismanagement (e.g., dust accumulation on nearby agricultural lands and terraces).

Criticality Analysis

In order to determine the combined influence of hydrological, ecological, and social issues, a multi-criteria weighted analysis was performed to distinguish critical roads from non-critical ones. This distinction is important since critical roads require stricter mitigation measures. The assessment showed that **roads of high criticality are JP1, JP2, JP3-1, JP4, JP7, JP9, JP11, and JP14.**

Impacts Evaluation

Given that at this stage, the specific activities planned for each of the 21 assessed roads are not

yet decided, impacts were assessed for all activities under the scope of work and the worst-case scenario impacts were considered for the identified critical roads.

Environmental impacts are expected to be localized and moderate. Impacts include fugitive dust emission during maintenance work, increase in noise pollution derived from construction machinery, degradation of water quality, potential damages to existing utilities, and disturbance of local biodiversity. In addition to the expected temporary disturbance of the natural ecosystems (dust emission, noise pollution and potential soil and water contamination), direct destruction of vegetation and population might occur if waste materials (e.g., excavated materials, debris, paints etc.) were discharged directly into the roadside riparian habitats, valleys, woodlots, and rocky habitats. Potential social risks related to the project include labor influx (in case the contractor doesn't recruit labor from the surrounding community) and potential risk of labor induced SH towards female workers and SEA towards women in the surrounding community (due to the close proximity of human settlements to the roads to be maintained); potential risk of child labor; poor labor conditions, dissatisfaction with job allocation; risk of under-participation or underemployment of women; nuisance and traffic disturbance; and temporary obstruction of access routes to sensitive receptors and disturbance (e.g., obstruction of access to churches and agricultural lands, dust accumulation on nearby vegetation and agricultural terraces). Finally, risk of traffic-related accidents and injuries to workers and local communities is expected to be significant if precautions and control measures were not implemented.

Potential positive environmental impacts of the routine maintenance activities, if activities were managed properly, are associated with enhanced road conditions. For instance, improved drainage will decrease blockages, improve surface storm water run-off, and control erosion, which in turn reduces the risk of water stagnation which can damage road pavement and is associated with several waterborne diseases. Additionally, the project will improve the safety conditions of the roads through repair of pavements, safety barriers, and retaining walls. Most importantly, the project will create short-term employment opportunities to local residents and Syrian refugees who will execute earthworks.

Development of the ESMP

This ESMP provides avoidance and mitigation measures to identified impacts. The aim is to assist the project Contractor to reduce the footprint of its operations in Jbeil and to ultimately achieve REP expectations regarding environmental and social performance.

Measures to control exhaust emissions, dust and odor emissions, and soil manipulation activities during the execution of work are provided. Moreover, proper measures and guidelines on the control of accidental spills of construction materials are provided including specific/stricter measures to critical roads. Regarding biodiversity, provided recommendations to guide the project Contractor in reducing the negative impacts on natural habitats and biodiversity are related to activities, schedules, and waste management. Contractors must be careful so that the direct impacts (direct destruction) on rich ecosystems and associated fauna would be minimal. In other words, waste should not be dumped into the adjacent natural habitats (e.g. woodlots, valleys, and rivers). Soil and water contamination could have irreversible impacts on biodiversity. Finally, activities near oak forests, rocky outcrops, and BNR should be planned carefully and buffer zones must be created if needed.

The social risks of this project can be mitigated through periodic monitoring of labor conditions, specific required clauses within contracts that protect workers and the Code of Conduct (CoC) for Gender Based Violence (GBV) issues. This ESMP guides the contractor to preferably hire local workers, not to hire individuals below the legal working age in accordance with the labor law of Lebanon, and ensure proper implementation of the CoC. Further, close coordination with the concerned municipalities is recommended in relation to road obstruction issues and REP GRM must be clearly communicated to all stakeholders during and before project implementation. Similarly, Health & Safety (H&S) risks can be mitigated through precaution and control measures including the development of site-specific safety and traffic management plans. Further, the ESMP provides key/measurable project indicators to monitor the detected risks. Project monitoring will be undertaken CDR (i.e. Supervisor Consultant) to ensure compliance and performance. Project progress reports will be prepared by CDR and submitted to the WB for review. Finally, REP GRM levels are provided including the procedure for handling complaints.

Conclusion

Assessments showed that the project risks can be mitigated if the Contractor succeeded in implementing this ESMP, which documents the project's risks management strategy. In order to achieve that, CDR has to oversee the implementation of this strategy by the Contractor. Most importantly, this ESMP guides the Contractor on critical roads that need special care if they are to be maintained.

Accordingly, if the Contractor succeeded in complying with the WB environmental and social standards and in ensuring a safe operation of activities, the project is expected to enhance the safety conditions of the select roads and most importantly create short-term jobs for the Lebanese and Syrians.

1. Introduction

1.1 Project Background

The Lebanon REP is a WB funded project that aims to improve transport connectivity along select paved road sections and create short-term jobs for the Lebanese and Syrians. The REP was approved by the WB Board of Executive Directors in February 2017 and ratified by the Lebanese Parliament in October 2018.

The REP originally had three components. Following its restructuring in March 2021, a fourth component was added to address the impact of the COVID-19 on the agriculture sector. REP components are as follows:

(i) Roads Rehabilitation and Maintenance (US$178 million): to finance works and related consultancy services for the rehabilitation and maintenance of about 500 km of primary, secondary, and tertiary roads, including road safety and spot improvements;
(ii) Improvement of the MoPWT' Road Emergency Response Capacity (US$4.5 million), especially during climate extremes;
(iii) Capacity Building and Implementation Support (US$7.5 million): to build the capacity of Lebanese agencies in planning and managing the road sector; and
(iv) Support to farmers engaged in crop and livestock production (US$10 million): to support continued agricultural production and vaccination of animals.

This ESMP only deals with the first component of REP that aims at (a) rehabilitating, upgrading, and maintaining selected primary (including International Roads/Highways), secondary and tertiary roads, (b) providing technical assistance for the design, procurement, and supervision of said sub-projects, and (c) preparing safeguards instruments for the Project. More specifically, this ESMP that was prepared by Dar Al Handasah Nazih Taleb & Partners, which was assigned by CDR to prepare all the tender documents needed for the rehabilitation and maintenance works of the roads located within Jbeil Caza (lot 1) under CDR contracts No.20832, covers the envisaged routine maintenance works for classified primary roads in Jbeil Caza.

It is important to note that REP Environmental and Social Management Framework (ESMF) which was cleared by the WB and disclosed in April 2018 identified the potential environmental and social aspects associated with the project as well as the recommended respective management and monitoring measures. Furthermore, the project's Resettlement (RPF) cleared by the WB and disclosed in April 2018 outlined the principles for resettlement impact mitigation as well as the organizational arrangements needed during project preparation and implementation; it also included the compensation measures that need to be implemented for any Project Affected Persons (PAPs) for any possible loss of land, properties or livelihoods. Moreover, 25 site-specific ESMPs were prepared between 2019 and 2020, consulted upon, cleared by the WB and disclosed on the CDR and the WB websites. This includes the Jbeil-specific ESMP prepared by Dar Al Handasah Nazih Taleb & Partners covering roads that were selected by the Lebanese Government for full rehabilitation works (ESMP for Jbeil Caza is

available on CDR Website via the following link https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Jbeil_Final-ESMP.pdf.aspx.).

Noting that the Project was signed before October 2018, date of effectiveness of the Environmental and Social Framework (ESF).

1.1 Project Rationale

According to Schwab, 2017, in terms of road connectivity, Lebanon ranked 95 and achieved a poor connectivity score index of 48.7 out of 100. As for the road conditions, approximately 95% of the roads are paved but lack proper maintenance. In this context, to deal with increasing safety challenges, the Lebanese Government is implementing REP that aims to improve transport connectivity and safety along select roads throughout Lebanon.

However, infrastructure projects can exert a substantial strain on the environment and natural resources. Only with sustainable practices and proper waste management plans enforced, the burden on the environment can be reduced. Sustainable projects can generally be achieved by considering the environmental impact of the construction process (Hoeckman et al., 2012). Similarly, the socio-economic effects of infrastructure projects can be reduced through transparency and fair compensation processes (Morris, 2007). In this context, this inclusive ESMP for routine maintenance works in Jbeil Caza was prepared by Dar Al Handasah Nazih Taleb & Partners for development decision to go hand in hand with environmental and social protection under the requirements of WB OP4.01, that classifies the project as Category B.

1.2 Report Objectives

The main aim of this ESMP for Jbeil Caza, is to stipulate the control measures required to manage and monitor the project environmental, social, and H&S risks in accordance with environmental laws and regulations in Lebanon and the WB guidelines.

This ESMP will serve as a practical tool for the project Contractor who is supposed to implement the devised management strategy to (1) reduce the footprint of REP' operations in Jbeil Caza and (2) ensure safe operation of activities and prevent injuries to workers or the public. To reach the above-mentioned objective, the ESMP will:

1. Establish environmental and socio-economic baseline
2. Set the Legal, Institutional, Standards & Policies Frameworks
3. Conduct an inclusive public consultation session that takes into consideration the views of Project Affected Persons (PAPs) to feed the project design and management plan
4. Identify potential social, environmental, and H&S impacts caused by the project
5. Propose feasible and applicable mitigation measures;
6. Guide on creating short term jobs for communities within a gender workforce equality environment;
7. Identify the responsible authorities and assign roles for different organizations in the efficient implementation of this ESMP.
8. Implement a robust GRM that is multi-channeled and fully functional and that is clearly communicated to all PAPs.

1.3 Methodology

This ESMP was prepared by TIVÈL Consultancy at the request of Dar Al Handasah Nazih Taleb & Partners, as a fulfillment of the environmental and social requirements stated in component 1 of REP. It documents the project's risk management strategy.

The methods used for setting the data collection, stakeholders' engagement, and impact assessment are elaborated in this section.

1.3.1 Collection of Environmental and Social Baseline information

Baseline data were collected from field surveys, previously conducted assessments in Jbeil Caza under REP, generated GIS maps and side meetings. Meteorological data, which play a vital role in transport and dispersion of air pollutants, were investigated and collected in shape of a statistical distribution of weather conditions over a period of time. Also, the ambient air quality for the study area was examined to assess the social wellbeing and health status of Jbeil community. A geospatial analysis was performed to indicate the percentages distribution of geological outcrops and hydrogeological classes along each road alignment. Similarly, a Land Use Land Cover (LULC) analysis was conducted to better understand the percentage distribution of LULC along each road alignment. Results were then compiled with site visit observations. Finally, regarding the social assessment, socio-economic information about Jbeil Caza was obtained from several national sources and studies, as well as from the Ministry of Social Affairs (MoSA) and informal meetings with municipalities. Finally, a list of sensitive receptors was generated to better determine the PAPs.

1.3.2 Methodlogy for Stakeholders Engagement

The Stakeholder Circle methodology (Bourne, 2016) was used for defining the stakeholder community and recognizing the communication needed to influence each stakeholder's prospects and actions. Stakeholders were first identified, prioritized, and then engaged through directed communication. Emails, letters, and direct phone calls were adopted to personalize the communication with main recognized stakeholders. Finally, a formal invitation letter was sent to all stakeholders in relation to the arranged formal public meeting at the Union of Jbeil Municipalities building.

1.3.3 Methodology for Impact Assessment

Specific activities that will be performed for each road separately have not yet been determined. Thus, impacts were assessed for the general routine maintenance activities under the project scope.

Also knowing that drainage works, pavement repair works, and removal/installation of concrete structures are the riskiest of the whole spectrum of routine maintenance activities (Huang et al., 2009), the "worst-case scenario" impacts were considered. Further, given that impacts are directly affected by the environmental and social conditions of the surrounding environment/adjacent areas to each target road, a multi-criteria weighted analysis was performed

to distinguish critical roads from non-critical. This distinction is important since critical roads, that are expected to be significantly impacted, require stricter mitigation measures. The parameters or criteria that were considered in the analysis are described in Chapter 4, section 1.16.

Existing Policies, Legal and Administrative Framework

1.4 Legal Framework

Similarly, to all the developed ESMPs within the REP project, this ESMP is conducted in accordance with the WB Safeguards and national and international laws/regulations that are related to environmental and social impact assessments (namely law 444 for the protection of environment, Laws 77 and 78 in relation to water and air protection, Law 80 and Decree 5605 on solid waste management, and the decisions on environmental standards that are elaborated in section 1.6). REP works contracts must comply with the national law on labor and the ILO obligations, which have been ratified by Lebanon (Penal code decree 340/1943; Labor Law/1946: The Lebanese Labor Code, Law No. 335/2001: Pursuant to the International Labor Organization ILO Convention No 182; Law 400 – 2002: Ratification of ILO convention No. 138, Decree 8987 – 2012; Law 205 – 2020; Law 28/2017, Decree 6940/2020; Decree 8987/2012: Prohibition of employment of minors under the age of 18; and Decree 3791/2016: Minimum Wage). Finally, Occupational Health and Safety (OHS) laws must be applied as well to avoid adverse impacts on workers. An overview of the main Lebanese environmental and occupational legislations is provided in Table A in Annex 1.

1.5 Institutional Framework

The project is implemented by the CDR in coordination with the MPWT. The other main national institutions that are in relation to REP include (1) municipalities in Jbeil Caza that were consulted at this stage of the project and they will supervise projects' implementation in their municipal territories; and (2) relevant ministries and governmental departments (e.g., Ministry of Environment (MoE), Ministry of Energy and Water (MoEW), Internal Security Forces/traffic department) that must be consulted when needed before and during project implementation in relation to hazardous waste management, water, electricity, and traffic matters (these institutions and their corresponding mandates are presented in Table B, in Annex 1).

1.6 Environmental Standards

Environmental standards that must be respected by the project Contractor are provided in this section. The Lebanese wastewater emission standards are less strict than the WB standards, but stricter for ambient air quality and similar for noise. In this context, during works execution, the stricter limits must be followed.

Allowable Wastewater Discharge

The allowable discharge requirement as specified by WB are presented in Table 0-1

Table 0-1 Allowable wastewater discharge levels (WB requirements)

Wastewater Effluent Pollutants Threshold

Parameters/pollutant	WB requirements
pH	6 – 9
BOD mg/l	30
COD mg/l	125
temperature Co	-
Total nitrogen mg/l	10
Total phosphorus mg/l	2
Oil and grease mg/l	10
Mercury mg/l	0.01
Total suspended solids mg/l	50
Total coliform bacteria (Most Probable Number/100 ml)	400

Air Emissions Targets

According to Decision 16/1 dated 2022, the maximum allowable limits for generators with capacity >=200 kW (or >=60 kVA) are shown in the below table. It is important to note that application of Decision 16/1 will be as of February 2023.

Table 0-2 Reciprocating engine generator with capacity >=200 kW (or >=60 kVA)

Monitoring Parameter	Maximum Allowable Limits (mg/Nm^3)	Fuel type	Measurement Frequency
Dust	50	-	Continuous • Mandatory if capacity >=10MW • Optional if capacity <10MW
CO	100	-	
NO_2	2,000	-	
SO_2	10	Diesel	
	750	Other	

2022)

Noise Emissions Targets

The expected noise pollution levels should not exceed the values listed in the MoE Decision 52/1 dated 1996. The limited; values are presented in the table below.

Table 0-3 Sound pressure limits (MoE Decision 52/1, 1996)

Phase	Sound Pressure Level dB(A)
Working Location (less than 8 working hrs.)	90
Working Location (requires good speech hearing)	80

Therefore, the maximum national standard of 90 (dB) for occupational noise exposure limits should not exceed an average duration of 8 hours working days. If the limits are higher than the acceptable limits, then the exposure duration should be reduced as mentioned in the table below.

Table 0-4 Noise exposure limits (MoE Decision 52/1,1996)

Sound Pressure Level dB(A)	Exposure Duration (hrs.)
95	4
100	2
105	1
110	0.5
115	0.25

Moreover, the following table indicates the Lebanese noise guidelines in different zones and at different periods of the day.

Table 0-5 Lebanese noise guidelines for different zones (MoE 52/1, 1996)

Area classification	Maximum accepted noise level dB(A)		
	Day[1]	Evening[2]	Night[3]
Residential area with few construction sites, activities or on a 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.			

1.7 World Bank Policies and Guidelines

1.7.1 Safeguard Policies

The ESMP for Jbeil Caza should comply with the safeguard policy of the WB, 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 maintenance of road infrastructures and associated civil works. Under the requirements of OP4.01, the proposed project is classified as Category B. Impacts have no severe effects on the environment and can be mitigated via an environmental, safety, and social management plan.

Despite that OP 4.12 was triggered by this project and RPF was accordingly prepared (disclosed on the CDR website), in the context of Jbeil and in accordance with site specific plans, no involuntary resettlement or land acquisition will take place. In other words, the project will be implemented primarily within the existing "right of way" and there will be no displaced persons by the project activities (this includes local and Syrian refugees).

1.7.1 Access to Information, Consultations and Disclosure Policy

The WB allows access to any information in its possession that is not on a list of exceptions. Moreover, transparency is essential to building and maintaining communal dialogue, and increasing public awareness about the WBG's development role and mission. In this context, a formal consultation process with the public took place during the preparation of this ESMP for Jbeil Caza (refer to section 7.1). Moreover, this ESMP will be disclosed on CDR's and concerned municipalities' website.

Description of the Proposed Project

1.8 Project Scope and Location

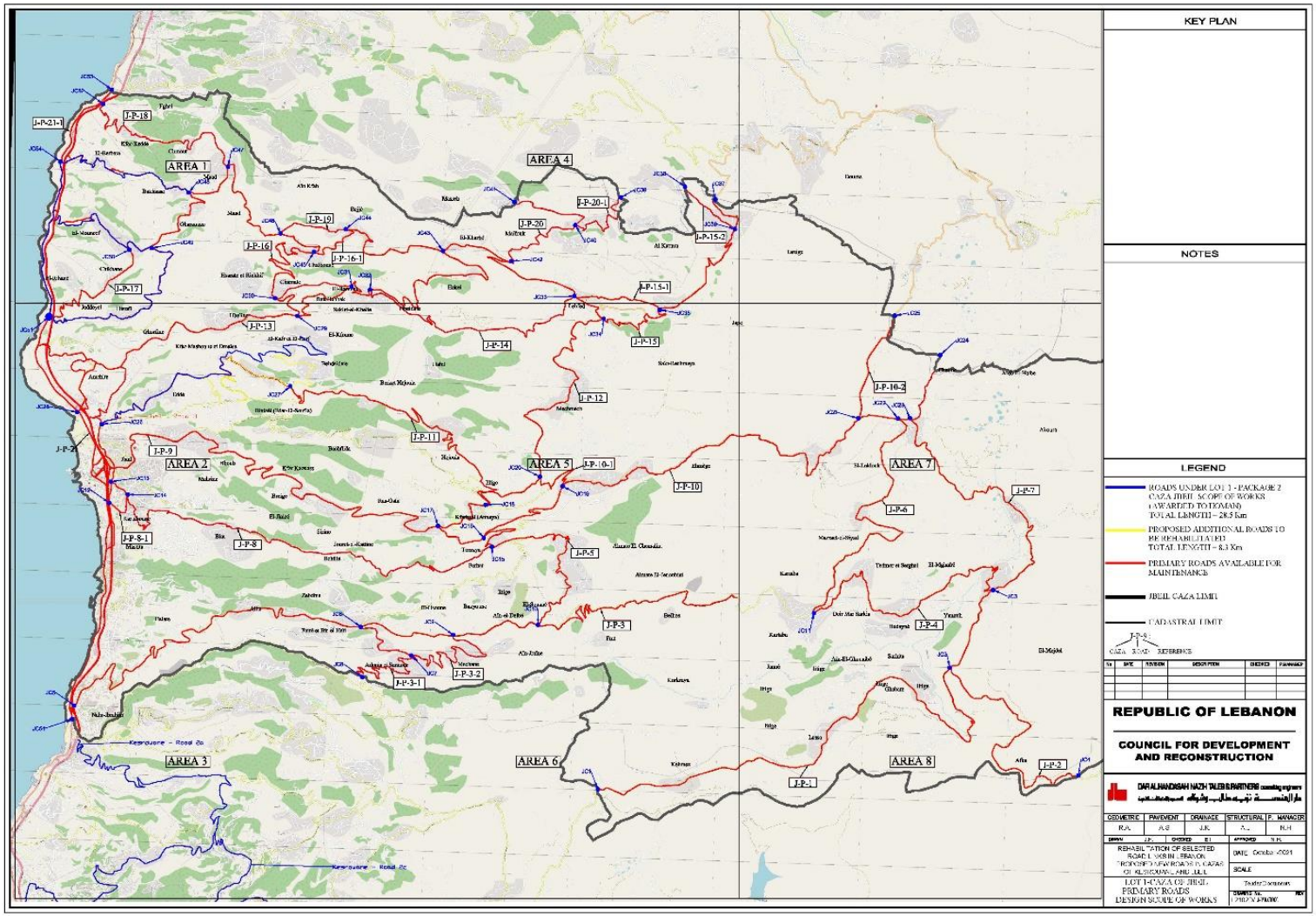
The project consists of routine maintenance activities for a period of two years in Lot 1- Jbeil Caza namely for primary roads. Candidate primary roads (including International roads ranging from one lane in each direction with low traffic volume to multiple lanes in each direction with high traffic density known as Highways,). (21 roads divided into sections) for routine

maintenance activities within Jbeil Caza are presented in Table 0-1 and Figure 0-1. The total length of these roads is around 263 km.

Table 0-1Jbeil Caza primary roads

Road	Concerned Villages	Road Length (km)
J-P-1	Kehmez - Lassa - Ghabate - Afka - El Mejdel	17.1
J-P-2	El Mejdel - Afka	7.6
J-P-3	Nahr Ibrahim - Halate - Alita - Zebdine - Fatré et Bir el Haït - El Hsoune - Aïn el Delbé - El Souané - Aïn Jraïne - Frat - Almate El Jenoubiat - Belhos - Kartaba	24
J-P-3-1	Fatré et Bir el Haït - Adonis et Sannour	6.18
J-P-3-2	El Hsoune - Mechane - Adonis et Sannour	5.05
J-P-4	Kartaba - Mazraet el Siyad - Deir Mar Sarkis - Hedayné - El Mghaïré - Yanouh - Akoura - El-Mejdel	8.46
J-P-5	Aïn el Delbé - El Souané - Almate El Jenoubiat - Almate El Chemaliat - Torzaya	8.08
J-P-6	Kartaba - Mazraet el Siyad - ElLaklouk	8.75
J-P-7	El Mejdel - Akoura - El Laklouk	8.04
J-P-8	Jbail - Kartaboune - Blat - Bchillé - Jouret el Kattine - Torzaya	12.25
J-P-8-1	Jbail - Kartaboune - Blat - Jbail	1.52
J-P-9	Jbeil - Hboub - Kfar Kaouass - Breige - Ras-Osta - Kfarbaal (Annaya)	14
J-P-10	Kfarbaal (Annaya) - Torzaya - Ehmège - El Laklouk - Akoura - Tannourine Foka	17
J-P-10-1	Ehmège - Mechmech	2.26
J-P-10-2	Ehmège - Akoura -	2.94
J-P-11	Bintaél (Fdar-El-Soufla) - Berket Hejoula - Hejoula - Kfarbaal (Annaya)	11.89
J-P-12	Kfarbaal (Annaya) - Ehmège - Mechmech - Lehfed - Saki Rechmaya	9.25
J-P-13	Amchite - Ghorfine - Hbeline - Chamate - Beit Habbak - Sakiet el Kheite	10.24
J-P-14-1	Obeidate - Mechmech - Lehfed	6.7
J-P-14-2	Lehfed - El-Kharbé	3.65
J-P-15	Lehfed - Saki Rechmaya - Jage - Tartige	8.93
J-P-15-1	Lehfed - Jage	2.29
J-P-15-2	Tartige	1.7
J-P-16	Beit Habbak - Chamate - Ghalboune	7.68
J-P-16-1	Ghalboune - Bejjé	1.72
J-P-17	Amchite - Jeddeyel - Chikhane	4.05
J-P-18	Chikhane - Gharzouze - Bakhaase - Maad - Chmout - Kfar Keddé - Fghal	10.36
J-P-19-1	Chamate - El Ramout - Obeidate	3.42
J-P-19-2	Obeidate - Hakel -El Kharbé	5.8
J-P-19-3	El Kharbé - Bejjé - Ghalboune - Aïn Kfah - Maad	8.77
J-P-20	El Kharbé - Lehfed - Al Kattara - Maïfouk	6.99
J-P-20-1	Maïfouk - Al Kattara - Ram - Hadtoune	2.71
J-P-21	Nahr Ibrahim - Halate - Mastita - Kartaboune - Jbail - Amchite	11.26
J-P-21-1	El Berbara - Kfar Keddé - Fghal	2.41
		263.05

Figure 0-1 Jbeil Caza primary roads



Source: Dar Al Handasah Nazih Taleb & Partners

1.9 Project Activities

The assessment of required maintenance activities is provided in a separate technical report prepared by the Engineer (Dar Al Handasah Nazih Taleb). It was based on site inspection and detailed field observation for 25% of the total primary roads which are considered as representative roads.

In this context, the envisaged general roadway repair works within Jbeil Caza were grouped into incidental repair works, pavement repair works, concrete repair works, and installation of channelizing devices and traffic control devices (Table 0-2). Specific activities for each of the 21 candidate roads are not yet assigned.

