ROADS &
EMPLOYMENT PROJECT

REPUBLIC OF LEBANON
COUNCIL FOR DEVELOPMENT
AND RECONSTRUCTION

DETAILED ENGINEERING DESIGN FOR THE
REHABILITATION OF SELECTED ROAD LINKS IN LEBANON

LOT 4

AKKAR - MINIEH & DANNIYEH - ZGHARTA

APPENDIX B2

ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN (ESMP) FOR REHABILITATION OF THE SELECTED ROADS IN AKKAR CAZA

JANUARY 2020

ASSOCIATED CONSULTING ENGINEERS (ACE)
P.O. BOX 11-3446 - BEIRUT - LEBANON

المكتب الهندسي الاستشاري - (أيس)
ص. ب ١١-٣٤٤٦ بيروت - لبنان

Final

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ACE	Associate Consulting Engineers
CBD	Convention on Biological Diversity
CDR	Council of Development and Reconstruction
CEDAW against Women	Convention on the Elimination of All Forms of Discrimination
CO	Carbon Monoxide
COM	Council of Ministers
DGUP	Directorate General for Urban Planning
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ESMP	Environmental and Social Management Plans
GBV	Gender Based Violence
GRM	Grievance Redress Mechanism
HCUP	Higher Council for Urban Planning
IBA	Important Bird Area
IFC	International Finance Corporation
MOC	Ministry of Culture
MOE	Ministry of Environment
MOIM	Ministry of Interior and Municipalities
MOL	Ministry of Labor
MOPWT	Ministry of Public Works and Transportation
NGOs	Nongovernmental Organizations
NO	Nitrogen Monoxide
NOx	Nitrogen Oxides
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
VA	Violence Against Children

WB	World Bank
WHO	World Health Organization

EXECUTIVE SUMMARY – NON-TECHNICAL SUMMARY

ES1. Introduction

The Council for Development and Reconstruction (CDR) acting as an executing agency on behalf of the Lebanese Council of Ministers (COM) awarded a contract to Associated Consulting Engineers (ACE), hereinafter the Consultant, to prepare the assessment, design and Environmental and Social Management Plans (ESMP) of Lot 4 under Roads and Employment Project. This project is funded by the World Bank (WB).

The Project's main objectives are to enhance the transport connectivity along selected secondary and tertiary road sections in different cazas and to create short-term job opportunities for the Lebanese and Syrian communities. The project will include the rehabilitation of urban and rural stretches of roads from all Lebanese regions. The project covers classified roads in 25 cazas throughout Lebanon with an expected total length of 835 km and grouped in six (6) lots. The project will be implemented over a period of five years.

This document represents the Environmental and Social Management Plan (ESMP) of Akkar Caza and it was prepared according to the WB OP 4.01 (Environmental Assessment). It covers all components of the proposed project during the rehabilitation and operation phase, assesses of the likely environmental and social consequences of a project, and determines the necessary measures to mitigate the negative ones and increase the positive impact on the environment and natural resources throughout a mitigation plan. In addition, the work included the development of a monitoring plan to ensure compliance of the project with environmental and social conditions and regulations. Moreover, public hearing sessions of the project were conducted and included the participation of the public and concerned communities.

ES2. Existing Policies, Legal and Administrative Framework

The governmental public institutions involved in the different stages of implementation of the roads project as well as its different components are CDR, Ministry of Public Works and Transportation (MOPWT), Ministry of Environment (MOE), Ministry of Labor (MOL), Ministry of Interior and Municipalities (MOIM), and the Ministry of Culture (MOC).
The various laws and regulations that road projects must abide by:

- Labor Law/1946: The Lebanese Labor Code
- law No. 335/2001: Pursuant to the International Labor Organization ILO Convention No 128
- law No. 400/2002: Pursuant to ILO Convention No 138
- Decree 8987/2012 Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals
- Decree 3791/2016 Minimum Wage
- Decree 2761/1933 on The prohibition of wastewater discharge into water streams
- Decree 8735/1974 on the Conservation of Public Hygiene
- Law 64/1988: Protection of the environment against pollution from hazardous waste disposal and substances
- Law 558/1996: Protection of forests
- Law 80/2018: Integrated Solid Waste Management

- MOE Decision 52/1 (1996) and 8/1 (2001) on the Requirements to protect air, water, and soil pollution
- Law 64/1988 Protection of the environment against pollution from hazardous waste disposal and substances
- MOE Decision 8/1/2001 Revised standards for air emissions, liquid effluents and wastewater treatment plants
- Law 444/2002 Framework Law for Environmental Protection
- Law 77/2018: Water Law
- Law 78/2018: Air Quality Law
- Decree 11802/2008 Occupational prevention, safety, and health in all enterprises subject to the Code of Labor
- Decree-Law 118/1977 on the Municipal Act
- Law 37/2008 on the Cultural Policy Law
- Law243/2012: New Traffic Law
- Legislative Decree 340/1943: Penal Code
- Law 58/1991: Expropriation law
- Law 53/2017: Amendment of Penal Code

The World Bank Policies and Procedures: OP/BP 4.01on Environmental Assessment, classifies the proposed project under Category 'B' and OP/BP 4.12 on Involuntary Resettlement (however the project will not include land acquisition or resettlement). In addition to the Public consultation and Disclosure Policy under OP/BP 4.01.

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

In addition, some international conventions and treaties are relevant to the project and are as follows: The United Nations Framework Convention on Climate Change (UNFCC), Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD), Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and International Labor Conventions.

ES3. Description of the Proposed Project

The study area where the proposed roads are located is the Caza of Akkar of North Lebanon Governorate. The total number of the proposed roads to be rehabilitated under this project is 10 roads with a total length of 38 km. All of the roads are already existing and require rehabilitation of various components, including pavement, sidewalks, drainage, safety measures, and street lighting. The selection of the roads was determined by the Cabinet of Ministers in their Meeting Number 32 dated 27/06/2019.

The proposed project consists of the rehabilitation of existing roads in the Caza of Akkar. The rehabilitation activities differ for each road depending on the pavement conditions and the road rating that was defined by the consultant.

Determining the condition of the asphalt is important to assign the proper pavement rehabilitation activities. The pavement rehabilitation activities consist of either pavement maintenance or overlay on existing pavement or complete removal of deteriorated pavement and constructing a new one.

The proposed project also consists of other activities beside the pavement rehabilitation works. These activities consist of:

- Construction or improvement of drainage systems
- Construction or improvement of retaining walls
- Installing concrete safety barriers
- Marking lanes and stoppage line
- Adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs
- Rehabilitating sidewalks
- Repairing street lighting
- Relocation of existing utilities as needed

ES4. Baseline Environmental and Social Conditions

Topography, Geology and Hydrogeology

Akkar of the North region, where the proposed roads are located, is around 100 km away from the capital of Beirut. The roads in Akkar lie within a range of 13 m (Al Abdeh) to 470 m (Bzal) above sea level. The main geological formation within the study belongs to the following: Pleistocene (q), Pliocene (P), the Upper Albian-Cenomanian to the upper Albian Mid Albian, Sannine and Hammana Formation (C3), Sannine Limestone, of Cenomanian epoch (C4). As for the water sources that are located within the project area, two rivers were identified in the surroundings of the study area and the proposed roads. These rivers are El Bared and Aarqa River. However, no springs were identified within the study area.

Climate and Meteorology

As part of the Caza of Akkar, the village of Bebnine and Bzal are representative of the project areaas they are located at the altitudes 117 m and 470 m respectively. Bebninehas an average temperature of 19.1°C and an average precipitation of 831 mm. As for Bzal,the average temperature is 17.9 °C and the average precipitation is 900 mm. Additional data on climate in the area was obtained from the Lebanese Agriculture Research Institute (LARI) from its station in the village of Aabdeh that is part of the project and located on road L4-AK-RD3A-1. This data represents the average temperatures and average precipitation of the year 2018 as well as the monthly and yearly averages of wind speed and directions.

Air Quality and Noise

Ambient air quality of the project area was requested from MOE. Data was available from the UNDP project “Air quality assessment in an East Mediterranean country: the case of Lebanon” which is based at the Ministry of Environment for the year 2010. The results have shown that the concentrations of NO2 in all the cells comply with the national standards. As for the concentrations of PM2.5 and PM10, the obtained values were not in compliance with the WHO standards for air quality except the obtained concentrations in cells 6. As for the level of noise in the region, as no data was available on the project location, observations during

site visits showed that noise level was observed to be slightly higher around other populated areas.

Land Use/Land Cover

Akkar is the second largest agriculture area in Lebanon after the Bekaa region due to its water resources and fertile soil. During the site visits it was notices that most of the agricultural lands are planted with olive trees or several annual crops such as the villages of Beit El Houch, Mar Touma, Dahr Haddara and kloud el Barkia. Also densely populated areas were identified in the project area specifically in Bebnine, Berkayel, Bzal, Majdala, and Zouq el Moukacherine. The table below represents the visual classification of land use based on google maps.

Municipality	Land Use
Bebnine	Densely Populated
El Karkaf	Sparsely populated with agricultural areas
Beit El Haouche	Agricultural areas
Berkayel	Densely populated with agriculture areas
Bzal	Moderately populated
Wadi El Jamous	Sparsely populated with dense agriculture areas
Majdala	Densely populated with agriculture areas
Mar Touma	Agriculture areas
DeirDaloum	Sparsely populated with agriculture areas
Zouq el Moukacherine	Moderately populated with agriculture areas
DahrHaddara	Agriculture areas
Homeira	Sparsely populated with agriculture areas
Kloud el barkia	Agriculture areas
Bkerzala	Densely populated
Zouk el Habasia	Moderately populated
Zouk El Hosnieh et DahrAyasse	Agriculture areas
Arka	Sparsely populated with agriculture areas
Eyoune El Ghouzlane	Sparsely populated with agriculture areas
Jedeidet El Kayteh	Densely populated with agriculture areas

Biological Environment and Ecologically Sensitive Areas

Flora: during the site visits, there was no important floral and tree species along the roads of the project area, however, many planted trees were identified such as the Cypress trees that are mainly planted as a fence for private lands, houses and some olive orchards (L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7). Pine trees were scattered along the road sides (L4-AK-RD3A-1, L4-AK-RD3A-4 L4-AK-RD3A-7 and L4-AK-RD3A-8). Moreover, some Orange, Palm, Salix, Oak and almond trees were rarely identified. In addition, groves of kaki were identified and olive groves dominate an important part of the project area.

Fauna: wild animals including mammals and birds were not identified during the site visits as the probability of animals crossing the roads is higher at night. Moreover, livestock were noticed in some farms along some of the roads such as cow farms and chicken farms observed on roads L4-AK-RD-3A-4 (Zouq El Hosniyyeh) and L4-AK-RD-3A-7 (Mar Touma).

The District of Akkar comprises the Upper Mountains of Akkar-Donnieh that were declared as an Important Bird Area (IBA). However, none of the studied roads in this project are located near or in this IBA. As for the protected areas, the District of Akkar comprises the Karm Chbat Nature Reserve declared by MOE as a nature reserve.

Demographic Profile

The total population registered in the Akkar District, including refugees, is 389,899 inhabitants. The total number of registered Syrian refugees is 106,333 individuals while 188 individuals are Palestinian Refugees. The total number of Syrian refugees within the study area is 17,686. The unemployment rate in Akkar is estimated at 9.3% compared to 11.4 % that is the national average.

Economic Activities

The economy of Akkar relies on agriculture and services sector. Around 30% of the local labor force works in agriculture and fishing sector. Half of the agriculture lands are planted of olives and vegetables while other kinds are fruit trees, citruses and vines. Akkar contributes to 14% of the total agriculture production in the country. As for livestock production, cattle raising is a rich and key sector in Akkar. The district also encompasses industrial agro-food companies (35%) and other companies (30%) in the non-mineral mining products. Moreover, cultural and eco-tourism activities are increasing in Akkar. During the site visits, many shops, markets, snacks, and car repairing were identified along the way and are in close proximity to some road stations especially in the residential areas.

Education

The District of Akkar is characterized by lower educational achievement as compared to national averages. The region has access to the educational establishments located in the North of the country where the highest number of vocational and technical schools is present. However, Akkar experiences the highest rate of schooling delay. Some parents cannot even afford the educational costs of the public schools or transportation expenses. During the site visits, various schools were identified along the project roads such as Bebnine Public School, Al Jawhara school were observed and Deir Dalloum School.

Health Services

The healthcare sector in Akkar is of low quality and suffers from shortage of adequate equipment, specialized physicians, medical laboratories, ambulances, first aid knowledge and awareness. Moreover, women experience different challenges in Akkar as gynecological services are offered by only one hospital that is far from many villages. The basic forms of health services, such as pharmacies or ambulances are also lacking in Akkar. During the site visits, the team haven't observed any hospital along the project roads. However, health care centers and pharmacies were identified along the project roads.

Cultural Heritage

Akkar offers opportunities in cultural and ecotourism due to the presence of many archeological, cultural and religious sites.

During the site visits, the team did not detect any site of archeological or cultural importance along the project roads.

Summary of Baseline

During the site visit that was conducted in November 2018 and December 2019, sensitive area that might be affected as a result of the proposed project are mainly health care centers and educational centers. All these establishments were identified along the project roads and detailed in the report.

ES5. Summary of Potential Environmental and Social Impacts during Rehabilitation and Operation Phases

Summary of Impacts during Rehabilitation Phase

Impact	Media	Nature
Environmental		
Air pollution from emissions of machinery, trucks or possible open burning activities	Air, nearby communities and workers	N
Dust pollution from rehabilitation and excavation activities	Air, nearby communities	N
Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators	Nearby communities and workers	N
Contamination of surface water from improper disposal of wastewater from workers and of water coming from cleaning of machines and equipment Reduction in overall surface water quality due to improper disposal of construction waste Water pollution due to accidental spill of oils and chemicals	Water resources, soil, nearby communities	N
Contamination of soil from accidental spills of oils and chemicals on the soil from machines and trucks and from transportation of chemicals and oils	Soil, subsoil and land	N
Improper disposal of cut volume may cause contamination of water bodies in rainy weather	Water resources	N
Surface water and soil pollution from improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Water resources, soil, subsoil and land	N
High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Energy resources	N
High consumption rates of water for construction related activities	Water resources	N
Over extraction of borrowing material and depletion of natural resources (sand, aggregates, …)	Soil, subsoil and land	N
Tree and floral species disturbance near the site during rehabilitation activities	Biodiversity and sensitive habitats	O
Disturbance of animals and residents in the area from noise, light and dust	Biodiversity and sensitive habitats	N
Material falling from vehicles during transport may cause traffic accidents or congestion	Nearby communities	N

Impact	Media	Nature
Accident and injuries to workers because of construction activities (mainly respiratory health risks)	Workers	2N
Dust generation and noise may cause health related problems to nearby residents	Nearby communities	N
Injuries from car accidents due to the presence of construction sites and closure of some roads	Nearby communities	N
Socioeconomic		
Creation of job opportunities for local communities	Labor influx, socio-economic activities	P
Local garages will benefit from the equipment oil maintenance and residents will benefit from the rent fees of the offices and the equipment parking area.	Nearby communities, socio-economic activities	P
Discrimination from the local community against the foreign workers	Foreign Workers	N
Social tensions as a result of perception that foreign workers being offered a major proportion of the jobs created by the project	Local and foreign workers	N
Child labor for construction activities	Local and foreign children	2N
Traffic congestion in the concerned towns due to transport of construction materials, the material that may fall or due to temporal road closure	Nearby communities, socio-economic activities	N
Potential occurrence of sexual abuse and exploration incidents	Nearby communities	N
Disruption of local community to access services due to construction activities and temporal road closure	Nearby communities and socio-economic activities	N
Disruption to access to shops as a result of construction activities and temporal road closure thus affecting livelihood of shop's owners	Shop's owners	N

Summary of Impacts during Operation Phase

Impact	Media	Nature
Environmental		
Increased vehicular pollutant levels in the area causing public health risks and other impacts on the environment	Air, Nearby communities	N
Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Nearby communities, biodiversity and sensitive habitats	N
Depletion of natural resources (fuel) used for street lighting purposes	Energy resources	N
Disruption of animals movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Biodiversity and sensitive habitats	N

Possible oil spills events transported through runoff and polluting nearby surface and groundwater bodies	Water resources, soil, subsoil and land, nearby communities	O
Accident occurrence due to the enhancement of vehicular movement resulted from the improvement of road conditions	Socio-economic activities, nearby communities	N
Socioeconomic		
Encouragement of new business opportunities, and marketing activities in project region, the increase in land values and facilitate the access to services and improve the living standards	Socio-economic activities, nearby communities	2P
Improvement in road conditions due to installation of proper safety signs	Socio-economic activities, nearby communities	P
Enhancement of tourism	Socio-economic activities, nearby communities	P

ES6. Environmental and Social Management and Monitoring Plans

In order to mitigate all identified impacts, the following were proposed during both the rehabilitation and operation phase:

During Rehabilitation

- Construct temporary structures to prevent runoff from reaching nearby water bodies and avoid working in rainy weather.
- Ensure the installation of the porta cabin toilets that are connected to the existing network or to the polyethylene tank if sewerage network is not available within the project site
- Discharged the collected wastewater in the polyethylene tank into nearby operational wastewater treatment plants
- Prohibit the discharge of wastewater into nearby water bodies
- Regular maintenance of vehicles, equipment and machinery
- Open burning of solid waste must be prohibited;
- Vehicles must move at a low speed on unpaved;
- Loading of raw material should be done under dust preventive measures
- Raw material storage areas should be covered
- Water should be sprinkled in order to suppress dust
- Transported material should be covered
- Regular maintenance of all noisy equipment and machinery
- Drilling and excavation activities should be executed only during working hours
- Heavy machinery such as percussion hammers and pneumatic drills should not be used during the night
- Reduce water wastage whenever possible
- Use dry-cleaning instead wet cleaning
- Training and awareness should be raised to workers concerning water conservation
- Water use for construction activities should not disturb the water availability and supply to the existing communities

- The light in the offices must be shut down during the night when offices are not in use
- Machinery and equipment must be turned off when not in use
- Avoid agriculture land for borrow materials;
- Ensure that the borrow material are extracted from legal quarrying sites
- Maintenance of vehicles and machinery
- Minimize noise by insulating machinery through installation of mufflers
- Drilling, excavation and any other noisy activity only during working hours
- All sources of light must be shut down during night time to avoid disturbance from light pollution at night
- Green landscape areas must be preserved whenever possible
- Warn the staff strictly not to involve in any unethical activities and to obey the local standards and cultural norms
- Select specific timings for the construction activities
- Ensure that the generated solid waste and liquid waste is disposed or discharged of in an environmentally friendly way and in selected areas
- Install overpass structures from the road to the shops
- Proper installation of sign boards
- Timely completion of the rehabilitation phaseDraft Codes of Conduct
- All workers including contractor, foreign workers and international consultants should sign codes of conduct
- All workers (locals and foreign, skilled and unskilled) shall be compensated equally as per the scale of market price rates
- Abide by the Labor Law and ensure that workers below 18 years are not engaged in construction works
- Ensure the contractor is aware of the penalties that Labor Law imposes in the case of child labor
- Oblige the contractor to strictly abide by the Labor Law through the CDR tender documents that should include prohibition of child labor
- Registration of workers and verification of their age to prevent child labor
- All workers are committed to prevent and report sexual abuse and exploitation incidents
- Respond to the reported incidents as a matter of priority.
- Conduct labor influx awareness campaigns for the local community
- Install proper warning.
- Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage
- A flagman should be positioned on the proposed roads to warn the passing cars and ensure the traffic is not blocked
- Coordinate with the municipality police to help in traffic management
- Restrict vehicles carrying construction materials during the daytime
- Cover the transported material by the trucks is well covered
- Workers should wear PPEs
- The contractor should abide by the assigned work schedule
- Proper safety and diversion signs must be installed at sensitive areas within the project area (i.e. near schools)

- Training of heavy machinery drivers about road safety
- Inform the local community about the construction schedule
- Install pedestrian and vehicular passages near residential areas

During Operation

- Maintain the storm water network collection system especially before the start of the rainy season
- Continually collect solid waste in order to prevent the blockage of the drainage system
- Ensure that the road is regularly maintained to ensure good surface conditions;
- Fixing speed limit along then roads
- Proper installation of warning signs should be placed near sensitive areas to prevent people from using the pressure horns
- Use of eco-friendly light bulbs for street lights
- Use dry cleaning techniques
- Install signs such as speed limit signs and animal crossing signs

Plant trees on the roads sides as a fence to prevent the collision between animals and the passing vehicles

ES7. Consultation, Disclosure and GRM

A public hearing was held at the Municipality of Halba on Wednesday, 16 October 2019. The purpose of the hearing was to inform the stakeholders (including the NGOs in the study area), about the proposed project to rehabilitate 10 roads in Akkar Caza and their accompanying infrastructural works and to take into account their concerns and feedback. Over 25 people participated in the meeting including 5 women in their forties to fifties, two of them working in the municipality of Halba and the others are social activists in different NGOs. The men are mainly municipality mayors, vice presidents and one working in an engineering office. During the session, different concerns were raised by the attendees especially those concerning road selection and road safety issue. The public proposed to install sidewalks in that area to ensure public safety.

The women participants were interviewed in a separate session in order to raise their concerns too. They stated that the project will contribute positively to improving women's participation in the economy by making transportation safer and more convenient. However, they mentioned that there must be regular supervision on the workers not to communicate in an improper manner with the residents especially where the roads are located near schools or residential areas. These proposed measures by the public will be taken into consideration and the project design that includes the rehabilitation of the roads and its different components including the sidewalks was proposed by the public.

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

International NGOs responded to the humanitarian crisis and worked directly with the Syrian in Lebanon by providing aid and responding to their critical situation.

In addition, a formal grievance readiness mechanism (GRM) will be implemented during both the rehabilitation and operation phases. The purpose of the GRM is to ensure that all feedback and complaints received from stakeholders, customers, employees, contractor staff and the public in general are documented, considered and addressed in an acceptable and timely manner.

ES8. Conclusion

It was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated liquid waste and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of heavy rehabilitation activities especially where new pavement is proposed for the roads. On the other hand, job opportunities will be created to the local community during the rehabilitation phase which is considered as a positive impact. However, these impacts are short in term and will diminish as soon as the project is completed. The assessed socioeconomic impacts during the operational phase were mostly positive in nature in terms of traffic and road safety and livelihood improvement within the project area. However, on the long term the proposed project will contribute in increasing vehicular pollutant levels in the area as well as traffic related noise causing public health problems and other impacts on the environment. Nevertheless, the negative environmental impacts that might arise from the rehabilitation of the proposed roads in Akkar caza can be minimized and even eliminated through proper management and mitigation practices that were proposed in the report.

ملخص تنفيذي - موجز غير تقني

مقدمة

منح مجلس الانماء والاعمار ، الذي يعمل كجهة منفذة بإسم مجلس الوزراء اللبناني، عقدا لشركة الإستشاريّة العالمية الهندسية (ACE)، المستشار، لإعداد خطة إدارة بيئية واجتماعية ل"Lot 4 "في اطار مشروع الطرق والعمالة في لبنان الممولة من البنك الدولي.

يهدف هذا المشروع إلى تحسين قطاع الطرق من طرق ثانوية وفرعية في عدة بلدات من كافة الأقضية اللبنانية، وخلق فرص عمل قصيرة الأجل للمجتمعات اللبنانية والسورية. يتضمن المشروع إعادة تأهيل الطرقات الممتدة في المناطق المدنية والريفية في جميع المناطق اللبنانية. يغطي المشروع طرقات مصنفة في ٢٥ قضاء في جميع أنحاء لبنان حيث يبلغ طولها الإجمالي المتوقع ٨،٣٥ كيلومترا، موزعة على ست مجموعات وسينفذ المشروع على مدى خمس سنوات.

يمثل هذا التقرير خطة الإدارة البيئية والإجتماعية لقضاء عكار ، وقد أعدت الدراسة وفقا لسياسة ضمانات البنك الدولي (سياسة تشغيلية رقم ٤،٠١) (التقييم البيئي). هذا المستند يغطي ايضا جميع عناصر المشروع المقترح خلال مرحلة التأهيل والتشغيل، ويقيم الآثار البيئية والإجتماعية المحتملة من المشروع ، ويحدد التدابير اللازمة للتخفيف من الآثار السلبية وزيادة الأثر الإيجابي على البيئة والموارد الطبيعية من خلال خطة الإجراءات التخفيفية للآثار السلبية. وإضافة إلى ذلك، يتضمن التقرير وضع خطة تحديد وسائل الرصد والمراقبة لضمان إمتثال المشروع للأنظمة البيئية والإجتماعية. بالإضافة، عقدت جلسات المشاورة العامة وشملت مشاركة المعنيين والهتمين بالمشروع.