Table 0-2 Envisaged routine maintenance activities for Jbeil

Category	Maintenance Activity
1. Incidental repair works	• Clearing and grubbing • Repair of damaged manhole covers • Repair of Masonry wall • Cleaning of waterways, hydraulic structures, drainage pipes, and box culverts,
2. Pavement repair works	• Pavement overlay, for a limited area, consists of paving over the existing roadway to cover cracks, fill potholes and increase the strength of the roadway • Shallow patching works, for a limited section, includes removing the existing pavement (milling); generally, between 4 to 5 cm, and paving the area that was milled • Deep patching works, for a limited section, may be needed when the structural integrity of the road is compromised. Including excavation, base course (30 cm), prime coat, asphalt binder course, tack coat and asphalt wearing courses • Crack sealing • Milling & overlay for sunken but stable trench, width less than 1 m including tack coat • Removal and reinstatement of damaged trench width less than 1 m including excavation, base course (30cm), prime coat, asphalt binder course, tack coat and asphalt wearing courses
3. Concrete repair works	• Repair of box culverts, headwalls, concrete channel, concrete safety barrier, retaining walls, and cover channels
4. Installation of Traffic control devices	• Installation of thermoplastic reflectorized road paint lines including surface preparation and removal of existing paint lines (where needed) • Installation of thermoplastic reflectorized special road marking including speed limit marking, cats eye, pavement studs, bituminous speed humps; rumble strips; delineators and makers posts; temporary traffic signs, barricade with flashers etc.
5. Temporary Channelizing Devices	• Installation and reinstallation of concrete barrier, removable single face concrete safety barrier, or removable double face concrete safety barrier.
6. Maintenance/ Repair of the Highway Bridge Expansion Joints	The Maintenance/ Repair of the existing highway expansion joint on Nahr Ibrahim bridge. This will be subject to the state of defect which is described based on two folds: • In case of slight defect: the repair of existing joints consists of replacing the damaged parts of joint and restoring/repairing the deteriorated parts of anchorage systems without full replacement of existing joints. • In case of complete defect: the rehabilitation of deck expansion joints includes mainly replacing the existing one by a similar type of joint according to the method statement presented hereafter.

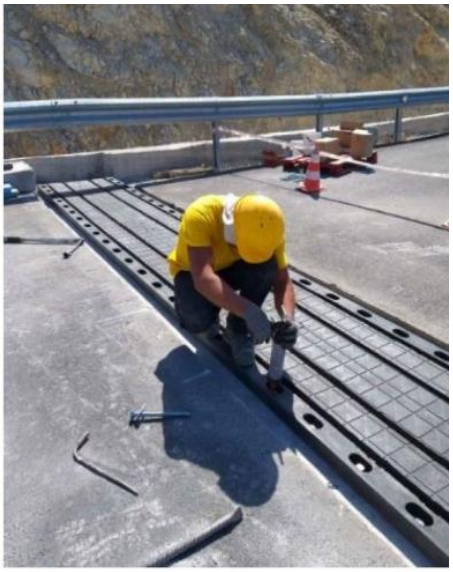
The majority of highway joints under this scope of work are reinforced elastomeric joints and the required maintenance works consist mainly of fully/partially replacing the damaged joint with a new one having similar technical specifications.

The execution of required works can be classified as a simple construction activity that will be carried out with a limited number of labourers (between 5 & 8 workers for each joint bridge), light construction machine (pick-up truck, bobcat), and in a quick time (not to exceed two weeks per bridge). It will include the following activities:

1) Install as necessary the temporary signing and channelizing devices for the traffic control plan in the working area.
2) Removing of the existing expansion joints, all related materials and accessories.
3) Repairing as required the area below the expansion joint (Utilization of Epoxy mortar for steel anchor).
4) Joint installation including drill and fixation of anchor bolts by Epoxy resin.
5) Surface asphalting from both sides (max. of 1 meter) of the expansion joint as needed.
6) Clean and fill the transition strip on both sides of the expansion joints.

The following photos illustrate the main activities in the maintenance of reinforced elastomeric joints (from other projects similar to this scope of works):

Photo 1 - Existing condition of one damaged Highway Bridge Joint

	Photo 2 - Levelling of surface below the expansion joint (step 3 above)  Photo 3 - Joint Installation (step 4 above) 

1.10 Link with REP Rehabilitation Activities

The candidate primary roads for routine maintenance activities are different from the ones that are currently under rehabilitation. A general map showing the candidate primary roads (including International Roads/Highways) for routine maintenance activities in Jbeil along with the roads that are under rehabilitation within REP (roads that were studied in 2020 https://www.cdr.gov.lb/getmedia/4c63204e-e9fb-4d76-a307-e2e5bd17edf1/Jbeil_Final-ESMP.pdf.aspx.) is presented in

Figure 0-2.

Given the same geographic scope of both 'projects' (rehabilitation and routine maintenance projects/activities under REP), concurrent actions would generally tend to offer a higher potential for cumulative impacts. However, routine maintenance activities may not be conducted at the same time of the currently ongoing rehabilitation activities. Moreover, given the nature of maintenance activities as they are smaller in scale compared to rehabilitation works (that involve complete and full asphalting of roads and deep excavations...) which makes REP projects' combined effect less significant on Jbeil local environment and community.

If there may be overlap between the rehabilitation and routine maintenance activities periods, as with air quality and noise emissions due to the distance between the activities and the difference in nature and scale (i.e. localized impacts during maintenance works), cumulative impacts are not expected to be significant at sensitive receptors. However, cumulative deterioration in groundwater quality is expected when roads are in close proximity to the same river/spring and if the contractors did not follow the projects' ESMPs.

1.11 Equipment and Materials/Items

Typical equipment used for routine maintenance activities include shovel, grass cutter, wheel roller, crusher, grader, paver, compacting equipment (compactor/roller), milling machines, cleaning machines, lifting devices etc. A typical tabular format, which shows the raw materials and items needed for the routine maintenance activities, is presented in Table D in Annex 1.

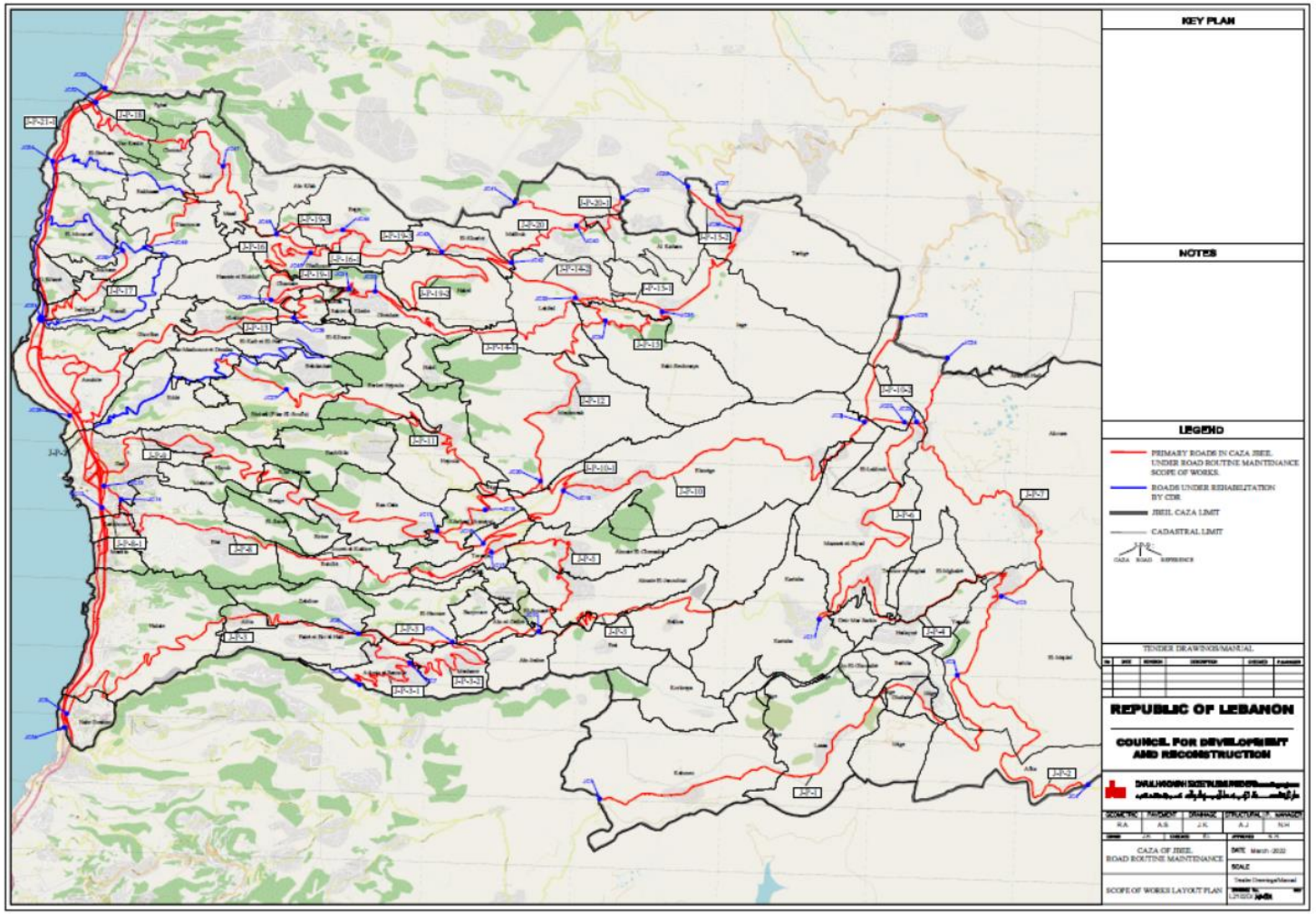
1.12 Staffing and Site Facilities

Routine maintenance activities are typically of small scale (i.e., activities will occur on a small section of the road), but widely dispersed, and most of them require skilled and unskilled manpower. The number of required unskilled workers (laborers) needed to perform repair works on-site will depend on each maintenance activity and on the timing of works. In this context, the number of workers is estimated to be 20 workers for normal days and can increase to reach up to 50 workers during the peak maintenance period (e.g., before the rainy season).. Accordingly, the Contractor will be encouraged to hire laborers from the local community living in the project area.

The Contractor's skilled labors include environmental, social, and OHS experts who will be responsible of the implementation of this ESMP in collaboration with project manager, site engineers, and site officers. They will also train non-skilled workers on how to follow the safeguards requirements.

The Project site will not include laborers camps, lodging on site, and repair garages. During the implementation phase, the Contractor will have to rent a flat located in the Project area to serve as a project office. The office will be fully used by the Contractor Engineers, technical skilled workers and the Supervising Consultant. The flat will be equipped with toilet, kitchen (including drinking water and appliances), lockers and other supplies needed for the daily administrative activities. If applicable, the on-site rest point will be decided by the Contractor at the time of works. Finally, the Contractor will have to service the on-site with a portable cabin toilet. The porta cabin will be mobile and its placement depends on the work zone (wastewater management in relation to the porta cabin are provided in Table 0-1).

Figure 0-2 Roads under rehabilitation and candidate roads for routine maintenance activities in Jbeil Caza



Source: Dar Al Handasah Nazih Taleb & Partners

Description of the Environment and Social Context

Existing conditions within the area of influence were recorded prior the project implementation. This data was then analyzed for impact prediction and assessment. Baseline data covers the status of the following receptors: air quality, water/soil quality, hydrogeological conditions, climate and meteorology, natural habitats, land-use/land-cover, and socio-economic conditions.

1.13 Physical Environment

1.13.1 Topography

Roads under consideration are located in Jbeil Caza. Primary roads start off at the coast and ascend east into the mountains. Attitude approximately range between 12m (road JP21 on the coast of Mastita village) to 1,850m (road JP6 in Laklouk village and JP10 in Akoura village) – Table F in Annex 2.

1.13.2 Subsurface and Surface Conditions

(1)Geological Outcrops:

The geology of the studied area was investigated for outcropping formations, subsurface stratigraphy, hydrogeology and hydrology. The summary of the geological outcrops exposed in the study are listed and described in Table G in Annex 2. Additionally, in order to obtain a better understanding of the geology in the area, a geospatial analysis (Table H in Annex 2) was performed to indicate the percentages of geological outcrops encountered in each unique road alignment. For example, road JP16 sits entirely (100%) over a C4 formation whereas road JP2 is ~87% over a Quaternary formation and ~13% over C3&C4 formations.

(2)Hydrogeological Conditions:

Geological units can be defined as aquifer or aquiclude in term of storing and transmitting water, and these types depend on the geological environment in which they occur. The detailed Hydrogeological conditions in the area are presented in Table E in Annex 2. In summary, in terms of hydro-stratigraphy, the project covers several classes:

- Karstic limestone formation represented as 1,2, and 3 in Figure A and described in Table I (in Annex 2): these types of formations **are highly susceptible to contamination** in the event of mismanagement of generated wastes due to the shallow water table and easy subsurface water flow which enhances spread of contamination when it occurs.
- In-porous formation represented as 9, 10, and 11 in Figure A: these types of formations typically limit subsurface water flow and therefore any contamination that manages to infiltrate to the subsurface is highly unlikely to spread.
- Clay formations: these types of formations are not risky in the sense that if a surface contamination occurs, surface spread is limited due to the clay impermeable formation.

Similar to the geological analysis, a hydrogeological analysis was done to determine the percentage distribution of hydrogeological classes along each road alignment (Table J in Annex 2). For example, road JP11 sits entirely (100%) over (2: Cretaceous Aquifer) with high transmissivity.

(3)Surface Water

The main rivers and springs in Jbeil are: Wadi Mouhnane", Wadi Baahta, Naher Ibrahim, Wadi Fidar, Wadi Madfoun, Ain el Souane and Ain el Delbe.

Rivers/Springs intersect with the assessed roads as follows:

- Ibrahim river is crossed by road JP1 ,2 ,3-1, 4, and 7;
- Wadi El Fidar is crossed by road JP5;
- Wadi Mouhnane is crossed by JP11 and JP14;
- Wadi Bacchta is crossed by JP16, 17, and 19-2;
- Khalaf spring is crossed by road JP4;
- Ain Al Daia spring is crossed by road JP7;
- Al Kassis Spring is crossed by road JP10

Other roads travel near some of the rivers, as summarized in Table K in Annex 2. In addition, the general surface layout map of Jbeil Caza is shown in Figure B in Annex 2.

1.13.3 Climate

The climate and meteorological parameters play a vital role in transport and dispersion of pollutants in the atmosphere. One of the most significant meteorological parameters that influence project activities is precipitation due to its ability to enhance the infiltration of accidental spills and contaminated construction wastewater within the area depending on site operation procedures. In order to have an idea about the meteorological parameter in the study area, three strategic locations were considered a) a low point, b) a middle point, and c) a high point in terms of surface elevation in order to encompass all the study roads and have an average of the results. In the study area, the monthly precipitation data is summarized in Table L in Annex 2. The historical data shows that most of the rain occurs in the winter months between December and March. The total precipitation ranges between 896mm and 1,024mm. whereas, the hottest month in the area is August (30 ^{o}C) and coldest month is January (-2 ^{o}C). Fluctuations in the temperature values are shown in Table L in Annex 2.

1.13.4 Ambient Air

Air quality is an essential component in assessing social wellbeing and health status of a community. Atmospheric air quality data was collected from the Sentinel 5P Tropomi Satellite which provides daily near real time data for various gases in the atmosphere. The mean tropospheric NO2 column density was calculated using the Google earth engine code java script editor resulting in Figure C (in Annex 2) which revealed in the mean NO2 values across the border of Lebanon between year 2018 up to end of year 2021. It is clear that the NO2 pollution is concentrated above the Beirut area and decreases when moving east to reach its lowest value

in the eastern Bekaa plain. The routine maintenance roads of Jbeil Caza are overlain as white alignments over the below NO_2 map to have an idea of the ambient air quality in the surrounding area.

1.14 Biological Environment

A rapid biological assessment was carried out to draw the ecological profile of the adjacent areas to Jbeil primary roads. The assessment was based on a LULC analysis to determine the distribution of LULC over the length of each primary road with a 50m strategic constant buffer (refer to Table M in Annex 2). Results were then compiled with site visit observations. Potential species were also considered in this assessment and their ecological value was based on their local ecological importance (distribution of species and degree of endemism (Tohmé and Tohmé, 2014) and IUCN classification).

1.14.1 Project Settlement

The biogeographic region ranges from the Thermo-Mediterranean near the coast to the Eu-Mediterranean and Supra-Mediterranean at Ehmej level and Mountainous zone at the level of Laqlouq. The altitudinal range plays an important role in plant composition (Abi Saleh, 1996). Characteristics of these zones are elaborated in Table O in Annex 2.

1.14.2 Natural Habitats and Associated Flora

Studied roads in Jbeil are mainly bordered by human settlements, olive groves (*Olea europaea)*, agriculture terraces, scrublands and grasslands, cultivated trees (e.g., cypress trees), and open garrigue vegetation, discontinuous bushy associations of the Mediterranean calcareous plateaus dominated by Kermes Oak (*Quercus calliprinos*) and dwarf-shrubs and spiny burnet (*Sarcopoterium spinosus*). These types of habitats do not provide a favorable environment for a large variety of plants and animals (refer to Table M in Annex 2). However, some roads involve partly particular biotopes (refer to Table O in Annex 2). These biotopes include rivers, forests or maquis dominated by evergreen *Quercus calliprinos*, rocky habitats (at higher elevation, e.g., JP2), and protected valleys (case of JP3-1).

1.14.3 Ecological Criticality

Roads that are considered ecologically critical are:

- Roads that involve particular biotopes (namely riparian habitats, which are excellent refuge for birds, reptiles, and amphibians) and at the same time surrounded in majority by dense oak forests/maquis, which are of high biodiversity value (JP3-1, JP9, JP11 refer to Table N, Annex 2).
- Mountainous roads given the ecological criticality of recorded rocky habitats and outcrops that are critical breeding sites for avian predators and refuge for reptiles. Also, characterized by one of the most important floral communities (e.g., outcrops constitute 87% of the adjacent LULC along JP2).
- JP11 road that is not only 90% surrounded by dense forest of oaks, it intersects in Bentael with BNR, created by the Law No.11 on February, 1999. BNR is also a designated Important Bird Area (IBA)- refer to refer to Table O in Annex 2).

1.15 Socio-Economic Condition

1.15.1 General Background

Jbeil Caza has a population of 92,016 in year 2016 excluding the Syrian refugees, where the majority of the population (~65 %) belong to the active group age, ranging between 15 and 65 years old (MoPH, 2016). Jbeil is home to 3.2 % of total number of industries in Lebanon, it is characterized by an unemployment rate of 5 %.

Agriculture is on the main sources of income for villages in the upper heights of the Jbeil Caza (e.g., Lehfed, Fatre, Lasa, Ghalboun etc.). Whereas, mountainous villages rely on religious tourism (e.g., Annaya). Roads under study invovle these villages.

According to OCHA (2016), approximately 69,933 of Lebanese are above the poverty line in Jbeil, whereas, the deprived Lebanese in Jbeil are approximately 10,728 persons.

Approximately 8,377 Syrian refugees are registered in Jbeil. 64.8% of Syrian refugees' household are below poverty line in Jbeil (VASYR 2017, UMHCR). However, no refugee camps (including Palestinians camps) were detected in the Caza (Table P in Annex 2). Regarding infrastructure there are several treatment plants (Table P in Annex 2). Whereas, in terms of solid waste, Hbaline open dump has been used for many years. In this context, the project Contractor must coordinate with concerned municipalities during the execution of works regarding waste disposal and wastewater management.

1.15.2 Sensitive Receptors

Nearly all assessed roads include segments that interest with churches or are in close proximity to churches (refer to Table Q in Annex 2). Some roads include as well sections that are in close proximity to hospitals and health services centers (JP9 and JP8-1), whereas others are in close proximity to schools (JP3, **JP3-1** (**<5m**), JP-2) (refer to Table Q in Annex 2). When sections are at a distance of 30 m or less to or cross the surrounding sensitive receptors namely, churches and schools special care is needed in case they will be maintained. These sections are highlighted so that the Contractor inform the local community about work schedule and execute the works at a good timing in order not to affect citizen going to church, students and patients.

Moreover, the LULC cover analysis showed that JP4, JP14, JP16 are mainly surrounded by deciduous fruit trees (40%,48%, 49%, respectively), and 58 % of JP17 is surrounded by olive groves (refer to Table N in Annex 2). These roads are considered socially critical as they involve numerous segments bordered by agricultural lands.

When determining critical roads, this study prioritized agricultural areas. In other words, the social parameter was mainly linked to the presence of agricultural areas along the assessed roads because agricultural lands are more spread over the alignments, are highly important for the neighboring communities, and are subsequently more likely to get impacted. Moreover, the assessment responded to local farmers' concerns (they were worried about the project implications on their produce (refer to Chapter 7)).

1.16 Determination of Critical Roads

1.16.1 Methodology

In order to calculate a net effect from the hydrogeological, ecological, and social parameters, a multi-criteria weighted analysis was performed in order to distinguish critical roads from non-critical roads. The parameters or criteria that were considered in the analysis are transmissivity, proximity to rivers, proximity to springs, sensitive LULC classes, and a social parameter.

Table 0-1 Weights assigned for each criterion to determine criticality of each road based on expert opinions

Criteria	Weight
Transmissivity	0.2
Proximity to river	0.15
Proximity to spring	0.15
LULC/Ecological	0.25
Social/proximity to agricultural lands	0.25

Specifically, each parameter consisted of the following (refer to Table R in Annex 2):

- **Transmissivity**: distinguished between High of Low, based on the geological and hydrogeological classes. Classes 1,2, and 3; which all the roads occupy entirely, have a high transmissivity.
- **Proximity to river**: Road are either a) cross a river, b) travel near a river (<100m), and c) are very remote from any surface water body and therefore an N.A. value is assigned.
- **Proximity to spring**: similar reasoning as proximity to river
- **LULC/Ecological:** This parameter was divided to either critical or not critical based on the LULC classes shown in Table N in Annex 2, where roads are bordered or intersect with natural habitats of high ecological significance namely, dense oak forests are assigned the highest score of 0.6 or 60%. The other two classes used to determine the ecological parameter are rocky habitats (outcrops) and low-density oak forests.

Table 0-2 Weights assigned to determined ecological parameter

LULC/Ecological	
Class	**Weight**
Dense forest of Oaks (Quercus ssp)	0.6
Outcrop (rocky habitats)	0.3
Low density oak forest	0.1

Social: This parameter was linked directly to the different types of agricultural areas that might be affected by the works and are of importance to the local community in Jbeil. This parameter was prioritized knowing that agricultural lands are more likely to get impacted by road maintenance activities and in accordance with farmers concerns (refer to Chapter 7). Similarly, it is divided to either critical or not critical based on the classes shown in Table 0-3, where roads passing near deciduous fruit trees areas are assigned the highest score of 0.4 or 40%.

Table 0-3 Weights assigned to determined social parameter

Social

Class	Weight
Deciduous fruit trees	0.4
Field crops in large areas	0.15
Field crops in small fields/terraces	0.15
Olives	0.2
Protected agriculture	0.1

1.16.1 Results

The results of the analysis are shown in Table 0-5 and the criticality score is either defined as low, medium, or high based on the legend shown in Table 0-4.

Roads of high criticality are JP1, JP2, -P 3-1, JP 4, JP7, JP9, JP11, and JP14.

Table 0-4 Criticality score and legend

Sensitivity Value	Criticality
<=0.3	Low
>0.3 and <=0.5	Medium
<0.5 and <=0.85	High

Table 0-5 Roads of High Criticality (results of the weighted analysis)

Road Name	Sensitivity Value	Criticality
JP-1	0.7125	**High**
JP-2	0.6	**High**
JP-3 r1	0.45	**Medium**
JP-3-1	0.6	**High**
JP-3-2	0.2	**Low**
JP-4	0.75	**High**
JP-5	0.35	**Medium**
JP-6	0.3125	**Medium**
JP-7	0.5	**High**
JP-8	0.45	**Medium**
JP-8-1	0.2	**Low**
JP-9	0.5625	**High**
JP-10	0.35	**Medium**
JP-10-1	0.2	**Low**
JP-10-2	0.2	**Low**
JP-11	0.6	**High**
JP-12	0.45	**Medium**
JP-13	0.3125	**Medium**
JP-14	0.85	**High**
JP-15	0.2	**Low**
JP-15-1	0.2	**Low**
J-P-15-2	0.2	**Low**
JP-16	0.35	**Medium**
JP-16-1	0.45	**Medium**
JP-17	0.35	**Medium**
JP-18	0.2	**Low**
JP-19-1	0.2	**Low**
JP-19-2	0.35	**Medium**
JP-19-3	0.2	**Low**

JP-20	0.2	**Low**
JP-20-1	0.2	**Low**
JP-21	0.35	**Medium**
JP-21-1	0.3125	**Medium**

Potential Impacts and Proposed Mitigation measures

In this Chapter, the project positive impacts and the identified REP's potential negative impacts are elaborated along with their correspondent mitigation measures.

1.17 Positive Impacts

Potential positive environmental impacts of the routine maintenance activities are associated with enhanced road conditions. For instance, improved drainage will 1) decrease blockages and improve surface storm water run-off, 2) improve traffic safety, and 3) control erosion, which in turn reduces the risk of water stagnation which can damage road pavement and is associated with several waterborne diseases and contamination. Additionally, the project will improve the safety conditions of the roads through repair of pavements, safety barriers and retaining walls. Most importantly, the project will create short-term employment opportunities to local residents and Syrian refugees. Considerable additional jobs will also be created in the supply chain industries as well as the engineering and consultancy services.

1.18 Negative Impacts

Potential negative impacts on local environment, communities, and workers are presented in Table 0-1.