السياسات القائمة والإطار القانوني والإداري

المؤسسات الحكومية العامة المعنية بمختلف مراحل تنفيذ مشروع الطرق، فضلا عن مختلف مكوناتها المؤلفة من وزارة النقل ووزارة الأشغال العامة ووزارة البيئة ووزارة العمل ووزارة الداخلية والبلديات ووزارة الثقافة. القوانين واللوائح المختلفة التي يجب ان تتقيد بها مشروعات الطرق:

- قانون العمل/١٩٤٦: قانون العمل اللبناني
- قانون رقم ٢٠٠١/٣٣٥: عملا باتفاقية منظمة العمل الدولية رقم ١٢٨
- قانون رقم ٢٠٠٢/٤٠٠: عملا باتفاقية منظمة العمل الدولية رقم ١٣٨
- مرسوم ٢٠١٢/٨٩٨٧ تحظر استخداما الأحداث قبل بلوغهم سن ١٨ في الأعمال التي تشكل خطر على صحتهم أو سلامتهم أو سلوكهم الأخلاقي
- مرسوم ٢٠١٦/٣٧٩١ تعديل المرسوم رقم ٧٤٢٦ تاريخ ٢٠١٢/١/٢٥ المتعلق بتعيين الحد الأدنى الرسمي لأجور المستخدمين والعمال الخاضعين لقانون العمل ونسبة غلاء المعيشة وكيفية تطبيقها
- مرسوم ١٩٣٣/٢٧٦١ التعليمات المتعلقة بتصريف المياه المبتذلة والمواد القذرة
- مرسوم ١٩٧٤/٨٧٣٥ المحافظة على النظافة العامة
- قانون ١٩٨٨/٦٤: المحافظة على البيئة ضد التلوث من النفايات الضارة والمواد الخطرة
- قانون ١٩٩٦/٥٥٨: قانون حماية الغابات
- قانون ٢٠١٨/٨٠: الإدارة المتكاملة للنفايات الصلبة
- قرار وزارة البيئة رقم ١/٥٢ (١٩٩٦) و١/٨ (٢٠٠١) تحديد المواصفات والنسب الخاصة للحدّ من تلوث الهواء والمياه والتربة
- القانون٦٤ /١٩٨٨ المحافظة على البيئة ضد التلوث من النفايات الضارة والمواد الخطرة
- قرار ٢٠٠١/١/٨ المواصفات والمعايير المتعلقة بملوثات الهواء والنفايات السائلة المتولدة عن المؤسسات المصنفة ومحطات معالجة المياه المبتذلة
- قانون ٢٠٠٢/٤٤٤: قانون حماية البيئة
- قانون ٢٠١٨/٧٧: قانون المياه
- قانون ٢٠١٨/٧٨: قانون حماية نوعية الهواء

- مرسوم ٢٠٠٤/١١٨٠٢ نظيم الوقاية والسلامة والصحة المهنية في كافة المؤسسات الخاضعة لقانون العمل
- المرسوم الاشتراعي رقم١٩٧٧/١١٨ قانون البلديات
- قانون ٢٠٠٨/٣٧ قانون الممتلكات الثقافية
- قانون ٢٠١٢/٢٤٣: قانون السير الجديد
- المرسوم التشريعي ١٩٤٣/٣٤٠: قانون العقوبات
- قانون ١٩٩١/٥٨: قانون الاستملاك
- قانون ٢٠١٧/٥٣: الغاء المادة ٥٢٢ وتعديل بعض مواد قانون العقوبات

سياسات و قوانين البنك الدولي: السياسة التنفيذية رقم ٤,٠١بشأن التقييم البيئي، يصنف المشروع المقترح في إطار الفئة "B" و السياسة التنفيذية رقم ٤,١٢ بشأن إعادة التوطين الجبري (غير أن المشروع لن يشمل حيازة الأراضي أو إعادة التوطين) بالإضافة إلى سياسة أجتماعات الحلقه التشاوريه و عرض النتائج بموجب السياسة التنفيذية رقم٤,٠١.

وفقا للسياسة التنفيذية رقم٤,٠١ يشترط البنك الدولي إجراء أجتماع حلقه تشاوريه ومع العديد من المهتمين والمعنين بالمشروع والمنظمات غير الحكومية المحلية بشأن جميع المشاريع التي تندرج في الفئة A والفئة B. والهدف من هذه المشاورات هو عرض عناصر المشروع إلى جانب الآثار البيئية والإجتماعية التي يمكن ان تنتج، وأخذ كل تساؤلات و ملاحظات الموجودين بالأعتبار.

وبالإضافة إلى ذلك،لقد تم عرض في هذا المستند بعض الإتفاقيات والمعاهدات الدولية ذات صلة بالمشروع وهي كما يلي: إتفاقية الأمم المتحدة المتعلقة بإطار العمل بشأن تغير المناخ، واتفاقية القضاء على جميع أشكال التمييز ضد المرأة واتفاقية التنوع البيولوجي واتفاقية الأمم المتحدة لمكافحة التصحر واتفاقية بازل بشأن تنظيم نقل النفايات الخطرة عبر الحدود والتخلص منها و إتفاقيات العمل الدولية.

وصف المشروع المقترح

يقع المشروع المقترحة في ، قضاء عكار محافظة عكار. يبلغ مجموع الطرق المقترحة التي سيتم إعادة تأهيلها في إطار هذا المشروع ١٠ طرق يبلغ طولها الإجمالي ٣٨ كيلومترا. جميع الطرق موجود سابقا وتتطلب إعادة تأهيل لمختلف بما في ذلك من الطبقات الإسفلتية والاساس، الأرصفة، عبارات لتصريف مياه الأمطار و شبكات إنارة. ولقد اختيرت الطرقات من خلال إجتماع مجلس الوزراء رقم ٣٢ بتاريخ ٢٠١٩/٦/٢٧.

يتضمن المشروع المقترح إعادة تأهيل طرق ا موجود سابقا في قضاء عكار. وتختلف أنشطة إعادة التأهيل بالنسبة لكل طريق حسب ظروف الطبقات الإسفلتية والاساس و تصنيف الطرق التي حددها الإستشاري.

بهدف تحديد أنشطة إعادة التأهيل المناسبة، من المهم دراسة حالة الطبقات الإسفلتية والاساس. وتتألف أنشطة إعادة تأهيل طرق: صيانة أو غشاء الطبقات الإسفلتية القائم أو إزالة الطبقات الإسفلتية المتدهور بالكامل و اعادة انشاءها من الجديد.

ويتضمن المشروع المقترح أيضا أنشطة أخرى إلى جانب أعمال إعادة التأهيل. وتتألف هذه الأنشطة من:

- تأمين/تأهيل أقنية، عبارات لتصريف مياه الأمطار
- تأمين/تأهيل جدران دعم إستنادية
- تأمين/تأهيل حواجز سلامة جانبية
- تخطيط الطرقات
- تأمين/تأهيل إشارات سير و إشارات تحذير
- تأهيل أرصفة
- تأهيل شبكات إنارة
- نقل المرافق الموجودة حسب الحاجة

الوضع البيئي والاجتماعي الحالي

التضاريس والجيولوجيا والهيدروجيولوجيا

تقع عكار في المنطقة الشمالية، حيث تقع الطرق المقترحة، على بعد حوالي ١٠٠ كيلومتر من العاصمة بيروت. وتقع الطرق في عكار ضمن مدى ١٣ مترا (العبدة) إلى ٤٧٠ مترا(بزال) فوق سطح البحر. ينتمي التكوين الجيولوجي الرئيسي داخل منطقة إلى ما يلي: Pliocene(p), Pleistocene(q) ، the Upper Sannine and (C3)،Albian-Cenomanian to the upper Albian Mid Albian Sannine Limestone, of Cenomanian epoch(C4)،Hammana Formation . أما بالنسبة لمصادر المياه الموجودة داخل منطقة المشروع، فقد تم تحديد نهرين في محيط منطقة الدراسة والطرق المقترحة. هذه الأنهار هي نهر البارد ونهر عرقا لكن لم يتم تحديد أي ينابيع داخل المنطقة الدراسية.

المناخ والأرصاد الجوية

تمثل قريتا ببنين وبزال منطقة المشروع حيث تقع تلك القريتين ضمن قضاء عكار على ارتفع ١١٧ و٤٧٠ مترا على التوالي. يبلغ متوسط درجة الحرارة في ببنين ١٩.١ درجة مئوية، ويبلغ متوسط هطول الأمطار ٨٣١ مم. أما بالنسبة إلى بزال، فإن متوسط درجة الحرارة هو ١٧.٩ درجة مئوية، ويبلغ متوسط الهطول ٩٠٠ ملم. وتم الحصول على معلومات إضافية عن المناخ في المنطقة من محطة مصلحة الأبحاث العلمية الزراعية في قرية عبدة التابعة لمنطقة المشروع والموجودة على الطريق L4-AK-RD3A-1 .وتمثل هذه البيانات متوسط درجات الحرارة ومعدل الهطول لعام ٢٠١٨، فضلا عن المتوسطات الشهرية والسنوية لسرعة واتجاهات الرياح.

جودة الهواء والضوضاء

لقد اخذت البيانات المتعلقة بجودة الهواء المحيطة بمنطقة المشروع من وزارة البيئة من خلال مشروع برنامج الأمم المتحدة الإنمائي. وقد أظهرت النتائج أن تركيزات ثاني أكسيد الكربون(NO2) في جميع الخلايا متوافق مع المعايير الوطنية. اما فيما يتعلق بتركيزات PM2.5 و PM10، لم تكن القيم التي تم الحصول عليها متوافقة مع معايير منظمة الصحة العالمية الخاصة بنوعية الهواء بإستثناء التركيزات التي تم الحصول عليها في الخلاية رقم ٦. وفيما يتعلق بمستوى الضوضاء في المنطقة، ونظرا لعدم توافر بيانات عن موقع المشروع، أظهرت الملاحظات التي أبديت خلال الزيارات الميدانية أن مستوى الضوضاء قد لوحظ أنه أعلى في المناطق المأهلة و المكتظة بالسكان.

غطاء الأرض

تعتبر عكار ثاني أكبر منطقة زراعية في لبنان بعد منطقة البقاع، نظرا لمواردها المائية وأراضيها الخصبة. خلال زيارة الموقع، لوحظ أن معظم الأراضي الزراعية تزرع بأشجار الزيتون أو العديد من المحاصيل السنوية مثل قرى بيت الحوش، مار توما، ضهر هدارة و قلود الباقية. كما تم تحديد المناطق المكتظة بالسكان في منطقة المشروع وتحديدا في ببنين، برقايل، بزال، مجدلا، وزوق المكشرين. الجدول التالي يمثل التصنيف البصري لغطاء الأراضي استنادا إلى خرائط جوجل.

البلدية	غطاء الأرض
ببنين	مكتظة بالسكان
القرقف	ذات كثافة سكانية منخفضة – وجود اراضي زراعية
بيت الحوش	مناطق زراعية
برقايل	مكتظة بالسكان مع بعض الأراضي زراعية
بزال	ذات كثافة سكانية معتدلة
وادي الجاموس	ذات كثافة سكانية منخفضة - وجود اراضي زراعية كثيفة
مجدلة	مكتظة بالسكان - وجود اراضي زراعية
مار توما	مناطق زراعية
دير دلوم	ذات كثافة سكانية منخفضة – وجود اراضي زراعية
زوق المكشرين	ذات كثافة سكانية معتدلة – وجود اراضي زراعية

البلدية	غطاء الأرض
ضهر هدارة	مناطق زراعية
حميرا	ذات كثافة سكانية منخفضة – وجود اراضي زراعية
قلود الباقية	مناطق زراعية
بقرزل	مكتظة بالسكان
زوق الحباسية	ذات كثافة سكانية معتدلة
زوق الحصنيه وضهر عيسي	مناطق زراعية
عرقا	ذات كثافة سكانية منخفضة – وجود اراضي زراعية
عيون الغزلان	ذات كثافة سكانية منخفضة – وجود اراضي زراعية
جديدة القيطع	مكتظة بالسكان مع بعض الأراضي زراعية

البيئة البيولوجية والمناطق الحساسة إيكولوجيا

النباتات: لم يكن هناك أي نوع هام من أنواع الأشجار على طول الطرق في منطقة المشروع، غير أنه تم تحديد العديد من الأشجار المزروعة مثل أشجار السرو التي تزرع كسياج للأراضي الخاصة والمنازل وبعض بساتين الزيتون(L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7) .).
اما أشجار الصنوبر فكانت متناثرة على طول جوانب الطرق (L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7)وعلاوة على ذلك، تم تحديد بعض أشجار البرتقال ، نخل، بلوط ، واللوز. وبالإضافة إلى ذلك، تم تحديد حقول الكاكي، وتهيمن أشجار الزيتون على جزء كبير من منطقة المشروع.

حيوانات: لم يتم التعرف على الحيوانات البرية بما فيها الثدييات والطيور خلال زياراة الموقع حيث ان احتمال عبور الحيوانات للطرق يكون أعلى ليلا. وعلاوة على ذلك، لوحظ وجود مواشي في بعض المزارع على طول بعض الطرق مثل مزارع الأبقار ومزارع الدجاج التي شوهدت على الطرق L4-AK-RD-3A-4 (زوق الحصنيه) و L4-AK-RD-3A-7 (مار توما).

تضم منطقة عكار جبال عكار – الضنيه العليا ، التي أعلنت كمنطقة للطيور المهمة. لكن الطرق المقطرحة في هذا المشروع لا توجد بالقرب منها. أما عن المناطق المحمية، فتشمل منطقة عكار محمية كرم شبات الطبيعية التي أعلنتها وزارة البيئة كمحمية طبيعية.

الديموغرافيا

يبلغ مجموع السكان المسجلين في قضاء عكار، بمن فيهم اللاجئون، 389,899 نسمة. ويبلغ العدد الإجمالي للآجئين السوريين المسجلين ١٠٦,٣٣٣ شخصا، في حين أن 188 شخصا هم من اللآجئين الفلسطينيين. ويبلغ العدد الإجمالي للآجئين السوريين في منطقة الدراسة ١٧,٦٨٦ لآجئا. ويقدر معدل البطالة في عكار بنسبة 9.3 %، مقارنة fالمتوسط 11.4%

الأنشطة الإقتصادية

يعتمد إقتصاد عكار على قطاع الزراعة والخدمات. ويعمل حوالي ٣٠ في المائة من القوى العاملة المحلية في قطاع الزراعة والصيد. تجدر الإشارة إلى أن نصف الأراضى الزراعية مزروعة باشجارالزيتون والخضروات ، بينما توجد أنواع أخرى من أشجار الفواكه والحمضيات والكروم. وتساهم عكار بنسبة ١٤ في المائة من إجمالي الإنتاج الزراعي في البلاد. أما بالنسبة لإنتاج المواشي، فإن تربية الماشية قطاع غني ومهم في عكار. كما تضم المنطقة شركات الصناعات الزراعية (٣٥ فى المائة) وشركات أخرى (٣٠ فى المائة). وعلاوة على ذلك، تتزايد الأنشطة الثقافية والسياحية البيئية في عكار. وتم خلال زياراة الموقع تحديد العديد من المحلات التجارية والأسواق و المحلات تصليح السيارات على طول الطريق وهي قريبة من بعض الطرق خاصة في المناطق السكنية.

قطاع التعليم

يتصف قضاء عكار بانخفاض التحصيل العلمي مقارنة بالمتوسط الوطني. ويمكن الوصول إلى المؤسسات التعليمية الموجودة في شمال البلد حيث يوجد أعلى عدد من المدارس المهنية والتقنية. إلا أن عكار تشهد أعلى نسبة تأخير في الدراسة. ولا تستطيع بعض العائلات تحمل تكاليف التعليم في المدارس العامة أو تكاليف النقل. وخلال زياراة الموقع، تم تحديد مدارس مختلفة على طول الطرقات المقطرحة، مثل مدرسة ببنين الرسمية، مدرسة الجوهرة، ومدرسة دير دلوم.

قطاع الرعاية الصحية

قطاع الرعاية الصحية في عكار ضعيف ويعاني من نقص في التجهيزات الطبية والأطباء التخصصيين والمختبرات الطبية وسيارات الإسعاف والإسعافات الأولية والتوعية الصحية. وعلاوة على ذلك، تواجه المرأة تحديات مختلفة في عكار، حيث لا يقدم خدمات أمراض النساء إلا في مستشفى واحد بعيد عن العديد من القرى. كما تفتقر عكار إلى الأشكال الأساسية للخدمات الصحية، مثل الصيدليات أو سيارات الإسعاف. خلال زيارات الموقع، لم يلاحظ الفريق أي مستشفى على طول طرق المشروع. ولكن تم تحديد الصيدليات و مراكز الرعاية الصحية على طول طرق المشروع.

التراث الثقافي

تعتبر عكار مركز للسياحة الثقافية والبيئية لوجود العديد من المواقع الأثرية والثقافية والدينية. لكن لم يكشف الفريق خلال زيارة الموقع عن أي موقع ذي أهمية أثرية أو ثقافية على طول الطرقات المقطرحة.

ملخص خط الأساس

خلال زيارة الموقع التي جرت في تشرين الثاني/نوفمبر ٢٠١٨ وكانون الأول/ديسمبر ٢٠١٩، تم تحديد المناطق الحساسة التي قد تتأثر نتيجة المشروع المقترح و هي: مراكز الرعاية الصحية والمراكز التعليمية. وتم تحديد جميع هذه المؤسسات على طول الطرقات المقطرحة ، وقد ورد ذلك بالتفصيل في التقرير.

موجز الآثار البيئية والاجتماعية المحتملة خلال مرحلتي التأهيل والتشغيل

ملخص للآثار البيئية والاجتماعية والاقتصادية المحتملة خلال مرحلة التأهيل:

الآثار	المستقبل	الطبيعة
البيئية		
تلوث الهواء الناجم عن انبعاثات الآلات أو الشاحنات أو أنشطة الاحتراق المفتوح	الهواء ، المجتمعات القريبة والعمال	سلبي
تلوث الغبار الناجم عن أنشطة إعادة التأهيل والحفر		سلبي
تلوث الضوضاء الناجم عن نقل أو المواد الخام وحركة الشاحنات والحفر وتشغيل المركبات الثقيلة مثل الحفارات	المجتمعات القريبة	سلبي
تلوث المياه السطحية من جراء التخلص غير السليم من مياه الصرف الصحي من العمال والمياه القادمة من تنظيف الآلات والمعدات	الموارد المائية والمجتمعات القريبة والعمال	سلبي
انخفاض في نوعية المياه السطحية بسبب التخلص غير السليم من مخلفات الحفر	الموارد المائية والمجتمعات القريبة والعمال	سلبي
تلوث المياه بسبب تسرب الزيوت والمواد الكيميائية	الموارد المائية والتربة والمجتمعات القريبة	سلبي
تلوث التربة بسبب انسكاب الزيوت والمواد الكيميائية عن طريق الخطأ من الآلات والشاحنات ونقل المواد الكيميائية والزيوت	التربة وسطح التربة والأرض	سلبي
التخلص غير السليم من كميات الحفر يسبب تلوث المياه في الطقس الممطر	الموارد المائية	سلبي

الآثار	المستقبل	الطبيعة
البيئية		
تلوث المياه السطحية والتربة بسبب التخلص غير السليم من النفايات الصلبة الصادرة عن العمال والمواد المستعملة، ومخلفات البناء الناجمة عن أعمال الحفر	الموارد المائية والتربة وسطح التربة والأرض	سلبي
إرتفاع معدلات إستهلاك الكهرباء مما يسهم في زيادة إستهلاك الوقود واستنفاده	موارد الطاقة	سلبي
إرتفاع معدلات إستهلاك المياه في الأنشطة المتصلة باعادة التأهيل	الموارد المائية	محايد
إستخراج مواد الخام واستنفاد الموارد الطبيعية (الرمل، البحص، ...)	التربة وسطح التربة والأرض	سلبي
تأثر الأشجار بالقرب من الموقع أثناء أنشطة إعادة التأهيل	التنوع البيولوجي والموائل الحساسة	سلبي
انزعاج الحيوانات والسكان في المنطقة المجاورة من الضوضاء والنور والغبار	والمجتمعات القريبة والتنوع البيولوجي	سلبي جدا
حوادث مرور أو إزدحام نتيجة سقوط مواد من المركبات أثناء النقل	مجتمعات قريبة	سلبي
الإصابات الناتجة عن حوادث السيارات بسبب وجود مواقع إعادة التأهيل وإغلاق بعض الطرق	مجتمعات قريبة	سلبي
الحوادث والإصابات التى تلحق بالعمال بسبب أنشطة البناء (المخاطر الصحية التنفسية بشكل رئيسي)	العمال	سلبي جدا
اقتصادي و اجتماعي		
توفير فرص عمل للمجتمعات المحلية	تدفق العمالة والأنشطة الاجتماعية والاقتصادية	P
استفادة محلات صيانة الاليات المحلية من صيانة المعدات و الشاحنات، و استفادة السكان من رسوم إيجار المكاتب وموقف المعدات و الشاحنات.	المجتمعات المحلية القريبة والأنشطة الاجتماعية والاقتصادية	P
التمييز من المجتمع المحلي ضد العمال الأجانب	العمال الأجانب	سلبي
توترات إجتماعية نتيجة تصور أن العمال الأجانب يحصلون على نسبة كبيرة من الوظائف التي خلقها المشروع	العمال المحليون والأجانب	سلبي
عمالة الأطفال في أنشطة البناء	الأطفال المحليون والأجانب	سلبي جدا
إزدحام المرور في المناطق المعنية بسبب نقل مواد البناء والمواد التي قد تسقط أو بسبب إغلاق الطرق	المجتمعات المحلية القريبة والأنشطة الاجتماعية والاقتصادية	سلبي
احتمال وقوع حالات اعتداء جنسي	المجتمعات قريبة	سلبي
تعزر وصول المجتمع المحلي إلى الخدمات بسبب أنشطة اعادة التأهيل وإغلاق الطرق مؤقتا	المجتمعات المحلية القريبة والأنشطة الاجتماعية والاقتصادية	سلبي
تعزر دخول المحال التجارية بسبب أعمال اعادة التأهيل وإغلاق الطريق مؤقتا مما يؤثر علي رزق أصحاب المحلات	أصحاب المحلات	سلبي

ملخص للآثار البيئية والاجتماعية و الاقتصادية المحتملة خلال مرحلة التشغيل:

الآثار	المستقبل	الطبيعة
البيئي		
زيادة مستويات تلوث الهواء في المنطقة مما يسبب مخاطر صحية عامة وآثار أخرى على البيئة	المجتمعات قريبة	سلبي
تلوث الضوضاء الناجم عن حركة المركبات و استخدام الأبواق الذي	المجتمعات القريبة والتنوع البيولوجي	سلبي

يزعج السكان في المناطق السكنية القريبة و الحياة البرية		
استنفاد الموارد الطبيعية (الوقود) المستخدمة لإضاءة الشوارع	موارد الطاقة	سلبي
تعطيل حركة الحيوانات بسبب زيادة حركة مرور المركبات في المنطقة	التنوع البيولوجي	سلبي
حوادث تسرب الزيوت و انتقالها عبر مياه الأمطار الى المياه السطحية والجوفية القريبة	الموارد المائية والتربة وسطح التربة والأرض والمجتمعات القريبة	محايد
الحوادث السير الناجمة عن ازدياد حركة المركبات بسبب تحسن أحوال الطرق	الأنشطة الاجتماعية - الاقتصادية، المجتمعات القريبة	سلبي
اقتصادي واجتماعي		
تشجيع الفرص التجارية الجديدة والأنشطة التسويقية في منطقة، وزيادة قيمة الأراضي وتيسير الحصول على الخدمات وتحسين مستويات المعيشة	الأنشطة الاجتماعية - الاقتصادية، المجتمعات القريبة	ايجابي جدا
تحسن أحوال الطرق نتيجة تركيب علامات السلامة المناسبة	الأنشطة الاجتماعية - الاقتصادية، المجتمعات القريبة	ايجابي
تعزيز السياحة	الأنشطة الاجتماعية - الاقتصادية، المجتمعات القريبة	ايجابي

خطة ادارة البيئة و المجتمع والاجراءات الاحترازية

اثناء التأهيل:

- إنشاء هياكل مؤقتة لمنع تسرب المياه الى المياه السطحية الجوفية وتجنب العمل في الجو الممطر.
- ضمان تركيب مراحيض مؤقطة متصلة بشبكة الصرف الصحي او الى خزان مخصص إذا لم تكن شبكة الصرف الصحي موجودة
- التخلص من مياه الصرف الصحي المجمعة في خزان في محطات معالجة مياه الصرف الصحي القريبة
- منع تصريف مياه الصرف الصحي في المياه السطحيةو الجوفية القريبة
- صيانة المركبات والمعدات والآلات بشكل منتظمة
- منع حرق النفايات الصلبة؛
- تحرك المركبات والآلات بسرعة منخفضة على الطرقات غير المعبدة؛
- ينبغي ان يتم تحميل المواد الخام في إطار التدابير الوقائية من الغبار
- تغطية مناطق تخزين المواد الخام
- رش الماء من أجل إزالة الغبار
- تغطية المواد في المركبات والآلات عند نقلها
- صيانة جميع المعدات والآلات بشكل منتظمة
- حصر أنشطة الحفر خلال ساعات العمل
- حظر إستخدام الآلات الثقيلة أثناء الليل
- تقليل هدر المياه كلما أمكن ذلك
- إستخدام التنظيف الجاف بدلا من التنظيف بالمياه
- تدريب وتوعية العمال فيما يتعلق بحفظ المياه
- لا ينبغي ان يأثراستخدام المياه في أنشطة اعادة التأهيل على وفرة المياه للمجتمعات المحلية القائمة
- يجب اطفاء الأضواء في المكاتب أثناء الليل
- عدم ترك الآلات والمعدات شغالة عندما لا تكون قيد الاستخدام
- تجنب الأراضي الزراعية من أجل استخراج المواد (رمال و بحص)
- ضمان إستخراج المواد (رمال و بحص) من كسارات قانونية
- صيانة المركبات والآلات

- تقليل الضوضاء من خلال عزل الآلات
- إطفاء جميع مصادر الضوء أثناء الليل لتجنب الاضطرابات الناجمة عنها خلال اليلا
- الحفاظ على المساحات الخضراء كلما أمكن ذلك
- تحذير الموظفين بدقة من المشاركة في أي أنشطة غير أخلاقية و الامتثال للمعايير الأخلاقية المحلية
- تحديد مواعيد لأنشطة اعادة التأهيل
- ضمان التخلص السليم من النفايات الصلبة والسائلة أو التخلص منها بطريقة صديقة للبيئة أوفي مناطق معينة
- تركيب هياكل للمرور من الطريق إلى المتاجر
- تركيب لوحات ارشاديه
- إنجاز مرحلة إعادة التأهيل في الوقت المحدد
- ينبغي أن يوقع جميع العمال، بمن فيهم العمال الأجانب والمستشارون الدوليون، على شروط قواعد السلوك
- تقاضي الرواتب بالتساوي لجميع العمال (المحليين والأجانب والاختصاصيين وغير الاختصاصيين) وفقا للأسعار السوق
- الالتزام بقانون العمل وضمان عدم مشاركة العمال الذين تقل أعمارهم عن ١٨ عاما في أعمال اعادة التأهيل
- ضمان أن يكون المقاول على علم بالعقوبات التي يفرضها قانون العمل في حالة عمل الأطفال
- إلزام المقاول بالالتزام الصارم بقانون العمل الذي يشمل حظر عمل الأطفال
- تسجيل معلومات عن العمال والتحقق من أعمارهم لمنع عمل الأطفال
- جميع العمال ملزومين بمنع حالات الاعتداء والاستغلال الجنسي والإبلاغ عنها
- الاستجابة للحوادث المبلغ عنها على سبيل الأولوية .
- تنظيم حملات توعية بشأن تدفق العمالة إلى المجتمع المحلي
- وضع علامات و لوحات ارشادية.
- إعلام المجتمع المحلي بالطرق المغلقة أو تغيير مسارها من خلال الإعلانات العامة
- التنسيق مع شرطه البلديه للمساعده في أدارة السير
- حظر المركبات التي تنقل مواد البناء خلال النهار
- إرتداء معدات الحماية الشخصية
- الالتزم بجدول العمل المعين
- يجب وضع علامات السلامة و الوحات الارشادية المناسبة في المناطق الحساسة داخل منطقة المشروع (أي بالقرب من المدارس)
- تدريب سائقي الآلات الثقيلة على السلامة على الطرق
- إبلاغ المجتمع المحلي بجدول أعمال اعادة التأهيل
- تركيب ممرات للمشاة والعربات بالقرب من المناطق السكنية

أثناء التشغيل:

- المحافظة على نظام تجميع شبكات مياه العواصف خاصة قبل بدء موسم الأمطار
- القيام باستمرار بجمع النفايات الصلبة لمنع انسداد نظام الصرف
- ضمان الحفاظ على الطريق بانتظام لضمان ظروف سطحية جيدة؛
- إصلاح حدود السرعة على طول الطرق
- تركيب علامات الإنذار بشكل سليم بالقرب من المناطق الحساسة لمنع الناس من إستخدام قرون الضغط
- إستخدام مصابيح الإضاءة الصديقة للبيئة في الشوارع
- إستخدام تقنيات التنظيف الجاف
- تركيب علامات مثل علامات الحد من السرعة وعلامات عبور الحيوانات
- زرع الأشجار على جوانب الطرق كسياج لمنع التصادم بين الحيوانات والمركبات العابرة

مشاورة العامة وإبلاغها وعرض النتائج

عقدت جلسة مشاركة عامة في بلدية حلبا يوم الأربعاء، ١٦ تشرين الأول/أكتوبر ٢٠١٩. وكان الغرض من هذه الجلسة اهو إبلاغ أصحاب المصلحة (بما في ذلك المنظمات غير الحكومية في منطقة المشروع)، بالمشروع المقترح لإعادة تأهيل ١٠ طرق في قضاء عكار وما يصاحبها من أعمال اخرى، ومراعاة ملاحظاتهم. وشارك في الاجتماع أكثر من ٢٥ شخصا، منهم ٥ نساء في الأربعينات والخمسينات، إثنان منهم يعملون في بلدية حلبا، والآخرون نشطاء إجتماعيون في منظمات غير حكومية مختلفة. يذكر ان الرجال هم فى الغالب رؤساء البلديات ونواب الرؤساء او عاملين فى مكاتب هندسة. وخلال الجلسة ، اعرب الحضور عن مخاوف مختلفة وخاصة تلك المتعلقة باختيار الطرق وسلامة العامة على الطرقات. واقترح المشاركين في الجلسة انشاء الأرصفة في المنطقة لضمان السلامة العامة.

وقد أجريت مقابلات مع النساء المشاركات في جلسة منفصلة من أجل اخذ تساؤلاتهم و ملاحظاتهم. وذكروا أن المشروع سيسهم بشكل إيجابي في تحسين مشاركة المرأة في الاقتصاد بجعل النقل أكثر أمانا. لكنهم أشاروا إلى ضرورة وجود رقابة دورية على العمال لعدم التواصل مع بطريقة غير لائقة، خصوصا في المناطق القريبة من المدارس أو المناطق السكنية.

هذه التساؤلات و ملاحظات التي طرحت من قبل الموجودين ستأخذ بالاعتبار بالدراسة المقطرحة

أما بالنسبة للتشاور بين المنظمات غير الحكومية،(١) المحلية: وهي مخصصة لكل قضاء وتتمثل مهمتهم في معالجة مختلف القضايا في المجتمع المحلي، بما في ذلك المسائل الاجتماعية والاقتصادية والمساواة بين الجنسين والبيئة وتمكين المرأة، وما (٢) الدولية: وهي تغطي البلد كله، وستطبق المشاورة معهم على جميع الدراسات البيئية. يجدر الذكر الى ان عندما اندلعت الأزمة في سوريا في مطلع عام ٢٠١١، إستجابت العديد من المنظمات الدولية غير الحكومية للأزمة الإنسانية وعملت بشكل مباشر مع السوريين في لبنان من خلال تقديم المساعدات والاستجابة لأوضاعهم الحرجة.

وبالإضافة إلى ذلك، سيتم تنفيذ آلية مراجعة الشكاوى GRM خلال مرحلتي التأهيل والتشغيل. والغرض من هذا هو ضمان توثيق جميع الملاحظات والشكاوى الواردة من أصحاب المصلحة والموظفين والعامة ، والنظر فيها ومعالجتها بطريقة مقبولة وفي الوقت المناسب.

الخلاصة

لقد استنتج أن معظم الآثار السلبية ستحدث خلال مرحلة التأهيل. هذه الآثار تتعلق بإزعاج السكان القريبين من أنشطة إعادة التأهيل إلى جانب بعض الآثار على البيئة المحيطة، مثل تدهورنوعية التربة و المياه إذا لم تتم إدارة النفايات السائلة والنفايات الصلبة بشكل سليم. اضافة إلى ذلك فهناك أثر سلبي على نوعية الهواء نتيجة أعمال اعادة التأهيل خاصة عند إزالة الطبقات الإسفلتية المتدهور بالكامل و اعادة انشاءها من جديد. ومن ناحية أخرى سيتم توفير فرص العمل للمجتمع المحلى خلال مرحلة اعادة التأهيل التى تعتبر اثرا ايجابيا. و لكن تعتبر هذه الآثار قصيرة الأمد وستتقلص بمجرد انهاء المشروع. اما الآثار الاجتماعية والإقتصادية التي تم تقييمها خلال مرحلة التشغيل فهي إيجابية في معظمها من حيث تحسين حركة المرور والسلامة العامة على الطرقات وتحسين الاحوال الاقتصادية في منطقة المشروع. لكن المشروع المقترح سيسهم على المدى الطويل في زيادة مستويات ملوثات االهواء في المنطقة فضلا عن الضوضاء المتصلة بحركة المرور التي تسبب مشاكل صحية عامة وآثارا أخرى على البيئة. ومع ذلك، يمكن التقليل من الآثار البيئية السلبية التي قد تنشأ عن اعادة تأهيل الطرق المقترحة في قضاء عكارا بل وازالتها من خلال ممارسات خطة ادارة البيئة و المجتمع و الاجراءات الاحترازية المقترحة في التقرير.

1. INTRODUCTION

1.1 Project Background

The Council for Development and Reconstruction (CDR) acting as an executing agency on behalf of the Lebanese Council of Ministers (COM) awarded a contract to Associated Consulting Engineers (ACE), hereinafter the Consultant, to prepare the assessment, design and Environmental and Social Management Plans (ESMP) of Lot 4 under Roads and Employment Project (REP) – *See more about the Project in Section 3.*

The Roads and Employment Project is funded by the World Bank (WB). Its objectives are (1) to improve transport connectivity along select paved road sections and (2) to create short term jobs for Lebanese and Syrians. The project covers classified roads[1] in 25 Cazas[2] throughout Lebanon with an expected total length of 835 km and grouped in six (6) lots. The project will be implemented over a period of five years.

This report represents the ESMP of the REP in Akkar Caza that is part of Lot 4.

1.2 Project Rationale

Lebanon has a total of around 8,000 km of roads along with a highway network linking the country with Syria (WFP, 2016). Despite this large road network coverage, a significant percentage of these roads is in poor condition. This situation hinders local and economic development mainly in rural and lagging regions, where the condition of the main network is worse than the national average. Moreover, this state has been aggravated by the influx of Syrian refugees which has significantly increased traffic and the utilization of the road network (CDR, 2018). As such, the proposed project aims to improve the efficiency of road sector expenditures through the prioritization of road works and the improvement of road asset management techniques (CDR, 2018).

The Project's main objectives are to enhance the transport connectivity along selected secondary and tertiary road sections in different cazas and to create short-term job opportunities for the Lebanese and Syrian communities. The project will include the rehabilitation of urban and rural stretches of roads from all Lebanese regions.

The specific objectives of the project are as follows:

- Providing road reconstruction/rehabilitation and road safety activities such as pavement structure, retaining walls, drainage systems, edge safety barriers, marking and traffic signing;
- Creating job opportunities for the local community by engaging them in several construction activities;
- Promoting gender workforce equality to the extent possible through encouragement of employment of both genders within the project.

[1]Classified roads are based on the official Ministry of Public Works road classification which classifies the roads in Lebanon as primary, secondary or tertiary.
[2]Lebanon is divided administratively into three levels: Governorates (محافظات), cazas or districts (أقضية), and municipalities (بلديات). There are eight governorates, 26 districts, and 1,029 municipalities in the country (as of the 2016 municipal elections).

1.3 Report Objectives

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

- Describe all components of the proposed project;
- Identify relevant environmental and social national, international and WB policies and regulations;
- Conduct public consultation to identify public concerns regarding the project and to feed into project design to the extent possible;
- Describe baseline environmental and socio-economic conditions within the study area;
- Identify the significant positive and negative environmental and social impacts associated with the construction and implementation of the proposed project;
- Propose mitigation / enhancement measures for the identified impact whenever possible;
- Facilitate informed decision making, including setting the environmental terms and conditions for implementing the proposed project;
- Develop a plan to monitor the identified impacts and their associated mitigation measures;
- Develop an institutional setup along with capacity building requirements.

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

1.4 Methodology

This ESMP of the REP in Akkar Caza that is part of Lot 4 was prepared to cover all components of the proposed project during the rehabilitation and operation phases, to assess the likely environmental and social consequences of a project, and to determine the necessary measures to mitigate the negative ones and increase the positive impact on the environment. As such, the task was initiated by conducting site visits and a literature review in order to determine the current environmental and social conditions (such as hydro-geological and groundwater quality, air meteorological data, biological and socio-economic conditions, and cultural heritage sites), along with relevant local and WB legislations, guidelines, and standards. The review also included the identification and assessment of the suggested alternatives to the project.

In addition, the environmental team communicated closely with the technical team in order to obtain the necessary information on both the status of each road, as well as the proposed rehabilitation activities, thus describing the proposed project in a thorough manner. In terms of the assessment, negative and positive impacts were identified and mitigation measures were proposed to address the negative ones. As such, an ESMP was developed and included a monitoring plan, which is needed to ensure compliance of the project with environmental and social conditions and regulations.

Furthermore, the scope of work included also the development of an institutional setup to ensure that the project implementers have sufficient technical and human resources available to effectively undertake the environmental management and monitoring tasks. As for the participation of the public and concerned communities, this was done through

conducting a public hearing in a central location and invited all stakeholders and local community to participate.

2. EXISTING, LEGAL, ADMINISTRATIVE AND POLICIES FRAMEWORK

2.1 National Legal Framework

The rehabilitation of roads involves a variety of activities that need to abide by national legislations that are enforced by various government institutions. Table 2-1 describes a legal framework governing the REP for Lot 4 in Akkar, taking into consideration that no land acquisition or expropriation will be required during its implementation.

Table 2-1: National Legal Framework related to Project

Year	Law[3] / Decree[4] / Decision[5]	Title	Relevant Provisions
Labor			
1946	Labor Law	The Lebanese Labor Code	The Labor Law covers the industrial accident prevention and compensation. It regulates the minimum wage, the minimum age of employment based on their ages and the workplaces, resting periods and vacations for adolescent workers. It also sets the working hours, and the penal code regulation of strikes and lock out in essential employments,
2001	Law No. 335	Pursuant to International Labor Organization (ILO) Convention No 128	This ratified convention addresses the minimum age of employment
2002	Law No. 400	Pursuant to the ILO Convention No 138	Elimination of the worst form of child labor
2012	Decree 8987	Prohibition of employment of minors under the age of 18 in work that may harm their health, safety or morals	This Decree restrict the employment of minors under the age of 18 in activities and works that can be harmful to their health, morals and that can limit their education
2016	Decree 3791	Minimum Wage	Raises the minimum daily wage to 20$/day
Environment			
1933	Decree 2761	The prohibition of wastewater discharge into water streams	States the characteristics of channels and reservoirs where wastewater is discharged. In addition to the

[3]Lebanon's legislative body is represented by the Lebanese Parliament that approves and issues Laws.
[4]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.
[5]Decisions are issued by a specific minister and are limited to the affairs of the ministry that promulgated it. Ministerial Decisions are subject specific.

			prohibition of its discharged into natural environment
1974	Decree 8735	Conservation of Public Hygiene	Solid waste management including collection and disposal is under the control of the municipality. It restricts dumping of wastes in public or private lands adjacent to roads and residential districts
1988	Law 64	Protection of the environment against pollution from hazardous waste disposal and substances	Solid, liquid and gaseous wastes that may cause detriment to man, soil, fauna and flora or that may pollute the air or water should be suitably treated
1996	MOE Decision 52/1	Requirements to protect air, water, and soil pollution	Allowable noise level according to type of areas and the permissible duration of exposure
1996	Law 558	Protection of forests	Classifies protected forests and defines the prohibited activities and works into the mentioned forests. It also contains offences and penalties.
2001	MOE Decision 8/1	Revised standards for air emissions, liquid effluents and wastewater treatment plants	The decision sets limits for emissions of fuel oil generators with a capacity over 0.5 MW
2002	Law 444	Framework Law for Environmental Protection	Protect the national environment against all forms of degradation, air and water and soil pollution, and the promotion of sustainable use of natural resources and conservation of biodiversity
2018	Law 77	Water Law	Tackles protection of water resources from pollution and management and monitoring of public wastewater treatment facilities
2018	Law 78	Air Quality Law	The investment in any facility or establishment that emanate foul or toxic odors should abide by the different environmental conditions issued by a decision from MOE.
2018	Law 80	Integrated Solid Waste Management	Covers the management of non-hazardous and hazardous waste, and responsibilities and penalties related to violations of waste management laws.
Health and Safety			
2008	Decree 11802	Occupational prevention, safety, and health in all	Provides the general regulations for the prevention of occupational hazards and accidents, and the promotion of health and safety in all industrial establishments subject to the Labor

		enterprises subject to the Code of Labor	Law. These cover prevention and safety, occupational health, the safe use of chemicals at work, as well as occupational noise standards
Cultural and Municipal			
1977	Decree-Law 118	Municipal Act	Defining the responsibilities of municipalities
2008	Law 37	Cultural Policy Law	Any archaeological artefact located in Lebanon and deemed to be of historical, artistic, architectural or anthropological significance by the Ministry of Culture must be protected
Traffic			
2012	Law 243	New Traffic Law	Provide general driving rules and defines the penalties upon violation of the law
General			
1943	Legislative Decree 340	Penal Code	The law defines the type of crimes such as rape; lewd acts by threat, violence, or against minors; and other similar crimes. It also states punishments and legality of penalties
1991	Law 58	Expropriation law	States general and specific provisions for land acquisition. Also is includes improvement tax resulting from the implementation of public works.
2017	Law 53	Amendment of Penal Code	Under sexual violence Article 522 of the Penal Code exonerated a perpetrator of kidnapping and adultery who married his victim. This was repealed in this law.

In terms of the national legal requirements for speed limits, Lebanon uses the American Association of State Highway and Transportation Officials (AASHTO) 7th edition "Policy on Geometric Design of Highways and Streets" of 2018, which leaves designers to select the design speed which is appropriate for the roadway and correlate the various features of the design. The selected design speed should realistically represent actual or anticipated operating speeds and conditions on the roadway being designed or studied.

2.2 Institutional

Numerous governmental public institutions will be involved in the different stages of the ESMP of the REP. They are described in Table 2-2, along with their mandate and relevant responsibilities.

Table 2-2: Relevant Institutions

Institution	Main Role	Relevant Role
Council for Development & Reconstruction (CDR)	Securing funding for projects, allocating funds to different government agencies, supervising the execution of plans and contributing to the rehabilitation of public institutions	Securing funds for rehabilitation of road networks, issuing invitations for tenders and awarding construction contracts
Ministry of Public Works and Transportation (MOPWT)	Management of all public roads, for developing a sustainable strategy for the transportation sector, road and street plans within cities and villages	Under the MOPWT, the Directorate General of Roads and Buildings is in charge of the design, execution and maintenance of roads, bridges, walls and water channels. It is responsible for land use planning and cleaning the sides of the roads from wastes
Ministry of Environment (MOE)	Safeguard natural and environmental resources in Lebanon	Setting regulations and standards, and approving implementation and the development of projects sustainably
Ministry of Agriculture (MOA)	The Forestry and Natural Resources Administration of MOA is responsible for constructing public parks and afforestation work in all state lands including communal and private lands. Providing assistance for the implementation of afforestation and reforestation and soil conservation, water conservation and the investment in public and forests.	Under decision 476/1 dated 2012 gives permissions for cutting trees for rehabilitation purposes
Ministry of Labor (MOL)	Responsible for all labor issues. It prepares, coordinates and executes legislations in the labor, trade union and social fields	Responsible for ensuring that the labor law is applied for all workers present on the working sites.
Ministry of Interior and Municipalities (MOIM)	The MOIM is responsible for internal policy affairs and maintenance of the system and security, supervises governorates affairs, villages, districts, electors, elective councils, municipalities and municipal federations, parties and associations. The municipalities and the Union of municipalities represent the level of local government with legal status, financial and administrative independence, which exercises powers and responsibilities over the territory it is granted by law	The MOIM is responsible for law enforcement and stopping infractions and violations and oversees the affairs and operations of local authorities. On the other hand, responsibilities of municipalities include general programs of works, cleanliness, health, water, lighting projects, the implementation, rectifying and enlarging of roads, transportation organizing. In addition, it includes preparation of general plans related to sanitary projects, maintenance of infrastructure including wastewater networks, as well as working for the protection of the environment
Ministry of Culture (MOC)	Responsible for the protection of heritage, antiquities, arts,	Any artefacts of potential historical importance that can be found on a rehabilitation site fall under the

Institution	Main Role	Relevant Role
	literature, cultural industries and historical property in Lebanon.	jurisdiction of the Directorate General of Antiquities at the MOC.

In addition to the national public institutions, the local community represented by the Non-Governmental Organizations (NGOs) were consulted (refer to Tables 8 1 and 8-2 in Section 8.1).

2.3 Environmental Standards

2.3.1 Wastewater Discharge Targets

Table 2-3 represents the allowable contaminants concentration for wastewater when discharged into the surface water bodies, sea, or wastewater network according to the MOE decision 8/1 dated 30/1/2001.

Table 2-3: Limits for Wastewater Discharge into Receiving Water Bodies (MoE Decision 8/1)

parameter	Discharge into Public Sewer	Discharge into Surface Water Bodies	Discharge into the Sea
Color	non	non	non
pH	6-9	6-9	6-9
Temperature	350C	300C	350C
BOD (5 day 20°C)	125 mg/l	25 mg/l	25 mg/l
COD (dichromate)	500 mg/l	125 mg/l	125 mg/l
Total Phosphorus	10 mg/l	10 mg/l	10 mg/l
Total Nitrogen6	60 mg/l	30 mg/l	30 mg/l
Suspended solids	600 mg/l	60 mg/l	60 mg/l
AOX	5	5	5
Detergents	-	3 mg/l	3 mg/l
Coliform Bacteria 370 C in 100 ml7	-	2,000	2,000
Salmonellae	Absence	Absence	Absence
Hydrocarbons	20 mg/l	20 mg/l	20 mg/l
Phenol Index	5 mg/l	0.3 mg/l	0.3 mg/l
Oil and grease	50 mg/l	30 mg/l	30 mg/l
Total Organic Carbon (TOC)	750 mg/l	75 mg/l	75 mg/l
Ammonia (NH4+)	-	10 mg/l	10 mg/l
Silver (Ag)	0.1 mg/l	0.1 mg/l	0.1 mg/l

[6] Sum ot Kjeldohl-N (orgcnic N + NH3).NO3-N. NO2-N

[7] For discharges in close distance to bathing water stricter environmental limit value could be necessary

Aluminum (Al)	10 mg/l	10 mg/l	10 mg/l
Arsenic (As)	0.1 mg/l	0.1 mg/l	0.1 mg/l
Barium (Ba)	2 mg/l	2 mg/l	2 mg/l
Cadmium (Cd)	0.2 mg/l	0.2 mg/l	0.2 mg/l
Cobalt (Co)	1 mg/l	0.5 mg/l	0.5 mg/l
Chromium total (Cr)	2 mg/l	2 mg/l	2 mg/l
Hexavalent Chromium (Cr vl+)	0.2 mg/l	0.2 mg/l	0.2 mg/l
Copper total(CU)	1 mg/l	0.5 mg/l	1.5 mg/l
Iron total (Fe)	5 mg/l	5 mg/l	5 mg/l
Mercury total (Hg)	0.05 mg/l	0.05 mg/l	0.05 mg/l
Manganese (Mn)	1 mg/l	1 mg/l	1 mg/l
Nickel total [Ni)	2 mg/l	0.5 mg/l	0.5 mg/l
Lead total (Pb)	1 mg/l	0.5 mg/l	0.5 mg/l
Antimony (Sb)	0.3 mg/l	0.3 mg/l	0.3 mg/l
Tin total (Sn)	2 mg/l	2 mg/l	2 mg/l
Zinc total (Zn)	10 mg/l	5 mg/l	5 mg/l
Active (Cl2)	-	1 mg/l	1 mg/l
Cyanides (CN+)	1 mg/l	0.1 mg/l	0.1 mg/l
Fluorides (F)	15 mg/l	25 mg/l	25 mg/l
Nitrate (NO3-)	-	90 mg/l	90 mg/l
Phosphate (POP43-)	-	5 mg/l	5 mg/l
Sulphate (SO42-)	1,000 mg/l	1,000 mg/l	1,000 mg/l
Sulphide (S2-)	1 mg/l	1 mg/l	1 mg/l

2.3.2 Air Emissions Targets

MOE Decision No. 52/1 of 1996 covers the National Ambient Air Quality Standards (NAAQS) for Lebanon and is presented in Table 2-4.