As mentioned earlier, specific activities that will be performed for each road separately have not yet been determined. Thus, impacts were assessed for the general routine maintenance activities under the project scope. The worst-case scenario impacts were considered for critical roads where impacts are expected to be more significant and accordingly specific mitigation measures are provided. Regarding the social impact assessment, impacts on socio economic conditions of vulnerable groups will be assessed as part of the impacts on the surrounding inhabited areas, as in the case Jbeil, displaced Syrians are not living in specific camps, and thus are considered as part of the local communities. Moreover, it is important to mention that maintenance works in Jbeil will not require land acquisition, therefore, vulnerable groups will not be relocated.

Impacts include fugitive dust emission during maintenance work, increase in noise pollution derived from construction machinery, degradation of water quality, potential damages to existing utilities, and disturbance of local biodiversity. Potential social risks related to the project include nuisance; traffic disturbance; potential labor influx; potential social tensions; increase in GBV risks (mainly SEA and SH); inappropriate labor conditions; obstruction of temporary access routes to sensitive receptors, damages of public utilities, and others. Further, adverse HS and OHS impacts that are associated with project activities (exposure to physical, chemical, biological hazards and traffic-related accidents) are expected to be of high significance in the absence of an effective Environment Health and Safety (EHS)/OHS management system and TMP or in case of safety gaps (e.g., incomplete risk assessment and

lack of safety procedures, training, engineering and administrative controls, emergency preparedness and response plan).

1.19 Management Plans

All identified impacts must be controlled and mitigated as early as possible. Thus, the aim of the management plans is to ensure effective and fast action responses to achieving good environmental, social, and safety performances.

Measures to control exhaust emissions, dust and odor emissions, and accidental spills of construction materials are provided with specific/stricter measures for critical roads (roads that crosses with rivers or are in close proximity to springs (e.g., where JP1 is only 50 m away from Afka spring or where JP4 Crosses Khalaf Spring in Qartaba (refer to Table K in Annex 2)). Further, to ensure that damage to biodiversity is avoided, the creation of a buffer zone and enforcing strict waste management plan are suggested for roads that are considered of certain ecological criticality (Table 0-5). Whereas, addressing potential GBV, SEA/SH concerns could be achieved by ensuring that CoC targeting GBV/SEA is signed and understood by workers; training on GBV/SEA are regularly delivered, and REP GRM and the referral pathways are functioning. Further, the Contractor is recommended to ensure continuous engagement of stakeholders (namely concerned municipalities, identified PAPs/sensitive receptors) in order to avoid impacting/disturbing the local community (namely for the detected touristic and religious areas where roads are in close proximity to churches (e.g., Annaya) – refer to Table Q).

Finally, municipalities' concerns were integrated into this management plan (e.g., prioritizing local labors, limiting impacts on farmers produce etc.).

In addition to the environmental management plan (Table 0-1) and the social management plan (
Table 0-2), a separate OHS management plan was provided (
Table 0-3). Both the ESMP and the OHS management plan must be implemented to fulfill REP safeguard requirements. In other words, the Contractor is obliged to implement reasonable precautions to provide a safe environment for the work force and public. Measures to prevent and control occupational and community hazards are provided at this stage of the project. However, an OHS plan, in line with CDR (2007), IFC, EHS/OHS, and OSHA guidelines for construction sites (including site-specific risk assessments), should be submitted by the Contractor before initiating works. The OHS manual plan should at least include the developed measures in Table 0-3 and a comprehensive Job Hazard Analysis (JHA). The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazard. Finally, measures in relation to traffic management and guidance in relation to the Traffic Management Plan (TMP) that should be prepared as well by the Contractor are provided along with H&S control measures in
Table 0-3**.**

Table 0-1 Environmental Management Plan

Parameter	Activities	Impacts	Mitigation Measures

Water and soil Quality	Works with Potential to Cause Impacts in case of <u>mismanagement of generated waste</u>, <u>improper handling of construction materials</u>, and <u>uncontrolled spills and littering</u>:
	
	Pavement repair works
	• Excavations and milling can produce substantial amounts of dust and scattered pavement materials.
	• Pavement repair works will result in the generation of solid and hazardous wastes; mainly old asphalt layers, crushed sub-base aggregates, solvent and oil products etc.
	• Accidental spills of bituminous materials with construction runoff and storm water might result in water and soil quality deterioration.
	
	Drainage Maintenance
	• Improper disposal of waste of removed obstructions, debris and waste; from cleaning hydraulic structures
	• Improper disposal of excess waste during replacement of drainage appliances
	
	Installation/removing of road markings and paintings
	• Improper storage and disposal of chemical compounds (e.g., paint).
	• Spillage of chemical paint substances
	
	Installation of concrete barriers and concrete repair works
	• Spills from on-site concrete pouring
		• Pollution of surface water where road cross rivers.
		• Pollution of underground aquifers specially that mainly all studied road alignments fall on karst limestone aquifers.
		• Increased water turbidity due to the generated dust that can either enter water courses when it is mixed and directed by rain or it can be deposited naturally.
		• Pollution of water resources and soil quality due to improper management of toxic substances (e.g., asphalt layer), inadequate disposal of solid waste, debris…
		• Pollution of water and soil quality due to accidental spills of bituminous materials, chemicals/paint and leachate of concrete pouring.
		• Pollution of water and soil quality due to improper management of the generated domestic solid waste and wastewater from the porta cabin.
		• Deterioration of water and soil quality due to contaminated stormwater runoff with bituminous materials, fuel/oil.
		
		These impacts will adversely affect the following rivers/watercourses that are crossed by the identified **critical roads** (refer to Table 0-5):
		• Nahr Ibrahim River is crossed by road JP1 ,2 ,3-1, 4, and 7
		• Wadi El Fidar is crossed by road JP5
		• Wadi Mouhnane is crossed by JP11 and JP14
		• Wadi Bacchta is crossed by JP16, 17, and 19-2
		• Khalaf spring is crossed by road JP4
		• Ain Al Daia spring is crossed by road JP7
		• Al Kassis Spring is crossed by road JP10
		• JP1 is close to Afka spring
		
		As for the groundwater resources, **nearly all roads** lie on a **<u>karstic formation</u>** characterized by **its high transmissivity** and can be easily exposed to contamination.
			<u>Dust Control</u>
			• During excavation, water should be sprinkled to hamper fugitive dust emissions that could pollute surrounding water quality.
			
			<u>Construction Solid Waste and Wastewater Management</u>
			• Excavated soil should be stored and transported offsite to the nearest licensed dumpsite “Hbaline dumpsite “due to possible heavy metal contamination.
			• <u>During pavement repair works</u>
			  ○ Cleared subgrade or reclaimed asphalt must not be disposed into the road adjacent ecosystems and rivers.
			  ○ Compacted, unsuitable/degraded materials shall be disposed in a licensed landfill and suitable materials should be sent to facilities to be reused in construction.
			• Cleared materials and debris (soil, stones and sticks) should not be disposed into the nearby streams and rivers. Cleared materials should be properly collected away from drainage waterways and disposed by the Municipality of Jbeil.
			• <u>When cleaning hydraulic structures</u>: store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain. All obstruction materials cleared debris, silt and vegetation must be disposed of to a safe place.
			
			<u>Management of Accidental Leakages/Spills</u>
			• Accidental leachate during concrete pouring should be immediately cleaned, collected in an impermeable bag and disposed along the municipal solid waste collection route.
			• Have a spill response plan in place and spill kits on site. All workers should be trained on its implementation.
			• Accidental spills of fuel or oil or hazardous materials should be stopped with an available obstacle. Spill should be cleaned with an absorbent pad or saw dust. Contaminated absorbent and/or soil should be collected in an impermeable bag to be deposed along the existing municipal waste collection route, in the absence of a national licensed landfill for hazardous waste.
			
			<u>Proper Handling of Construction Materials and Hazardous Waste</u>
			• Proper handling of fresh asphalt, slurry, paints, and other construction materials.
			• Provide secondary containment when storing hazardous substances in bulk quantities.
			• All refueling operations shall take place off-site, vehicles should be fueled up before arriving to the road section.
			• Ensure Material Safety Data Sheet (MSDS) of all hazardous materials (chemicals, sealants, patching materials) are present onsite.
			• Raw materials should be stored away from watercourses.
			
			Additionally, when the maintenance works are conducted in close proximity to critical roads (refer to Table 0-5) the following should be implemented:
			• Clearing and grubbing should be practiced at least 30 m away from the nearest stream or river.
			• Mix hazardous materials at a minimum of 40 meters away from any watercourse or sensitive habitats.
			• Limit the application of surface treatments to the road surface and avoid over spraying near water courses and at watercourse crossings.
			• Maintain suitable buffers between, material storage and watercourses and sensitive habitats.

Parameter	Activities	Impacts	Mitigation Measures
			• Placement of geotextile silt traps as appropriate, especially in areas close to water bodies (when roads are in close proximity to Wadi Mouhnane, Wadi Baachta, Ibrahim, and Wadi El Fidar rivers and Al Kassis spring and Ain Al Dai spring). • During installation of concrete barriers and concrete repair works, on-site concrete pouring must be done in a way to avoid leaching in nearby streams and water bodies. Concrete works should be performed at least 40 meters away from nearby streams or sensitive habitats. **<u>Control of Stormwater Runoff</u>** • In case of temporary storage of excavated materials, accidental contamination or spills of the removed soil should be avoided to limit contamination of storm water runoff and in turn the surrounding streams. • Any stockpiled construction material should be covered with an impermeable layer to avoid contamination of stormwater runoff. **<u>Domestic Solid Waste and Wastewater Management</u>** • Domestic-like waste shall be removed daily from the routine maintenance sites. • The generated waste onsite should be properly segregated at source into recyclables and organic waste in appropriately labelled waste bins. • The Contractor should link the porta cabin toilet to the existing wastewater network. • In case of linking the porta cabin toilet to a polyethylene storage tank, the following should be done: o A specialized contractor should be selected to periodically collect the wastewater from the polyethylene tank. o The tank should be inspected regularly to check for any leakages and to ensure that the generated wastewater is properly collected before it's full. **<u>Timing of Works</u>** • Clean drain structures and repair slopes and road shoulders prior to the wet season for easier control of deleterious materials and runoff. If intervention in rainy season is needed, special care is required to allow water away from the road and avoid erosion. • If the schedule requires working in the rain, the work area shall be isolated and appropriate erosion plan must be installed to prevent the release of sediment-laden water and other deleterious substances into watercourses and sensitive habitats particularly for surface maintenance activities requiring the application of patching and sealing component, tar, asphalt, and dust control materials
Soil erosion	• Earth works • Cleaning and grubbing • Repair works resulting in disturbed areas which aren't properly re-vegetated.	• Excavation of soil may result in disturbance of soil structure and thus may cause an increase in soil erosion and release of sediments. This will permanently change the structure of the soil and surface geology. • Cleaning and grubbing grass and weeds may result-in erosion of the slopes and removal of vegetation.	• After repairing shoulders, it is important that the side slope is immediately covered with grass turfing. • When trimming of grass and weeds from roadway it is important to ensure that the grass is not grubbed but only trimmed to avoid erosion of the slopes.
Air quality	• Excavation and milling works • Movement of raw materials transporting vehicles on unpaved surfaces • Unloading of raw materials • Open storage of raw materials	• Exhaust emissions from vehicles transporting workers to/from site (i.e., buses, mini-vans, cars). • Exhaust emissions from power generators. • Exhaust and dust emissions from excavators, paving vehicles (graders, sweepers, dump trucks, asphalt pavers,	**<u>Control of Exhaust Emissions</u>** • Ensure the maintenance of all construction equipment and vehicles regularly, at least once a month. • Machinery and equipment should be equipped with air pollution control equipment that should be monitored regularly to ensure its effective operation. • Power generators should be equipped air pollution control equipment. • Avoid idling time of machinery.

Parameter	Activities	Impacts	Mitigation Measures
	• Disturbances to material stockpiles by local winds and material handling, which is of great significance depending on the road location. • Wind blow during transportation of materials by vehicles and specifically when transporting on unpaved roads	compactors/rollers, steel wheel rollers, bitumen tanks with spreaders). • Dust emissions from disturbances to material stockpiles by local winds, material handling and traffic using unpaved roads. The generated fugitive dust will highly affect the nearby agricultural lands, shown in Table N in Annex 2.	**<u>Control of Dust Emissions</u>** • During excavation and dust generating activities, water should be sprinkled to hamper fugitive dust emissions. **In specific, water should be sprayed on exposed surfaces during dry periods near schools, churches and agricultural lands surrounding the critical roads (refer to Table 0-5, Table N and Table Q in Annex 2).** • Ensure that trucks hauling raw materials are properly covered. • Ensure that stockpiles of raw materials are always covered • Ensure that all trucks carrying removed materials/waste from construction sites are covered. **Additionally**, when the maintenance works are conducted in close proximity to critical roads (refer to Table 0-5), the following should be implemented: • Loading and off-loading of raw materials should be performed away from sensitive ecosystems and/or nearby rivers. • Stockpiles of raw materials should be placed at least 50 m away from sensitive habitats.
Odor	• Pavement repair works • Installation of road marking and painting	• Odors from asphalt fumes and paint can cause unpleasant smells to the surrounding. • Odor emissions might be generated from mismanagement of solid waste and wastewater and disrupt the local environment.	• Transport trucks, specifically trucks transporting asphalt, are to be tightly covered at all hauling times to reduce as much as possible release of unpleasant odors. • When maintenance activities will be performed in close proximity to sensitive receptors (refer to Table Q in Annex 2), the community should be informed beforehand regarding the expected odor emissions. • Ensure daily collection of solid waste from the site and adequate management of the generated wastewater.
Noise	• Elevated noise levels will mainly result from excavation, pavement and milling, and concrete placement, etc. • Noise and vibration might be caused by the operation of earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and workers.	• Heavy and noisy machinery such as, excavators, bob cat, steel roller, compressors, pick- up, dump trucks that generate unpleasant noise levels and disrupt nearby settlements and natural habitats.	• Regular maintenance of the machinery, equipment and vehicle should be performed to prevent excessive noise. • Appropriate work schedule should be applied to avoid nuisance to the surrounding receptors. • Vehicles and equipment that meet national standards for noise and vibration should be used. • Avoid noise generating activities near roads surrounded by sensitive receptors (mainly road segments that are surrounded by forests (refer to Table O in Annex 2) and when the road (JP11) intersects with BNR).
Biodiversity	• Routine maintenance debris, excavated materials and other used construction materials if discharged directly into the adjacent rivers and valleys. • Wastewater discharge into the roadside woodlots and riparian habitats can severely affect the local fauna and flora and eventually lead to population destruction. • Contamination of terrestrial habitat due to accidental spill • The generation of emissions and disturbances such as noise, dust, and pollutants in adjacent areas' soil and vegetation. • Clearing and grubbing (i.e., removal within the limits of working area all vegetation, surface debris and scattered stones and rocks etc.) could include accidental removal of sensitive and protected species. • Fauna injuries due to collision with machine and vehicles due to increase in traffic movement	• Temporary disturbance of nearby ecosystems • Direct destruction of population • Habitat Alteration • Road kills (i.e., mortality due to vehicular collisions). • Contamination of terrestrial habitat due to accidental spills • Fauna injuries due to collision with machine	**General Mitigation Measures** • During drainage maintenance, culverts should be surveyed for the presence of nesting communities • Culverts where wildlife have been determined to be absent do not require buffers or exclusion practices • Prior to grubbing or excavation, the contractor should inspect the working zones for areas of endangered plant or animal species (mainly areas that are considered of high ecological criticality- indicated in this ESMP in Table 0-5). Any findings shall be reported immediately • Whenever any vegetation is scheduled to remain in-place, selective clearing techniques shall be employed. All vegetation listed to remain should be marked • Contractor's personnel should not damage remaining shrubs, trees or their root systems during selective clearing • A waste management plan must be taken to avoid contaminating adjacent natural habitats and direct destruction of wildlife **Strict Measures Near Critical Habitats:** • In case works will take place near riparian habitats (i.e., when roads cross or are in close proximity to rivers and streams) provide a filter strip between the road and the river/stream (e.g., Wadi Mouhnane, Wadi Baachta, Nahr Ibrahim, and Wadi El Fidar rivers).

Parameter	Activities	Impacts	Mitigation Measures
			• Prevent spillage of construction materials and do not discharge unused or removed materials during maintenance activities into adjacent natural habitats (refer to critical natural habitats in Table O in Annex 2). • Restricting the use of noisy machines and/or adopting noise-reducing means (silencers) for construction machines, especially near sensitive areas (namely if works took place along JP11 in Bentael where the road intersects with BNR/IBA and other critical roads refer to ecologically critical roads in Table O in Annex 2). • Washing of vehicles and machinery should be done offsite and away from particular biotopes (wooded lands and riparian ecosystems); • Routine maintenance activities along JP11 (road intersecting with BNR/IBA) must not take place during the two major migration seasons for birds (i.e, early September-late November and mid-Mars–early May), if feasible. • In case works will take place along mountainous roads that involve rocky habitats (at higher elevation, e.g., JP2) avoid direct destruction of reptile communities by creating a buffer zone. • Road cross-section must be fixed during works to reduce the impact on biodiversity, for example, by flattening side slopes. This makes crossing easier for animals that find roads a physical barrier (WB)- If feasible (in case major maintenance activities will take place at JP11).
Resources Consumption	• Water will be used for domestic purposes, for construction activities (curing of concrete, moisturizing temporary stockpiles…etc.) and for cleaning and dust suppression. • Energy will be consumed for the operation of vehicles and equipment.	• During the routine maintenance works, overconsumption of water and energy will lead to exploitation of natural resources.	**Control of Freshwater Demand** • Dry clean-up methods should replace wet cleaning methods whenever practical (sweeping, dust collection vacuum, wiping…etc.). • Appropriate plastic sheeting or waterproof paper should be used to cover the concrete after water curing to preserve moisture and reduce the evaporation that leads to decrease water quantities used. • Signs near water-using appliances should be installed to encourage water conservation. **Control of Energy Demand** • Turning off non-used equipment should be done. • Machinery and generators shall be regularly maintained and operated in an efficient manner. • Vehicles should not be allowed to remain idle for long periods.
Physical Cultural Resources	• Excavation, milling and grubbing.	• During excavation (shallow and deep) and other geotechnical works, there is a potential to unexpectedly find and impact archaeological materials in an area not previously known for its archaeological interest.	Prior to grubbing or excavation, the contractor should inspect the working zones for areas of archaeological remains. **Chance-find procedure:** • All construction activities in place of the discovery must cease immediately once discovery of an archaeological artefact or complex is discovered. • The site must be fenced (protected) and authorities (Ministry of Culture / Directorate General of Antiquities (MoC/DGA)) must be informed within 24 hours following the national procedures (law 166/LR of 1933 that regulates antiquities and law 37 of 2008 on Cultural properties • The area should be secured in order to prevent any destruction or disappearance of the archaeological complexes. • Work should not be commenced without the DGAs' written decision on how to handle the findings and recommence the work.

Table 0-2 Social Management Plan

Parameter	Impacts	Mitigation measures
Social Risks	**Socio-Economic Conditions** **Community** • Labor influx and Labor-induced SH and SEA	**Labor influx and labor induced SEA** • Providing workers with the necessary training and awareness raising session on issues regarding SEA, GBV prior to signing the CoC. • Ensuring that workers sign the Code of Conduct (CoC) (refer to Annex 3) that targets GBV risks, specifically SEA induced by labor influx, and penalizes the perpetrators of SEA.

Parameter	Impacts	Mitigation measures
	• Traffic disturbance and obstruction of access routes to sensitive receptors • Disturbance of sensitive receptors • Disturbance of public utilities and interference with private properties/lands	• Ensuring that REP established GRM is well disseminated to concerned communities (before commencement of works) through municipalities public boards and project sign boards. • Ensuring that REP GRM (including the QR code along active roads) is properly functioning to record complaints from the surrounding communities. This will ensure the management of complaints and the implementation of corrective actions. **Obstruction of access routes to sensitive receptors** • Adequate and timely communication with the concerned municipalities and dissemination of project-related work schedule with the surrounding community. • Routine maintenance works should not be performed during peak traffic hours (e.g., works can take place when students are already at school and in a way not to disturb people going to church where roads are in close proximity to schools churches as shown in Table Q in Annex2). • The temporary traffic control can involve lane width reduction, lane closures depending on the type and duration of routine maintenance activities to be performed. Detours and diversions should be designed and provided as needed to ensure a continuous traffic movement. • Provision of safe passages and crossings for pedestrians namely for roads that involve schools, hospitals, and churches (refer to Table Q in Annex 2) and for farmers when road segment are in close proximity to agricultural lands (refer to Table N in Annex 2) – this was one of the main concerns of attendees at the public participation for Jbeil Caza (refer to section 1.24). **Disturbance of sensitive receptors (noise and dust)** • Noise levels and air emissions should be maintained within the national permissible limits and the contractor should be limited to working hours as defined with local municipalities. • Activities should be planned in consultation with the local community so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. • Nighttime activities, if any, should be performed using low-noise technologies. • When performing noise generating activities, the Contractor should inform sensitive receptors such as schools, hospitals, and churches that if they lie in close proximity to the assessed roads, as shown in Table Q in Annex 2). • During excavation and dust generating activities, water should be sprinkled to hamper fugitive dust emissions. In specific, water should be sprayed on exposed surfaces during dry periods near schools, churches and agricultural lands surrounding the critical roads (refer to Table 0-5, Table N and Table Q in Annex 2). • Strict measures and supervision must be applied when roads are in close proximity to the detected sensitive receptors. **Disturbance of public utilities and private properties** • Pushing excavated materials onto adjacent lands and damaging public utilities or private properties must be avoided through delineation of work areas. • When trimming trees, broken or cut limbs are not to fall on or damage overhead wires.
	Labor Conditions • Inadequate labor conditions • Workers tension (Syrian/Lebanese ratio) • Child labor • Under-participation of women	**Labor Induced SH** • Laborers should be provided with training sessions and awareness campaigns on SH • CoC should be enforced to project laborers (in a language understood by all workers). • The Contractor should ensure that CoC requirements and sanctions to be applied, if breached, are well understood by signatories, prior to signing the CoC. • Ensuring that training on GBV/SEA are regularly delivered, and REP GRM and the referral pathways are functioning. • REP GRM specific procedures for SEA/SH, including confidential reporting with safe and ethical documenting of SEA/SH cases must be communicated to all workers. • The Contractor should employ a social/environmental specialist to supervise the GBV issues related to SEA/SH such as supervise signing of CoCs, verify adequate operation of the GRM for SEA/SH etc. **Child Labor** • The project should have measures in contracts to ensure that those below the working age are not hired and ensure that labor law of Lebanon is followed. • Labor registry and age verification must be maintained during the whole project through an age verification mechanism to be implemented by the Contractor and checked by the supervising engineer (continuous ID control). • Penalty provisions should be available for hiring child labor. • During the employment procedure, the contractor or subcontractor should abide by the Lebanese Law No.0 dated 1946. **Inadequate Labor Conditions** • Safety and protection of workers should be ensured within the contracts provided by the contractor. • Appropriate rules and regulations should be implemented in order to ensure the protection of laborers. • Contractors should be forced to abide by the specified Lebanese law determining the minimum wage and minimum working age for children.

Parameter	Impacts	Mitigation measures
		• Contractor must comply with Decision 29/1 dated 2018 which restricts significant number of jobs to Lebanese only and allows Syrians to occupy jobs that are not restricted to Lebanese. • Continuous monitoring is required to maintain adequate labor conditions. **Social tensions and conflict over job-sharing and dissatisfaction with allocation of project-generated jobs.** • Clear criteria for job selection and allocation should be adopted accounting for the ratio of Syrian and Lebanese community workers in Jbeil Caza and types of positions available. • It is important to avoid competition between Syrian workforce willing to accept lower wages and skilled Lebanese labor. • The Contractor should ensure a fair allocation of job opportunities, and most importantly non-discrimination and fair treatment should be ensured among workers (such as equal contractual wages/benefits and working conditions). • Clear communication with all affected workers and good implementation of REP GRM are essential to mitigate the potential risk of social tensions or dissatisfaction among Syrian and Lebanese workers. **Under-participation or underemployment or discrimination of women** • Setting minimum percentage of women at the employment phase. • The project should ensure that gender equality is attained when it comes to recruitment, salary levels and others. • Promoting the employment of females in appropriate jobs such as managerial or administrative positions.

Table 0-3 H&S Management Plan (in accordance with IFC EHS/OHS guidelines) – *see more details in Annex 6*

Health and Safety Hazards	Impact	Mitigation Measures
Community Health and Safety	• General site hazards • Disease Occurrence • Traffic accidents	**Communication of risk with local community** • Placing of warning signs to warn the passing citizens about the potential hazards. Signage should be in accordance with international standards (e.g., OSHA 29 CFR 1910.145) and be well known to, and easily understood by the general public as appropriate. • Restricting access to working sites, through directorial controls and dangerous spots in the working sites such as pits, trenches, etc. must be clearly marked and fenced. **Disease prevention** • When repairing rain cuts and minor slips, if material was borrowed along the sides of the embankment, it is important to ensure that it does not become a pond of stagnant water where mosquitos can breed, particularly when it is situated nearby human settlements **Developing a TMP** • A TMP must be developed before commencement of work to ensure traffic safety (refer to traffic safety section of this table) • The TMP should address the partial closure requirements to limit interference to the traveling public and minimize project-related traffic delay and accidents by applying effective traffic mitigation plans and timely diffusion of information to the community and motorists concerning construction operations. These plans must cover alternative routes when needed and must focus on preventing, minimizing and managing traffic incidents.

Occupational Health and Safety	• **Job Hazards**
	• **Workplace/Site Hazards**
	• **Injuries**
	• **Physical hazards** (covering all planned routine maintenance activities)
	  ○ Noise
	  ○ Lifting, slipping, electrical, equipment and working at height hazards
	  ○ Vibration and excavation hazards
	  ○ Vehicle driving & site traffic hazard
	  ○ Environmental hazards
	  ○ Culvert–specific hazards
	  • Confined space
	  • Hazardous atmosphere
	  • Culvert collapse
	  • Water: High flow rates can create dangerous footing conditions
	  • Animals, particularly snakes, in the culvert can be dangerous, especially if trapped
	  • Entrapment: Deep mud can entrap personnel walking through it
	  ○ Working with precast concrete elements -specific hazards
		Hazard Identification and Risk Assessment
		• A JHA must be conducted before commencement of work. The results of the analysis should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards.
		• Permit to Work (PTW) should be used for Higher Risk activities.
		
		Workplace
		• Clean eating area, potable water supply, lavatories and showers, first aid kits, lighting, fire detectors and fire-fighting equipment must be provided by the Contractor in Jbeil site office.
		• Equipment should be adequate for the dimension of the office and the maximum number of people present.
		• Fire and emergency alarm systems must be installed.
		• A person must be appointed to be responsible for the fire protection.
		• Workstations must be equipped with first-aid stations, rest areas, and eye-wash stations
		• Fire extinguishers must be available in foremen cars.
		
		First Aid and Injuries
		• The Contractor should ensure that qualified first-aid can be provided at all times.
		• First aid kits must be available at project site office and at foremen cars.
		• One laborer onsite should be appointed to respond to emergency cases.
		• All workers onsite should know where the first aid facilities are located and how to adequately use first aid kits.
		• A complete list of nearby hospitals, medical centers and emergency contact numbers should be provided to workers at project site offices and to foremen.
		Special care must be taken:
		• If manual methods for removing brush, and other vegetation are labor-intensive and require close supervision to ensure good production and worker safety.
		• In order to avoid serious physical injury or equipment damage when debris being cut by a machine shatters and flies in unpredictable directions.
		Communication of Hazard

Health and Safety Hazards	Impact	Mitigation Measures
	• Incorrect loading and unloading methods: High-risk activity (serious injuries) • Uncontrolled collapse of elements • Incorrect lifting and/or unsafe lifting equipment • Poorly secured loads • Inappropriate or unstable work areas for cranes • **Chemical hazards** o Exposure to toxic, corrosive, sensitizing or oxidative substances. o Exposure to asphalt fumes is linked to breathing problems, and skin irritation (Norseth et al, 1991). • **Biological hazards** o Covid-19 spread/ labor-intensive project	*Area signage and labelling of equipment* • Hazardous areas (e.g., storage and excavation areas), installations, materials, and emergency exit, etc. must be marked appropriately. • All containers that may contain substances that are hazardous must be labeled as to the contents and hazard (i.e., based on MSDS), or suitably color coded. Copies of the hazard coding system must be posted outside the storage area where they are likely to come to the attention of safety personnel. • All energized electrical devices and lines should be marked with warning signs. • Machines with moving parts must be turned off, all electrical devices must be marked with warning signs. • Warning signs (danger/caution signs, general safety information signs, emergency and direction signs) must be installed at sites, offices, parking/storage areas as needed. *Site security* • Communication of risks to workers must be implemented. • Signage should be easily understood by workers. • Good house-keeping practices (e.g., placing loose construction materials in established areas and properly managing generated wastes) **Training** • Ensure that all workers are given proper site-specific instructions on OHS prior to commencing work. The OHS training should consist of hazard awareness and control measures. • Provide specialized trainings for supervisors of High-Risk activities to enhance personal safety (e.g., for people working at height, supervisor must be assigned and trained on risk assessment, inspection of scaffolds according to CFR 29 OSHA Part 1926 standards (SCF) and for basic fall arrest and basic rescue). • Trainings on PTW must be conducted to all workers participating in the job. • First Aid Training must be delivered to workers by a certified trainer from Red Cross to help them learn to be more conscious of safety on site and how to deal with accidents occurrence in a proper way. **Physical hazards** Noise • Workers should not be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. • Limiting the duration of noise exposure (e.g., for every 3 dB (A) increase in sound levels, the allowed exposure period should be reduced by 50 percent). reference • Periodic medical hearing checks should be performed on workers who are exposed to high noise levels. Working at Height • Working at height: Scaffolds inspection according to the OSHA standards • Fall prevention and protection measures should be implemented, such as the installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area • Train supervisors and workers for basic fall rescue Safe tree branches removal • Ensure all ladders or scaffolding used in tree branch removal are securely fixed and one worker is holding the ladder while another worker is climbing up and cutting the branches. • When using the rope to remove branches from tree, ensure that the length of the rope is longer than the height of the tree. Electrical, lifting, slipping, and equipment hazards • Checking all electrical cords, cables and hand power tools for frayed and exposed cords and following manufacture recommendations for maximum permitted operational voltage. • Protecting power cords and extensions from physical damages like getting wet from rain. • Train all workers on proper safe lifting technique (namely for lifting concrete elements). • Assess thoroughly the work area in order to identify areas at high risk for slip, trip, and fall injuries and control it; conduct regular inspections on general cleanliness, spill response, and the effectiveness of cleanings; • Turning off or disconnecting machinery with exposed moving parts. Working with precast concrete – specific hazards (OSHA standards) • The lifting hardware must be capable of supporting at least 5 times the maximum intended load • No employee shall be permitted under precast concrete elements being lifted • Use of tag lines to eliminate potentially hazardous situation Exposure to vibration • Installation of vibration dampening pads or devices. • Limiting the duration of exposure. Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers.

Health and Safety Hazards	Impact	Mitigation Measures
		Excavation hazards (IFC OHS guidelines): • Controlling site-specific features which may contribute to excavation slope instability (e.g., use of excavation dewatering, side-walls support, and slope gradient adjustments that minimize the risk of collapse and entrapment). • Providing safe means of access and egress from excavations, such as graded slopes, or ladders. Vehicle driving and site traffic hazards (IFC OHS guidelines): • Training and licensing vehicle operators in the safe operation of specific vehicles • Ensuring drivers undergo medical surveillance (regular request of medical checkup reports including drug test for truck and heavy machinery drivers). • Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns. • Implementation of traffic control procedures (e.g., application of traffic control devices and assigned traffic control people). • Traffic control procedures must be communicated to workers prior to starting work and used for toolbox safety meetings. Environmental Hazards • Care should be taken when cleaning culverts because snakes can be present. • Workers when undertaking routine maintenance activities (e.g., clearing and grubbing) can be exposed to bite and stings. Culvert-specific hazards • Permit-required confined space entry procedures (as specified in OSHA CFR 1910.146) should be followed for culverts. These procedures include: o Workers shall be trained in confined space entry procedures. o Entry hazards shall be evaluated and workers shall be informed of these hazards. o Before and during culvert entry, the atmosphere should be tested for oxygen content and flammable gases. o At least one assistant should be available outside the permit space into which entry is approved for the duration of entry operations. o Forced ventilation should be supplied if needed. **Chemical hazard** • All workers should be responsible for understanding the MSDS for any chemical that they may be exposed at the construction site (toxic, corrosive, sensitizing or oxidative substances). • All workers should handle hazardous materials properly, clean up any spills that occur. • All workers must wear proper PPE at all times. Hazard associated with working with Asphalt • The application temperature of heated asphalt must be kept as low as possible. • Worker exposure to asphalt fumes and asphalt-based paint aerosols must be minimized. • Recommended PPE when working with asphalt are respiratory protection/ chemical goggles, loose clothing with closed collars and buttoned cuffs, thermally insulated gloves with gauntlets that extend up the arm, safety shoes at least 150 mm high and laced. • Long handled sprayers with flexible hoses should be used when emulsified asphalts are applied by hand for tack coats. Hazardous materials plan • The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaking (e.g., banded-container). Secondary containment system must be free of cracks and able to contain the spill. • Any leaking containers must be removed immediately from the site and appropriate remediation measures must be undertaken on resulting contaminated areas. • Chemicals should be managed, used and disposed, and precautionary measures taken as required MSDS. • Workers who may be in contact with such products must be trained on their handling and toxicity. • Hazardous material containers must be kept in designated storage areas. **Biological Hazards** Covid-19 measures • Specific posters, signs and kits in relation to Covid-19 must be available at offices and working zones. • All workers should keep proper spacing of at least 1.5 m. • All workers should wash their hands often and clean them with an alcohol-based hand sanitizer that contains 60 to 95% alcohol • All workers should wear a facemask at all times. • All workers should cover their mouth and nose with a tissue when they cough or sneeze. • All workers should avoid sharing personal items. **PPE** • Selection of PPE should be based on the hazard and risk ranking.

Health and Safety Hazards	Impact	Mitigation Measures
		• Correct use of PPE should be part of the OHS training program for employees. • Ensure that workers wear PPEs all the time during working hours. • Specific PPE should be used when handling corrosive or poisonous substances and working with asphalt (NIOSH, 2003) including thermally-insulated gloves to keep asphalt from burning or irritating the skin; steel-toed safety shoes; a face shield with the safety glasses. • Ensure proper maintenance of PPE, including replacement when damaged.
Traffic Safety: Community and Workers (in accordance with CDR/WB guidelines on TMP)	• Increase in movement of heavy vehicles for the transport of construction materials and equipment may increase the risk of traffic-related accidents and injuries to workers and local communities.	**Community** • Signs, barriers and traffic diversions signs (vertical signalization and signs at the beginning of work zone) should be placed prior the working zone to inform the public that routine maintenance activities are taking place. • Protection screens should be mounted on the concrete barriers delineating the work zone boundaries to avoid the drivers' distraction with the routine maintenance activities, to reduce the dust and noise resulting from these activities and prevent anyone from entering the work site. • Advanced warning and regulatory signs should be installed prior and along the work zone. The signs should be placed at decision-making points on routes approaching the construction site and detour to inform motorists about alternate routes to avoid the constructions works. • Advisory speed limit signs should be placed in advance or the reduced speed zone to inform the drivers about any driving speed changes. • Installation of signs to ensure access to nearby facilities. • Pedestrian safety must be ensured namely children if the school is in the vicinity. • Traffic should be allowed only in the lane not being sealed. Car must go in a direction opposite of the seal coat operation. This prevents cars being turned on freshly placed seal coat. Some emulsions may require up to 24 hours of traffic control or until the first sweeping occurs. • Temporary traffic control schemes must be removed after completion of the construction activities that can mislead the drivers. **Workers** • Regular traffic safety training sessions must be delivered to workers. • Safe movement and working environment for workers must be provided (e.g. temporary traffic barriers should delimitate the work zones to protect the workers from any errant vehicle). The concrete barriers should be flared to the clear zone outer edge to avoid any vehicle head-on collision with the upstream barrier. • Entrance and exit gates should be provided to allow the access of workers, trucks and other construction equipment.
Road users and Nearby communities	• Routine Maintenance Expansion Joints Repair on highway bridges	**The traffic management plan shall be implemented, as first stage before starting works.** **During the execution of maintenance/ repair of these joints, the traffic shall be diverted to the edge lanes or to service lanes in a safe manner, ensuring the continuity of traffic circulation with an acceptable flow.**

Monitoring Plans

Monitoring aims to ensure that all project activities undertaken are environmentally and socially sound, while considering the mitigation measures provided in this ESMP. It does so by defining a clear set of measurable indicators in an attempt to properly evaluate the project's performance and compliance with WB safeguards. These indicators can then be used to assist in the early detection of non-compliances. This allows the involved parties to take corrective measures and limit any unsatisfactory performance if such a case arises. It also allows them to accurately communicate the performance and compliance of the project with REP proponents.

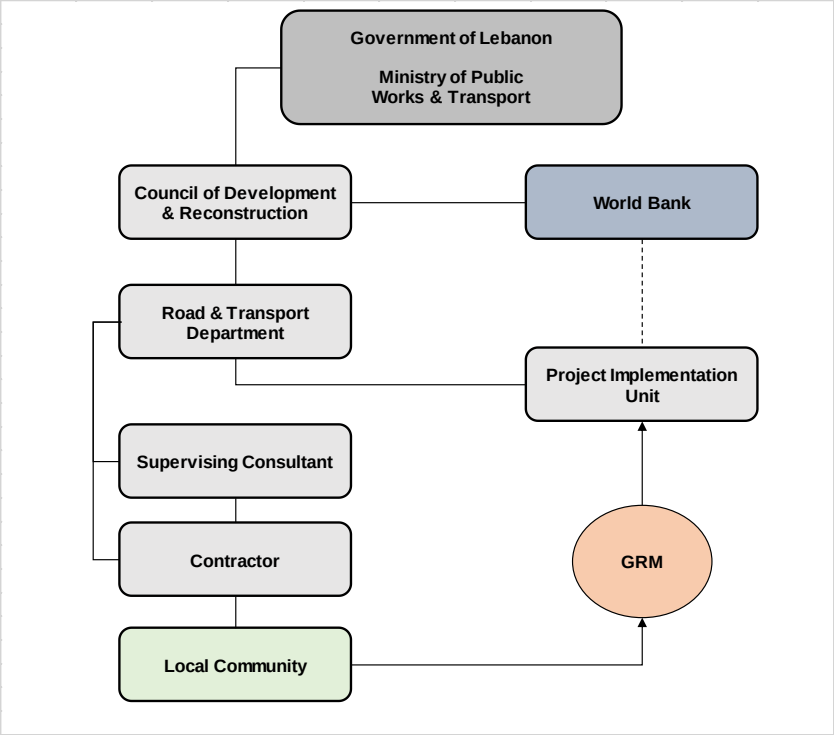
1.20 Institutional Setup

During the routine maintenance work, the Contractor would be the primary actor; ensuring compliance of works with the different items specified in the management plans. Accordingly, the Contractor will be supervised by several entities appointed by CDR (executor of REP on behalf of MoWPT) through weekly and/or monthly reports (sent by the Contractor) and site visits, ensuring and enforcing mitigation measures. In order to achieve proper management and monitoring, a clear, functional institutional structure was defined (refer to Figure 0-1).

The project will be monitored by CDR Project Implementation Unit (PIU) dedicated to REP, which includes social and environmental specialists and the Supervising Consultant who will directly monitor the Contractor. In this context, planning, implementation and supervision of environmental safeguards will thus take place at different stages (a) PIU, (b) Supervising Consultant, and (c) Contractor.

PIU will be responsible for providing the overall plan direction and validation of management plans and monitoring of compliance and progress reporting to the WB. The responsibility of implementation and management of environmental and social safeguards by the PIU will be coupled with the assignment of Supervising Consultant (focal point(s) for REP safeguards) who will be in charge of ensuring sound application of the ESMP. Accordingly, the Supervising Consultant will have to appoint qualified experts to directly supervise and guide the Contractor team and ensure project compliance. Finally, the main concerned municipalities will be involved in managing and communicating citizen's potential complaints to the CDR (PIU).

Figure 0-1 Institutional setup



1.21 Capacity Building

In order to ensure safeguard procedures, instruments and monitoring needs of REP are well understood by the Contractor staff, CDR (i.e. Supervising Consultant) will ensure that skilled and unskilled workers receive trainings covering environmental; social (including SEA, CAE, GBV, GRM, Coc), and OHS/First aid issues/requirements before initiation of works. These trainings aim to familiarize the Contractor's staff on REP safeguards management and monitoring requirements as specified in this ESMP. Further, refreshers and specialized training sessions must be conducted at all times during the implementation of the project.

1.22 Monitoring Plans Implementation

Contractors' experts and officers and the Supervising Consultant's safeguard expert will monitor the developed key indicators to ensure the implementation of this ESMP. Compliance monitoring involves visual observation/inspection, interviews with employees and external stakeholders, measurements and inspection of equipment, document review, and assessment of activities and parameters (Table 0-1). This will allow detecting, reporting, and correcting the non-compliances. More specifically, the Supervisor Consultant must ensure that (1) Contractor staff are receiving safeguard trainings and signing CoC, (2) Contractor is filling out (a) workers' registration and muster roll sheets; (b) complaints, and (c) environmental & OHS forms (e.g., incident forms, waste log, traffic inspection checklists, training records, equipment inspection checklists etc.) which shall be reported in the monthly progress report (3) Contractor is not hiring underage labors (age verification mechanism-regular inspection of workers IDs). The Supervising Consultant must also inform CDR/WB on any severe accident on-site. Finally, ministries (e.g., MoE, MoA, MoC/DGA etc.) would also be expected to follow up, if deemed necessary, on the proper implementation and abidance by the relevant laws and regulations.

Table 0-1 Environmental, Social, and H&S Monitoring Plans

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
Environmental Monitoring								
Air Emissions/GHG/ Dust	PM2.5-10, SO_x, NOx, O_3, CO,Total Suspended Particles (TSP)	If needed	• Construction vehicles exhaust • Working sites for dust	• Single point sampling (at one quarter the diameter across the stack/source) • Visual opacity • Smoke inspection	Decision 16/1 dated 2022 Particulate Matter ($PM_{<10}$) 50 mg/Nm^3 Sulfur dioxide (SO_2) 10 mg/Nm^3 Nitrogen dioxide (NO_2) 2,000 mg/Nm^3	Supervising Consultant	CDR (PIU)	(1,500 per test)
Noise	Noise Levels (Lmin, Lmax, and Leq)	During the execution of noisy operation	• At the working site, especially near loud machinery and excavation sites	• One sample per location (near sensitive receptors)	Decision 52/1 dated 1996	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
WW Generation	Domestic-like wastewater	Monthly	• Polyethylene storage tank (in case porta cabin toilet is not linked to WW network)	• Visual inspection	Prohibit leaks from tank Prohibit overfilling of tank	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Accidental Releases	Number of spills/leaks (of lubricants, oil, fuel, or other chemicals)	Continuously-during the execution of maintenance activities	• Around the Routine maintenance site, especially near equipment, material, and storage tanks	• Visual inspection	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Construction Solid Waste storage, transport, and disposal	Collection and transport of the generated waste to the designated site.	Continuously-during the execution of maintenance activities	• Solid Waste Collection Point • Storage areas • Transport trucks	• Visual inspection • Review of solid waste log	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Biodiversity								
Biological Resources	Ecological audit for particular biotopes	When maintenance activities will occur near critical natural habitat	• Riparian habitats near water channels and streams • Forests adjacent to the roads	• Samples and photos per location and GPS point	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Social & Safety Monitoring Plans								
GBV	• CoC signed by new workers • Delivery of induction training (including GBV)	Before commencement of works or every time a new worker is recruited	• At site office	• Signed CoC • Training attendance sheet • Interview with workers • Review of received GBV-related grievance	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
	• GBV-related internal grievances	Upon grievance occurrence	• At routine maintenance site	• Received complaints and GRM records	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Social Tensions and Conflicts over Job-Sharing	• Number of related grievances • Percentage of workers (based on gender, nationality)	Continuously-during the execution of maintenance activities	• At routine maintenance site	• Received complaints and records • Check workers ‘sheets	N.A.	Supervising Consultant	CDR (PIU)	-
Obstructing Access to Amenities	• Type, location, and duration of amenity to which access was obstructed	Before and during the execution of maintenance activities	• At routine maintenance site	• Visual inspection • Complaint records	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Working conditions	• Labor’s wages and working hours • GRM in place • Grievances recorded	Monthly	• Laborers’ contracts	• Review workers’ complaints records • Interview with workers • Labor law verification	Lebanese Labor Law dated 1946	Supervising Consultant	CDR (PIU)	-

Impact	Parameters to Monitor	Frequency	Monitoring Location	Monitoring Method	Standard/Guidelines National/International	Monitoring Responsibility	Institutional Follow-up	Approximate Cost (USD/year)
Child labor	• Labor's age	Continuously-during the execution of maintenance activities	• At routine maintenance site	• Labor registry • Government-issued IDs and Badges (age verification)	Lebanese Labor Law dated 1946	Supervising Consultant	CDR (PIU)	-
Underemployment of Women	• Percentage of female employees in workforce	Monthly	• At site office	• Labor registry	N.A.	Supervising Consultant	CDR (PIU	-
Other Grievances	• Internal and external grievance reports	Upon grievance occurrence	• At each routine maintenance site	• Complaints records	N.A.	Supervising Consultant	CDR (PIU	Included in Routine maintenance Cost
OHS	• Regular OHS- training • Total number of work injuries • OHS-related internal grievance	Continuously-during the execution of maintenance activities	• At routine maintenance site	• Attendance sheet • Employee records • OHS incident form	N.A.	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
	• Ensure use of PPE • Availability of fire extinguishers onsite • Good housekeeping onsite • Use of mask • OHS-related internal grievances recorded • Covid-19 precaution measures in place • Traffic violations and accidents recorded (number of accidents)	Continuously-during the execution of maintenance activities	• At routine maintenance site office	• Review of OHS records (inspection reports, follow-up reports, incidents, and training records) • Review of covid-19 checklist (reported cases) • Inspection of driving license, drivers' medical checkup reports, and drug tests • Review of traffic inspection checklists	IFC OHS guidelines for construction sites CDR OHS guidelines OHS national laws/decree Lebanese Traffic Law 243 dated 2012 (licenses requirements) MoPH guidelines/measures in relation covid-19	Supervising Consultant	CDR (PIU)	Included in Routine maintenance Cost
Traffic Hazards	• Safe traffic flow on roads under maintenance in accordance with TMP ○ Availability of adequate safety and warning signs and restricted access measures ○ Availability of Flagmen ○ Availability of safety barriers	Continuously-during the execution of maintenance activities	• At routine maintenance site	• Visual inspection	N.A.	Supervising Consultant	CDR (PIU0	Included in Routine maintenance Cost
Other Impacts								
Damage to existing infrastructure	• Type, size, and number of damaged infrastructure entities	Continuously-during the execution of maintenance activities	• At routine maintenance site	• Visual inspection	N.A.	Supervising Consultant	CDR (PIU)	-
Risk on cultural resources	• Possible archaeological features found during the works • Adequate implementation of the archeological chance find procedure.	Upon discovery	• At routine maintenance site	• ID and photographic records of all archaeological features found during the works	Lebanese Antiquity Law No. 166	Supervising Consultant	DGA	-

1.23 Documentation and Reporting

Monitoring yields lots of data regarding project performance. As a result, proper documentation is necessary for two reasons: first to prepare and send performance reports to the concerned parties and second to analyze the acquired data and implement changes when necessary. In this context, monitoring reports will take place as described below.

- Contractor's experts submit compliance reports to the Supervising Consultant on a monthly basis (including completed workers' sheets, GRM log, and environmental and OHS forms)
- The Supervision Consultant experts review and approve contractor reports and submit them to PIU on a monthly basis.
- PIU submits environmental/social progress as part of their quarterly project progress reports to the WB on a quarterly basis.

In case of severe incidents (e.g. fatality on site) immediate reporting within 24 hours to CDR and within 48 hours to the WB must be done.

Consultation, Disclosure and GRM

1.24 Public Consultation

PAPs, mainly municipalities and local authorities (Makhatir (مخاتير)), in addition to local residents represented by local NGOs, and International NGOs were consulted on the project's environmental and social aspects (list of attendees is attached in Annex 6). The public consultation meeting covered REP planned (1) routine maintenance activities for primary roads in Jbeil Caza (the subject of this ESMP) and (2) rehabilitation of the remaining road in Jbeil Caza (Jbeil R3: Dmilsa - Bentael - Bhdaydat - Kafar – Kfoun).

The public participation meeting was held at the Union of Jbeil Municipalities building on Tuesday December 14, 2021. Invitations were sent by the consultant on behalf of CDR to concerned municipalities and NGOs through official letters and emails. A sample of the invitation letter is attached in Annex 7. Invitations were sent to the concerned parties at least one week in advance from the meeting date. The number of attendees was 23 of which 3 were women.

Invited local NGOs include BNR committee, Young Women's Christian Association Jbeil (YWCA) and Frontiers' Rights (Rouwad Houkouk) all of which cover Jbeil area. As for international NGOs, ACTED, ANERA, and DRC were invited. Details in relation to invited NGOs are presented in Annex 6.

It is worth mentioning here that all relevant municipalities will be informed upfront before the commencement of works about the Project since public consultation was conducted back in December 2021. In addition, a public notice will be posted at each relevant municipality including the GRM procedure. This will disseminate the Project and ensure that its activities are implemented in a transparent manner.

During the meeting, attendees were informed about the project objectives, the identified natural, economic, and social resources of importance in the area, the project's possible environmental and social risks and the planned mitigation measures.

Firstly, local municipalities asked about their main role in REP project. In this context, the consultant explained that municipalities have a main role to inform people about the project and at a later stage, they have a major role in assisting CDR in monitoring any potential violations by the Contractor during maintenance works. The consultant explained as well that a multi-channeled GRM was established for REP project in Jbeil Caza to register and address grievances and complaints from all project stakeholders. REP GRM was disseminated, and it was explained that for each worksite, a QR code will be added on the project sign board (which includes the project GRM and the online feedback form before the commencement of work). This will ensure addressing/responding to grievances and reporting to stakeholders as indicated in the ESMP (all complaints will be individually followed up).

Further, municipalities asked to prioritize local labors and were particularly worried about the coordination with relevant authorities, especially with respect to public works (i.e., wastewater and water infrastructure, etc.). Correspondingly, some attendees including a citizen woman from Bchillé village expressed their wish to have projects that aim to improve infrastructures such as upgrading or installing sewerage networks instead of maintenance activities. In addition, local authorities asked the consultant if non-classified primary roads can be included in the maintenance scope of work. According to them, secondary roads are in greater need for maintenance activities. Accordingly, the consultant explained that given the limited remaining available funds for this Caza (REP phase 2), only primary roads are candidate for maintenance works. It was also explained that the Contractor will coordinate with local authorities with respect to public works in Jbeil and with local municipalities in relation to local labors recruitment.