Table 2-4: NAAQS of MOE Decision 52/1/1996

Parameters	NAAQS Maximum Levels (µG/M3)
Nitrogen dioxide (NO_2)	200 (1 hr) 150 (24 hrs) 100 (Annual)
Carbon Monoxide (CO)	30,000 (1 hr) 10,000 (8 hrs)
Ground-level Ozone (O_3)	150 (1 hr) 100 (8 hrs)
Total Suspended Particles(TSP)	120 (24 hrs)
PM_{10}	80 (24 hrs)

Parameters	NAAQS Maximum Levels (µG/M3)
$PM_{2.5}$	NA
Lead	1 (annual)
Benzene	16.2 (annual)

2.3.3 Noise Emissions Targets

Article 46 of Law 444 recognizes that loud noises, particularly noises caused from machinery and vehicles, may be harmful to human health and the environment. According to MOE decision 52/1 for 1996, noise pollution levels should not exceed the following listed limits in different workplace locations (Table 2-5).

Table 2-5: Permissible Noise Levels in Various Areas

Type of Area	Noise Limit (dB)		
	Day (7 am – 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7am)
Administrative and commercial area in the City Center	55-65	50-60	45-50
Residential Area with some commercial areas or along main road	50-60	45-55	40-50
Residential Areas in the City	45-55	40-50	35-45
City Suburbs	40-50	35-45	30-40
Rural Areas, hospitals, and gardens	35-45	30-40	25-35
Industrial Areas	60-70	55-65	50-60

Table 2-6 contains the hours of work permitted under various noise levels over 90 dB.

Table 2-6: Hours of Work Permitted under Noise Level

Noise Level (dB)	95	100	105	110	115
Hours permitted to work	4	3	1	0.5	0.25

2.4 Word Bank Policies

The Project activities should comply with the safeguards operational policies and procedures of the World Bank– specifically OP/BP 4.01 on Environmental Assessment and OP/BP 4.12 on Involuntary Resettlement.

The objective of OP/BP 4.01 is to identify, prevent, and mitigate the potential adverse environmental and social impacts associated with the implementation of a proposed project. In the World Bank operations, the Environmental Assessment (EA) is conducted in an effort to improve decision making, ensure that proposed project is environmentally sustainable, and that affected communities have been properly consulted. Moreover, the Bank classifies the proposed project into three main categories. The classification is based on the location, type, sensitivity, and scale of the project as well as the nature and significance of its environmental impacts. These categories are as follows:

- Category “A”: Significant negative environmental impacts are likely to occur as a result of implementing the proposed project. These impacts might affect an area broader than the project sites.
- Category “B”: Potential environmental impacts are less adverse than those of Category “A” projects. These impacts occur within the project site and proposed mitigation measures can be designed and implemented more readily than Category "A" projects. As such, a preliminary EIA must be prepared.
- Category “C”: Minimal or no negative environmental impacts are likely to occur as a result of implementing the proposed project. As such, an EIA is not required in this case.

Since the project activities are focused mainly on road maintenance and rehabilitation activities, thus the majority of impacts are expected to be localized and temporary. As such, this project falls under Category “B”.

Under OP/BP 4.12 on Involuntary Resettlement, involuntary displacement does not cover only the physical displacement such as the relocation or loss of home but also the economic displacement that includes loss of access to natural resources or restrictions on land use. The policy aims to avoid involuntary resettlement to the extent possible or to minimize the negative socioeconomic impacts that might affect the targeted community. Moreover, resettlement should be done in a sustainable way when its avoidance is not feasible. This policy also requires the borrower to prepare a suitable resettlement planning instruments prior to Bank assessment of the proposed project. However, no involuntary resettlement or land acquisition will take place in the proposed project in Akkar caza.

2.4.1 Public Consultation and Disclosure Policy

According to OP/BP 4.01, the Bank requires that a public consultation with project-affected people and local nongovernmental organizations (NGOs) must be conducted for all projects under Category A and Category B. The aim of the consultation is to present to the public the components of the project along with potential environmental and social impacts and takes their comments and concerns into consideration (see more details about Project Public Consultation in Section 8.1.1). Under Category B projects, it is required to conduct at least one formal public consultation which is usually done during the ESMP draft stage. Moreover, during the implementation of the proposed project, the borrower has to consults with such affected and interested groups in order to address any environmental or social issue that may arise.

In an effort to make the public consultation as significant and meaningful as possible, the consultant should provide relevant data on the proposed project to the public before the consultation session and in a form and language that are clear and accessible to the targeted groups. Information that must be included during the public consultation session includes a brief on the proposed project's objectives, general description, and potential environmental and social impacts during all project phases. Finally, once the borrower officially submits the ESMP report to the Bank, the Bank makes the report available to the public through the Bank’s external website and through the government counterpart, which in this case is CDR.

2.4.2 Guidelines and Manuals

The World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines are mandatory and need to be adopted throughout the project duration. In addition, the WB has

developed guidelines and manuals that need to be adopted during the ESMP implementation phase of the project. These guidelines and manuals include technical reference documents with general and sector-specific examples of good practices during all phases of the proposed project. Guidelines and manuals include:

- WBG Environmental, Health and Safety (EHS) Guidelines.
- Disclosure Handbook.
- The World Bank Participation Sourcebook.
- Roads and the Environment. A Handbook. World Bank Technical Paper.
- Doing Better Business through Effective Public Consultation and Disclosure – A good Practice Manual, issued by IFC.

  Good Practice note addressing Gender Based Violence in Investment Project Financing involving Major Civil Works

2.5 International Treaties and Conventions

Error! Reference source not found. presents the international conventions that Lebanon is a signatory to whose provisions may be relevant to the project.

Table 2-7: Relevant International Treaties and Conventions

Convention	Ratification	Description
United Nations Framework Convention on Climate Change (UNFCCC) - 1992	Ratified through Law No. 359 (1994)	The main objective of the UNFCCC is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". In addition, the executive secretary emphasizes the importance of agriculture and land use in the fight against climate change.
Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) - 1979	Ratified by Lebanon in 1997 with reservations	Aims to eliminate discrimination against women in the field of employment and other areas of economic and social life in order to ensure, on a basis of equality of men and women, the same rights. The convention also requires taking into account the particular problems faced by rural women and the significant roles which rural women play in the economic survival of their families.
Convention on Biological Diversity (CBD) - 1992	Ratified through Law No. 360 (1/8/1994)	The CBD develops strategies in order to conserve biodiversity, ensure the sustainable use of its components and the fair and equitable sharing of benefits arising from genetic resources.
United Nations Convention to Combat Desertification (UNCCD) – 1994	Ratified through Law No. 469 (21/12/1995)	The UNCCD specifies measures to conserve natural resources through integrated and sustainable management of natural resources, including forests, vegetation cover and wildlife, water resources and biodiversity.

Convention	Ratification	Description
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal – 1989	Ratified though Law No. 387 (21/12/1994)	This convention aims to reduce the movements of hazardous waste between countries. The Convention is also intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist LDCs in environmentally sound management of the hazardous and other wastes they generate.
International Labor Conventions: Convention 120 concerning Hygiene in Commerce and Offices Convention 136 concerning Protection against Hazards of Poisoning Arising from Benzene Convention 139 concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents	 Ratified by Lebanon in 1977 Ratified by Lebanon in 2000 Ratified by Lebanon in 2000	This Convention protects workers health and ensures proper sanitation and hygiene.

2.6 Environmental Health and Safety (EHS) Guidelines of the WB

2.6.1 Wastewater and Ambient Water Quality

Table 2-8 shows the EHS guidelines for treated sanitary sewage discharges into surface water bodies at are adopted by the IFC of the World Bank Group in the Environmental, Health, and Safety Guidelines for environmental wastewater and ambient water quality (WBG-IFC, 2007) and the allowable contaminants concentration for wastewater when discharged into the surface water bodies according to the MOE decision 8/1 dated 30/1/2001.

Table 2-8: EHS and National wastewater effluent quality for the discharge into surface water bodies

pollutant	EHS guidelines for treated sanitary sewage discharges	National discharge to surface water bodies decision 8/1
pH	6-9	5-9
BOD	30 mg/L	100 mg/L
COD	125 mg/L	250 mg/L
TN	10 mg/L	30 mg/L
TP	2 mg/L	10 mg/L
Oil and Grease	10 mg/L	30 mg/L
TSS	50 mg/L	200 mg/L
Total coliform bacteria	400	-

Source: EHS 2007 and MOE Decision 8/1 for 2001

2.6.2 Air Emissions and Ambient Air Quality

Error! Reference source not found. shows the WHO Ambient Air Quality Guidelines (WHO, 2005) that are adopted by the IFC of the World Bank Group in the Environmental, Health, and Safety Guidelines of Air Emissions and Ambient Air Quality. As can be noted fromTable 2-4 above, the NAAQS maximum levels of the ambient air quality are much higher for several pollutants comparing to the same pollutants of the WHO. These elements are SO_2, NO_2, PM10, Lead and Benzene. However, the other pollutants have similar values. Therefore, for this project, the WHO standards apply.

Table 2-9: WHO Guidelines for Ambient Air Quality of 2005 and NAAQS of MOE Decision 52/1-1996

Parameters	WHO Guidelines (µG/M^3)	NAAQS Maximum Levels (µG/M^3)
Sulfur dioxide (SO_2)	500 (10 minutes) 20 (24 hrs)	-
Nitrogen dioxide (NO_2)	200(1 hr) 40(Annual)	200 (1 hr) 150 (24 hrs) 100 (Annual)
Carbon Monoxide (CO)	30,000 (1 hr) 10,000 (8 hrs)	30,000 (1 hr) 10,000 (8 hrs)
Ground-level Ozone (O_3)	100 (8 hrs)	150 (1 hr) 100 (8 hrs)
Total Suspended Particles (TSP)	150 (24 hrs)	120 (24 hrs)
PM10	50 (24 hrs) 20 (Annual)	80 (24 hrs)
PM2.5	25 (24 hrs) 10 (Annual)	NA
Lead	0.5 (annual)	1 (annual)
Benzene	Unit Risk Life 6.10^{-6}	16.2 (annual)

Source: WHO 2005 and MOE Decision 52/1-1996

2.6.3 Noise Management

Table 2-10 shows the noise level guidelines according to the EHS Guidelines. Comparing these levels with the national one, although some characteristics differ for WHO in reference to the type of area and the day hours that extend to 10 pm instead of 6 pm for the national standards, the noise limits for residential, institutional, and educational areas by the WHO are more stringent and therefore apply. Noise limits for Industrial and commercial areas are more stringent in the national standards.

Table 2-10: WHO Noise Level Guidelines Compared to National Levels

Type of Area	WHO Noise Level (dB)	Noise Standards as per MOE Decision 52/1-1996

	Day (7 am – 10 pm)	Night (10 pm – 7 am)	Day (7 am- 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7 am)
Residential	55	45	45-55	40-50	35-45
Institutional	55	45	-	-	-
Educational	55	45	55-65	50-60	45-50
Industrial	70	70	60-70	55-65	50-60
Commercial	70	70	55-65	50-60	45-50

3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 Location

The study area where the proposed roads are located is in the Caza of Akkar of North Lebanon Governorate. The total number of the proposed roads to be rehabilitated under this project is 10 roads with a total length of 38 km. All of the roads are already existing and need rehabilitation works. The length of each road along with the municipalities that is passes through is presented in the table below (Table 3-1).

An overview of the proposed roads locations is presented in Figure 3-1 while the location of each of the project roads are represented in the maps illustrated in Figure 3-2, Figure 3-3, Figure 3-4, Figure 3-5, Figure 3-6, Figure 3-7, Figure 3-8, Figure 3-9, Figure 3-10 and Figure 3-11.

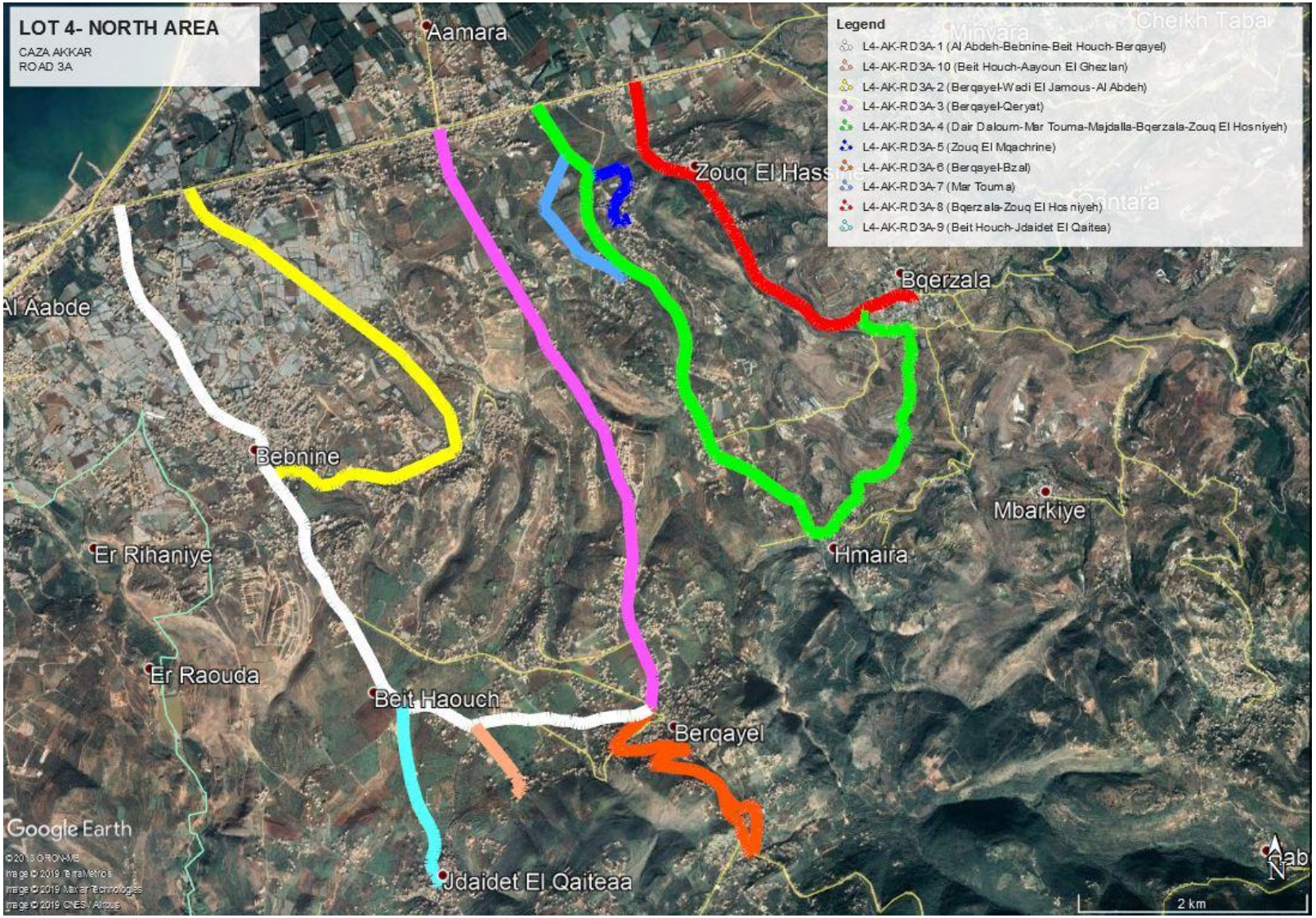
Table 3-1: Proposed Roads within the Caza of Akkar (Road 3A)

	Road Name	Road Code[1]	Classification	Municipalities	Length (m)	Average Width (m)
LOT 4 -Akkar CAZA (L4-AK)	Al Abdeh - Bebnine - Beit Houch -– Berqaye	L4-AK-RD3A-1	Primary	Bebnine El Karkaf Beit El Haouche Berkayel	7,430.87	6
	Berqayel - Wadi El Jamous - Al Abdeh	L4-AK-RD3A-2	Tertiary	Bebnine Wadi El Jamous	5,123.51	5.9
	Berqayel -– Bzal	L4-AK-RD3A-3	Primary	Berkayel Majdala (small part) Mar Touma Deir Daloum	3,636.1	6
	Berqayel - Qeryat	L4-AK-RD3A-5	Tertiary	Deir Daloum Zouq el Moukacherine Dahr Haddara Homeira Majdala Kloud el bakia Bkerzala	5,525.55	5.2
	Dair Daloum - Mar Touma - Majdalla - Bqerzala – Zouq El Hosniyeh	L4-AK-RD3A-5	Tertiary	Dahr Haddara Zouq el Moukacherine Deir Daloum (small part)	7,207.52	6
	Zouq el Mqachrine	L4-AK-RD3A-6	Tertiary	Bzal Berkayel	993.69	6
	Dair Touma	L4-AK-RD3A-7	Tertiary	Mar Touma Deir Daloum	1,509.47	6
	Bqerzla Zouq el Hassine	L4-AK-RD3A-8	Tertiary	Bkerzala Zouk el Habasia Zouk El Hosnieh et Dahr Ayasse Arka	3,797.34	5.2
	Beit Haouch-Jdaidet El Qaitea	L4-AK-RD3A-9	Tertiary	Berkayel	1653.4	5.8

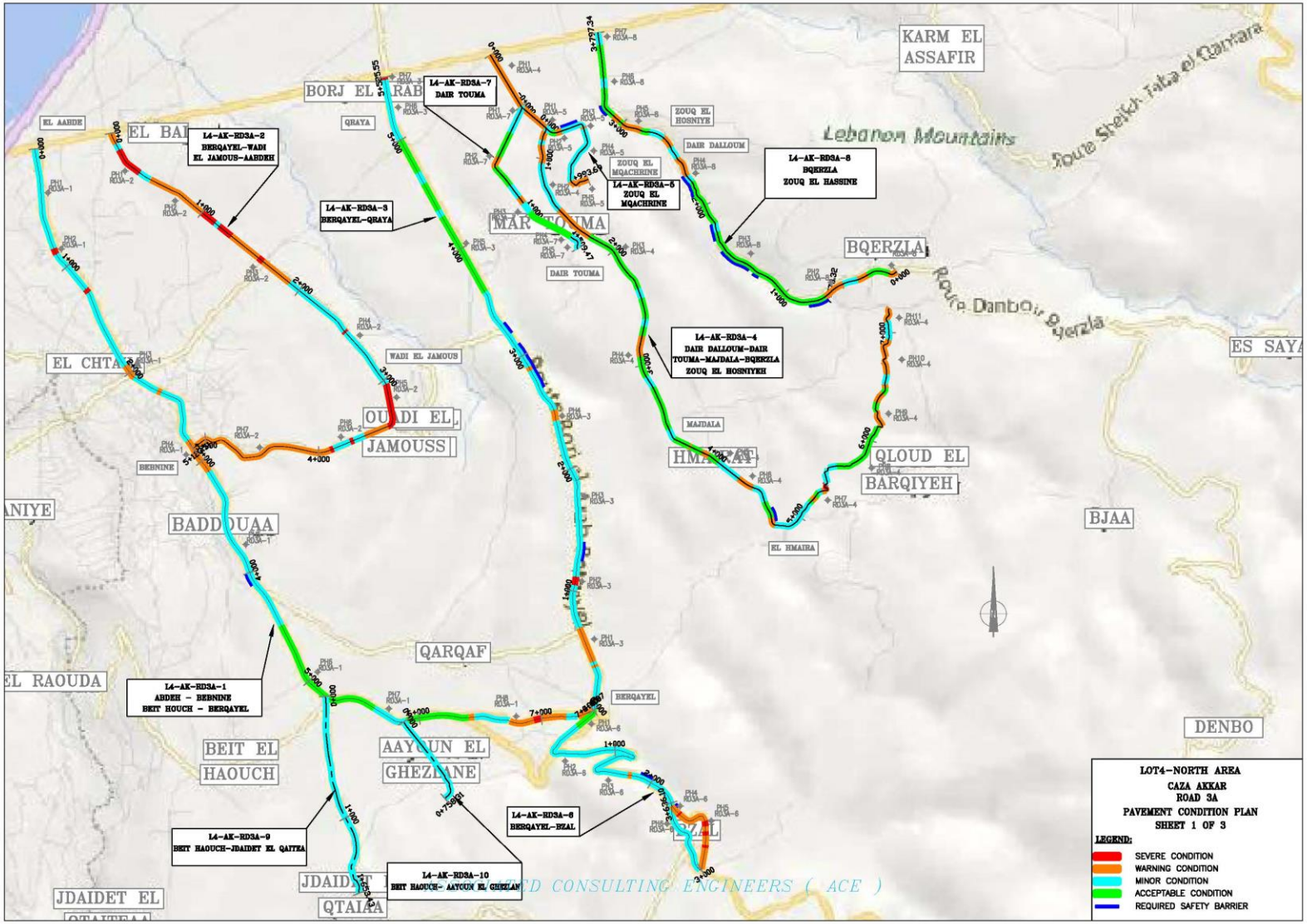
				Eyoune El Ghouzlane Jedeidet El Kayteh		
	Beit Haouch-Aayoun El Ghezlan	L4-AK-RD3A-10	Tertiary	Eyoune El Ghouzlane Berkayel	758.3	5.8
	Total Length	37,635.75 m				

[1] The code for the roads represents the road label for example for L4–AK–RD3A–1: L4=Lot No.4 (Lot Number as per Contract), AK=Akkar (Name of Caza as per Contract), RD3A-1=Road label (as per Contract) such that 1 represents the number of the alignment.