A member of BNR Committee who joined the meeting, suggested to meet with the consultant before project execution in order to check the solid waste management plan to be adopted by the Contractor (if routine maintenance activities will take place in Bentael (i.e., JP11 road)).Finally, given that concerned roads under REP are mainly rural and bordered by agricultural lands (fruit trees and vegetables), the head of municipalities (who are partially farmers) were concerned about REP implications on their land. Also, they were worried about possible obstructions. In this context, the consultant explained that strict mitigation measures will be provided for road segments that are surrounded by agricultural lands to avoid impacting farmers' produce and activities.

1.25 Grievance Redress Mechanism (GRM)

A multi-channeled GRM was established for REP project in Jbeil Caza to register and address grievances and complaints from all project stakeholders. Anonymous grievances will be addressed in both GRMs for communities and workers. The maximum anticipated time needed to close a GRM case is 45 days.

1.25.1 GRM for Surrounding Communities

The REP GRM has been established and is already accessible to communities to send their concerns and complaints. Citizens will be informed about the GRM mechanism before commencement of work through municipalities (i.e. through public announcement letters that will posted at the public board of concerned municipalities including the number of Contractor's site engineer to be contacted and also through project sign boards). REP GRM levels are as follows and the schematic illustration is shown in Annex 4:

- Level 1: If any person has any complaint or concern regarding the project implementation, he/she can lodge an oral or written grievance to the site engineer. In case an oral complaint is made, it should be written by the Contractor Social expert. The issue must be resolved within a maximum duration of one week.
- Level 2: If the person is not satisfied with the action of the Contractor, he/ she can send the complaint to the PIU social specialist through Phone: 01980096 ext:317, Email: GRM.REP@cdr.gov.lb or official letter registered at the CDR. The issue shall be resolved within a maximum of two weeks.
- Level 3: If the person is not satisfied with the decision of the social specialist of PIU, he or she can bring the complaint to the attention of the PIU Director's Office through e-mail (elieh@cdr.gov.lb) or phone call (01980096 ext:159). Once the PIU Director receives the complaint, it needs to be resolved within a maximum of two weeks. Citizen can also register an official letter at the CDR (Address: Tallet al Serail - Riad el Solh, Beirut – Lebanon).

All complaints will be individually followed up on and documented accordingly in a GRM log. 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 (i.e. the Contractor social expert will report to the Supervising Consultant expert who will report monthly to the PIU (CDR) who will, in turn, submit the consultants' monthly reports to the WB).The Complaints Register form or GRM log (refer to Annex 5) includes details/ nature of the complaint, the complainant's name and their contact details, date, corrective actions taken in response to the complaint.

Finally, an online form has been designed using the IMPACT platform to allow citizens to share their feedback (https://cdr.impact.gov.lb/worldbankmobile/home/main?lang=en). The link was shared with concerned municipalities and NGOs during the public participation meeting. It was also clarified that for each worksite in Jbeil, a link to the form will be shared with the local communities via location-based SMS, email and social media. At each worksite, a QR code will also be added on the project sign board (which already includes the project GRM) to automatically direct participants to the online form.

1.25.2 **GRM for Workers**

Similar to the GRM for surrounding communities, a GRM for internal employees, namely the labors onsite are also necessary. It aims to allow labors to report any wrongdoings in their favor or important concerns they might have. Workers must be informed about this GRM before commencement of works through induction training (refer to section 1.21). 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 PIU Director and should be resolved within one weeks. It also follows the Complaints Register form (refer to Annex 5).

Conclusion

Assessments showed that the project risks are localized, moderate, and can be mitigated if the Contractor succeeded to implement this ESMP, which documents the project's risks management strategy. In order to achieve that, CDR (i.e. the Supervising Consultant) plays a major role in assisting and supervising him during project implementation.
Most importantly, this ESMP guides the Contractor on critical roads that need special care if they are to be maintained. Noting that local communities were engaged and their concerns were integrated in the management strategy. However, engaging stakeholders including local communities is a continuous process that needs to be effectively adopted by the Contractor.

Finally, if the Contractor succeeded in complying with standards and in ensuring a safe operation of activities, the project is expected to enhance the safety conditions of the concerned roads and most importantly create short-term employment opportunities to local residents and Syrian refugees.

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Annex 1: Figures and Tables Related to Chapters 2 and Chapter 3

Table A National Applicable Legal Framework

Relevant Sector	Legislation	Date	Brief Description	Relevance to The Project
Environment	MoE Decision 52/1	29/06/1996	Environment quality standards and criteria for air, water and soil pollution. Revised standards for water, air and soil pollution (partly updated in Decision 8/1 dated 30/1/2001).	Decision 52/1 was referenced in the study to specify the National Standards for Environmental Quality and the Environmental Limit Values for Air and Water. The described decision (Annex 12 in decision 52/1) was used for monitoring air emissions.
	Decision 34	1997	Naher Ibrahim River became protected under MoE	When primary roads are close to Naher Ibrahim river, special care is needed.
	Law No.11	25/2/1999	Bentael Nature Reserve (BNR) was created by the Law No.11 on. managed by the Bentael Nature Reserve Committee under the supervision of MoE.	BNR lies in Jbeil Caza. If the assessment shows that some segments of target primary roads are close to the nature reserve, special attention is needed during the execution of work.
	Decision 8/1	30/01/2001	Amendment to part of MoE Decision 52/1 dated 29/6/1996. National Standards for Environmental Quality (NSEQ) that covered air and liquid emissions for all sectors.	This decision will be used to monitor air and water quality during implementation of project activities.
	Law 444	29/07/2002	Environment Protection Law: Fundamental principles and public rules (7 parts, 68 articles), Organization of environmental protection, Environmental information system and participation in the management and protection of the environment, Environmental Impact Assessment, Protection of environmental media, Responsibilities and fines. Other regulations (miscellaneous, institutional).	It is essential for the proposed project as the protection of the environment is a must throughout all of the steps of the project.
	Law 77	13/04/2018	Water Resources Law	Penalizes unauthorized discharges or disposal of any kind of waste in water resources
	Law 78	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
	Law 80	10/10/2018	Integrated Solid Waste Management which sets integrated solid waste management principles and provides guidelines for the management of waste.	Solid waste generated during the project should be managed in accordance with Law 80, which includes limiting quantities generated, when possible, as well as properly disposing of any generated waste.

Health and safety	Decree 5605	11/09/2019	Decree 5605 focuses on the importance of source sorting, reducing and reusing, the sorting method according depending on the type in order to protect the environment and reduce the damages.	The generated domestic solid waste are to be properly sorted as per decree 5605
	Decision 16/1	2022	Updated ELVs for air quality stated in Decision 8/1 and stated additional parameters for various industries.	Exhaust emissions from mobile onsite generators and heavy machinery should abide by the standards set in this decision
	Law 64	12/8/1988	Protection against hazardous wastes that could harm air, water, biodiversity, soil, and people.	Precautionary measures should be taken to limit any potential damage from generated hazardous wastes (if any)
	Decree 11802	30/01/2004	Occupational health and safety decree	The occupation health and safety conditions during maintenance works should comply with this decree.
Labor Laws	Labor Law	23/09/1946	Labor Law that sets basic labor rights in Lebanon including minimum working age, working and resting hours etc.…	It protects employees from any sort of violations dictated in this law.
	Law 335	2/8/2001	This law is the ratification of ILO convention No. 182: The agreement required the ratifying country to take immediate and effective measures to prohibit the worst forms of labor and eliminate it and specify the types of work that harm the health, safety or ethical behavior of children and their location.	Does not allow the employment of children and protects them from engaging in any work activities that could harm their health and safety.
	Law 400	5/6/2002	This law is the ratification of ILO convention No. 138: This agreement aims to develop a general instrument on the subject of minimum age for employment to gradually replace the instruments applied in specific economic sectors, aiming to completely eliminate child labor	Minimum age of employment on tasks and works that pose risks or hazards to health and safety
	Decree 8987	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.
	Decree 3791	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.
Traffic	Law 243	22/10/2012	Aims at the elimination of any kind of traffic violations such as: exceeding the speed limit, driving without a license or driving under any substance alternating the normal mental and physical state.	All transportation vehicles utilized during project implementation should abide by the general rules specified in Law 243.

General	Decree law 166	7/11/1933	Antiquity law (166/LR) regulates antiquities and Directorate General of Antiquities (DGA) has the authority to halt any development that is damaging archeological deposits.	Defines chance find procedures that should be followed in case antiquities were identified in the project site
	Decree 340	01/03/1943	The text of Article 522 of the Lebanese Penal Code, applies to cases of assault of women, by force, violence, and manipulations which are acts that affect a woman's dignity, physical health, psychological state, and moral integrity.	This law was mentioned as the project may hold risks on women during maintenance work.
	Law 118	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.
	Law 58	29/05/1991	Law of properties and expropriation	Despite that no expropriation activities will be done; this law is added because OP 4.12 was triggered by the project.
	Law 53	14/09/2017	Abolishment of article 522 of the penal code that exempts a rapist from punishments if he marries a victim	This law was mentioned as the project may hold risks on women during maintenance works (influx of workers (men) to the concerned area).
	Law 28	16/02/2017	Right to access information.	This law should be followed throughout the implementation of the project.
	Decree 6940	24/09/2020	Determining the minutes of application of Law No. 28 date.	This decree should be followed throughout the implementation of the project.
	Law 205	30/12/2020	Criminalizing sexual harassment and habilitating its victims.	This law should be implemented, in case of sexual harassment.

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

Table B Institutional framework

Institution	Roles and Responsibilities
MoPWT	MoPWT is responsible for the management of public roads, and for developing a sustainable strategy for the transportation sector within the urban and rural areas. o MoPWT will work closely with CDR during project implementation to ensure that important decisions on road (selection priorities, road designs, equipment specifications, and road asset management) are well coordinated.
CDR	CDR is a public institution established through Decree No. 5 dated 31st January 1977. CDR's main responsibilities is to: o Coordinate with relevant government agencies and with the relevant government agencies, particularly MoPWT, regarding roads priorities, technical aspects, and project's requirements. o Monitor the project. In particular, every six months CDR must submit to the Bank project progress reports summarizing all project aspects and progress achieved in project implementation.
Municipalities	o Municipalities in Jbeil Caza are responsible for their municipal area. According to Decree 118/1977, municipalities are responsible for supervising projects' implementation in their municipal territories. In this context they were consulted for this project.
Ministry of Environment (MoE)	o MoE is responsible for planning and monitoring of environmental issues. o MoE is in charge of protecting the environment in general, setting regulations and standards, and advising on implementing projects and programs in a sustainable manner. Accordingly, this ESMP must comply with the Lebanese environmental standards and regulations issued by MoE.
Ministry of Agriculture (MoA)	o MoA is responsible for monitoring all activities related to forestry and agriculture. It regulates the introduction of new species in agriculture and livestock, protects, supervises and manages natural resources and provide technical assistance whenever necessary. o The REP will not involve the construction of new roads or widening of existing ones (i.e., no tree cutting will occur). However, in the context of maintenance works, if the contractor had to cut native trees for traffic safety issues, the MoA must be consulted. Tree cutting permits are provided by MoA.
Ministry of Energy and Water (MoEW)	o Monitoring the quality and determination of surface and groundwater. o Design, study, and implement major water infrastructure installations. o Protecting water resources from waste and pollution by taking the necessary measures to prevent pollution.
Traffic Department at the Internal Security Forces	o Ensuring public safety o Maintaining regular traffic control

Ministry of Labour (MoL)	o MoL is responsible for all labour and employment issues. Labour inspection is the responsibility of the Department of Labour Inspection, Prevention and Safety (DLIPS) under the Labour Relations Authority of the MoL. o DLIPS supervises the implementation of all laws, regulations, decrees and rules pertaining to the terms and conditions of employment, and the protection of workers in the workplace, including the provisions of international labour Conventions ratified. Labour inspectors ensure the supervision of compliance with regulations regarding conditions of employment and protection of workers including occupational safety and health. The works contracts must comply with the national law on labour and the ILO obligations, which have been ratified by Lebanon

International Treaties and Conventions in relation to REP.

Date	Convention/Agreement	Status	Relevance to Project
1992	United Nations Framework Convention on Climate Change.	Covered by Law No. 359 dated 11th August 1994.	This project must control activities that release green-house gases such as emissions from machineries used (most of which rely on fuel).
1992	Rio de Janeiro Convention on Biological Diversity.	Covered by Law No. 360 dated 11th August 1994.	This project should abide by this convention to avoid or control activities that may pose a threat on biodiversity at all levels, since improvement of roads sometimes leads, directly or indirectly, to the loss and degradation of natural habitats and biodiversity.

Table C Labor Conventions

ILO Convention	Name	Entry into force	Ratification Date	Description	Relevance to Project
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.

Table D Raw material and items needed for routine maintenance work

Item	Description	Unit
B	**Incidental Repair Works**	
B1	Clearing and Grubbing	m^2
B2	Repair and adjustment of manholes (replace damaged ones)	Nr
B3	Cleaning of waterways hydraulic structures, drainage pipes and box culverts	m^3
B4	Galvanized Steel Guardrail	lm
B5	Repairing Mortared Masonry wall	m^2
C	**Pavement Repair Works**	
C1	Shallow Patching works	m^2
C2	Deep Patching works	m^2
C3	Crack sealing	lm
C4	Trench Shallow Patching	lm
C5	Trench Deep Patching	lm
D	**Concrete Repair Works**	
D1	Cast-in-situ Reinforced concrete, Class 250/20 (B25) for repair of box culverts, headwalls and wing walls, concrete channels and retaining walls (all types and shapes)	m^3
D2	Plain concrete for patching for deteriorated concrete in culverts, channels, walls and safety barriers	m^2
D3	Cast-in-situ Reinforced concrete, Class 250/20 (B25) for channel's cover	lm
E	**Traffic Control Devices and Safety Barriers**	
E1	Road Paint Lines width	m^2
E2	Special Road Marking	m^2
E3	Cats eye	Nr
E4	Bituminous speed humps	m^2
E5	Rumble strips	lm
E6	Delineators J4	Nr
E7	Small Signs	m^3
E8	Concrete Single Face New Jersey Barrier free standing. Concrete class 360/20	lm

Annex 2: Figures and Tables Related to Chapter 4

Table E Hydrogeological conditions in the area

Aquifers	Aquifers in the area are Sannine Limestone (C4), Mdeirej Limestone, and Lower Aptian (C2a2). The limestone formation forms a main part to the study area and is the most important karstic system in the study area characterized by a significant amount of groundwater flowing in channels, faults and fractures. These fractures include solution joints, solution pits, lapiaz, grooves and sinkholes. Cavities in the rocks are often filled with calcite and cave deposits.
Aquicludes	Aquicludes formations along the area are the Hammana Formation, Albian (C_3) and Quaternary (Q) formation. These deposits constitute an aquiclude due to the presence of marls and marlstones with low hydraulic conductivity. However, low to medium discharge springs are present in this formation.
Semi-Aquifers	Semi-Aquifers in the area are the Chouf Sandstone (C1), Abey Formation, Lower Aptian (C2a1) and Hammana Formation, Upper Aptian (C2b), and Bikfaya Limestone, Portlandian (J6) epoch which is composed of sand, with very high permeability, and clay, with low permeability are present within these deposits. In relation to permeability and porosity, there are no important fractures or joints within these formations that is why they are classified as a semi-aquifer.

Table F Variation of surface elevation of Jbeil roads

Road Alignment	Elevation (m)		
	Min	Max	Mean
J-P-1	1,100	1,500	1,300
J-P-2	1,350	1,800	1,573
J-P-3 r1	50	1,350	740
J-P-3-1	300	800	542
J-P-3-2	750	950	857
J-P-4	1,150	1,200	1,175
J-P-5	900	1,100	1,000
J-P-6	1,250	**1,850**	1,550
J-P-7	1,250	1,750	1,500
J-P-8	100	950	553
J-P-8-1	100	100	100
J-P-9	100	1,100	600
J-P-10	1,100	**1,850**	1,487
J-P-10-1	1,250	1,350	1,300
J-P-10-2	1,600	1,750	1,683
J-P-11	550	1,200	878
J-P-12	1,050	1,250	1,157
J-P-13	50	600	335
J-P-14-1	700	1,000	869
J-P-14-2	800	1,000	914
J-P-15	1,000	1,250	1,150

J-P-15-1	1,000	1,250	1,125
J-P-15-2	1,100	1,100	1,100
J-P-16	400	500	447
J-P-16-1	450	550	513
J-P-17	50	300	175
J-P-18	50	500	292
J-P-19-1	450	650	550
J-P-19-2	700	800	738
J-P-19-3	400	750	545
J-P-20	750	950	857
J-P-20-1	900	1,000	950
J-P-21	12	50	13
Stats	**Min**	**Max**	**Mean**
	12	**1,850**	**862**

Table G Summary of geological outcrops exposed along Jbeil primary roads

Geology	Name	Description
C1	Chouf Sandstone (Grés de Base), Neocomian-Barremian	Varicolored, cross bedded Sandstone with inter-beds of shale; contains heavy minerals; color depends upon percentage of hematite and presence of volcanic giving purplish color; Sand is sometimes white; contains coal seams and traces of brittle amber. This formation can reach 300 meter in thickness.
C2a	C2a1: Abey Formation, Lower Aptian	Clastic: mixture of clay, sand and calcareous material in varying proportions forming clay, sandy clay, marl, marly limestone etc. The calcareous material may be slightly to moderately indurated. Where marl prevails, its fresh color is bluish, weathering to creamish brown. This formation can reach 125 meter in thickness.
	C2a2: Mdeirej Limestone, Lower Aptian	Karstic, massive marine depositional environment Limestone forming a prominent cliff, which often used as a marker bed. Transition with the Abey Formation consists of three layers of green clay intercalating limestone. This formation is outcropping to the East of the site and it can reach 45 meter in thickness.
C2b	Hammana Formation, Upper Aptian	Marl intercalated with marly Limestone with thick layers of Sand on top; layers of ferro-oolitic limestone sometimes overlie the sand. This formation can reach 20 meter in thickness
C3	Hammana Formation, Albian	Green Marl (containing glauconite) intercalated with thick layers of marly Limestone forming cliffs 3 - 4 m in height; may contain some thin sand layers in the lower part of the formation. This formation can reach 150 meter in thickness.
C_4	Sannine Limestone, of Cenemonain age	(C_4); this unit is divided into three subunits: **C_{4a}**: Dolomitic Limestone, within this formation, geodes of different sizes filled or voided can be recorded. Thickness of this unit is about 300 meters. **C_{4b}**: Bluish marl and shale containing crystals of quartz, chert nodules and bands form. Thickness of this unit is about 100 meters. **C_{4c}**: Limestone and dolomitic limestone white to brown in color. Limestone is highly karstified. Thickness of this unit is about 300 meters.
C_5	Maameltain / Ghazir Limestone	Composed of hard crystalline and micritic limestone to dolomitic limestone, creamish white to brown in color, while the weathered color is mainly gray. Limestone / dolomitic limestone is highly karstified and within this formation, geodes of different sizes filled or voided are recorded.
J6	Bikfaya Limestone, Portlandian epoch	Finely crystalline, massive, cliffy Limestone that includes trace to abundant brown chert nodules. This formation is chemically deposited with smooth fresh fracture. The thickness of this unit is ranging from 60 to 65 m and Type section is Bikfaya.
Q	Quaternary formation, belonging to the Quaternary age	This formation can reach a thickness of 100 m and typically consists of sandy beaches, detrital LS, conglomerates, volcanic coastal or alluvial deposits

Source: Dubertret, (1945)

Table H Percentage distribution of the geological outcrops over the length of each road in Jbeil Caza

Road Name	C1	C2a	C2b	C3	C4	C5	J6	Q
JP-1	30.7%	8.6%	7.9%	0.3%			30.4%	22.1%
JP-2				12.2%	1.0%			86.8%
J-P-3 r1	17.5%	13.3%	5.3%	9.3%	0.8%		53.9%	
J-P-3-1		19.4%	7.8%	13.6%	1.1%		56.0%	2.1%
J-P-3-2		22.8%	9.1%				65.7%	2.4%
J-P-4	29.1%	35.3%	2.4%				18.5%	14.7%
J-P-5	7.8%	14.8%	5.9%	10.4%	0.9%		60.2%	
J-P-6	18.5%	53.9%	8.1%	4.7%			11.0%	3.8%
J-P-7		66.9%	13.1%	4.3%				11.5%
J-P-8			1.1%	1.9%	0.2%	96.9%		
J-P-8-1						89.3%		10.7%
J-P-9					0.1%	89.2%		10.7%
J-P-10	20.1%	60.7%	9.6%	1.3%	0.1%			
J-P-10-1			34.6%	60.4%	5.0%			
J-P-10-2	21.6%	63.1%	9.5%					
J-P-11					100.0%			
J-P-12					100.0%			
J-P-13					0.2%	99.8%		
J-P-14					100.0%			
J-P-15		32.1%	8.4%		1.2%		58.3%	
J-P-15-1					100.0%			
J-P-15-2		59.9%	35.0%		5.1%			
J-P-16					100.0%			
J-P-16-1					100.0%			
J-P-17						100.0%		
J-P-18						94.6%		
J-P-19-1					100.0%			
J-P-19-2					100.0%			
J-P-19-3					3.7%	96.3%		
J-P-20					100.0%			
J-P-20-1					100.0%			
J-P-21					0.1%	84.5%		15.2%
J-P-21-1					1.9%	16.6%		81.5%

Table I Summary of hydrogeological classes exposed for all Jbeil roads

Geology Class	Groundwater sheets		Lithology	Age	Flows of the Sources L/sec.	Probable Instantaneous Flows of the Works L/sec.	Transmissivity m^2/Sec
1	**In Karstic Formations** Wide And Rich Water Table		Massive limestone and dolomitic limestone with interval marls Thickness: >1000 m.	Jurassic Bathonien-Portlandien	<100 100-1000 >1000	>100	Generally, high $10^{-2} \leq T \leq 1$
2			Limestone regularly bedding Thickness: 800 à 1000 m.	Cretaceous Cénomanien-Turonien	<100 100-1000 >1000	>100	
3			Limestone and marly limestone beds of flint Thickness: ~ 200m.	Cretaceous Turonien	100-1000 >1000	>100	
9	**IN POROUS FORMATIONS**	**Water Table Extended**	Silt and "terra rossa" Thickness: 600 m.	Quaternary	Diffuse Discharge	<10	Poor with weak very changing
10		**Local or Discontinuous Water Table**	Sandstone Thickness : 150 à 250 m.	Cretaceous Grès De Base	<10	<10	$10^{-5} \leq T \leq 10^{-4}$ Poor with weak
11			Detachments gravel slopes and mud flows. Thickness: variable	Quaternary	_	<10	Poor with weak
16	**Areas Generally Without Water Table or a Very Local Water Table**		Alternations of clay-sandy, limestone beds and marl Thickness: 300 to 400 m.	Cretaceous Aptien_Albien	<5 (Sources intermittent)	<5	Weak with very weak
22			Basalt of variable thickness	Cretaceous Inf. Miocene Pliocene Quaternary	_	Very weak	Very weak

Table J Percentage distribution of the hydrogeological classes over the length of each road in Jbeil Caza

Road Name	1: Jurassic Aquifer	2: Cretaceous Aquifer	3: Cretaceous Aquifer	9: Quaternary Low - Semi Aquifer	10: Cretaceous Low - Semi Aquifer	11: Quaternary Low - Semi Aquifer	16: Cretaceous Non-Aquifer	22: Basalts Non Aquiferous
JP-1	84%				2%	2%	10%	2%
JP-2		97%					2%	
J-P-3 r1	17%	82%					1%	
J-P-3-1	17%	82%					1%	
J-P-3-2	94%						5%	1%
J-P-4					14%		78%	8%
J-P-5	17%	82%					1%	0%
J-P-6					11%		65%	24%
J-P-7					10%	8%	59%	22%
J-P-8		97%	1%				1%	
J-P-8-1				100%				
J-P-9		99%	1%					
J-P-10	17%	80%					3%	1%
J-P-10-1		100%						
J-P-10-2	89%				1%		10%	
J-P-11		100%						
J-P-12		100%						
J-P-13		99%	1%					
J-P-14-1		100%						
J-P-14-2		100%						
J-P-15		100%						
J-P-15-1		100%						
J-P-15-2		100%						
J-P-16		100%						
J-P-16-1		100%						
J-P-17			100%					
J-P-18		99%	1%					
J-P-19-1		100%						
J-P-19-2		100%						
J-P-19-3		100%						
J-P-20		100%						
J-P-20-1		100%						

J-P-21		99%	1%					
J-P-21-1		100%						

Figure A General hydrogeological map of the Jbeil cadastral limits and Caza

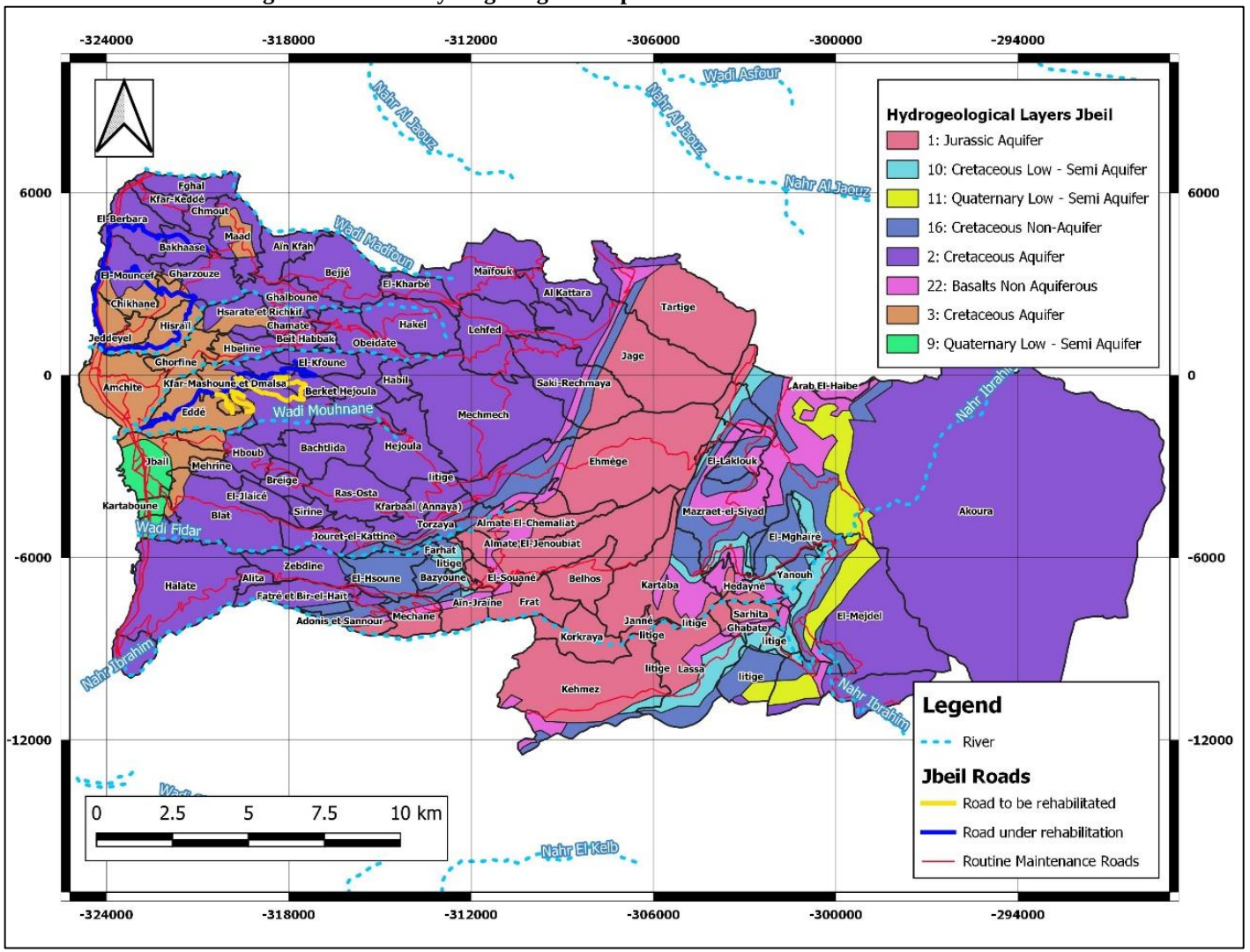


Table K Existing surface water with respect to assessed roads (rivers and springs)

Road Name	River Location	Spring
J-P-1	Crosses Nahr Ibrahim in El Mejdel village	Close to Ain EL Safra, Ain EL Hissan, and Afka spring in Afka at 1,200m elevation
J-P-2	Crosses Nahr Ibrahim in Afka village	-
J-P-3	Parallel to Nahr Ibrahim <260m	-
J-P-3-1	Crosses Nahr Ibrahim in Adonis et Sannour	-
J-P-3-2	>600m away from Nahr Ibrahim	-
J-P-4	Crosses Nahr Ibrahim in El Mejdel village	Crosses Khalaf Spring in Qartaba Close to Zein Spring in Deir Mar Sarkis village (<100m) Close to El Toute Spring in Yanouh village (<50m)
J-P-5	Crosses Wadi El Fidar in Almate El Chemaliat	-
J-P-6	>1km away from Nahr Ibrahim	Close to several springs in Mazraet el Siyad <90m
J-P-7	Crosses Nahr Ibrahim in Akoura village	Close to several springs in Akoura and crosses Ain Al Daia spring
J-P-8	Parallel to Wadi Fidar closest at <210m	-
J-P-8-1	-	-
J-P-9	Close to Wadi Mouhnane in Jbeil <200m	-
J-P-10	-	Crosses Al Kassis Spring in Akoura village
J-P-10-1	-	-
J-P-10-2	-	-
J-P-11	Crosses Wadi Mouhnane in Berket Hejoula and Hejoula	-
J-P-12	-	-
J-P-13	Parallel to Wadi Mouhnane and less than 90m close in Hbeline and Chamate	-
J-P-14	Crosses Wadi Mouhnane in Obeidate	-
J-P-15 and 15-1 and 15-2	-	-
J-P-16	Crosses Wadi Bacchta in Ghalboune village and less than 90m close to Wadi Mouhnane in Chamate	-
J-P-16-1	-	-
J-P-17	Crosses Wadi Bacchta in Amchit village	-
J-P-18 and 19-1	-	-
J-P-19-2	Crosses Wadi Bacchta in Hakel village	-
J-P-19-3, 20, and 20-1	-	-
J-P-21	Crosses Wadi Fidar in Mastita - Wadi Mouhnane and Wadi Bacchta in Amchit	-
J-P-21-1	Very close to Wadi Madfoun (<40m) in Fghal village	-

Figure B General surface water and layout map of the Jbeil Caza

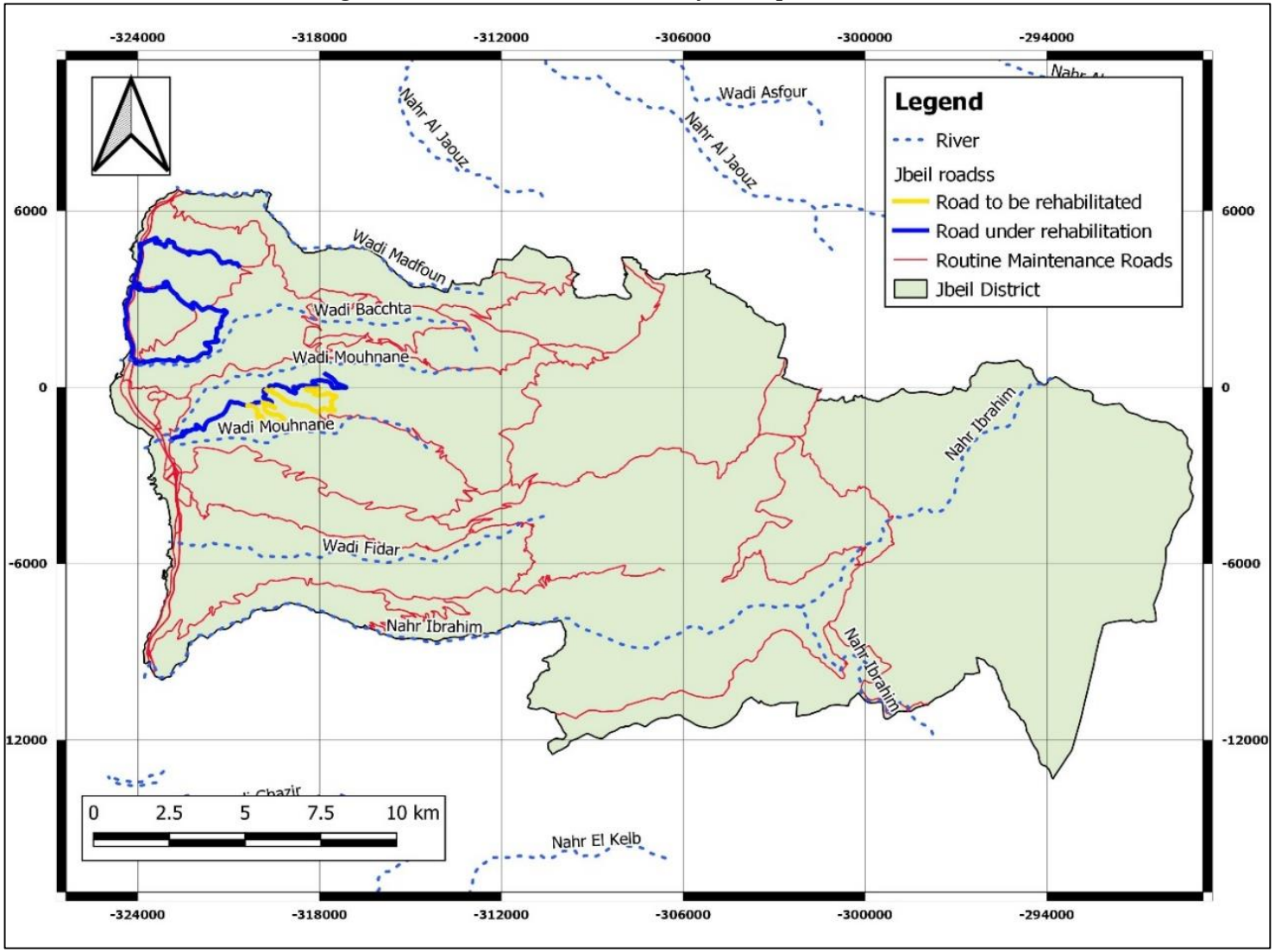


Table L Summary of land surface temperature variation and precipitation at the project area (period extending between 2000-2018) extracted and analyzed from MODIS satellite 1km spatial resolution

Month	Precipitation (mm)			Min Temp (ºC)			Mean Temp (ºC)			Max Temp (ºC)		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
1	189	204	212	8	1	-2	11	6	3	14	8	7
2	171	193	212	8	1	-1	12	6	3	15	8	8
3	124	155	168	9	3	1	14	8	6	17	12	11
4	51	58	62	12	6	4	17	13	10	21	17	16
5	21	22	21	15	9	7	21	16	14	24	21	21
6	1	2	2	18	12	10	24	20	18	27	24	24
7	1	1	1	20	14	12	26	22	20	29	27	27
8	1	1	1	21	14	12	26	23	21	30	28	28
9	3	4	4	19	12	11	24	20	18	29	25	25
10	50	49	51	17	10	7	22	17	15	26	22	21
11	117	114	120	13	6	4	18	12	9	21	15	14
12	167	168	170	10	3	0	14	8	5	16	10	10
	Total			**min**			**avg**			**max**		
	896	**971**	**1,024**	**8**	**1**	**-2**	**19**	**14**	**12**	**30**	**28**	**28**

Figure C Distribution of air pollutant Nitrogen Dioxide (NO2) in the troposphere above the Lebanese border average from year 2018 up to January 2022 (data retained from Sentinel-5 precursor/TROPOMI Level 2 Product

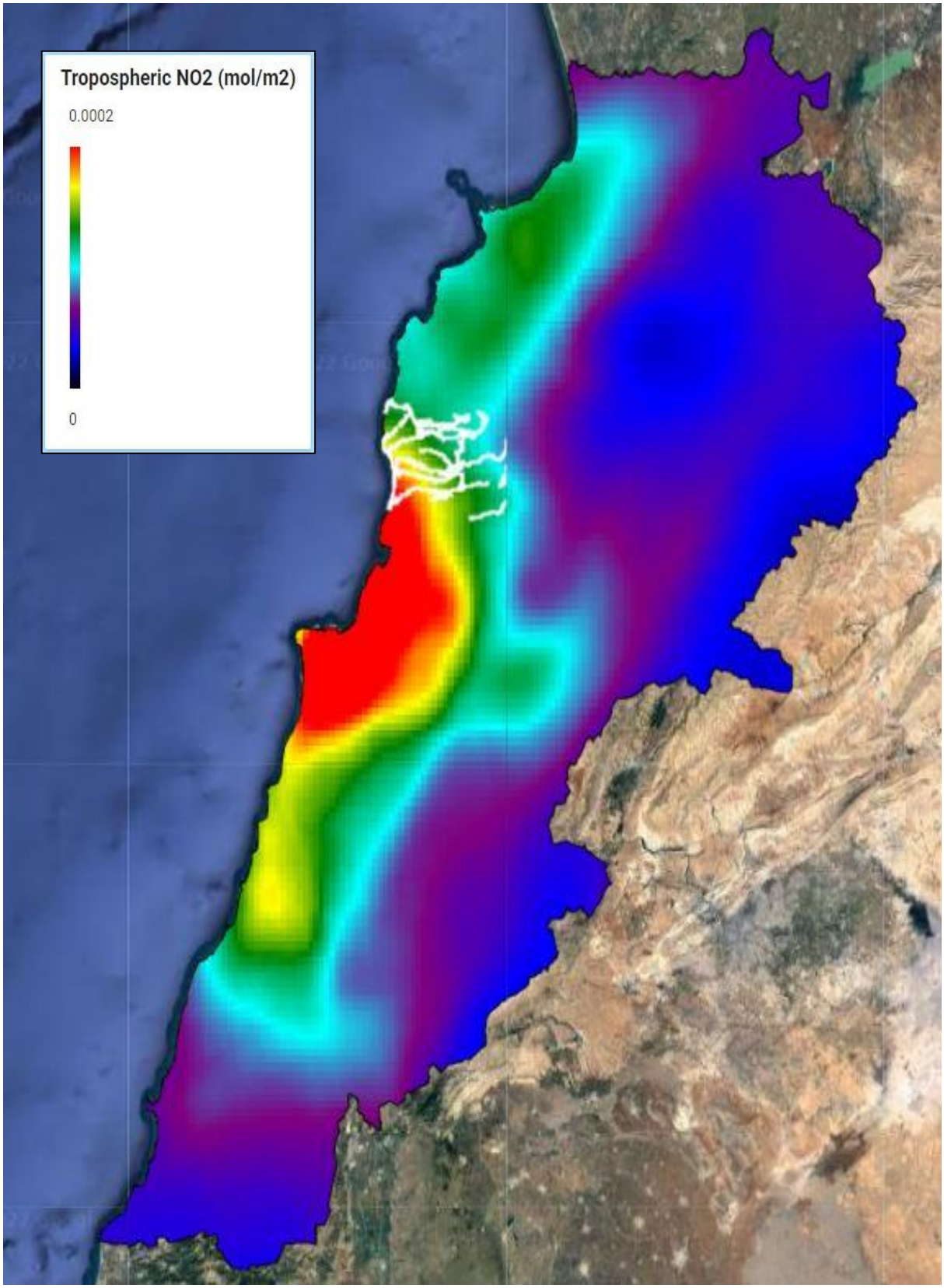


Table M Main natural habitats encountered along the assessed roads in Jbeil Caza

The biogeographic region ranges from the Thermo-Mediterranean near the coast to the Eu-Mediterranean and Supra-Mediterranean at Ehmej level and Mountainous zone at the level of Laqlouq. The altitudinal range plays an important role in plant composition (Abi Saleh, 1996). Thermo-Mediterranean zone comprises at the sea level a coastal belt sheltering plant communities reflecting the beach habitat and consist at higher altitude of mainly Carob-lentiscus series and *Quercus calliprios* thermophilous series. The Supra-Mediterranean zone is characterized by a series of vegetation that are found on limestone substrata. The series of *Quercus calliprinos*, the series of *Quercus infectoria*; the series of *Ostrya carpinifolia* and *Fraxinus ornus* series; the *Pinus pinea* and *Pinus brutia* found on sandstone. Whereas, Mediterranean mountains are characterized by different forest groupings, quite rich and quite specialized floristically. Mainly cedar and fir trees are associated with varied deciduous oak trees that can also exist in scattered stand from particular subseries.	
LULC analysis	Field observations
Dense forest of Oak and mixed low-density forest	Oak forests and woodlands
Bare rocks and outcrops	Bare rocks in garrigue Rocky outcrops
Shrubland with scattered trees and scrubland	Open garrigue vegetation Stony shrubland
Grassland of medium density	Grasslands used for agriculture and forage (croplands)
Olives, field crops in small fields/terraces, deciduous fruit trees	Olive groves (*Olea europaea)*, fruit terraces and polytunnels
Low and Medium density urban fabric	Rural settlements and urbanized areas

Figure D Road J-P-3/ Section-1-Okay forests

Figure E J-P10 Oak maquis

Figure F Rocky Habitats along JP2

Figure G J-P-9 Open rocky garrigue

Figure H BNR adjacent to JP11

Figure I Rich Pine forest along JP3-1

Table N Percentage distribution of the LULC classes over the length of each road in Jbeil Caza

LULC/Road Name	JP-1	JP-2	J-P-3 r1	J-P-3-1	J-P-3-2	J-P-4	J-P-5	J-P-6	J-P-7	J-P-8	J-P-8-1	J-P-9	J-P-10	J-P-10-1	J-P-10-2	J-P-11	J-P-12	J-P-13	J-P-14-1	J-P-14-2	J-P-15	J-P-15-1	J-P-15-2	J-P-16	J-P-16-1	J-P-17	J-P-18	J-P-19-1	J-P-19-2	J-P-19-3	J-P-20	J-P-20-1	J-P-21	J-P-21-1
Banana											7%																					6%	
Bare Rocks													23%																				
Beaches																																	
Deciduous fruit trees	31%					40%		6%	17%					9%						48%				5%	49%	6%	6%	19%	12%	6%	15%	19%		15%
Dense forest of Oaks (Quercus ssp)			88%	94%						90%		85%				90%	87%		88%							47%							
Field crops in large areas	10%				22%															17%	7%	7%				7%	12%		8%				17%
Field crops in small fields/terraces	7%					14%	12%							33%									16%								5%		6%	
Grasslands of medium density	14%				17%		7%	81%	79%				57%		94%			15%						10%		7%		12%		8%			16%	30%
Low density oak forest					28%											7%	9%	17%	9%		81%	85%		38%	20%	6%		18%	18%	29%		53%		8%
Low-density urban fabric					7%									27%				8%		33%		6%	24%		10%	10%		8%					17%	
Material Extraction Sites																							15%										
Medium density urban fabric											84%							18%							11%								12%	
Mixed low density forests	21%						45%						10%																				
Olives																		14%					21%	31%	10%	58%		11%	5%	19%				
Outcrop		87%					5%																			7%		17%					
Protected agriculture																																19%	
Shrublands					5%																			6%			8%	6%						5%
Shrublands (with scattered trees)	6%				12%	29%	19%	10%						26%				19%					23%			9%	11%	8%	35%	20%	73%	10%	9%	6%
Urban sprawl on dense forest														6%																			
Urban sprawl on field crops					5%																												
Urban sprawl on permanent crops																															9%		
Urban vacant land																																	7%

Table O Particular biotopes and natural habitats along the assessed roads

Road Name	Distance from Nature Reserves, Protected Areas (PAs), Important Bird Areas (IBAs), valleys and rivers	%LULC along the road (50 m buffer)	Elevation	Vegetation zone (Abi Saleh & Safi, 1996).	Characteristics of Natural Habitats
J-P-2	• Crosses Nahr Ibrahim river in Afka village. ✓ Nahr Ibrahim is under the protection of the MoE, Deicion No. 34/1997)	87% Outcrop	1,350-1,800	Supra-Mediterranean and Mediterranean Mountains	• Rocky outcrops provide habitat for a range of unique plants and animals. Also, characterized by one of the most important floral communities, with many endemics or rare species. Among the important flora that were recorded/potentially present in the study area: *Centaurea speciosa, Phagnalon kotschyi, Staehelina lobelia,* and *Thalictrum orientale* • Riparian thickets were recorded along the road segment that intersects with Nahr Ibrahim river including Salix spp, *Juglan regia, Celtis australis* and shrubby vegetation namely *Rubus hedycarpus*
J-P-3-1	• Crosses Nahr Ibrahim river in Adonis et Sannour ✓ Nahr Ibrahim is under the protection of the MoE, Deicion No. 34/1997) ✓ Nahr Ibrhim valley-constitutes a dynamic hideout for numerous reptiles, mammals, and birds	94 % Dense Forest of Oaks	300-800	Thermo-and Eu-Mediterranean zones	• Road bordered by Oak (*Quercus calliprinos)* woodlots on compact limestone • A dense pine forest (*Pinus brutia*) stretches up the valley (above Nahr Ibrahim river)—a quasi-pure coniferous forest, with a rich understory • Riparian thickets were recorded along the road segment that intersects with Nahr Ibrahim river including Oriental Plane (*Platanus orientalis*) together with smaller tree and shrub species including Mediterrnean buckthorn (*Rahmnus alaternus*), and Oriental Alder (*Alnus orientalis*) were recorded in the study area.
J-P-7	• Crosses Nahr Ibrahim in Akoura village • Close to several springs in Akoura and crosses Ain Al Daia spring	79 % Grasslands of medium density	1250-1750	Supra-Mediterranean zone and Mediterranean mountains	• Riparian thickets bordering the segment of the road that intersects with Naher Ibrahim river • Grasslands (must be restored) • Overgrazed Grasslands
J-P-9	• Close to Wadi Mouhnane in Jbeil <200m • Close to forest area in Kfar Kaouass - Breige - Ras-Osta villages (<90m) between 500m to 650m	95% Dense forests of Oak	100-1100	Thermo and Supra-Mediterranean zones	• Mediterranean oak woodland, dominated by the evergreen oak species *Quercus calliprinos*, with a scattering of deciduous oak *Quercus infectoria* and other tree species including Strawberry Tree (Arbutus sp.) • Mediterranean maquis that constitute a dynamic hideout for numerous reptiles, mammals, and birds. • Open garrigue vegetation, discontinuous bushy associations of the Mediterranean calcareous plateaus.

J-P-10	• Crosses Al Kassis Spring in Akoura village • Close to forest area in Ehmej village(<90m) at 1,250m elevation- and J-P-10-1 is 10m away from the same forest.	• 57 % Grasslands of medium density • 27% bare rocks	1100-1850	Supra-Mediterranean zone and Mediterranean mountains	• The majority of this road (80%) is located within rural area, bordered by grasslands (overgrazed grasslands) and guarrige vegetation (rocky guarrigue). Further, an Oak Forest (mixed forest of *Quercus calliprinos* intermixing with *Quercus infectoria*) was recorded in Ehmej less than 90m and 10 m away from j-p-10 and JP-10-1, respectively. • Rocky outcrops at higher altitude Laqlouq and Akoura were recorded. These habitats are high density spot for reptiles.
J-P-11	• Crosses Wadi Mouhnane in Berket Hejoula and Hejoula • Crosses Bentael Natural Reserve in Bentael at 640m elevation (reserve extends between 250 and 800 m of altitude absl). ✓ Bentael Nature Reserve (BNR) was created by the Law No.11 on February, 1999. managed by the Bentael Nature Reserve Committee under the supervision of MoE. ✓ BNR is an IBA	• 90 % Dense Forest of Oaks	550-1,200	Eu-Mediterranean and Supra-Mediterranean zones	• The road is bordered by dense oak forests (*Quercus calliprinos*) and Mediterranean bushy association in low altitudes dominated by Kermes Oak (*Quercus calliprinos*) and Calabrian Pine (*Pinus brutia*). • Other trees and shrubs encountered along the road are Umbrella pine (*Pinus pinea*), Aleppo oak (*Quercus infectoria*), Pistachio trees (*Pistachio palestina*), Strawbery trees (*Arbutus andrachne*), Laurel trees (*Laurus nobilis*) and Oleander trees (*Nerium oleander*), Spiny brunet (*Poterium spinosum*), and Throny-broom (*Callicotome villosa*) • The road crosses BNR, that reserve that consists of a mosaic of ecosystems harboring two major forest types: an oak (*Quercus calliprinos*) stand on compact limestone, limited in the valley by the riparian forest and a planted pine forest (*Pinus pinea*) on sandstone. • Birds believed potential in the studied habitat include the European Honey-buzzards, White Pelicans, and Levant Sparrowhawks. These species were recorded in the study area by SPNL in Autumn 2006. This indicates clearly that BNR does hold some importance as a bottle-neck site for soaring birds. Further, Masked Shrike, Black-eared Wheatear and Western Rock Nuthatch are expected to breed at BNR (SPNL).
J-P-12	Close to a forest patch in Mechmech (<90m away) at 1,200m elevation	87 % Dense Forest of Oaks	1,050-1,250	Supra-Mediterranean zone	• The series of *Quercus calliprinos*, *Quercus infectoria*; and *Ostrya carpinifolia* were recorded.