Figure 3-1: Overview of Location of Roads L4-AK-RD-3A(1-2-3-4-5-6-7-8-9-10) in Akkar Caza

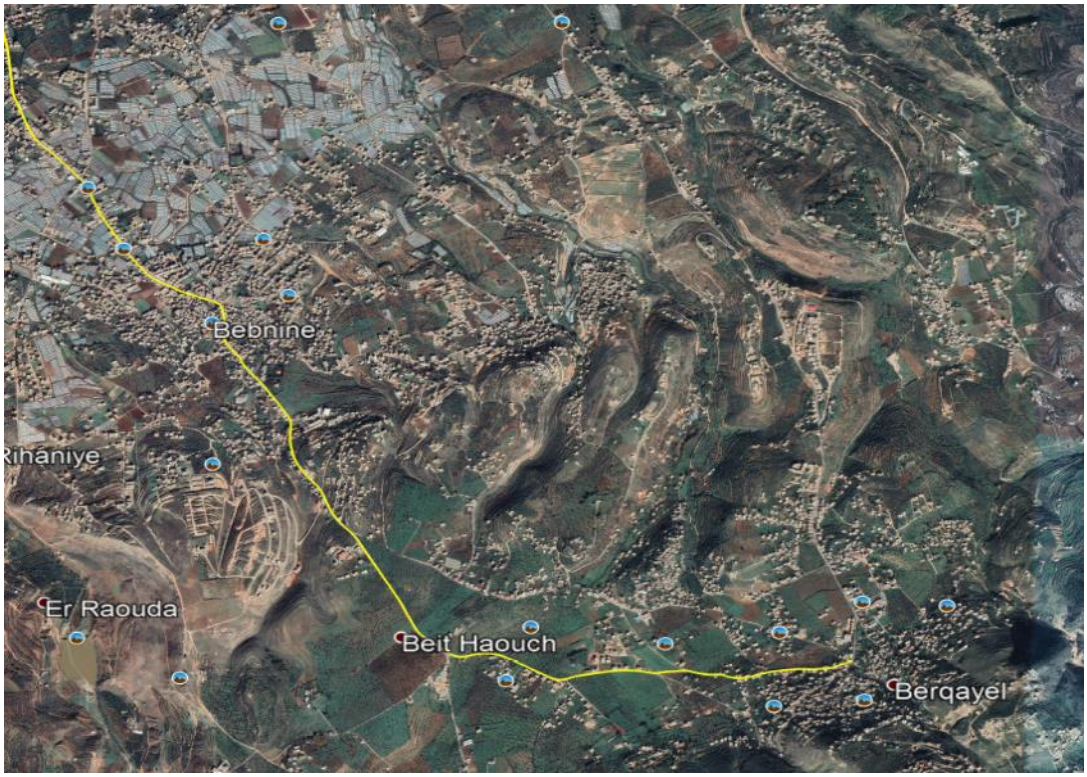


Source: Google Earth, 2019


KARM EL ASSAFIR
BORJ EL ARAB
L4-AK-RDSA-7 DAIR TOUMA
QRAYA
ZOUQ EL HOSNIYE
DAIR DALLOUM
ZOUQ EL MQACHRINE
L4-AK-RDSA-5 ZOUQ EL MQACHRINE
L4-AK-RDSA-8 BQERZLA ZOUQ EL HASSINE
Lebanon Mountains
Route Sheikh Taba el Qantara
EL AAHDE
EL BA
L4-AK-RDSA-2 BERQAYEL-WADI EL JAMOUS-AABDEH
L4-AK-RDSA-3 BERQAYEL-QRAYA
MAR TOUMA
DAIR TOUMA
BQERZLA
Route Danbo - Bqerzla
L4-AK-RDSA-4 DAIR DALLOUM-DAIR TOUMA-MAJDALA-BQERZLA ZOUQ EL HOSNIYEH
ES SAYA
EL CHTA
WADI EL JAMOUS
OUADI EL JAMOUSS
MAJDALA
HMAIRAT
QLOUD EL BARQIYEH
BEBNINE
ANIYE
BADDOUAA
EL HMAIRA
BJAA
QARQAF
EL RAOUDA
L4-AK-RDSA-1 ABDEH - BEBNINE BEIT HOUCH - BERQAYEL
BERQAYEL
DENBO
BEIT EL HAOUCH
AAYOUN EL GHEZLANE
L4-AK-RDSA-6 BERQAYEL-BZAL
L4-AK-RDSA-9 BEIT HAOUCH-JDAIDET EL QAITEA
L4-AK-RDSA-10 BEIT HAOUCH- AAYOUN EL GHEZLANE
JDAIDET EL QTAITEA
LOT4-NORTH AREA
CAZA AKKAR
ROAD 3A
PAVEMENT CONDITION PLAN
SHEET 1 OF 3
LEGEND:
SEVERE CONDITION
WARNING CONDITION
MINOR CONDITION
ACCEPTABLE CONDITION
REQUIRED SAFETY BARRIER

Source: ACE

Figure 3-2: Road L4-AK-RD3A-1

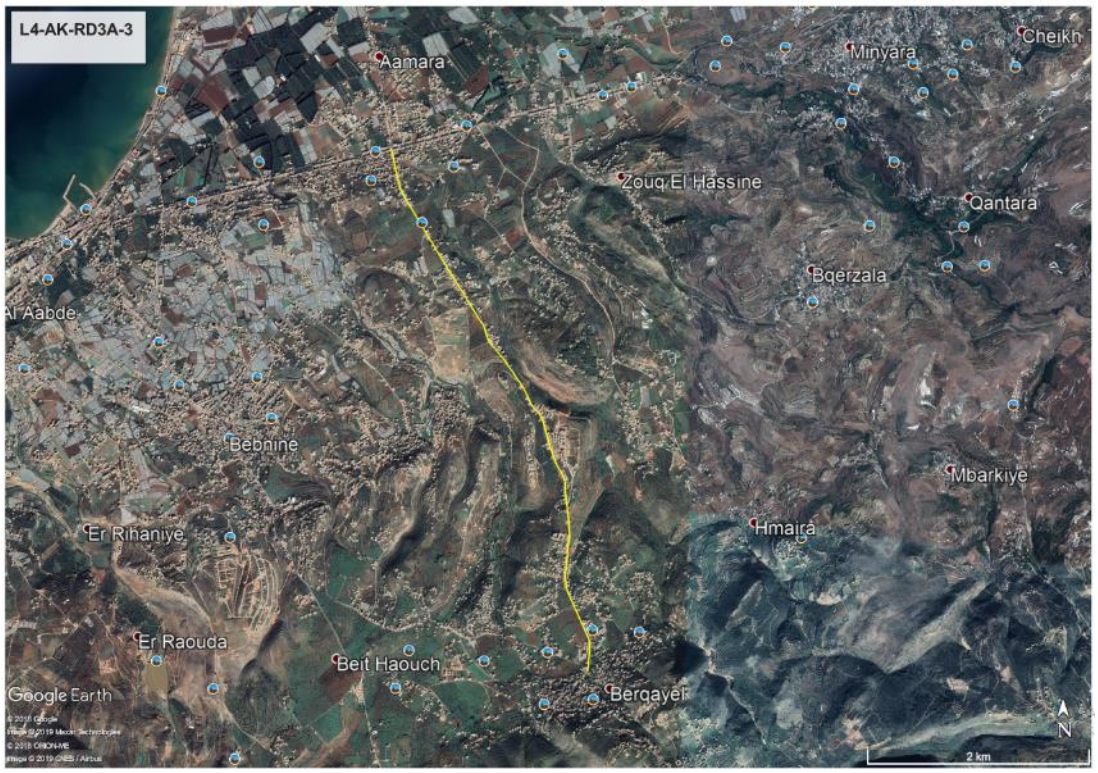


Source: Google Earth, 2019

Figure 3-3: Road L4-AK-RD3A-2

Source: Google Earth, 2019

Figure 3-4: Road L4-AK-RD3A-3



Source: Google Earth, 2019

Figure 3-5: Road L4-AK-RD3A-4

Source: Google Earth, 2019

Figure 3-6: Road L4-AK-RD3A-5

Source: Google Earth, 2019

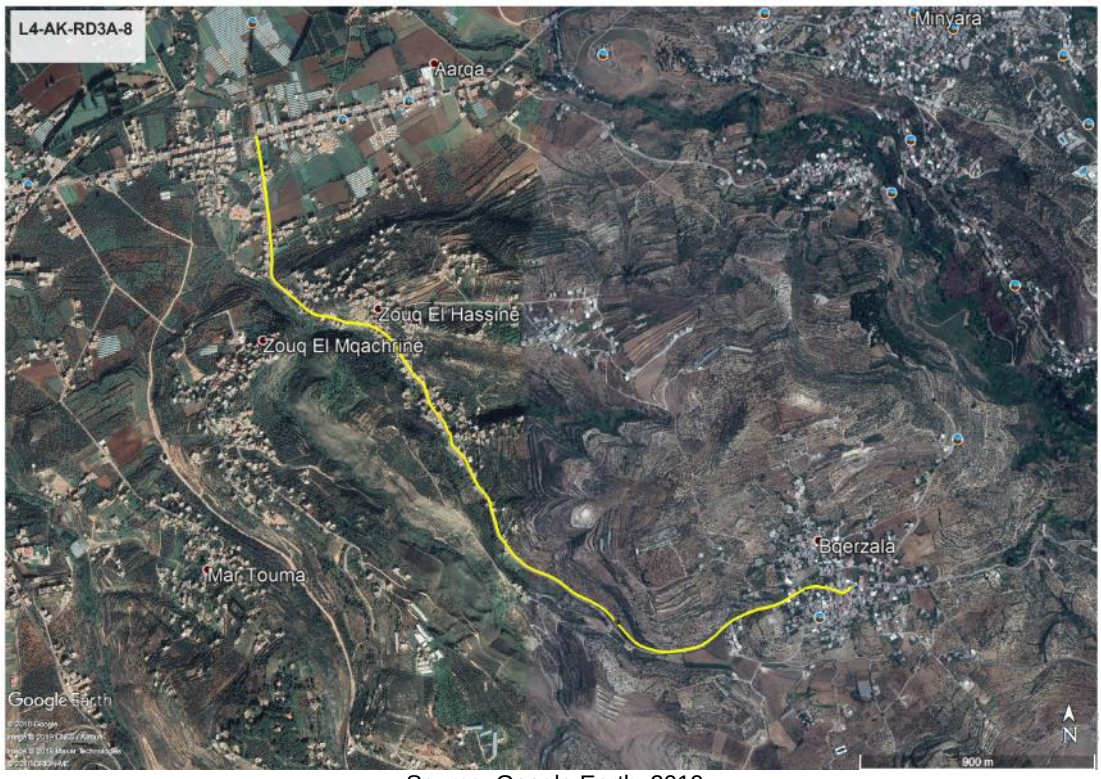
Figure 3-7: Road L4-AK-RD3A-6

Source: Google Earth, 2019

Figure 3-8: Road L4-AK-RD3A-7

Source: Google Earth, 2019

Figure 3-9: Road L4-AK-RD3A-8



Source: Google Earth, 2019

Figure 3-10: Road L4-AK-RD3A-9

Source: Google Earth, 2019

Figure 3-11: Road L4-AK-RD3A-10

Source: Google Earth, 2019

Photos that were taken during the site visits can be found in Figure 3-12 and Figure 3-13.

Figure 3-12: Residential Areas along Road L4-AK-RD3A-8 (Bqerzla – Zouq El Hosniyeh)

Source: HK, ACE - November, 2018

Figure 3-13: Green Areas on Both Sides of Road L4-AK-RD3A-4

Source: HK, ACE – November, 2018

3.2 Project Activities

The proposed project consists of the rehabilitation of existing roads in the Caza of Akkar.

3.2.1 Road Selection

The road selection was determined by the cabinet of Ministers in their Meeting Number 32 dated 27/06/2019.The assessment of pavement condition follows several steps before identifying the type of repair activity needed for each stretch of road. The first step is the

initial visual assessment of the engineering design team. The outcome of such step is reflected in the following Table 3-2.

Table 3-2: Percentage of Asphalt Conditions for Each of the Proposed Roads (Based on visual Assessment)

Road Code	Severe Conditions	Warning Conditions	Minor Conditions	Acceptable Conditions
L4-AK-RD3A-1	2.15%	12.85%	63.46%	21.53%
L4-AK-RD3A-2	19.32%	44.50%	36.18%	0.00%
L4-AK-RD3A-6	2.75%	16.50%	75.52%	5.23%
L4-AK-RD3A-3	0.90%	7.24%	69.23%	22.62%
L4-AK-RD3A-4	0.83%	36.14%	27.51%	35.52%
L4-AK-RD3A-5	0.00%	23.55%	71.42%	5.03%
L4-AK-RD3A-7	0.00%	9.94%	33.09%	56.97%
L4-AK-RD3A-8	0.00%	22.12%	14.49%	63.39%
L4-AK-RD3A-9	0.00%	0.00%	100.00%	0.00%
L4-AK-RD3A-10	0.00%	0.00%	100.00%	0.00%
Total	3.61%	21.43%	51.27%	23.69%

The next step is a thorough visual examination of the identified distresses. After carrying out further studies such as Geotechnical investigation, Automated Traffic Counts and Road geometry (topographic survey), the pavement structure calculation takes place leading to identifying the right type of activity needed for each stretch of road.

3.2.2 Rehabilitation Works

Determining the condition of the asphalt is important to assign the proper pavement rehabilitation activities. The pavement rehabilitation activities consist of three activities: (1) either pavement maintenance or (2) overlay on existing pavement or (3) complete removal of deteriorated pavement and constructing a new one.

An estimated 80% of the works to be executed within this project fall under the following pavement related types of activities:

- A- Patching
- B- Milling and Overlay
- C- Pavement Total Reconstruction.

The phases for the main three activities are as follows:

A- Phases of Construction for a stretch of road that needs: Pavement Patching

- A.1- Saw-cut existing pavement in a rectangular shaped area where pavement distresses are located as per tender drawings and specifications.
- A.2- Remove asphalt layer within the limits of the executed saw-cut using hammer drill breaker operated by air compressor.

- A.3- Examine the exposed pavement structure under the removed asphalt using proper testing for base course and sub-base course layers as well as the subgrade level & material.
- A.4- Remove and replace or repair under asphalt layers as per technical assessments and recommendations.
- A.5- Execute asphalt layer(s) similar to surrounding asphalt thicknesses and parameters by either applying binder course asphalt layer and a wearing course asphalt layer (with prime coat & tack coat where required) or by applying directly the final wearing course after spraying prime coat over the prepared base course surface.

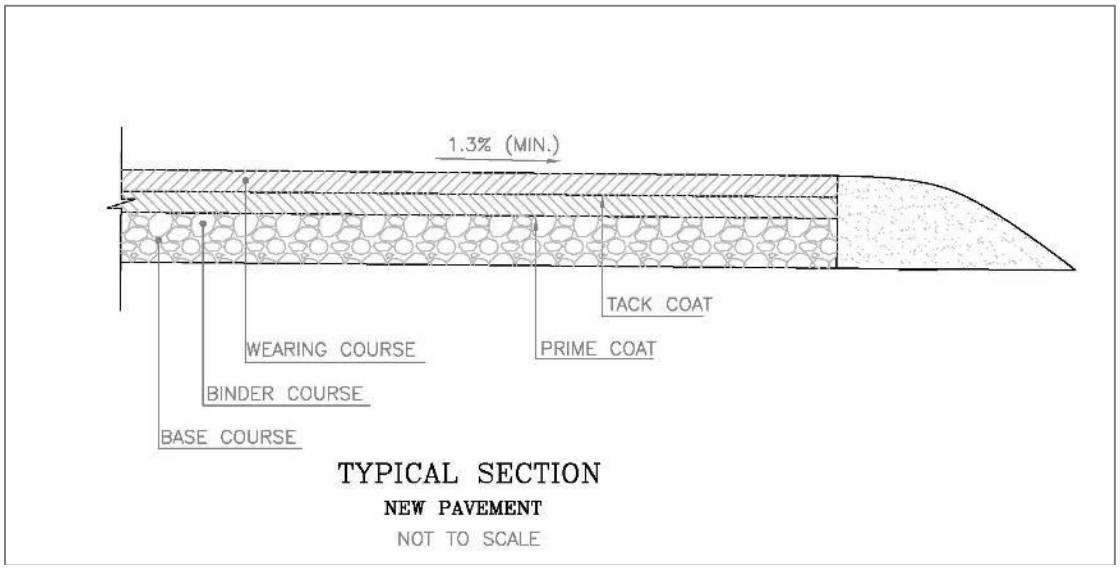
B- Phases of Construction for a stretch of road that needs: Milling & Overlay

- B.1- Contractor to proceed with the milling activity as described in the tender document with regards to the thicknesses of existing asphalt to be milled.
- B.2- New surface of asphalt obtained after milling shall be cleaned from all debris and dust with the use of mechanical road sweepers and water jets.
- B.3- Tack coat will be sprayed on the newly prepared clean surface of existing asphalt.
- B.4- Asphalting activity will take place using the right thickness of the new asphalt layer as per the design/tender documents. Such activity includes spreading asphalt as well as compaction of the new layer.

C- Phases of Construction for a stretch of road that needs: Pavement Total Reconstruction (Figure 3-14)

- C.1- Scrape and remove asphalt layer(s) to reach base course level.
- C.2- Excavate and remove the sub-base and base course layers to reach subgrade level.
- C.3- Prepare sub-grade surface after making sure by soil tests that reached subgrade level is suitable to receive pavement structure. If not, unsuitable material to be replaced by suitable borrow fill and compacted to reach required compaction percentage.
- C.4- Execute sub-base/base course layers as per specifications and thicknesses according to tender documents. Compact sub-base/base-course layers to reach required compaction level/percentage.
- C.5- Spray prime coat over the prepared and leveled surface of base course in order to receive asphalt binder course layer(s).
- C.6- Spread and compact asphalt binder course layer(s) as per the thicknesses and specifications specified in tender documents.
- C.7- Spray tack coat over the newly executed asphalt binder course in order to receive asphalt wearing course layer.
- C.8- Spread and compact asphalt wearing course layer as per the required specifications and thicknesses).

Figure 3-14: New Pavement Cross Section Scheme



The road sections in Akkar caza that require new pavement are as follows:

- Station 800m - 2Km 300m and 5km 900m – 7km 400m of RD 3A-1,
- Station 0m –1km 900, 3km 020m – 3km 392 m and 3km 600m – 5km 100m of RD 3A-2,
- Station 700m – 1km 300m of RD 3A-3,
- Station 5km-Station 7km of RD 3A-4,
- Station 100m – 996m of RD 3A-5,
- Station 2km 270m – 3km of RD 3A-6

The proposed project also consists of other activities beside the pavement rehabilitation works. These activities consist of:

- Installing concrete safety barriers
- Adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs
- Marking lanes and stoppage line
- Rehabilitating sidewalks
- Construction or improvement of drainage systems
- Construction or improvement of retaining walls
- Relocation of existing utilities as needed
- Repairing street lighting

During the execution of rehabilitation works for a specific road, and in case the works imply the temporary closure of this road, other ancillary and associated works including traffic management during rehabilitation, reinstatement of roads disturbed by the works and tapering to the existing roads as necessary. Thus, traffic will be secured by the project operators via alternative routes to reach relevant destinations. However, the implementation of detours, diversions and road blockage will be determined during the rehabilitation phase by the contractor. The consultant's supervision team as well as the

traffic department of CDR have to agree to the location of traffic relocation in consultation with the affected communities.

With regards to electrical street lighting activities, existing networks along the selected roads shall be assessed, repaired and rehabilitated. Works shall be limited to:

- Replacing damaged light poles or brackets,
- Replacing lighting luminaires or bulbs,
- Repairing electrical wiring (directly buried or laid in pipes),
- Adding light poles where needed,
- Removing light poles obstructing the road and placing them at proper locations in addition to executing of other miscellaneous electrical repairs to the existing street lighting network.

As this project is a road rehabilitation project, the speed limit will be assigned based on existing road curves. The designer thus defined the best fit centerline for each road, in which the existing radius of each curve could be identified and posted the speed limit that complies with the minimum radius of curvature. The applicable speed limit for most of the roads were 60 kph based on road geometry in general cases and was reduced accordingly at stretches where sharp curves were encountered in which it was reduced as much as to reach 30pkh at very sharp curves.

3.3 Materials and Equipment

The required main materials and equipment for the rehabilitation of the proposed roads and its associated works are presented in the table below (Table 3-3).

Table 3-3: Materials and Equipment Used during the Rehabilitation Works

Materials	Equipment
Aggregates (fine and coarse)	Steel-wheeled Rollers
Asphalt mix	Pneumatic-tyred Rollers
Liquid Asphalt	Asphalt Distributor
Concrete mix	Concrete mixing trucks
Water	Trucks
Fuel	Excavators
Thermoplastic Paint Material	Loaders
Steel Guardrails	Asphalt Milling Machines
Stones (for stone pitching)	Steel Rollers
Reinforcing Steels	Motor Graders
Manhole Covers	Thermoplastic Road Marking Machines
Rubber Bitumen	Liquid Asphalt Spraying Tanks
Cat Eyes	Guardrail Post Driving Machines
Delineators	Paver instead of Asphalt Distributors
Traffic Signals	Dumper Trucks instead of Trucks
	Air Compressors
	Asphalt Cutters

3.4 Site Construction Staffing

The total number of workers for the overall road/project shall be based on the total volume of each activity as per the bill of quantities of the tender documents, as well as the independent assessment of the awarded contractor subject to the project duration and the planner's effort to produce a relevant program of work to cover all project activities. It is estimated that the rehabilitation phase will extend over a period of 15 to 18 months Therefore, the total number will be deduced accordingly.

As a result, the total number of labor (including equipment operators and machinery drivers) shall be in correlation with:

- Volume of each type of work (quantities in Bill of Quantities BOQs)
- Division of work as per the program of works to be submitted for approval by the awarded contractor. Such program of works shall be resource loaded to cover all required activities as per the tender documents and shall reflect actual numbers of labor with regards to each activity and the time dedicated for it, as well as for the total of the Project.

Furthermore, some indicative numbers of workers and drivers are provided in Table 3-4 and

Table 3-5 per task and per day. All rehabilitation activities need the involvement of a certain number of workers ranging from unskilled labors to equipment drivers to foremen/engineers. As described in table 3-4, the activities vary from pavement works to earthworks, piping, electrical, structural, and road safety. Each of such activity require specialized/skilled resources. As shown in tables below Table 3-4 and

Table 3-5, the number of persons involved from engineers, technicians to workers as well as machinery drivers is variable as per the activity needed on each road. It is assumed that an estimate total number of workers shall range between 150 and 250.In addition, efforts will be made by the contractor to equally hire local (from the same region as the project location) and foreign workers and drivers. It is worth to mention that the workers will sign code of conduct before starting the work and training sessions will be conducted to inform the workers about their responsibility to act ethically.

Table 3-4: Number of Workers for the Different Project Activities

#	ACTIVITIES	Site Engineer	Safety Officer	Foreman	Surveyor	Assistant Surveyor	Skilled Carpenter	Semi-skilled Carpenter	Bar Bender (Steel Fixer)	Skilled Electrician	Skilled Welder	Skilled Laborer	Semi-skilled Laborer	Laborer	Total
1	Pavement Patching	1	1	1	1	1						1	1	4	11
2	Milling & Overlay	1	1	1	1	1						1	1	6	13
3	Pavement Total Reconstruction	1	1	1	1	1						2	2	10	19
4	Concrete Retaining Walls	1	1	1			1	1	1					3	9
5	Concrete Safety Barriers	1	1	1			1	1	1					3	9
6	Electrical Street Lighting Work	1	1							1	1			2	6
7	Culverts & Channels	1	1	1	1	1	1	1				1	1	4	13
8	Traffic Marking	1	1		1	1		1	1		1		1	2	10
9	Guardrails Fixing	1	1	1	1	1								2	7
10	Sidewalk & Tiling	1	1	1	1	1						2		4	9
11	Structural Elements	1	1	1			1	4	2					4	14
12	Earthwork (Excavation & Backfill)	1	1	1	1	1						2	4	10	21
13	Piping or Pipe Repair	1	1	1								1		2	6

Table 3-5: Numbers of the Machinery Drivers

#	ACTIVITIES	MACHINERY DRIVERS															
		Loader	Excavator	Motor Grader	Steel Roller	Milling Machine	Dump Truck	Water Tank Truck	Asphalt emulsion	Asphalt Paver	Pneumatic Asphalt Roller	Mobile Crane	Guardrail Post Driving	Concrete Mixer Truck	Mobile Concrete	Road Marking Machine	Pick-up Truck
1	Pavement Patching	1	1		2		1	1	1	1	1						1
2	Milling & Overlay	1			1	1	3	1	1	1	1						1
3	Pavement Total Reconstruction	1	2	1	2	1	6	1	1	1	1						1
4	Concrete Retaining Walls							1				1		1	1		1
5	Concrete Safety Barriers							1						1	1		1
6	Electrical Street Lighting Work											1					1
7	Culverts & Channels	1						1						1			1
8	Traffic Marking							1				1				1	1
9	Guardrails Fixing						1						1				1
10	Sidewalk & Tiling							1									1
11	Structural Elements							1				1		1	1		1
12	Earthwork (Excavation & Backfill)		2		1		2	1									1
13	Piping or Pipe Repair																1

3.5 Site Facilities

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

During the work implementation, the Contractor will have to rent a flat located in the Project area to serve as a Project Offices. These offices will be used by the Contractor Engineers, technical skilled workers and Supervising Consultants. The flat will be equipped with toilet, kitchen (including drinking water and appliances), lockers and other supplies needed for the daily administrative activities. It might also serve as a meeting point for all Project workers at the start and end of their shifts.

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

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

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

4. BASELINE ENVIRONMENTAL & SOCIAL CONDITIONS

This section presents an overall description of the baseline environmental and social conditions in the study area, which is the Caza of Akkar. It is divided into three sections covering the physical, biological and socioeconomic environment. Additional details on environmental components occurring along each of the roads can be found in Annex 1.

4.1 Physical Environment

4.1.1 Topography

Akkar of the North Governorate, where the proposed roads are located, is about100 km away from the capital cityBeirut. The altitude of roads in Akkar lie within a range of13m (Al Abdeh) to 470 m (Bzal) above sea level. Akkar is divided into three physiographic zones namely the plain called Al Sahel, the mid-elevation plateau, and the mountains called Jurd including the highest peak Qornet Es Sawda (IDAL, 2018).

4.1.2 Geology

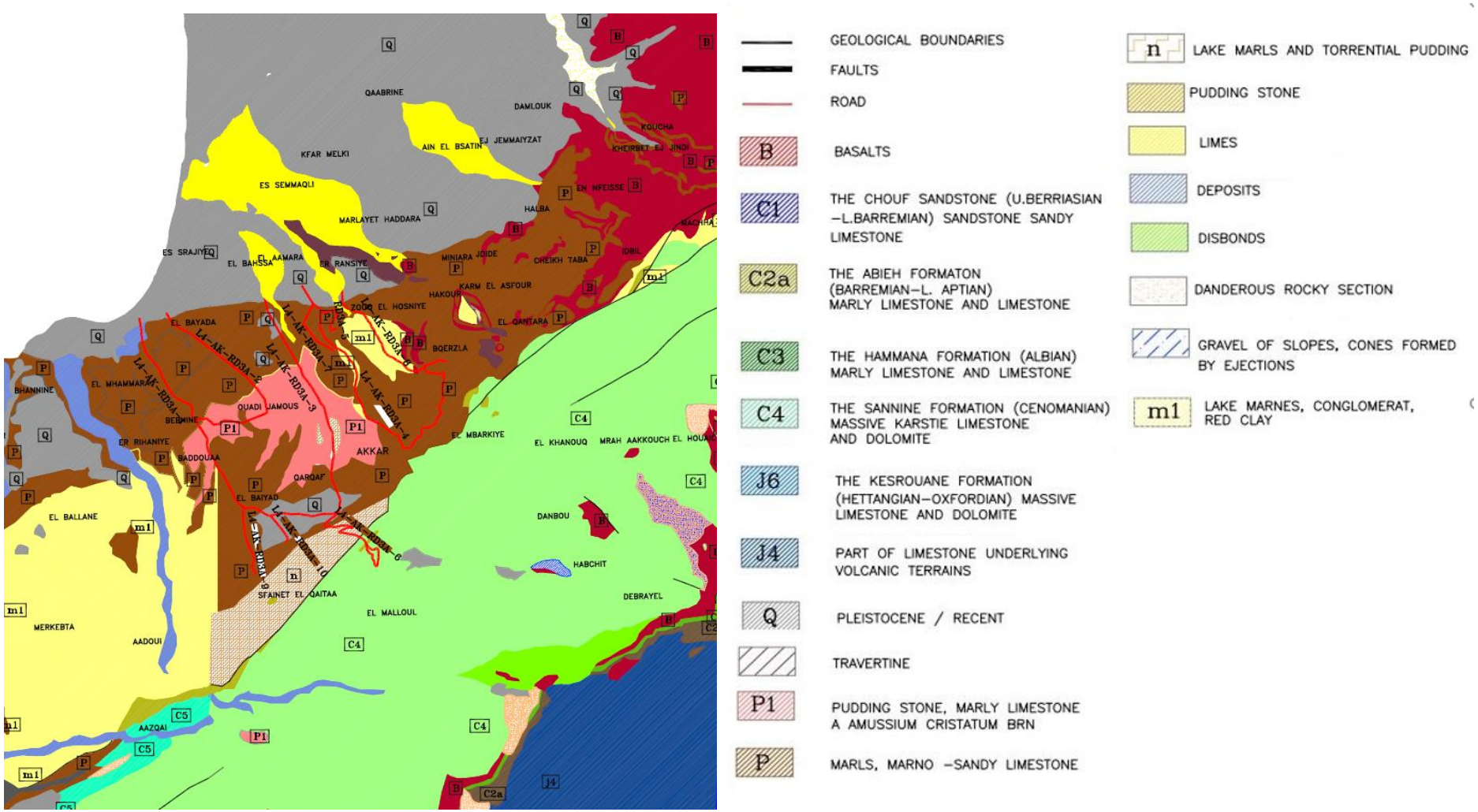
The geological formation of the proposed roads that are located within the Caza of Akkar are presented in (Figure 4-2). Based on the geology map below, the main geological formation within the study belongs to the following:

- Pleistocene (q)
- Pliocene (P): this formation belongs to the tertiary geological unit. It is characterized by its conglomerate, sandstone and sandy marine marl. The color of this formation is bluish and has a thickness ranging between 300 to 400 m
- Upper Albian-Cenomanian to the upper Albian Mid Albian, Sannine and Hammana Formation (C3).
- Sannine Limestone, of Cenomanian age unit (C4); this unit is divided into three subunits namely:
  - Dolomitic Limestone (C4a)
  - Bluish marl and shale (C4b)
  - Limestone and dolomitic limestone (C4c).

4.1.3 Hydrogeology

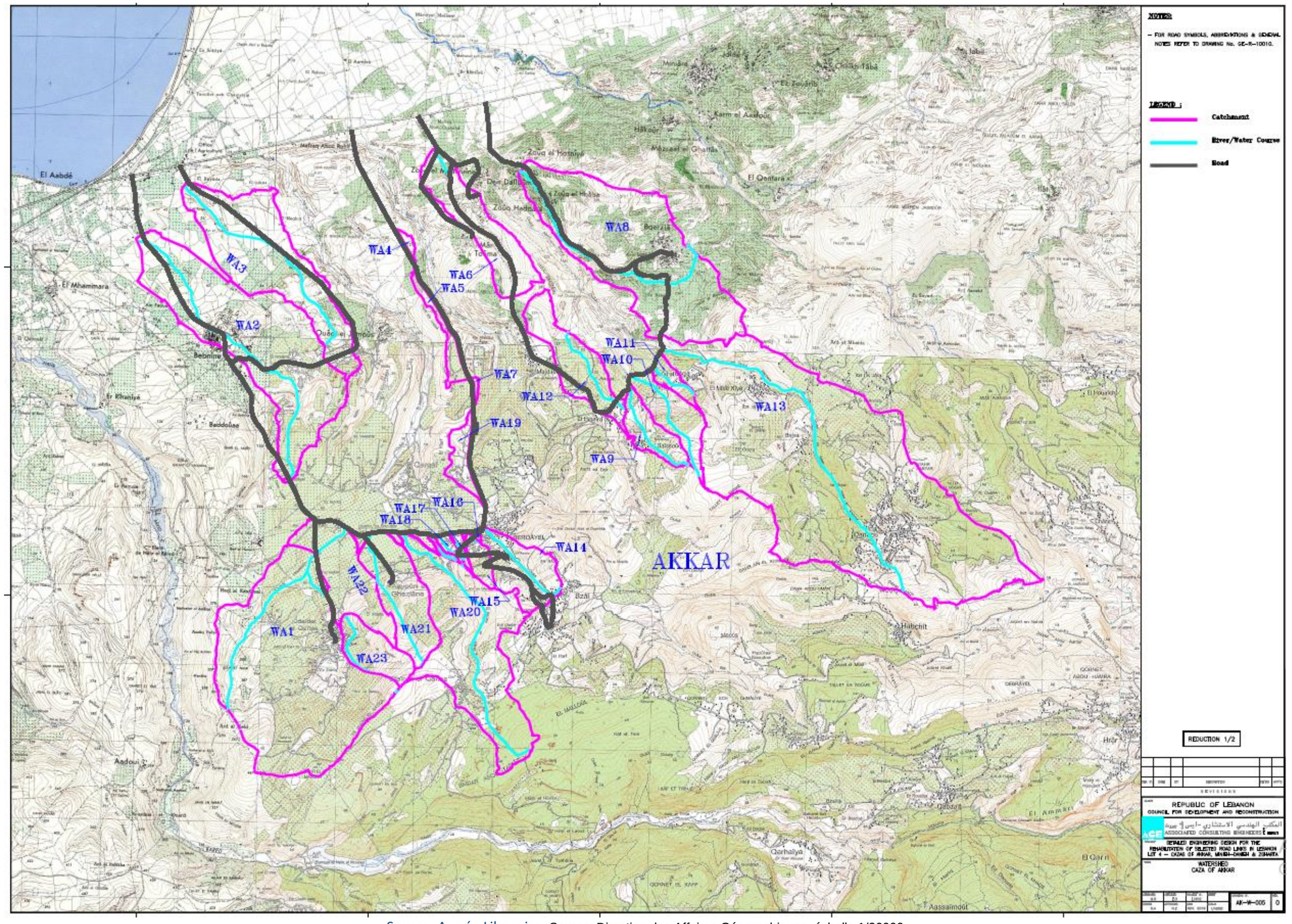
During the site visits, two rivers were identified in the surroundings of the study area and the proposed roads. These rivers are El Bared and Aarqa River. Figure 4-3 below shows the proposed roads of the project with respect to the rivers and their watersheds in the caza of Akkar. In addition, some sections of the project roads are either at proximity or crosses the rivers. These roads are as follows: L4-AK-RD3A-1, L4-AK-RD3A-2, L4-AK-RD3A-4, L4-AK-RD3A-6, L4-AK-RD3A-8, L4-AK-RD3A-9 and L4-AK-RD3A-10. It is worth to mention that there are no springs located within the study area.

Figure 4-1: Geological Map of Study Area



Source: Prepared by E.D. based on the geological map of Dubertret scale 1/50000 (Sir Ed Danié: Feuille NI-37-XIII-1C & Halba: Feuille NI-37-XIII-3a & Hamidieh: Feuille NI-37-XVIII-4b)

Figure 4-3: Major Rivers in Akkar District and Location of Existing Project Roads

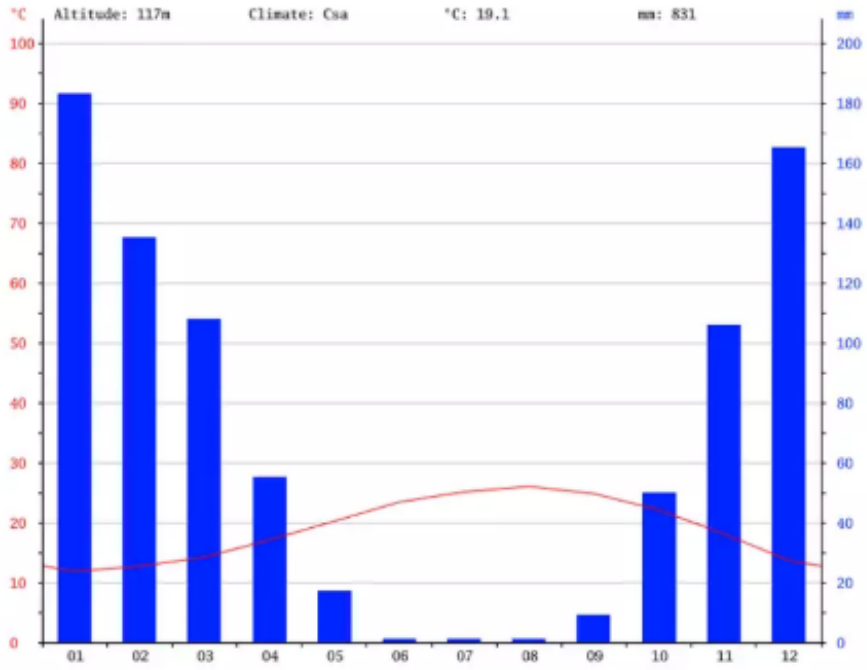


Source: Armée Libanaise, Source: Direction des Affaires Géographiques, échelle 1/20000

4.1.4 Climate and Meteorology

The villages of Bebnine and Bzallocated in the Caza of Akkar are representative of the project area climate as they are located at the altitudes 117 m and 470 m respectively knowing that the villages of this project are located between the altitudes 13 m and 470 m as mentioned before. In Bebnine, the average temperature is 19.1 °C and the average precipitation is 831 mm. The month of June is the driest month with only 1 mm of precipitation. The month of January has the highest amount of precipitation with an average of 183 mm and has the lowest average temperatures of 11.8°C. However, the month of August has an average of 26°C and is the hottest month. Figure 4-4represents the climatic data of the village of Bebnine at altitude117 m (climate-data.org, 2019).

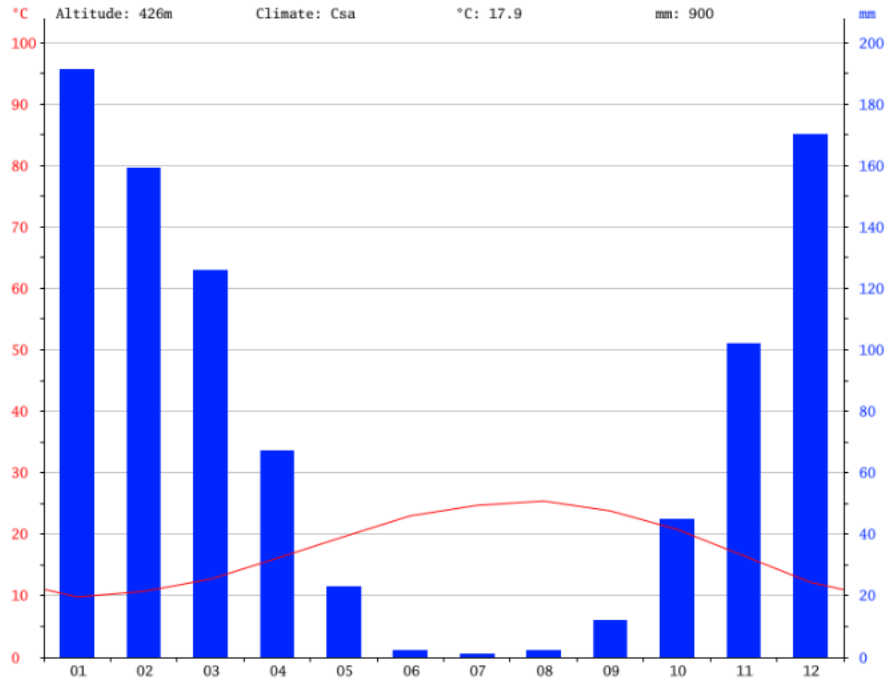
Figure 4-4: Climograph of Bebnine at 117 m (Historical Data between 1982 - 2012)



Source: climate-data.org, 2019

As for Bzal village,the average temperature is 17.9 °C and the average precipitation is 900 mm. The month of July is the driest month with only 1 mm of precipitation. The month of January has the highest amount of precipitation with an average of 191 mm and has the lowest average temperatures of 9.8°C. However, the month of August has an average of 25.4°C and is the hottest month. Figure 4-5 represents the climatic data of the village of Bzal at altitude426 m.

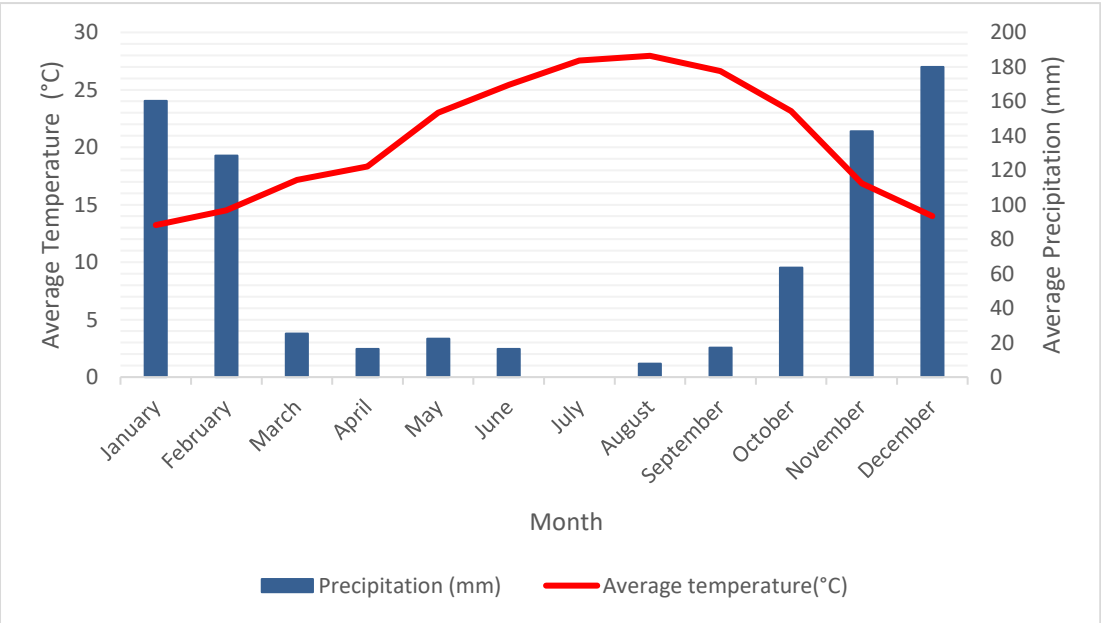
Figure 4-5: Climograph of Bzal at 426 m (Historical Data between 1982 - 2012)



Source: climate-data.org, 2019

Additional data on climate in the area was obtained from the Lebanese Agriculture Research Institute (LARI) from its station in the village of Aabdeh near the project road Al Abdeh - Bebnine - Beit Houch – Berqayel (L4-AK-RD3A-1) . This data represents the average temperatures and average precipitation of the year 2018 ().

Figure 4-6: Climograph of Al Aabdeh of LARI Station for the Year of 2018



Source: LARI, 2018

As for the wind data, wind speed and direction data were also obtained from LARI from its nearest station in Aabdeh village that is part of the project area (L4-AK-RD3A-1) and located at the altitude 100 meters a.sl. Table 4-1 represents the average monthly and annual wind speed and direction for the year of 2018.

Table 4-1: Monthly and Yearly Averages of Wind Speed (m/s) and Direction (degrees) registered by Aabdeh's LARI Station in 2018.

Month	Jan	Feb	Mar	Ap	May	June	July	Aug	Sep	Oct	Nov	Dec	Average per year 2018
Monthly Average Wind Speed (m/s)	0.7	0.44	0.72	0.45	0.48	0.77	0.86	0.74	0.46	0.31	0.388	0.54	0.57
Monthly Average Wind Direction (Degrees)	224.8	218.39	240.48	208.1	211.48	225.6	235.77	207.45	219.83	218.58	208.76	216	219.6

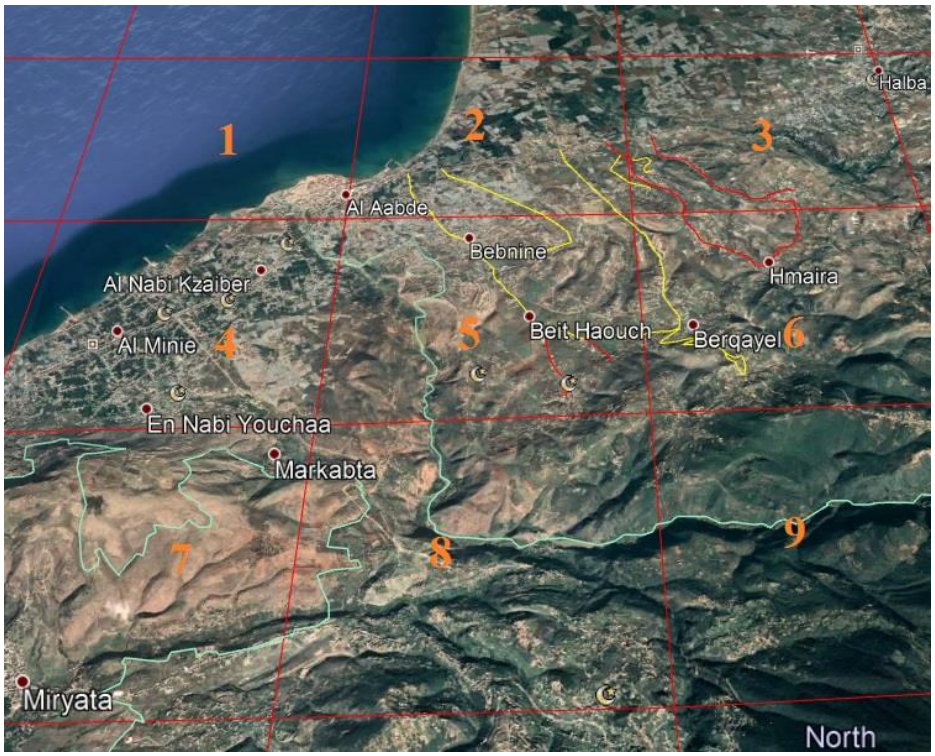
Source: Data provided by LARI on January 2, 2020

4.1.5 Air Quality and Noise

Like many other regions, Akkar is experiencing various environmental problems. Significant air pollution has been witnessed in urbanized areas, as burning of domestic and agriculture waste have been regularly practiced and the majority of residents use diesel for heating in winter season (Mada Association, 2008).

Ambient air quality of the project area was requested from MOE. Data was available from the UNDP project "Air quality assessment in an East Mediterranean country: the case of Lebanon" which is based at the Ministry of Environment for the year 2010. The available data is for criteria pollutants: Particulate Matter (PM), Ozone (O_3), Carbon monoxide (CO), Nitrogen dioxide (NO_2), Sulfur dioxide (SO_2). The project area was divided into different cells (Figure 4-7) and the data of the annual background average concentrations in $\mu g/m^3$ was obtained. Table 4-2 shows the detected annual concentrations, the national limit values dictated in Decision 52/1 dated 1996 and WHO Guidelines. For some parameters, the obtained data on air quality is the annual concentrations while some of the standards are available only for intervals of 8 hours or 24 hours.

Figure 4-7: The Project Area Divided into Different Cells



Source: Data Provided by the Ministry of Environment on January 3, 2020

Table 4-2: Annual Ambient Air Quality at the Project Site (The Roads are Located on Cells 1,2, and 5 to 8) for the Year of 2010

Pollutant ($\mu g.m^{-3}$)	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2	CO
Concentration in Cell 2	32.978	69.246	23.345	19.938	23.489	382.567
Concentration in Cell 3	26.129	73.319	21.201	18.347	19.147	295.002
Concentration in Cell 5	34.407	67.481	22.981	19.942	24.420	378.590
Concentration in Cell 6	21.195	77.187	19.364	16.789	16.043	282.810
Lebanese Standards	100 (Annual)	100 (8 hrs)	80 (24 hrs)	-	-	10,000 (8 hrs)
WHO Guidelines	40 (Annual)	100 (8 hrs)	20 (Annual)	10 (Annual)	20 (24 hrs)	10,000 (8 hrs)

Source: Data provided by the Ministry of Environment on January 3, 2020

The results have shown that the concentrations of NO_2 in all the cells comply with the national standards. As for the concentrations of $PM_{2.5}$ and PM_{10}, the obtained values were not in compliance with the WHO standards for air quality except the obtained concentrations in cells 6 that was slightly below the standard for PM_{10}.

As for the level of noise in the region, as no data was available on the project location, observations during site visits showed that noise does not seem to be significant along most of the roads with no sources of noise pollution observed. However, the noise level was observed to be slightly higher around other populated areas where transportation is affected by the bad conditions of the narrow roads which increase traffic congestions and makes it difficult to the visitors to reach their destination.

4.1.6 Land Use/Land Cover

Akkar is the second largest agriculture area in Lebanon after the Bekaa region due to its water resources and fertile soil. Most of the agricultural lands are planted with olive trees or several annual crops (IDAL, 2018).
During the site visits, the major observed areas along the project roads were highly dominated by olives agriculture lands. In addition, another kind of trees and areas were observed. These are as follows:

- Some wild pine trees along the road L4-AK-RD3A-1 were present
- Greenhouses, trees planted near residential buildings were observed along road L4-AK-RD3A-2.
- Along road L4-AK-RD3A-3, palm and salix trees were observed
- Along L4-AK-RD3A-4 different fruit trees such as orange trees and almond trees, cypress, pine and oak trees were also identified. Moreover, a river passes near this road.
- Road L4-AK-RD3A-6 includes a palm tree, nut tree and a fig tree. From this road a sharp curve is overlooking a valley.
- Along road L4-AK-RD3A-7 cypress and some pine trees were observed.
- Along road L4-AK-RD3A-8 an agriculture area was observed. In addition, some small pine trees were newly planted and a river was noticed.