Table P Socio-economic data for Jbeil Caza

Category	Value		Source
Demographic Profile			
Population count	92,016		MoPH, 2016
Average number of people per household	3.7		LFHLCS 2018-2019
Registered births/year	1,466		MoPH, 2016
Distribution of registered births by gender	Female	726	MoPH, 2016
	Male	720	
Registered deaths/year	609		MoPH, 2016
Distribution by age group	<15	22,636	MoPH, 2016
	>65	8,926	
	Active Population	60,454	
Number of Displaced Syrians	8,377		MOE/EU/UNDP, 2014
Number of Displaced Palestinians	0		OCHA, 2016
Economic Conditions			
Unemployment rate	5%		IDAL, 2019
Number of Lebanese above poverty line	69,933		OCHA, 2016
Number of deprived Lebanese	10,728		OCHA, 2016
Industrial activities	3.2% of total number of industries in Lebanon		MOI/UNIDO/ALI, 2010
Lebanese above poverty line	69,933		OCHA, 2016
Deprived Lebanese	10,728		OCHA, 2016
Syrian refugees' household below poverty line in Jbeil:	64.8%		VASYR, 2017
Health Services			
Number of primary healthcare centers	2		MOPH, 2019
Number of Private Hospitals	2		MOPH, 2019
Number of Public Hospitals	1		MOPH, 2019
EDUCATION			
Number of public schools	23		CRDP, 2016
Number of private schools	22		CRDP, 2016
INFRASTRUCTURE			
Water and Wastewater Infrastructure			
Water wells	0.4%		MOE/UNDP/ECODIT, 2011
Presence of water network	89%		MOE/UNDP/ECODIT, 2011
Presence of wastewater network	9.5%		MOE/UNDP/ECODIT, 2011
Availability of wastewater treatment units	WWTPs in Jbeil, Kafr, Ain Kfaa, Haqel El Kharbe, Tartij, Laqlouk, Qartba Lassa, Yanouh, Qarqaiya Bchille ,Chloumay Ghalboun		FAO, 2016
Solid Waste Infrastructure			
Collection services			-
Solid waste management facilities	-		EU/MoE/GFA, 2017
Number of dumpsites	1operationaldumpsite (Volume=600,000 m^3) Hbaline		MoE/UNDP, 2017
Religious Infrastructure			
Places of worship	371		International City/County Management Association (ICMA), 2011

Table Q Sensitive receptors recorded along Jbeil roads

Road Name	Sensitive receptors
J-P-3	Don Bosco Public School <90m in El Hsoun
J-P-3-1	Fransiscain School <5m in Adonis
J-P-4	Qartaba public school <180m
	Church <100 in Qartaba
	Qartaba Government Hospital <40m
J-P-5	Crosses Holy Church in Torzaya
J-P-7	Saint Elie church in Akoura <50m
	Saint Georch church in Akoura <50m
J-P-8	Mar Elias and Holy churches in Torzaya <30m
J-P-8-1	Jbeil health services center <100m
J-P-9	Hôpital Notre Dame des Secours <50m
	Breij church <60m
J-P-10	Église Notre Dame de la Falaise <50m in Ehmej
	St Maroun and Disciples Church <20m in Akoura
	Ehmej Semipublic Elementary School <50m in Ehmej
J-P-11	Saint Maroun and Charbel churches < 50m in Aanaya
J-P-12	Chapelle Padre pio <80m in Mechmech
	Saint Maroun church <50m in Mechmech
	Mar Youssef Church crosses in Saki Rechmaya
J-P-13	Beit Hbak Dispensary <90m
J-P-14	House of Brother Estephan Nehme in Lehfed (crosses)
	Al Saydet El Athareya - Church in Lehfed <20m
J-P-15-1	St Elias church in Lehfed <50m
J-P-16	Crosses Saint Georges Church in Ghalboun
J-P-17	Crosses Mar Dumit Church (Greek Orthodox) in Jeddayel
J-P-18	Crosses Saint Rafka church in Maad
J-P-19-1	Crosses Old twin church St Takla & Stephan in Chamat
J-P-20	<50m Public School Maifouk
J-P-20-1	Church st Mora <50m
	Our Lady of Ilige <50m in Maifouk

Table R Criteria considered in the weighted decision analysis for determination of the level of criticality of Jbeil roads

Road Name	Transmissivity	River	Spring	LULC	Social
JP-1	H	Crosses	Near	NC	C
JP-2	H	Crosses	N.A.	C	NC
J-P-3 r1	H	N.A.	N.A.	C	NC
J-P-3-1	H	Crosses	N.A.	C	NC
J-P-3-2	H	N.A.	N.A.	NC	NC
J-P-4	H	Crosses	Crosses	NC	C
J-P-5	H	Crosses	N.A.	NC	NC
J-P-6	H	N.A.	Near	NC	NC
J-P-7	H	Crosses	Crosses	NC	NC
J-P-8	H	N.A.	N.A.	C	NC
J-P-8-1	H	N.A.	N.A.	NC	NC
J-P-9	H	Near	N.A.	C	NC
J-P-10	H	N.A.	Crosses	NC	NC
J-P-10-1	H	N.A.	N.A.	NC	NC
J-P-10-2	H	N.A.	N.A.	NC	NC
J-P-11	H	Crosses	N.A.	C	NC
J-P-12	H	N.A.	N.A.	C	NC
J-P-13	H	Near	N.A.	NC	NC
J-P-14	H	Crosses	N.A.	C	C
J-P-15	H	N.A.	N.A.	NC	NC
J-P-15-1	H	N.A.	N.A.	NC	NC
J-P-15-2	H	N.A.	N.A.	NC	NC
J-P-16	H	Crosses	N.A.	NC	NC
J-P-16-1	H	N.A.	N.A.	NC	C
J-P-17	H	Crosses	N.A.	NC	NC
J-P-18	H	N.A.	N.A.	NC	NC
J-P-19-1	H	N.A.	N.A.	NC	NC
J-P-19-2	H	Crosses	N.A.	NC	NC
J-P-19-3	H	N.A.	N.A.	NC	NC
J-P-20	H	N.A.	N.A.	NC	NC
J-P-20-1	H	N.A.	N.A.	NC	NC
J-P-21	H	Crosses	N.A.	NC	NC
J-P-21-1	H	Near	N.A.	NC	NC

Note:*H: High*
N.A.: Not applicable
Crosses: road crosses a river or spring
Near: Road is <100m from a river or spring
C: Critical NC: Not Critical

Annex 3: Code of Conduct

Individual CoC in Arabic

Code of Conduct - مدونة سلوك

مشروع الطرقات والعمالة – Roads & Employment Project
الممول من قبل البنك الدولي (القرض رقم ٨٧٠٥ – لبنان)، بإدارة وتنفيذ مجلس الانماء والإعمار لصالح وزارة الأشغال العامة والنقل

تعتبر مدونة السلوك هذه وثيقة ضرورية لحماية جميع العاملين في مشروع الطرقات والعمالة من جميع مظاهر العنف القائم على أسس اجتماعية، التنمر، سوء المعاملة، التحرش والاعتداء والاستغلال الجنسي وأي سلوك اجتماعي أخر يخلّ بحقوق الانسان، المجتمع المحلي والآداب العامة، بما في ذلك المعايير التالية:

١- التزام الاحترام والآداب العامة	• الالتزام بمعاملة النساء والرجال والشباب باحترام بغض النظر عن انتمائهم الديني، العرقي، الطائفي، اللغوي، التوجه السياسي، الاعاقة، الجنسية، الجندرة، الخ. • احترام موقع العمل وادوات العمل المشتركة: نظافة المكان، عدم التعدي على الممتلكات العامة المجاورة للأعمال، الخ.
٢- عدم استعمال العنف بشتى اشكاله	• العنف القائم على النوع الاجتماعي: أيّ فعل مؤذٍ يُرتكب ضدّ إرادة الشخص. وهو مبنيٌّ على الفروق بين الذكور والإناث التي يُعزى وجودها لأسباب اجتماعية. • العنف الجنسي: الاغتصاب، الاعتداء الجنسي، التحرش الجنس، الخ. • العنف الجسدي: الضرب، الصفع، الضرب المتكرر أو باستعمال أداة، الخ. • العنف العاطفي: الاستغلال النفسي، والابتزاز، الخ. • العنف الاقتصادي: الحرمان من الموارد، الحصول على أدوات العمل ، عدم الالتزام بالأجر المتفق عليه، الخ.
٣- التحرش والاعتداء والاستغلال الجنسي	الالتزام بالتصدي لأي شكل من أشكال التحرش أو التمييز أو التخويف أو الاستغلال أو الاعتداء الجنسي بما في ذلك التعليقات المهينة المتعلقة بالميل الجنسي، القدح بألقاب أو عبارات ذات دلالات جنسية، التحديق بطريقة ذات إيحاء جنسي، اللمس غير مرغوب فيه، القيام بحركات جنسية غير لائقة، تبادل الحكايات أو النكات الجنسية، توجيه رسائل ذات إيحاء جنسي بأي شكل من الأشكال، محاولة الاعتداء الجنسي أو ارتكابه، بما في ذلك الاغتصاب.

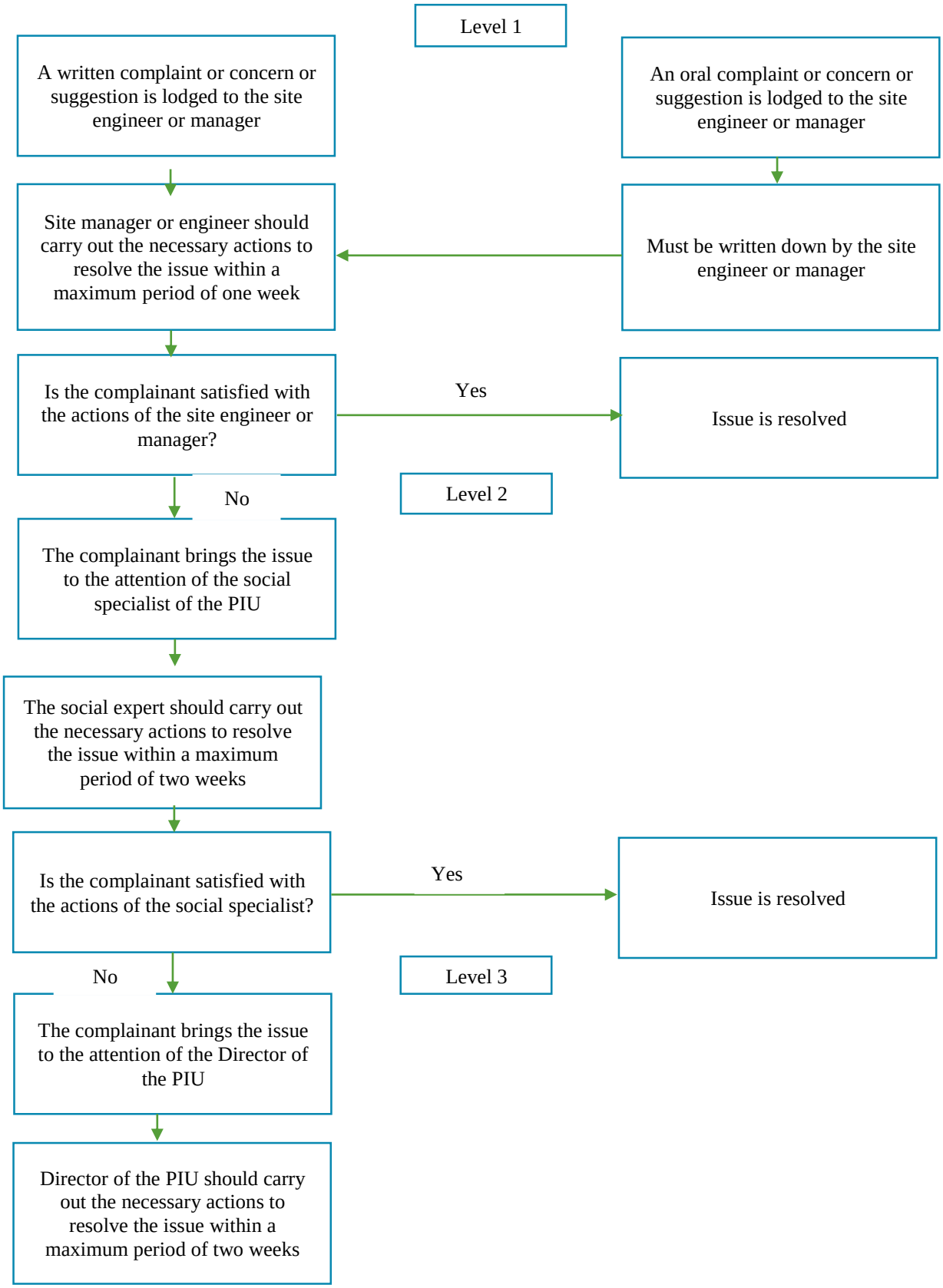
أنا الموقع أدناه، أقر بأني قرأت وتُلِيَ عَلَيَّ وفهمت وتلقيت الشرح والتدريب والمعلومات الكافية عن مدونة السلوك التابعة لمشروع الطرقات والعمالة. وأوافق على الامتثال للمعايير الواردة فيها وأعرف أن أي إجراء يتعارض مع مدونة السلوك هذه قد يؤدي إلى اتخاذ إجراء تأديبي وقد يؤثر على استمرارية عملي ضمن مشروع الطرقات والعمالة.

أسم وامضاء العامل	أسم وامضاء مسؤول الموقع (من قبل المتعهد)	أسم وامضاء المشرف على الاعمال (من قبل الاستشاري)
التاريخ:	التاريخ:	التاريخ:

☐ العامل يجيد القراءة، وقد دوّن اسمه وإمضاءه

☐ العامل لا يجيد القراءة، وقد تُلِيَت عليه مدونة السلوك وتمّ الامضاء نيابةً عنه من قبل الأخصائي الاجتماعي

Annex 4: Schematic illustration of the GRM



Annex 5: Complaint Register Form

Table S Complaints Registration Form

Name (optional), 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

Annex 8: Plans and Procedures during Maintenance Activities

Pollution Prevention Plan

The Contractor shall prepare and abide by a Pollution Prevention Plan to ensure that pollution to air, water or land is prevented or, where this is not possible, reduced and mitigated as far as practicable during the construction phase. The Pollution Prevention Plan will be developed for managing:

- liquid effluents
- air emissions
- noise and vibration
- fuel, oil, and chemical storage and handling
- hazardous, non-hazardous, and household waste handling, storage and final disposal
- vehicle and equipment selection and maintenance

Effluent Management Provisions

- No effluent shall be discharged under any condition neither into water courses or bodies including surface water bodies nor to ground surface or infiltrated into subsoils
- Install mobile porta-cabins and connect the generated wastewater from workers to the existing sewage network or to polyethylene tank
- Empty the tank in the sewer network or into nearby operational wastewater treatment plants either by municipality-owned or contracted wastewater tankers

Rainwater run-off Management Provisions

- Install temporary structures to prevent runoff from reaching nearby water bodies
- Remove base coarse and sand from active maintenance sites to prevent the transfer of suspended solids in rainwater
- All platforms where generators or hydrocarbon storage tanks are installed have an impervious layer
- Restrict excavation activities during periods of intense rainfall

Atmospheric Emissions and Dust Management Provisions

- Exercise care to minimize emissions of dust from its activities, including traffic, at work sites, in residential areas and on access roads.
- Stop dust generating activities during windy weather especially in residential areas

- Where it is deemed that dust is impacting or may have an impact on human, plant or animal receptors or where dust may cause sedimentation of watercourses/water bodies or unacceptable levels of soil loss, water shall be applied to the area creating the dust
- Control vehicle speeds to reduce traffic-induced dust dispersion and resuspension by setting and enforcing speed limits
- Post speed limit signs in sensitive areas
- Ensuring trucks hauling sand, dirt or other loose materials are covered (sheeting trucks)
- Cover dusty stockpiles
- Suspending topsoil stripping and replacement during strong winds
- Using a dust collection system for bulk materials unloading
- Ensure proper handling and storage of materials thus minimising the areas of stockpiled materials
- When storage, transport and handling of bulk materials is made in the open air and exposed to the wind, necessary dust abatement measures shall be implemented
- Regular maintenance of construction machinery, equipment and vehicles

Spill Prevention and Management

- Spill clean-up procedure to reduce the risks of accidental leakages
- Carry out all re-fuelling in designated areas with impervious surfaces and guarantee no fuel spills
- A spill collection tank must be installed under generators and specific equipment
- All chemicals shall be stored in dedicated areas on a paved or sealed floor and in tightly closed containers and be protected from adverse weather conditions
- Used oil or chemical must be stored in an appropriate area until it is collected and disposed in licensed sites
- Use of secondary containment basins for long term storage of lubricants and fuels
- Ensure that the plan is present at the construction site and that oil spill response kits are available
- Ensure proper housekeeping conditions are maintained at the oil/chemical storage areas
- Train all workers to implement this plan in case of accidental spillage

Waste Management Plan

This plan shall be developed and implemented by the Contractor to manage the generated waste effectively. The plan shall include the following components:

- Establish and maintain a waste register which is at the disposal of the Engineer. This register will record all waste management operations: production, collection, transport and disposal. Waste shall be categorized according to the following definitions:

- Non-hazardous solid waste generated at maintenance sites and offices includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office and kitchen wastes.
- Hazardous solid waste includes contaminated soils, oily rags, used oil filters, used oil, as well as spill cleanup materials from oil and fuel spills

- Waste shall be collected from each maintenance sites and from offices at the same rate that it is produced
- All the waste materials generated at work sites and offices shall be segregated into domestic (organic/ paper and cardboard/ metals, glass and plastics) and hazardous waste and disposed into the color-coded containers (one for the disposal of organic waste, one for paper and cardboard and one for aluminium, glass and plastics)
- The domestic waste containers shall be emptied 2 to 3 times per week by the municipality to maintain maintenance sites sanitation
- Segregated recyclables shall be sent to recycling facilities in the area where possible
- Reuse of excavation materials generated during cutting and filling activities whenever possible and disposal of remaining material in controlled disposal site to be identified by the contractor in coordination with the relevant municipality
- Approval letters shall be obtained from the concerned municipalities for domestic and construction waste disposal
- Reuse or recycle the generated waste whenever possible
- Train workers on waste reduction procedures
- Provide workers with nearby sanitation facilities and inform them about their location
- The work zone shall be cleaned on a daily basis. Construction leftovers that are external to the working zone shall be removed regularly. Site housekeeping must be maintained

Hazardous Materials Management Plan

A Hazardous Materials Management Plan will be developed for hazardous materials that pose a potential risk to human health or the environment and include cleaning chemicals, solvents and fuels. The plan shall include the following:

- Fuel and hazardous chemicals/materials shall be stored in designated areas, except for quantities generated or required for the daily construction activities.
- All fuel and hazardous chemical storage facilities shall be located on flat or gently sloping ground and shall be contained within a bund designed to contain at least 110% of the total capacity of the storage containers plus 10% of the aggregate tank volume within the containment area or as otherwise specified by regulatory requirements. The bund walls and floor shall be constructed of concrete or other suitably impermeable material. The filling connection must be within the bund. No drain valves or other connections through the bund walls shall be permitted. Tanks shall be fitted with a gauge to allow the fill level to be monitored during refilling and preferably with a high-level alarm.
- Hydrocarbons, lubricants, paints, solvents and batteries are transported in drums to suitable waste management facilities, if available

Emergency Preparedness and Response Plan

An Emergency Preparedness and Response Plan (EPRP) will be developed so that the Contractor is prepared to respond to accidental and emergency situations in a manner that prevents and mitigates harm to people and the environment. The EPRP needs to be discussed and disclosed to service providers and local affected communities prior to construction. The EPRP shall cover the following emergency situations as a minimum/;

- Medical emergency
- Fire or explosion;
- Hazardous Material Spill or Release;

The EPRP will identify

- Accidents and emergency situations and the communities and individuals that may potentially be impacted
- Response procedures, provision of equipment and resources, designation of responsibilities, communication systems and channels and periodic response training

The Project will need to ensure that the Contractor shall

- Maintain fit-for-purpose Emergency Response Capability, which shall be clearly documented
- 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 the nearest hospital shall be prominently displayed in the Contractor´s office.
- Ensure that all personnel are informed and aware of how to react in an emergency situation, and responsibilities are defined. Information and awareness training shall be documented, and available on all Project Areas
- Organize and document emergency simulation exercises within 3 months of the physical start of the works, and subsequently once every 12 months

Traffic Management Plan

A Traffic Management Plan (TMP) will need to be developed by the main contractor. The TMP shall be a starting point for further discussion between the main contractor, local authorities and road agencies. The plan will include preventative measures to manage the risks from potential increases in traffic from construction activities including transportation of material and workers to and from the maintenance activity sites. In addition, it will include measures to protect workers and manage the risks from civilian traffic within close proximity to maintenance activities especially within residential areas. The TMP will be refined and updated as access routes are confirmed and the timing and type of abnormal loads become known.

The TMP shall include the following:

- Proposed program of works;
- Details of key stakeholders;
- Details regarding the proposed method of construction;
- Proposed Temporary Traffic Control/ Management Plans (TTCP/ TMP);
- Various traffic diversion plan layouts for various type of activities;
- Diversion signs;
- Regulatory signs;
- Informative signs;
- Analysis of impacted roads;
- Risk Assessment;

- Proposed working hours; and
- Protection of Work Zones and road users including pedestrians;

The TMP shall be approved by the Consultant prior the execution of work.

A special TMP shall be prepared regarding works on Highways.

Noting that Works on Highways shall be minimized during Peak- Hours and maximized during off-peak hours, 7 days a week.

Public Health and Safety Plan

An effective Public Health and Safety Plan for construction shall include at least the following components:

- Secure the site and restrict access to it
- Prohibit unattended/unauthorized public access
- No children are allowed to be present on the work site, reminding workers and community members of this in all related communications
- Install barriers with warning lights at night around excavations, material dumps or other obstructions at the maintenance sites
- Install warning signs for drilling and maintenance at the external part of the site and at a distance of 100 meters
- Inform residents and place proper safety and diversion signs at sensitive areas within the project area (i.e. near schools, shops hospitals and agriculture areas)
- Install pedestrian and vehicular passages near residential areas
- Accidental oil spillage shall be well controlled
- Make sure at least three sets of first aid kits are present on the construction site.
- Access to hospitals should not be impeded at any time
- Properly manage trucks and heavy machinery entering and exiting the construction site.
- Training of heavy machinery drivers about road safety
- Equip Project drivers with telephones for contacting the emergency services to enact the EPRP if necessary in case of emergency.
- Keep stakeholders informed of maintenance schedule and abide by assigned timing
- Manage the grievance mechanism through which community members can make complaints about project activities

- The community health and safety plan shall cross reference with other relevant management plans such as the TMP and EPRP. Local health care and emergency services shall be consulted in the development of the plan.

Occupational Health and Safety (OHS) Plan

In addition, the Contractor shall ensure the workers' health and safety against possible accidents and injuries from the various maintenance activities. The plan shall include the following:

- Hazard Identification and assessment including (Physical injuries from: Traffic accidents, Falling from moving vehicles, Loss of stability and overturning of equipment, Falling from height, Hit by construction materials, Slips, trips and falls, Electrical incidents, Burns from hot works, Health problems due to: Fumes and dust, Noise and vibration, Excessive manual handling, Disease outbreaks, Asphyxiation in confined spaces and Fire)
- OHS protection measures for the identified hazards
- OHS protection measures for Unexploded Explosive Ordnance
- Prevention and precaution measures for COVID-19
- Identify the mandatory personal protective equipment (PPE) to be used including hard hats, safety boots, reflective vest as well as specific PPEs
- Identify and manage dangerous substances planned to be used on the project area
- Work Permit System for Confined Space Entry, Hot Works, Excavation, Lifting, Working at Height, Handling of Hazardous Materials, and Electrical works
- Safe Work Method Statements
- Hazard communication
- Emergency and Evacuation procedures
- Accident and incident reporting and investigation

The Contractor shall implement mitigation measures as per the Occupational Health and Safety Plan. Measures include but not limited to:

- Personnel and visitors to maintenance activity areas shall be equipped with a safety helmet, safety shoes and a reflective jacket as a minimum.
- Adequate quantities of PPE shall be available on the project areas and stored properly
- Personnel shall be trained on how to use and care for PPE

- Conduct training and awareness meetings including correct use of PPE, health and safety procedures, and handling hazardous material containers and related wastes
- Ensure refreshing training session on occupational health and safety measures is conducted on a monthly basis
- Ensure that supervision, directly in charge of construction activities, fully brief and discuss with Personnel HS Tool Box Talks at the start of each work day and prior to commencing new activities. These talks shall be conducted in a language understood by the workforce. A checklist shall be utilised for this purpose. At a minimum it shall include the following: Nature of the job, associated hazards, safe working methods to be adopted and requirements of the Permit to Work
- Ensure a minimum of first-aid provisions on any work site, including: suitably stocked first-aid kits; a person, respectively an adequate number of staff appointed and trained to take charge of first-aid arrangements and ensure that staff and workers are informed about first-aid arrangements
- Equip the project area with a communication system exclusively for the purposes of communication with the first aid services. Information on how to communicate with the first aid services shall be clearly indicated near the communications equipment
- Collaborate with local health authorities and make arrangement with an appropriate number of local doctors, and/or nurses, hospitals and ambulance services to ensure that medical staff, first aid facilities, and ambulance service are available within the project area
- Measures as per national guidelines published by WHO and Ministry of Public Health regarding COVID-19 prevention and quarantine procedures
- Workplace inspections

Chance Finds Procedure

The chance find procedure is a project-specific procedure that identify actions necessary if previously unknown heritage resources, particularly archaeological resources, are unexpectedly encountered during project construction phase.A Chance Find Procedure will set out how chance finds associated with the project will be managed and will include the following requirements:

- Notify relevant authorities (Directorate of General of Antiquities) of found objects or sites

- Fence the area of finds or sites to avoid further disturbance
- Conduct an assessment of found objects or sites by cultural heritage experts in order to identify and implement actions consistent with the requirements of ESS8 and national legislation

Train project personnel and project workers on chance find procedures

Annex 7: Public Consultation

Consulted NGOs

Municipalities and NGOs were consulted at this phase of the project. The public consultation meeting covered REP planned (1) routine maintenance activities for primary roads in Jbeil Caza (the subject of this ESMP) and (2) rehabilitation of the remaining road in Jbeil Caza (Jbeil R3: Dmilsa - Bentael - Bhdaydat - Kafar – Kfoun).

Consulted NGOs were targeted 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. The name of the invited NGOs and their field of activity are presented in the table below. Those local NGOs may play a role of advocates to reduce projects' social and environmental risks. Out of the invited local NGOs, only BNR committee attended the meeting.

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 (Anera, Acted, and DRC) 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 Jbeil Caza, the total number of registered Syrian is 8,377 individuals (UNHCR, 2017). 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 T Consulted Local NGOs and their Activities

Organization	Phone Number	Activities
Young Women's Christian Association Jbeil (YWCA)	09-540500	Being the oldest volunteer movement for women and girls in Lebanon, the YWCA aims to achieve social justice through programs for community development. It prioritizes the advancement and greater participation of women at all levels of society.
Frontiers' Rights (Rouwad Houkouk)	01-383556	Ruwad was founded in 2014 after long years of advocacy work launched by its activists in 1999. The association defends the fundamental rights of marginalized groups in Lebanon, focusing on three areas: statelessness, right to asylum, and right to personal freedom, safety and non-refoulement (non-forced return to home country).

Bentael Nature Reserve organization/Committee	03-838982	Bentael Nature Reserve (BNR) was created by the Law No.11 on February 1999. In the absence of a proper Management team, the site is managed by the Bentael Nature Reserve Committee under the supervision of MoE.

Table U Consulted International NGOs and their Activities

NGO Name	Contacts	Intervention Sector(s)	Comments
ANERA Lebanon	Mrs. Dima Zayat Deputy Country Director T: 01382590 (ext: 105) M: 70051813 E: dzayat@aneralebanon.org	• 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.
ACTED	Mr. Jack French Deputy Country Director T: 01324331 M: 79160375 E: jack.french@acted.org	• Development • Infrastructure & Services Rehabilitation • Labor & Livelihoods • Shelter • Water sanitation and hygiene	Mr. French received the Project information sheet and explained that ACTED is working with Syrian in Beirut and northern districts of Mount Lebanon (Baabda, Metn, Keserwane and Jbeil), as well as in Akkar District. He welcomed the idea of the Project and will disseminate it across his organization.
Danish Refugee Council (DRC)	Mr. Rickard Hartmann Country Director T: 01339052 (ext: 201) E: rickard.hartmann@drc.ngo	• Direct Assistance • Protection • Shelter • Community Empowerment and Livelihoods	Mr. Hartmann Mr. French 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.

Photos: Jbeil Caza- Inclusive public participation meeting

Public Participation meeting for Jbeil roads (December 14, 2021)



Invitation letter:

TIVÈL Consultancy
Cell. : +961-76 788843
1st floor-Ghaleb Center-Slayeb
Zgharta, Lebanon
Registry No. 3017068

الموضوع: دعوة لحضور إجتماع مشاركة عامة حول مشروع "الطرق والعمالة"

تحية طيبة وبعد،

بما أنّ مجلس الإنماء والإعمار يقوم بتمويل من البنك الدولي بتنفيذ مشروع "الطرق والعمالة" لتأهيل طرقات في جميع المحافظات اللبنانية، بإستثناء محافظة بيروت؛

ولما كانت شركة دار الهندسة نزيه طالب وشركاه قد تكلفت من قبل مجلس الإنماء والإعمار للقيام بالدراسات الهندسية والبيئية المتعلقة بالمشروع والتي بدورها كلّفت شركة **TIVÈL** للإستشارات البيئية بإعداد خطة إدارة بيئية وإجتماعية للمشروع المذكور؛

وحيث أنه من الضروري عقد اجتماعات تشاورية مع الجهات المعنية ومع العامة بشؤون البيئة والأمور الإجتماعية ذات الصلة بمشاريع الطرق والإستماع إلى آرائهم المتعلقة بالمشروع؛

وبما أنّ المشروع يهدف للقيام:

- بأعمال صيانة الطرق في قضاء جبيل؛
- إعادة تأهيل طريق – كفر مسحون دملصا – بنتاعل – بحديدات – الكفروالحرف.

لذلـــــــــــك،

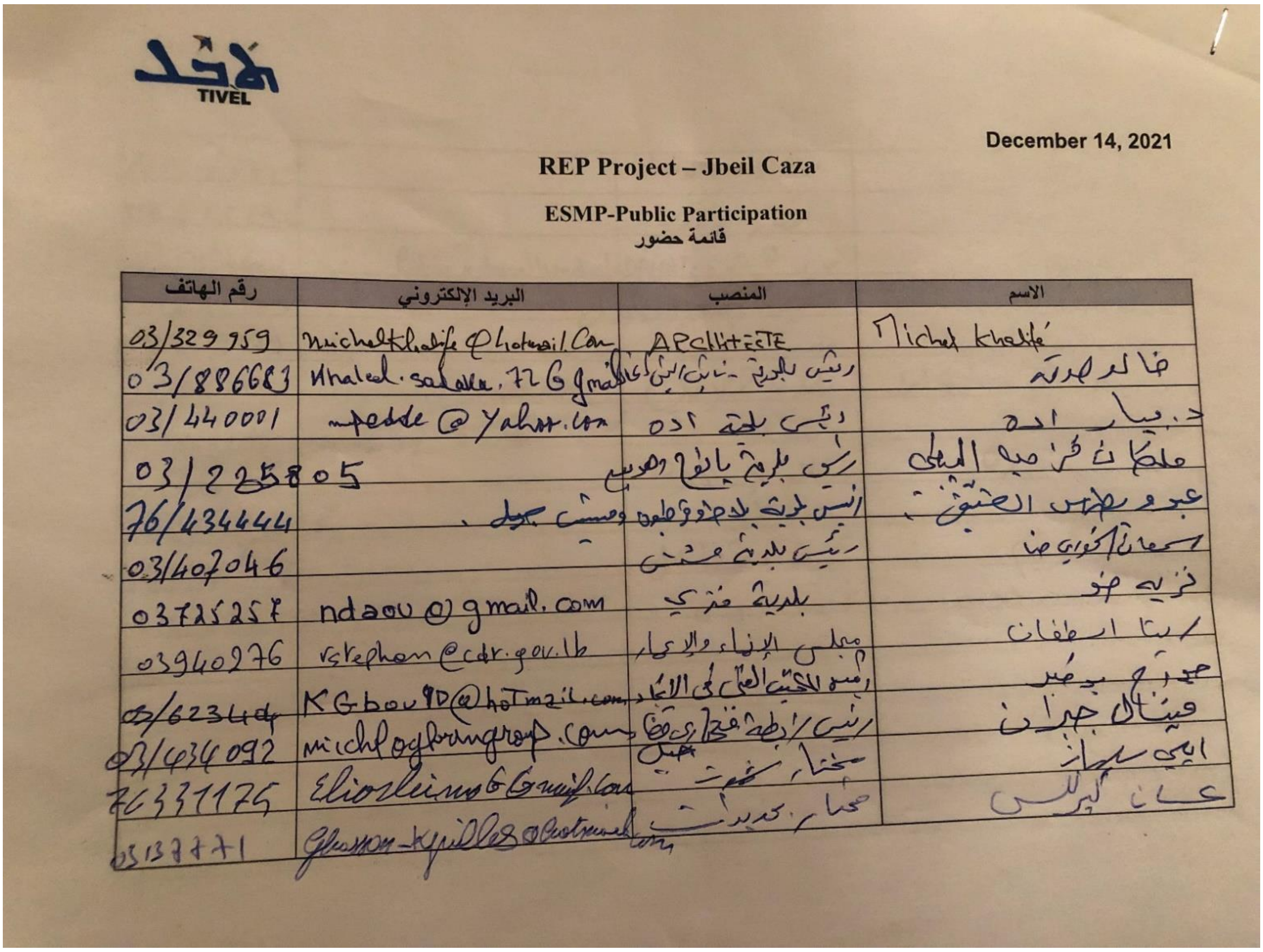
ندعوكم لحضور إجتماع مشاركة للعامة في تمام الساعة الحادية عشر صباحاً من يوم الثلاثاء الواقع في 14 كانون الأول في مبنى إتحاد بلديات قضاء جبيل؛ ونتمنى على المواطنين الكرام، إبداء الملاحظات الخطيّة، في حال وجودها، حول المشروع المذكور، وإرسالها إلى شركة دار الهندسة نزيه طالب وشركاه بواسطة الفاكس على الرقم التالي 01/863434 أو إيداعها في مبنى إتحاد بلديات قضاء جبيل.

وتفضلوا بقبول فائق الإحترام

مُديرة شركة TIVÈL

نسرين الغزال معوض

Attendance sheet:



TIVEL

December 14, 2021

REP Project – Jbeil Caza

ESMP-Public Participation
قائمة حضور

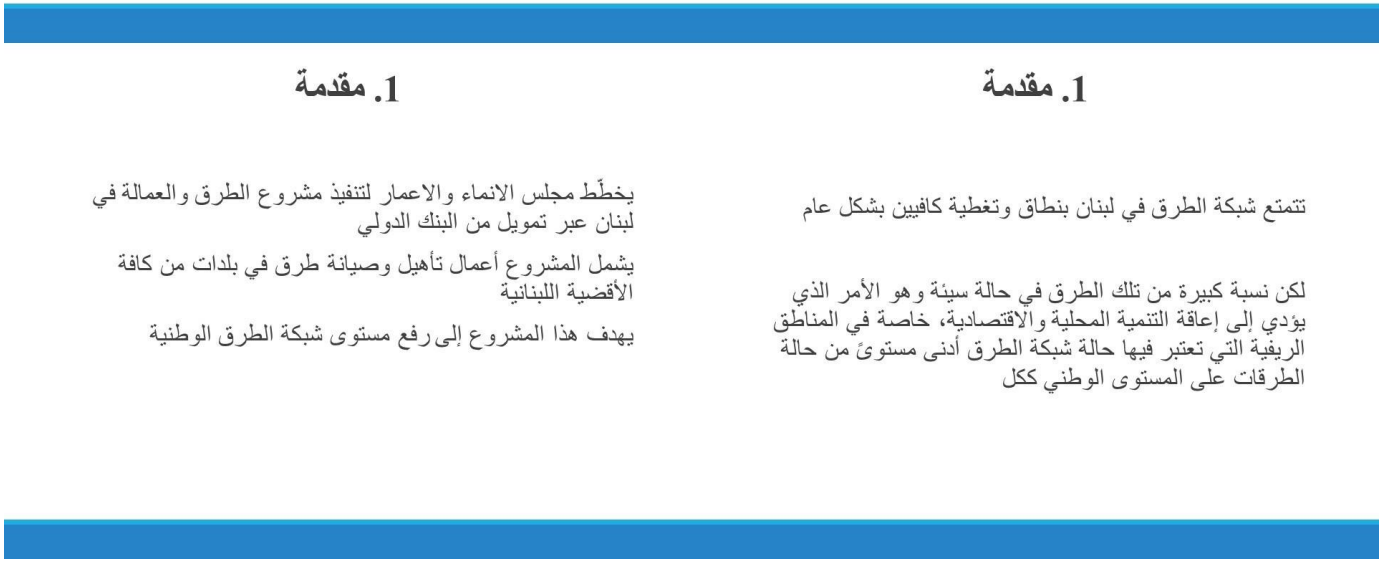
رقم الهاتف	البريد الإلكتروني	المنصب	الاسم
03/329959	michelkhalife@hotmail.com	ARCHITECTE	Michel Khalifé
03/886683	khaled.salame.72@gmail	رئيس بلدية [illegible]	خالد سلامة
03/440001	mpedde@yahoo.com	رئيس بلدية اده	د. بيار اده
03/225805		رئيس بلدية [illegible]	[illegible]
76/434444		رئيس بلدية [illegible]	[illegible]
03/407046		رئيس بلدية [illegible]	[illegible]
03725257	ndaou@gmail.com	بلدية [illegible]	[illegible]
03940276	vstephan@cdr.gov.lb	مجلس الإنماء والإعمار	ريتا اسطفان
03/62344	KGbou9D@hotmail.com	رئيس [illegible]	[illegible]
03/434092	michel@[illegible]group.com	رئيس رابطة [illegible]	[illegible]
76331175	Eliosleiman6@gmail.com	مختار [illegible]	ايلي سليمان
03137771	Ghassan-[illegible]@hotmail.com	مختار [illegible]	غسان [illegible]

TIVEL

December 14, 2021

71725507		مختار بشتاعل فدار	عبدو الخوري
03412386		مختار دملصا	بطرس الخوري
03/313160	naji.habre@daralhandasah.com	مدير المشروع DAHNT	ناجي [illegible]
03000303		رئيس بلدية الحجولا	سمير عاكر
07/559129	edyouthage@Gmail.com	بلدية جبيل	ادكار [illegible]
03857465	drsamias@msn.com	بلدية [illegible]	د. سامي ابي سليمان
03/406383	rectomsquaibey2017@icloud.com	[illegible]	رستم حبيب
03/364633		بلدية اده	شارل اده
03/112535		بشتلدى	[illegible]
03/811871		محبة بشتاعل	جورج كريم
03318852		مختار اده	ايلي اده

PowerPoint Presentation:



2. الجهات المعنية بالمشروع

الجهة	الصفة
البنك الدولي	ممول المشروع
مجلس الانماء والاعمار	إدارة وتنفيذ
دار الهندسة نزيه طالب وشركاه	استشاري هندسي
TIVÈL	استشاري بيئي

3. أهداف اللقاء

تحقيق الشفافية عبر إعلام الرأي العام بالمشروع لإبداء ملاحظاتهم وذلك وفقاً لسياسة ضمانات البنك الدولي (سياسة تشغيلية رقم 4.01)

عرض لأهم الاثار البيئية والاجتماعية والتدابير التخفيفية المرتبطة بتنفيذ المشروع

مناقشة خطة الإدارة البيئية والإجتماعية للمشروع التي تهدف لحماية الصحة البشرية، السلامة العامة والموارد البيئية

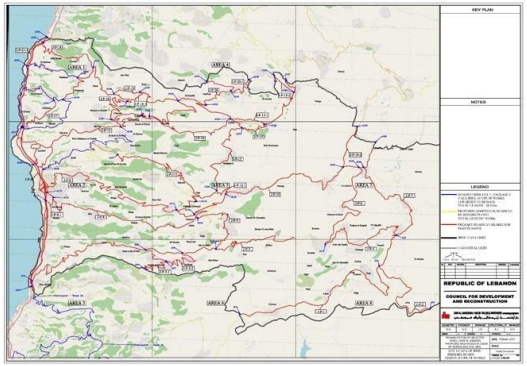
4. وصف المشروع

أن المشروع يهدف للقيام:

a) بأعمال صيانة معظم الطرقات الرئيسية في قضاء جبيل؛
b) إعادة تأهيل طريق ملحوظ في هذا المشروع:
- طريق كفر مسحون دملصا – بنتاعل – بحديدات – الكفروالحرف

4. وصف المشروع (a)

أعمال صيانة معظم الطرقات الرئيسية في قضاء جبيل



4. وصف المشروع (a)

CAZA	Road Code	Name of Primary Roads in Caza Jbeil	Length (km)
Jbeil	J-P1	Kehmez - Lassa - Ghabate - Afka - El Mejdel	17.1
	J-P2	El Mejdel - Afka	7.80
	J-P-3	Nahr Ibrahim - Halate - Alita - Zebdine - Fatré et Bir el Hait - El Hsoune - Ain el Delbé - El Souané - Ain Jraine - Frat - Almate El Jenoubiat - Belhos - Kartaba	24.00
	J-P-3-1	Fatré et Bir el Hait - Adonis et Sannour	6.18
	J-P-3-2	El Hsoune - Mechaire - Adonis et Sannour	5.05
	J-P-4	Kartaba - Mazraet el Siyad - Deir Mar Sarkis - Hedayné - El Mghaire - Yanoush - Akoura - El-Mejdel	8.46
	J-P-5	Ain el Delbé - El Souané - Almate El Jenoubiat - Almate El Chemaliat - Torzaya	8.08
	J-P-6	Kartaba - Mazraet el Siyad - ElLaklouk	8.75
	J-P-7	El Mejdel - Akoura - El Laklouk	8.04
	J-P-8	Jbeil - Kartaboune - Blat - Bchilé - Jouret el Kattine - Torzaya	12.25
	J-P-8-1	Jbeil - Kartaboune - Blat - Jbail	1.52
	J-P-9	Jbeil - Hboub - Kfar Kaouass - Breige - Ras-Osta - Kfarbaal (Annaya)	14.00
	J-P-10	Kfarbaal (Annaya) - Torzaya - Ehmège - El Laklouk - Akoura - Tannourine Foka	17.00
	J-P-10-1	Ehmège - Mechmech	2.26
	J-P-10-2	Ehmège - Akoura -	2.94
	J-P-11	Bintaël (Féar-El-Soufa) - Barket Hajoula - Hajoula - Kfarbaal (Annaya)	11.89
	J-P-12	Kfarbaal (Annaya) - Ehmège - Mechmech - Lehfed - Saki Rechmaya	9.25
	J-P-13	Amchite - Ghorfine - Hbaline - Chamate - Beit Habbak - Salciet el Khate	10.24
	J-P-14	Obeidate - Machmech - Lehfed - El-Kharbé	10.35
	J-P-15	Lehfed - Saki Rechmaya - Jage - Tartige	8.93
	J-P-15-1	Lehfed - Jage	2.39
	J-P-15-2	Tartige	1.70
	J-P-16	Beit Habbak - Chamate - Ghalboune	7.68
	J-P-16-1	Ghalboune - Beijé	1.72
	J-P-17	Amchite - Jeddeyel - Childrane	4.05
	J-P-18	Childrane - Ghanzouze - Balthazar - Maad - Chmout - Kfar Kaddé - Fghal	10.36
	J-P-19	Maad - Ain Kfah - Ghalboune - Beijé - El Kharbé - Hakel - Obeidate - El Ramoul - Chamate	17.99
	J-P-20	El Kharbé - Lehfed - Al Kattara - Maifouk	6.99
	J-P-20-1	Maifouk - Al Kattara - Ram - Hadtoune	2.71
	J-P-21	Nahr Ibrahim - Halate - Mariza - Kartaboune - Jbail - Amchite	11.26
	J-P-21-1	El Berbara - Kfar Kaddé - Fghal	2.41
		Total Length of Primary Road in Caza Jbeil (Km)	**263.00**

ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

1. الصيانه العاديه

الفحص الدوري المتواصل للطرق مع الحرص على تنفيذ المهام التاليه بصفة دائمه أو كلما دعت الحاجة إلى ذلك

- تنظيف الطريق وتشكيل حدود حرم الطريق .
- تعبئة التشققات وإصلاح العيوب البسيطة الموجودة على سطح الطريق.
- إصلاح الأكتاف والميول الجانبيه للطريق.
- تنظيف منشآت تصريف مياه الأمطار والقيام بالإصلاحات البسيطة اللازمة للمنشآت الخرسانية.
- فحص وصيانة وإصلاح حواجز السلامة.
- إصلاح أو إستبدال إشارات الطرق ودهان الطريق.

4. وصف المشروع (a)

تم فحص الطرق لتحديد ما تحتاج إليه من صيانة من خلال مسح شامل

- لتحديد أوضاع طبقات الرصف الإسفلتية (مستويات الأضرار ومدى انتشارها)
- أوضاع المنشآت (منشآت تصريف مياه الأمطار، حواجز السلامة والعبارات الصندوقية)
- أوضاع العناصر غير الرصفية كاللوحات الإرشادية والخطوط المرورية والعلامات

ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

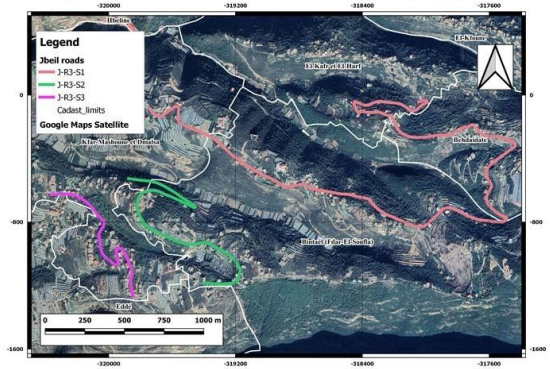
2. الصيانه الوقائيه والتى تعمل على إطالة العمر الإفتراضي للطريق وتتم به الاعمال التالية

- تغطية سطح الطريق بطبقات جديدة.
- إستبدال الطبقات الأسفلتيه سواءً بإعادة رصفها أو بإزالتها تماماً وإعادة إنشائها تبعاً لحالة الرصف.
- إصلاح الجسور والعبارات الصندوقية (culvert box) لإزالة التلفيات العادية أو الأضرار الناتجه عن السيول.

4. وصف المشروع (b)

Jbeil Road 3 : 8.3 km

طريق كفر مسحون دملصا – بنتاعل – بحديدات – الكفرو الحرف



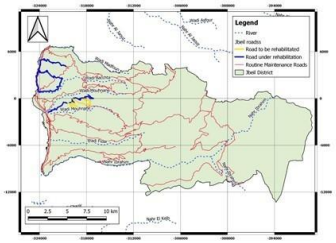
ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

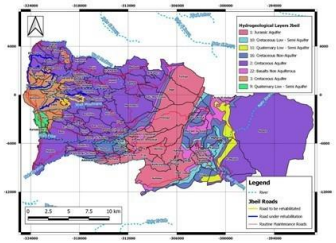
- استبدال أو تأهيل طبقات الإسفلت بحسب نتائج اختبار من أجل إعادة تأهيل
- إعادة تأهيل شبكة تجميع مياه الأمطار عند الحاجة
- وضع إشارات السير وتخطيط الطرقات
- بناء جدران دعم وحاجز السلامة عند الحاجة

5. دراسة المحيط البيئي (الوضع الحالي)

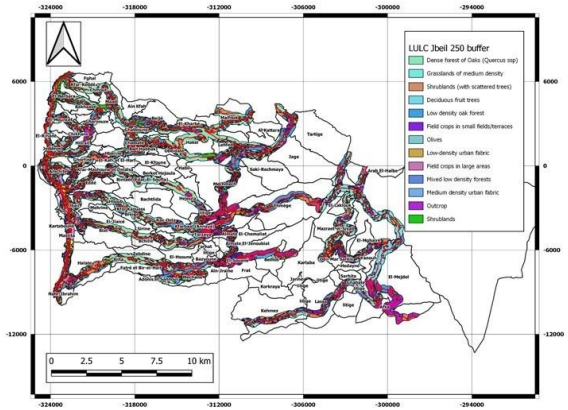
- نوعية الهواء
- جيولوجية المنطقة
- نوعية التربة والمياه السطحية والجوفية
- التنوع البيولوجي
- التلوث الضوضائي
- الوضع الاجتماعي والاقتصادي للمنطقة

5. دراسة المحيط البيئي (الوضع الحالي)





5. دراسة المحيط البيئي (الوضع الحالي)



6. الآثار البيئية والاجتماعية الإيجابية للمشروع

مشاريع الطرق:

تقلل أو تمنع الغبار، وتحسن التصريف، وتقلل العقبات المرورية

تضمن سلامة الطرق وتحد من الحوادث المرورية

ترفع قيمة الأراضي وتزيد الخيارات للأنشطة التجارية على طول الطريق

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

الآثار المحتملة على البيئة	التدابير التخفيفية
تلوث الهواء	• إستخدام آلات ذات انبعاثات منخفضة • توجيه مصادر الإنبعاثات بعيداً عن المساكن المحيطة • رش الطرق بإنتظام بالمياه لمكافحة الغبار • تغطية مركبات نقل المواد الأولية والمخلفات من وإلى موقع المشروع • تحديد سرعة الشاحنات والمركبات
تلوث المياه	• استخدام حواجز لمنع وصول الترسبات الرملية الى قنوات المياه • تغطية مواد البناء • تطبيق ممارسات ترشيد المياه من قبل عمّال البناء

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

الآثار المحتملة على البيئة	التدابير التخفيفية
تلوث التربة	• التأكد من صيانة المركبات والمعدات ومن عدم وجود أي تسرب للوقود • توفير أطقم في الموقع لمعالجة أي انسكاب عرضي على الفور • تعيين مسؤولين عن الممارسات الجيدة في الموقع بما في ذلك العلاج السريع لأي انسكاب عرضي
إنشاء المخلفات الصلبة	• تدريب الموظفين على إدارة النفايات • إزالة المخلفات الصلبة من الموقع خلال 24 ساعة، والتخلص منها في مكبات قانونية محددة.

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

الآثار المحتملة على المجتمع	التدابير التخفيفية
تغير في حركة السير	• التخطيط والتشغيل السليمين للتحويلات المرورية • إعادة تأهيل الطريق بشكل تدريجي • وضع علامات سير وأنظمة إضاءة في الأماكن الحساسة لضمان سلامة النقل
خطر على الصحة والسلامة المهنية والعامة (في حال حصول اي حادث)	• تطوير خطة للتأكد من إلتزام المقاولين بالمبادئ التوجيهية للصحة والسلامة المهنية • توفير المعدات المناسبة للحماية الشخصية • توفير التدريب على الصحة والسلامة المهنية للعمال

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

الآثار المحتملة على المجتمع	التدابير التخفيفية
تأثر الحركة التجارية للمؤسسات والمحال القائمة على جانبي الطريق	• تسريع العمل من خلال الوضع والالتزام بأهداف ومقاييس واضحة لتقييم الأداء ومتابعة سير العمل • إعادة تأهيل الطريق بشكل تدريجي
الضوضاء	• حصر الأعمال في ساعة محددة ومصرح عنها سابقاً • صيانة دورية للمعدات وتجنب تعطلها • الحد من إستخدام الأجهزة والمعدات التي تسبب الضوضاء خصوصاً بالقرب من المنشآت الحساسة (المدارس وأماكن الصلاة)

8. خطة الإدارة البيئية والإجتماعية

هدف الخطة الادارة البيئية: مراقبة المشروع والتأكّد من مطابقته مع جميع المعايير البيئية والإجتماعية.

بعد دراسة الاثار المحتملة للمشروع ،تقوم الدراسة باقتراح اساليب تخفيفية لهذه الاثار وسبل لمراقبتها.

خطة الادارة البيئية تتضمن:

- مراقبة نوعية المياه
- مراقبة نوعية التربة
- مراقبة نوعية الهواء
- مراقبة نوعية التنوع البيولوجي
- مراقبة الصحة والسلامة العامة
- خطة طوارئ في حال حدوث اي حادث مفاجئ.

9.أسئلة ومناقشة عامة

يمكنكم إبداء رأيكم
عبر التواصل مع شركة TIVÈL
هاتف:843 788 76 961+

أو عبر التواصل مع وحدة مشروع الطرق والعمالة في مجلس الانماء والاعمار

هاتف: 096 980 1 961+

بريد الكتروني: rep.grm@cdr.gov.lb