Table 4-3: Visual Classification of Land Use based on Google Maps

Municipality	Land Use
Bebnine	Densely Populated
El Karkaf	Sparsely populated with agricultural areas
Beit El Haouche	Agricultural areas
Berkayel	Densely populated with agriculture areas
Bzal	Moderately populated
Wadi El Jamous	Sparsely populated with dense agriculture areas
Majdala	Densely populated with agriculture areas
Mar Touma	Agriculture areas
DeirDaloum	Sparsely populated with agriculture areas
Zouq el Moukacherine	Moderately populated with agriculture areas
DahrHaddara	Agriculture areas
Homeira	Sparsely populated with agriculture areas
Kloud el barkia	Agriculture areas
Bkerzala	Densely populated
Zouk el Habasia	Moderately populated
Zouk El Hosnieh et DahrAyasse	Agriculture areas
Arka	Sparsely populated with agriculture areas
Eyoune El Ghouzlane	Sparsely populated with agriculture areas
Jedeidet El Kayteh	Densely populated with agriculture areas

Source: Google Maps, 2019

A detailed list of the existing areas along the roads is presented in Annex 1.

4.2 Biological Environment

4.2.1 Flora

The vegetative cover in Akkar Caza encompasses different forests of diverse species such as Cedar forests (*Cedrus libani*), fir forests (*Abies Cilicica*), Juniper (*Juniperus sp.*), oaks (*Quercus calliprinos* and *Quercus infectoria*, *Quercus ithaburensis*) distributed in Karm Chbat, Bezbina, Sfineh, Marbine - Jhanam Valley and Qammouaa (MOE, 2006). During the site visits, there was no important floral and tree species along the roads of the project area, however, many planted trees were identified such as the Cypress trees that are mainly planted as a fence for private lands, houses and some olive orchards along various sections of roads L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7. In addition, pine trees were scattered along the roadsides of L4-AK-RD3A-1, L4-AK-RD3A-4 L4-AK-RD3A-7 and L4-AK-RD3A-8. The species include wild pine trees known as the *Pinus brutia* and the stone pine trees (*Pinus pinea*) that some of them were newly planted on some of the road sides. Moreover, some Orange, Palm, Salix, Oak and almond trees were rarely identified. In addition, groves of kaki were identified and olive groves dominate an important part of the project area.

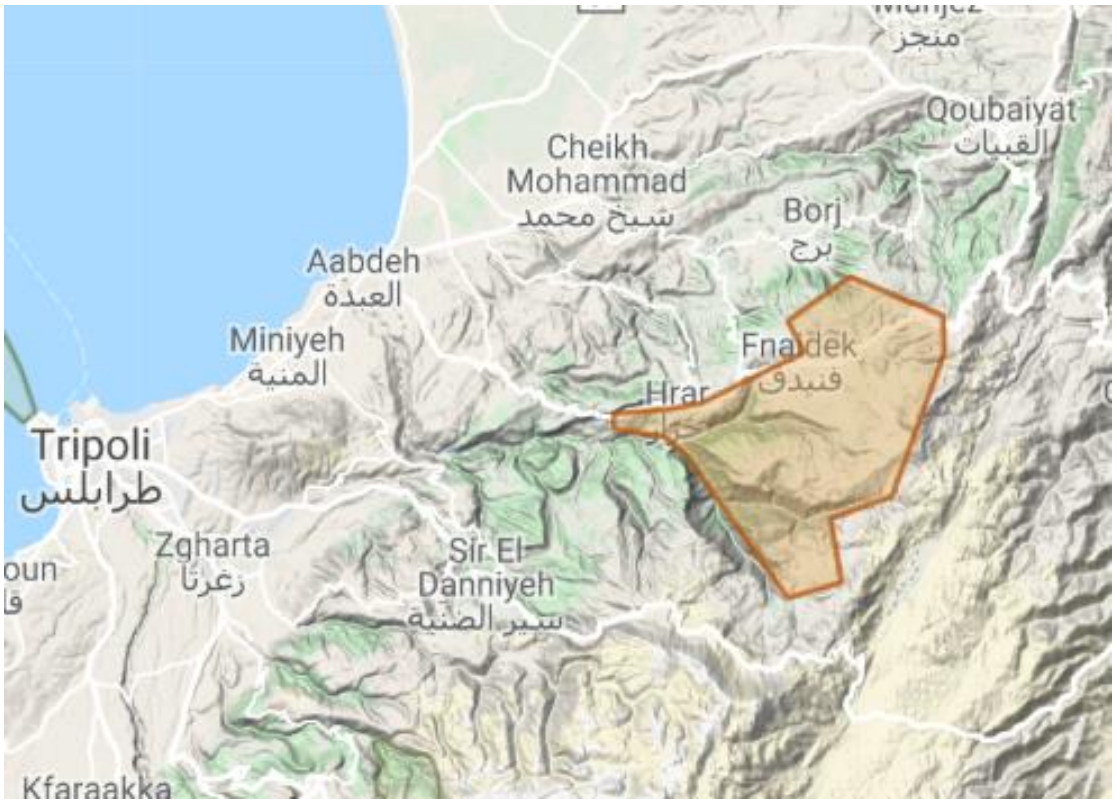
4.2.2 Fauna

The fauna in the Akkar Caza include mainly animals that are raised for livestock production such as goats, sheep, bees and poultry. However, wild animals are also present and are identified in the nature reserves surroundings and other natural areas and forests such as wolves (*Canis lupus*), striped hyenas (*Hyaena hyaena syriaca*), foxes (*Vulpes vulpes*) and Jackals (*Canis aureus*). However, none of these species are endangered except the hyena that is classified as a vulnerable specie according to the IUCN Red list of Threatened species. As for the site visit, the wild animals including mammals and birds were not identified during the site visits as the probability of animals crossing the roads is higher at night. Moreover, livestock were noticed in some farms along some of the roads such as cow farms and chicken farms observed on roads L4-AK-RD-3A-4 (Zouq El Hosniyyeh) and L4-AK-RD-3A-7 (Mar Touma).

4.2.3 Ecologically Sensitive Areas

The District of Akkar comprises the Upper Mountains of Akkar-Donnieh that were declared by BirdLife International as an Important Bird Area (IBA) where 134 bird species are observed such as the regional endemic Syrian Serin that is only found in the Middle East. Figure 4-8 shows the location of the Upper Mountains of Akkar-Donnieh IBA. However, none of the studied roads in this project are located near or in this IBA. The nearest road (L4-AK-RD3A-6) is about 6 km away from the IBA (Figure 4-9).

Figure 4-8: Location of the Upper Mountains of Akkar-Donnieh IBA



Source: Birdlife International, 2019

As for the protected areas, the District of Akkar comprises the Karm Chbat Nature Reserve declared by MOE Decision 14 in 1995 as a nature reserve. However, this nature reserve is located at the upper mountain area of Kobbayet village and is around 24 km away from project area (Figure 4-10).

Figure 4-9: Nearest Road Location to the IBA

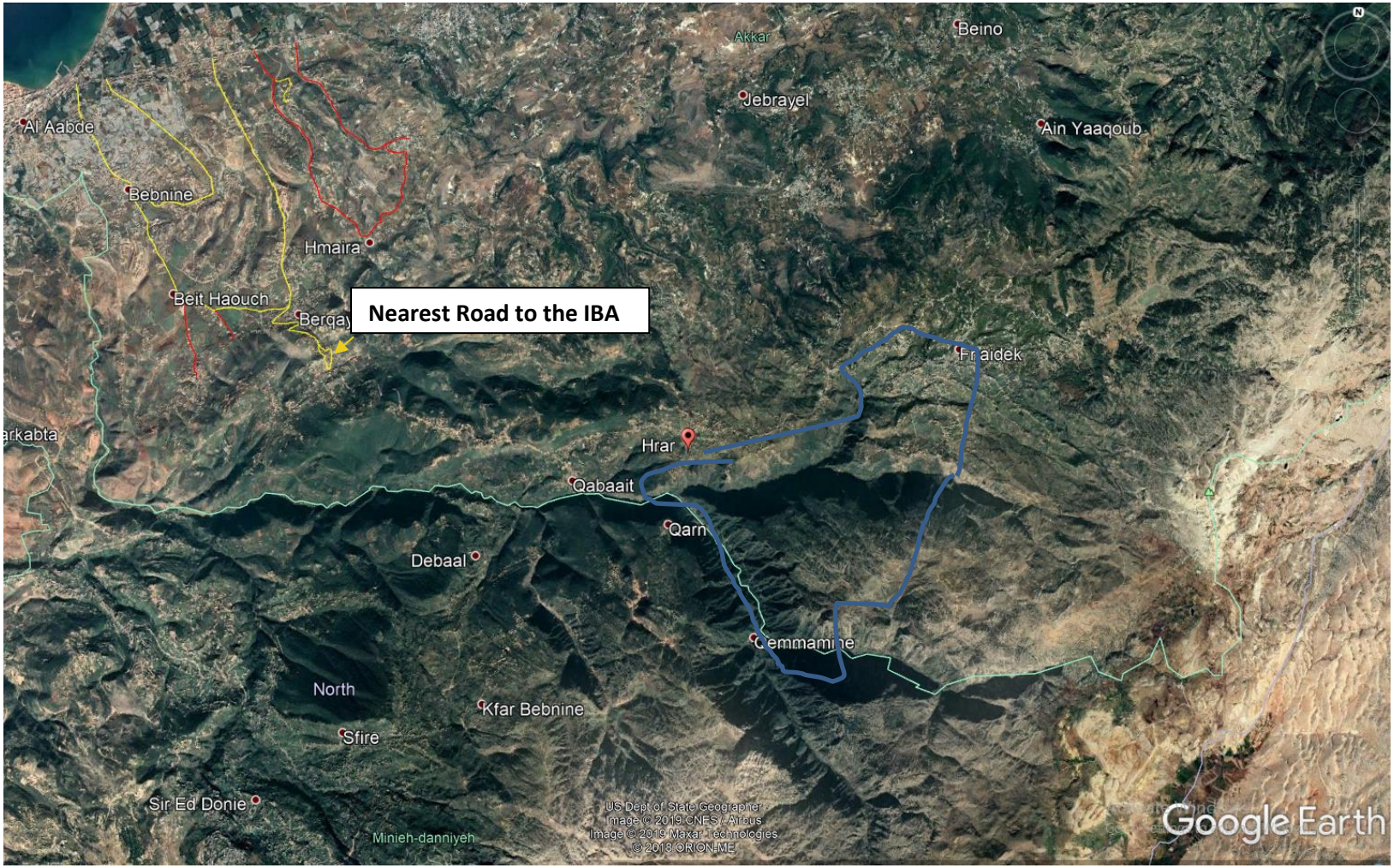
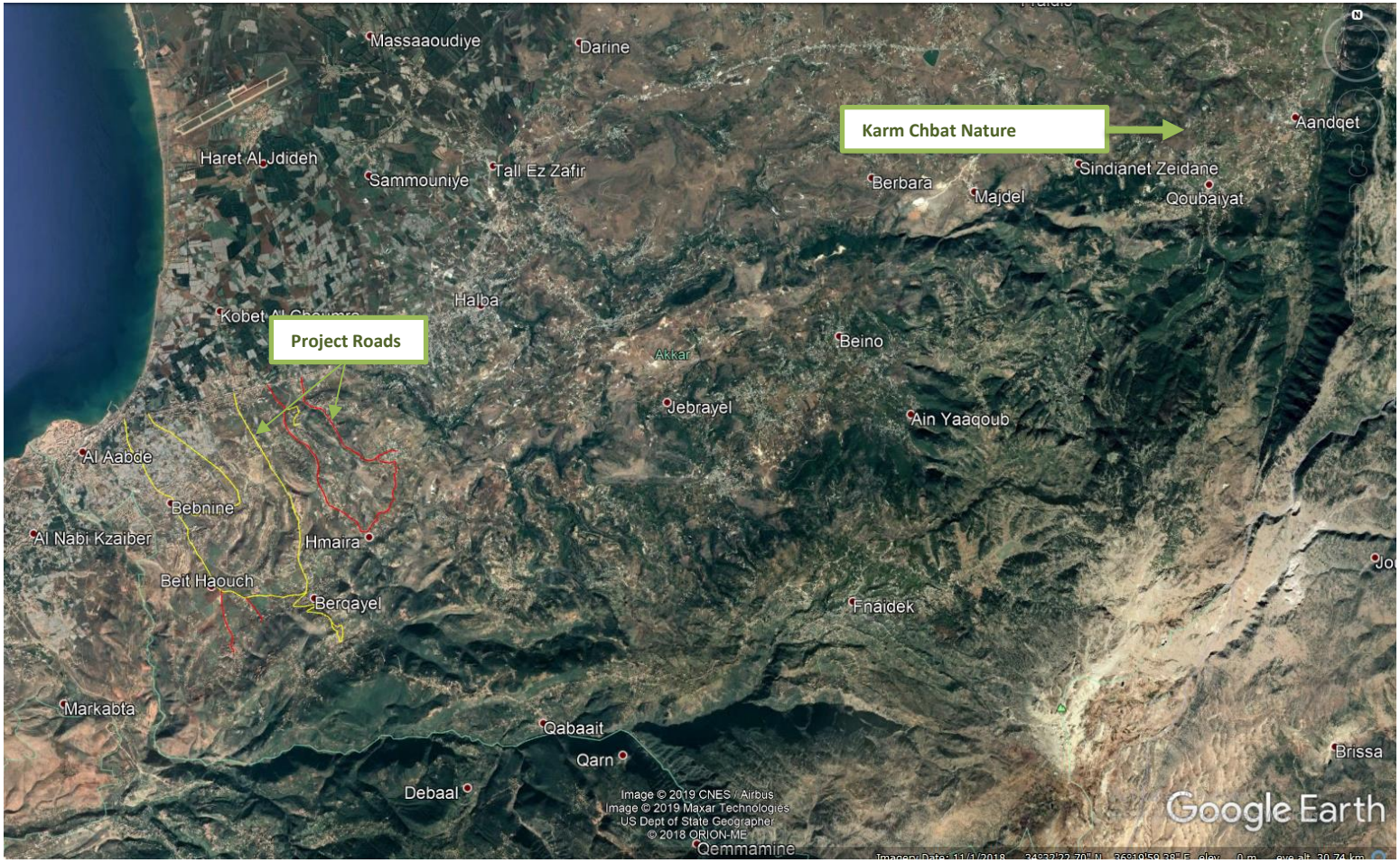


Figure 4-10: Project Roads in Reference to Karm Chbat Nature Reserve



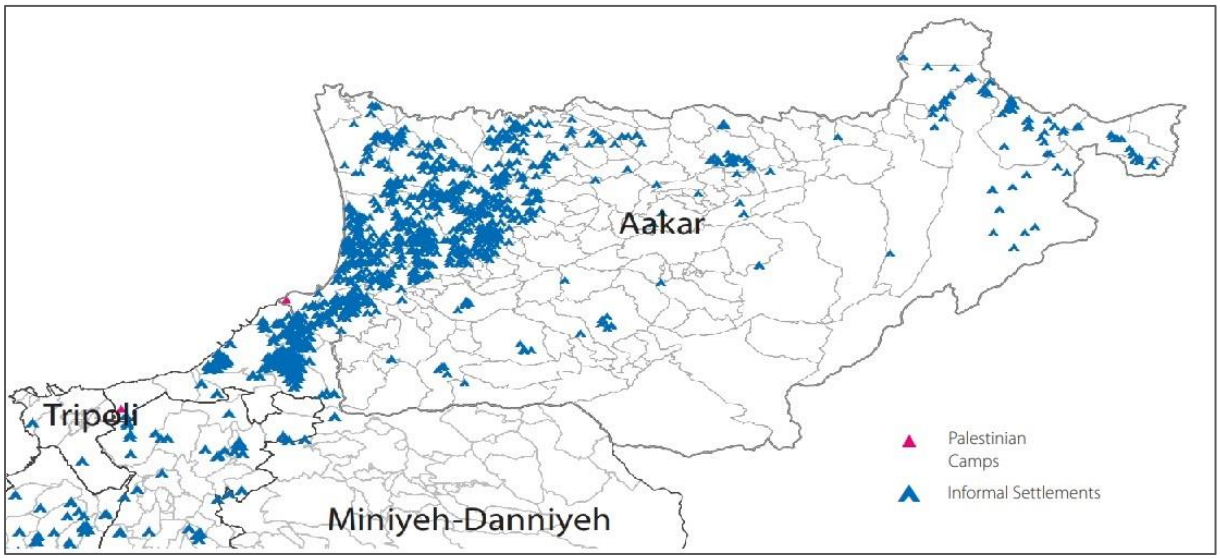
The trees that were observed in the project area are mainly planted trees that are either for road separations such as the palm, salix and cypress or ornamental trees such as the pine trees that are planted near residencies. Moreover, the main agriculture areas were olive groves that were observed outside the project road delimitations. The project area does not have an important ecosystem that includes sensitive habitats of animal and plant biodiversity. The region is inhabited and anthropogenic activities are frequent such as agriculture, economic activities and the presence of residential areas.

4.3 Socio Economic Environment

4.3.1 Demographic Profile

The total population registered in the Akkar District including refugees is 389,899 inhabitants with a population density of 494 people per square kilometer considered the lowest among all the Governorates in Lebanon (IDAL, 2018). The district is considered the most rural district of Lebanon, with a rural population of 80 percent (Mada Association, 2008). The largest average household size resides in the Caza of Akkar and has reached 4.8 individuals. However, the overall average household size in Lebanon is 3.8 (CAS, 2019). According to the Syria Refugee response in the Akkar Governorate, the total number of registered Syrian refugees is 106,333 individuals (UNHCR, 2019). Moreover, there are 188 Palestinian Refugees in Akkar (OCHA, 2016). Figure 4-11 shows the distribution of the informal settlements of Syrian refugees as well as the Palestinian camps. However, during site visits none of these settlements were observed near project roads.

Figure 4-11: Informal Settlements of Syrian Refugees and Palestinian Camps in Akkar



Source: OCHA, 2016

The number of the Syrian refugees in each village is presented in Table 4-4, showing that as of end of 2019, the total number of registered refugees in the project area was 17,686.

Table 4-4: Registered Refugees in Each Municipality along the Proposed Roads

Municipality	Number of Syrian Refugees
Bebnine	6,405
El Karkaf	349

Municipality	Number of Syrian Refugees
Beit El Haouche	13
Berkayel	3,631
Bzal	62
Wadi El Jamous	1,965
Majdala	200
Mar Touma	66
DeirDaloum	2,825
Zouq el Moukacherine	2
Dahr Haddara	59
Homeira	10
Kloud el barkia	0
Bkerzala	387
Zouk el Habasia	5
Zouk El Hosnieh et Dahr Ayasse	121
Arka	1,355
Eyoune El Ghouzlane	30
Jedeidet El Kayteh	201
Total	17,686

Source: UNCHR, 2019

The unemployment rate in Akkar is estimated at 9.3% compared to the national average of 11.4 % (CAS, 2019) and Akkar is considered the poorest of all Lebanon's governorates (OCHA, 2018).

4.3.2 Economic Activities

The economy of Akkar relies on agriculture and services sector. The local residents represent around 30% of the labor force working in agriculture and fishing sector. Akkar is considered the 2nd largest agriculture area after the Bekaa and agriculture is its main economic activity. Half of the agriculture lands are planted of olives and vegetables while other kinds are fruit trees, citruses and vines. However, Akkar contributes to 14% of the total agriculture production in the country (IDAL, 2018). The fishing sector is an important source of income for a considerable number of families living along the coast in Akkar (GFA Consulting Group, 2014). As for livestock production, cattle raising is a rich and a key sector where 17% of total cattle heads in the country are present in Akkar. The district also encompasses industrial companies (35%) operating in the Agro-Food sector and other companies (30%) in the non-mineral mining products. Moreover, cultural and eco-tourism activities are increasing in Akkar (IDAL, 2018).

During the site visits, many shops, markets, snacks, and car repairing were identified along the way and are in close proximity to some road stations especially in the residential areas. For example, along road L4-AK-RD3A-1 there is small vegetable shops, minimarkets, cell phone shops and small restaurants. As for L4-AK-RD3A-2 there are 1$ dollar shops, minimarkets and car maintenance shops. L4-AK-RD3A-3 also has clothes and cell phone shops. Along L4-AK-RD3A-6 there are pharmacies, local vegetable and fruit market and some car maintenance shops. L4-AK-RD3A-8 also has pharmacies, minimarkets and one dollar shops. The location of these shops were determined at a station level during the site visits. This can be found in Annex 1. A description of how these shops and sources of livelihoods will be affected are included in section 5.3.13. Proposed mitigation

measures such as access to these shops and sources of livelihood during construction are included in section 6.3.1.1

4.3.3 Education Services

The Governorate of Akkar is characterized by lower educational achievement as compared to national averages (Mada Association, 2008). However, the region has access to the educational establishments distributed in the North of the country where the highest number of vocational and technical schools is present with 32% share of such schools offering vocational courses and 18 universities of business, law and engineering (IDAL, 2018). However, Akkar experiences the highest rate of schooling delay. In addition, some parents with low income and a high average number of children per household, could not even afford the educational costs of the public schools and the transportation costs as well (Mada Association, 2008). During the site visits, Bebnine Public School for girls and Al Jawhara school were observed along the road L4-AK-RD3A-1, Deir Dalloum School was observed on road L4-AK-RD3A-5 and a third school on road L4-AK-RD3A-6. The exact location of these schools is mentioned in Annex 1.

4.3.4 Health Services

The healthcare sector in Akkar is of low quality and suffers from shortage of adequate equipment, specialized physicians, medical laboratories, ambulances, first aid knowledge and awareness. In addition, it is insufficient to serve the local population's demand for healthcare. There are four operational hospitals in Akkar, three of them are private and only one is governmental. There are 10 licensed medical laboratories and 87 pharmacies. In addition, two Red Cross Emergency Medical Service centers are located in Akkar one of which is in Halba. Due to lack of medical specialists, the residents of Akkar are forced to find better hospitals outside the region, such as in Tripoli or Beirut for specialized treatment and health care (GFA Consulting Group, 2014).

Moreover, women experience different challenges in Akkar as gynaecological services are offered by only one hospital that is far from many villages. Women therefore endure long waiting time for appointments. In addition, the bad condition of the roads and the long distances needed to reach the hospital are also another challenge such that it is common for women to give birth en route to the hospital. There is a need for an adequately equipped maternity centre in the District. The basic forms of health services, such as pharmacies or ambulances are also lacking in Akkar (MADA, 2008). During the site visits, the team haven't observed any hospital along the project roads. However, two health care centers were observed on road L4-AK-RD3A-1 (Akkar Medical Center) and on road L4-AK-RD3A-4 in Majdala village. Pharmacy Hiba was observed on road L4-AK-RD3A-6 and two other pharmacies were observed along L4-AK-RD3A-8.

4.3.5 Cultural Heritage

Akkar offers opportunities in cultural and ecotourism due to the presence of many archeological, cultural and religious sites. Some of the religious sites are the Old Mamluk Mosque, Ghezarat Church, Saydet al Qalaat Church, and DeirDalloum. As for the archeological and cultural sites these include the Roman Temples in Akroum, the Citadel of Hosn in Akkar and Al Brieh Heritage Citadel. In addition, old bridges and mills are observed in Aarqa, an old souk, a citadel, a Khan and a heritage house are present in Halba, and the old mosque, serails and old tombs in Berqayel (MOT, 2011). During the site visits, the team did not detect any site of archeological or cultural importance along the project roads.

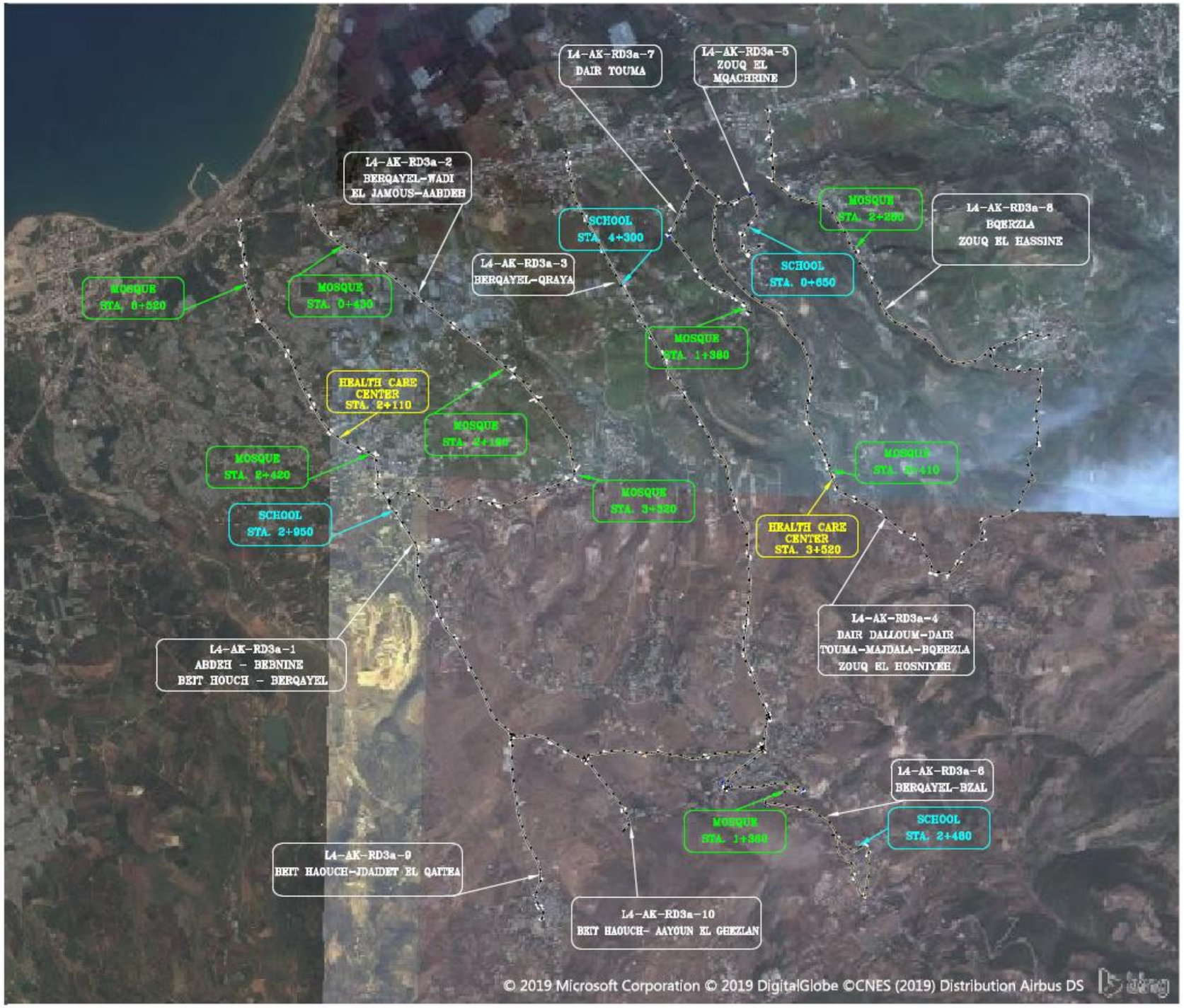
4.4 Summary of Baseline

During the site visit, sensitive area that might be affected as a result of the proposed project are mainly health care centers, educational centers, religious and the presence of water resources near the project area. Schools were identified along each of the proposed roads where by two schools were observed along L4-AK-RD3A-1 (Station 1+300: Al Jawhara School, Station 2+750: Bebnine Public School for girls) and one school along L4-AK-RD3A-5 (Station 0+560: Dair Dalloum School). Also one school was identified along L4-AK-RD3A-6 on Station 2+480. The exact location of these schools is mentioned in Annex 1.
The health care centers that were observed during the sites are a health care center (Akkar Medical Center) on road L4-AK-RD3A-1 at Station 2+110, another one in Majdala village on road L4-AK-RD3A-4. Moreover, Pharmacy Hiba was observed along road L4-AK-RD3A-6 at Station 0+750 and two others were observed along road L4-AK-RD3A-8

Figure 4-12 below and Annex 1 have the exact location of these health centers, schools and Mosques that are located within the area of the proposed roads.

Moreover, the trees that were observed in the project area are mainly planted trees such as the Cypress trees that are mainly planted as a fence for private lands and households. Pine trees were scattered along the roadsides. The species include wild pine trees known as the *Pinus brutia* and the stone pine trees (*Pinus pinea*) that some of them were newly planted on some of the road sides. Moreover, some Orange, Palm, Salix, Oak and almond trees were rarely identified. In addition, groves of kaki were identified and olive groves dominate an important part of the project area. The planted groves were observed outside the project road delimitations. All the mentioned species above do not include any endangered or endemic species. The project area does not have an important ecosystem that includes sensitive habitats of animal and plant biodiversity. The region is inhabited and anthropogenic activities are frequent such as agriculture, economic activities and the presence of residential areas.

Figure 4-12: Schools, Mosques and Health Care Centers Within Project Area



5. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

This section describes the potential anticipated positive and negative environmental and social impacts associated with the rehabilitation of the selected roads and the required networks in Akkar Caza.

5.1 Assessment Methodology

The evaluation of potential environmental impacts was based on scientific evidence, literature review and the professional judgment of the Consultant. The impact classification and ranking approach that was applied is as follows:

- Identification of project-related activities (during both rehabilitation/reconstruction and operation phases) and environmental aspects;
- Determination of potential impacts on the natural and man-made environment that might arise from these activities;
- Assessment and evaluation of potential impacts based on the criteria set out in the Environmental and Social Management Framework of the project.

As such, impacts were weighted on the scale of P, 2P, O, N, 2N to signify Positive, strongly Positive, Neutral, Negative, and Strongly Negative impacts respectively.

5.2 Potential Positive Impacts during Rehabilitation

The rehabilitation of the proposed roads in Akkar caza is considered as an economic opportunity for the selected contractor and their subcontractors. Local businesses may benefit from rehabilitation activities through selling raw materials, equipment, machinery and goods and the project will create jobs and could hire labors from the local population. In addition, local garages will benefit from increased business in vehicle and equipment maintenance and residents will benefit from the rent fees of the offices and residences as well as vehicle and equipment parking area. In addition, foreign workers living in the project area will benefit from the job opportunities. The influx of workers will also increase the economic activity in the area as they will likely purchase their daily requirements from the surrounding shops. This will have a ripple effect within the communities where the roads will be rehabilitated. This impact is, however, temporary and jobs will be discontinued as soon as construction works are complete.

As such this impact on socio-economic activity in the region is considered as a positive impact (P).

5.3 Potential Environmental Negative Impacts during Rehabilitation

The majority of impacts resulting from the project will occur during the road rehabilitation phase. However, most of these impacts are temporary for the duration of the works.

5.3.1 Water and Soil Quality

Contamination of soil, underground and surface water from the rehabilitation of the proposed project might occur as a result of several activities. These include the improper disposal of solid waste and excavated material, inappropriate discharge of liquid waste, domestic waste, accidental oil and chemical spillages, and diversion of contaminated rainwater runoff from the project site. Two

rivers pass through the area of the proposed roads. These rivers are Aarqa and El Bared River. Some sections of the project roads are either at proximity or crosses the rivers. These roads are as follows: L4-AK-RD3A-1 at Berqayel village, L4-AK-RD3A-2 at Wadi Al Jamous village, L4-AK-RD3A-4 at Majdala and Deir Touma, L4-AK-RD3A-6 at Berqayel, L4-AK-RD3A-8 at Deir Dalloum and Deir Haddara, L4-AK-RD3A-9 at Jdeidit El Qaitaa and L4-AK-RD3A-10 at Aayoun Al Ghezlan. As such, if the generated solid waste, liquid waste and domestic waste were not contained properly surface water pollution might occur through the transport of pollutants such as debris and suspended solids into the rivers through runoff.

A detailed description of the sources of pollution along with the associated activities is listed below:

Liquid waste from rehabilitation

Major rehabilitation activities that lead to the generation of liquid waste include:

- Concrete mixing for the retaining walls and sidewalks;
- Excavation road sections that are in sever conditions generating runoffs contaminated with suspended solids, especially during rainy days if the rehabilitation work will start in the fall season;
- Storm water runoff that contains high amounts of suspended solids

This liquid waste might pollute nearby rivers, streams and soils if not discharged and managed properly.

Wastewater

Workers will be needed during the rehabilitation of the proposed roads and its associated works. As such workers will generate wastewater during the entire rehabilitation phase from the use of the portable cabin toilet. If the generated wastewater was not managed to be discharged in storage tanks or connected to existing sewage network, nearby surface water bodies might be polluted with high organic loads especially Aarqa and El Bared River that were identified near roads L4-AK-RD3A-1, L4-AK-RD3A-2, L4-AK-RD3A-4, L4-AK-RD3A-6, L4-AK-RD3A-8, L4-AK-RD3A-9 and L4-AK-RD3A-10.

Accidental Spillage

Water and soil can be polluted as a result of accidental oil spills from the equipment used for rehabilitation of the roads. The spills may occur during re-fueling of oil supplies for machinery generation, as well as using oils and lubricants during operation. Accidental spill of oils may occur and contaminate the underground water resources especially in the case where soil layers are permeable to these materials that could be easily infiltrated. The spills may also affect water quality of El Bared and Arqa Rivers during the rehabilitation of the proposed roads (L4-AK-RD3A-1, L4-AK-RD3A-2, L4-AK-RD3A-4, L4-AK-RD3A-6, L4-AK-RD3A-8, L4-AK-RD3A-9 and L4-AK-RD3A-10).

Solid Waste Generation

The rehabilitation activities of the roads may generate solid waste from construction materials such cement and their resulting empty bags, electrical wiring, rebar, wood and piles of sand, ruined asphalt and dirt due to excavation. Inappropriate waste handling and improper disposal practices of this type of waste may result in ground and surface water contamination due to leaching and runoffs, hence, reduction in overall water quality. In addition, these materials could be directly discharged into El Bared and Arqa Rivers as these two rivers passes through the project area L4-AK-

RD3A-1, L4-AK-RD3A-2, L4-AK-RD3A-4, L4-AK-RD3A-6, L4-AK-RD3A-8, L4-AK-RD3A-9 and L4-AK-RD3A-10. Furthermore, improper disposal of solid waste, inappropriate discharge of wastewater and accidental spills (fuel, oil, chemicals) can have a negative impact on the soil quality.

As such, the impact on the water and soil quality in the area of the proposed project during construction is evaluated as negative (N).

5.3.2 Air Quality

The machinery and vehicles used during the rehabilitation phase produce air emissions and gases that can temporarily affect local air quality. In general, air emissions generated from the combustion of diesel used by machinery and vehicles contain particulate matter, Benzene, Toluene, Xylenes, Ozone, Nitrogen Oxides, and Sulfur Oxides, Carbon Dioxide and Carbon Monoxide.

Rehabilitation activities, movement and transportations practiced by heavy machinery unpaved surfaces generate particulate emissions such as dust that can affect the local air quality. Fugitive dust emissions could disturb many receptors including workers and the residents of Akkar especially were the proposed roads passes through residential areas (Bebnine, Berqayel, Bqerzala and Jdaidet El Qaitea). Also some of the proposed roads are located near pine andoak trees (L4-AK-RD3A-1, L4-AK-RD3A-4 L4-AK-RD3A-7 and L4-AK-RD3A-8), Cyprss trees planted as a fence for private lands and agriculture lands (L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7) and olive and orange groves that have dominated the project area. As such, this type of vegetation will be disturbed by the different construction and rehabilitation activities and all the resulting emissions. The generated emissions include dust and particulate matter that accumulate at the surface of the leaves thus affecting the photosynthesis process. The significance of dust emissions is highly dependent on the wind conditions during the construction phase. Open burning of solid waste or other material on site could release emissions accompanied by toxins. It is worth to mention that some of the road sections in Akkar caza require new pavement. At these stations (listed below), the impact on the air quality will be higher than at sections where only patching and overlay is required.

The road sections in Akkar caza that require new pavement are as follows:

- Station 800m - 2Km 300m (El Chtaha) and 5km 900m – 7km 400m (Berqayel) of RD 3A-1,
- Station 0m –1km 900 (El Baiyada), 3km 020m – 3km 392 m (Wadi El Jamous) and 3km 600m – 5km 100m (Bebnine) of RD 3A-2,
- Station 700m – 1km 300m (Berqayel) of RD 3A-3,
- Station 5km-Station 7km of RD 3A-4,
- Station 100m – 996m (Zouq El Mqachrine) of RD 3A-5,
- Station 2km 270m – 3km (Bzal) of RD 3A-6

As such, during rehabilitation, the impact on the air quality in the area of the proposed project is evaluated as negative (N).

As for odor emissions during the construction phase, the improper storage and disposal of solid wastes and the accidental liquid waste leakages will lead to odor emissions.

Thus the generation of odor emissions during rehabilitation is considered a neutral impact (O).

5.3.3 Noise and Light

Noise will be generated during the rehabilitation of the proposed roads and its associated works. These activities include transportation or delivery of raw materials, trucks movement, concrete mixing, excavation, and operation of heavy vehicle movement such as excavators, stabilizers, pneumatic drills and stone crushers. All these activities require heavy construction machineries and onsite equipment. A list of major machineries and equipment along with their noise levels decibels (dB) is shown in Table 5-1.

Table 5-1: Noise levels emitted from Construction Machinery and Equipment

Machinery/Equipment	Noise Level at 16 m (50 ft) from source in dB (A)
Loader	80
Concrete Mixer Truck	85
Dump Truck	84
Pile Driver	95
Excavator	80
Pneumatic tyred roller	85

Source: Knauer et al., 2006

Therefore, noise from rehabilitation will likely temporarily disturb the workers and town residents (Bebnine, Berqayel, Bqerzala and Jdaidet El Qaitea). Noise from rehabilitation will also affect the animals and birds that use the area for foraging and breeding. However, noise levels are highly dependent on the extent and duration of the rehabilitation activities and are temporary and specific to the construction phase.

During the rehabilitation phase of the project roads, the machinery lights and artificial lights might be used in the periods of insufficient natural lights. This might disturb the passers-by, people living in the residential areas as well as animals that might pass. However, this will likely be temporary as the rehabilitation works won't be extended to the night period.

Thus the generation of nuisances-noise and lights is considered a negative impact (N).Use of Natural Resources

5.3.3.1 Water Consumption

Water is needed for different processes in the rehabilitation activities. It is needed for concrete mixing, cleaning of tools and the used machinery, dust suppression, and earthworks activities. Water consumption in the rehabilitation site may be overused causing overexploitation of water resources. This impact is evaluated as negative (N).

5.3.3.2 Natural Material Sourcing

The proposed project requires the use of borrow material such as aggregates and sand. As such, the excavation of lands for the extraction of borrow material may result in removal of land resource. This leads to the change in the morphology of the land. Also in some cases the change might be sever whereby the soil losses its fertile top layer affecting the productivity of the area. Hence this

impact is high negative in nature (N). It is worth to mention that no illegal quarries will be used by local contractors to provide the project with the required borrow material.

5.3.4 Land Cover

The rehabilitation of the proposed roads will not change the land use of the area since the roads already exist and the REP aim is to rehabilitate it. However, at certain sections vegetation cover will be removed to be replaced by sidewalks or retaining walls thus losing some of the vegetation around the proposed roads. It is worth to mention that this vegetation cover is not of significant importance, thus this impact is evaluated as neutral (O).

5.3.5 Biological Environment (Flora and Fauna)

As mentioned in Section 4.2.5, during the site visits, many trees were observed such as the Cypress trees that were planted as fencing for private lands, agriculture lands and houses along various sections of roads L4-AK-RD3A-1, L4-AK-RD3A-4, L4-AK-RD3A-6 and L4-AK-RD3A-7. However, these trees are not expected to be affected during project rehabilitation. In addition, the olive orchards that dominate most of the project area will also not be affected by the rehabilitation activities as none of these trees are located on the road sides but are planted around four meters away from the proposed roads. Moreover, pine trees scattered along the roadsides (L4-AK-RD3A-1, L4-AK-RD3A-4 L4-AK-RD3A-7 and L4-AK-RD3A-8) include wild pine trees known as the *Pinus brutia* and the stone pine trees (*Pinus pinea*). Some of these trees have been newly planted on the roadsides. The two species of pine are well known in Lebanon and are of a resistant gender and are not considered as endangered. Moreover, some Orange, Palm, Salix, Oak, almond trees and kaki groves were rarely identified at different stations along the proposed roads.

However, trees will not be removed within the area of the proposed project. In addition, the main rehabilitation activities that may have a negative effect on the study area flora are the activities of heavy machinery movement on unpaved roads and removal of deteriorated asphalt layers. However, the tree species mentioned above were observed away from the road alignment. As such the dust generated from these activities will not have a significant impact on the flora in the project area. It is worth to mention that the rehabilitation phase is a short-term phase and the impacts of such activities will disappear as soon as the work is completed.

The impact of the construction and rehabilitation activities is therefore assessed as neutral (O).

As for the fauna, no animals were identified during the site visits. Some of the mentioned animals in section 4.2.2 such as hyenas, Jackals and wolves have a nocturnal activity and won't be affected by the rehabilitation activities that will be implemented during day hours. However, the other animals that are present in the area and may approach or cross the proposed roads have the tendency to escape due to the noise and vibrations emanating from the undertaken activities and be disturbed. Nevertheless, this phase is temporary and the disturbance impact will diminish as soon as this phase ends. This impact is considered negative (N).

5.3.6 Visual Intrusion

As mentioned previously this project will not change the landscape of the area since the roads already exist. However, the project contractor will try to the extent possible to prevent visual intrusion for nearby people during the rehabilitation works. This impact is temporary and will diminish as soon as the project is completed and is considered as a neutral impact (O).

5.4 Potential Socioeconomic Impacts during Construction

5.4.1 Labour Influx

Sexual abuse and exploitation (SEA) induced by labor influx and sexual harassment (SH) in the workplace are potential gender-associated impacts that may arise during the project construction/rehabilitation phase. These impacts will most likely occur due to labor mobilization and the unfamiliar cultural and social settings. Moreover, social interactions between workers living in the area (in rented apartments), surrounding communities, local vendors and sellers can cause culturally insensitive behavior and relationships leading to sexual abuse and exploitation incidents (GGITR & GTGDR, 2018). This impact is considered to be negative (N).

5.4.2 Traffic

As a results of the proposed rehabilitation activities, on site traffic management may pose a challenge on the proposed roads. Moreover, the movement of heavy machinery and construction activities may lead to temporary traffic jam or might result in accidents and cause inconvenience to the people using those roads. In addition, traffic could be disrupted by the rehabilitation activities throughout traffic diversions, detours or blockage. As mentioned before, the location of these detours will be specified by the contractor during the rehabilitation phase. However, these impacts are temporary and will vanish as soon as the project is completed. As such, this impact is assessed as a negative impact (N).

5.4.3 Social Tensions

Social tensions may arise between local and displaced communities should the former perceive that most the job opportunities created are being offered to foreign workers. In addition, discrimination by the local community of foreign workers residing in residential buildings (in rented apartments) may have a negative impact on the wellbeing of these workers. This impact is considered to be negative (N).

5.4.4 Child Labour

During construction, it is possible that the contractor may recruit children who are under the legal age as workers on the site, especially in the case of the day laborers. Without proper mitigation and enforcement measures, this impact would be considered as a strongly negative impact (2N).

5.4.5 Cultural Heritage

The project is not expected to result in any impacts on cultural heritage and archaeological sites as the proposed roads are not located near these sites.

5.4.6 Worker Health and Safety

During summer, high temperatures could cause heat stress and dehydration to some of the workers. Accident and injuries to workers and the public may be caused by transportation accidents, falls, electric shock from street light repairing activities, mishandling of machinery and other rehabilitation related accidents. The high noise generated from the machinery could damage the hearing of the workers and dust generation from the different construction activities, movements and transportations may cause respiratory problems for workers on site if appropriate personal protection equipment are not being used. As such most of the health problems that might affect the

workers results from the generated air pollutants at the construction site. The following are potential airborne health risks along with the associated construction activity:

- Acute respiratory disorders, lung and heart diseases due to the generation of particulates from vehicular emissions and constructional machinery that operates on fuel as well as silica in dust from the earth agitated by heavy machinery on unpaved roads.
- Acute irritation of the upper airways resulting in coughs and cold from large particulates.
- Acute manifestations including inflammatory conditions like bronchitis, bronchiolitis and pneumonia which may be rapidly fatal from the inhalation of small size particulates (2.5u to 10u).
- Pollutants such as SO_2, NO_2 and CO emitted from vehicular emissions contribute to respiratory ill health.
- Long term exposure is associated with chronic lung diseases such as lung cancer and silicosis (GoG-MRH, 2017).

Other health related effects that area associated with the generation of dust includes irritation of mucous membranes or allergic reactions that might be harmful to the eyes and skin (GoG-MRH, 2017). Thus occupational health and safety impacts for the workers and nearby residents are evaluated as a strongly negative impact (2N).

5.4.7 Public Safety

Residents of villages may be injured as a result of activities associated with the rehabilitation of the proposed roads in the nearby towns. In fact, these activities can lead to car accidents especially when safety and road rerouting signs are not installed properly. Also accidents are more prominent to occur with the local residents who are not familiar with presence of heavy equipment and machinery. Since this impact will vanish as soon as the project is complete, the impact of public safety is considered temporary and negative (N).

5.4.8 Access to Services

During the rehabilitation activities, some of the trade and supply flows of goods will be disturbed in the project area. Moreover, women within the project area might be affected from the presence of rehabilitation activities and workers along the proposed roads. Women might not be able to perform their routinely outdoor activities. The mobility of women working in different fields such as agriculture and livestock may be affected. This impact is therefore considered negative (N).

5.4.9 Economic Activities

As mentioned previously, many shops, markets, snacks, and car repairing were identified along the way and were in close proximity to some road stations especially in the residential areas. For example, along road L4-AK-RD3A-1 there is small vegetable shops, minimarkets, cell phone shops and small restaurants. As for L4-AK-RD3A-2 there are 1$ dollar shops, minimarkets and car maintenance shops. L4-AK-RD3A-3 also has clothes and cell phone shops. Along L4-AK-RD3A-6 there are pharmacies, local vegetable and fruit market and some car maintenance shops. L4-AK-RD3A-8 also has pharmacies, minimarkets and one dollar shops. The location of these shops were determined at a station level during the site visits (Annex 1). During the rehabilitation phase, these shops might be affected due to potential road closure, presence of excavation activities and heavy machinery near those shops. Thus, this will impact the livelihood of the shops owners. This impact is therefore considered negative (N) and temporal as the livelihood will be enhanced once the road is rehabilitated.

5.5 Potential Positive Impacts during Operation

5.5.1 Socioeconomic Environment

5.5.1.1 Economic Activities

Once the project is completed the improved infrastructure will encourage new business opportunities and marketing activities in project region. Moreover, the rehabilitation of roads will improve the standard of living of the local community as it will have a better access to education and healthcare facilities especially for women and children and it will benefit from the new business opportunities. It is also expected that the proposed road rehabilitation project will increase the land values in nearby villages thus allowing land owners to sell their land at an increased prices and start new businesses.

Tourism is expected to increase in the region since the improvement of the road infrastructure conditions in the region will attract more visitors.

As such, this impact economic activities in the region is considered as a strongly positive impact (2P).

5.5.1.2 Traffic and Road Safety

The rehabilitation of the roads including adding adequate traffic signs for stoppage give ways as warning signs, mirrors at sharp edges, and other regulatory and warning signs will improve road conditions resulting in a smoother vehicular movement providing safer conditions for locals and tourists to commute. Thus, this is evaluated as a positive impact (P). This issue is addressed further in Section 5.5.7.

5.5.2 Cultural Heritage

There is no evidence of any historical vestige in the location of the proposed roads. Thus the proposed project will not impact the cultural heritage of the region. However, the improvement of road conditions will enhance touristic activities to historical and archaeological landmarks, churches, old ruins, historical cemeteries, citadels and Sarays in the region. Thus it is assessed as a positive impact (P).

5.6 Potential Negative Environmental Impacts during Operation

5.6.1 Water Quality

The rehabilitation of the already existing roads will not have major negative impacts on groundwater and surface water during the operational phase. However, some accidental oil spills might be released from vehicles, oil tankers and infrequent spills in the service areas. Such spills contain high oil and grease content and could be transported through runoff into nearby surface and groundwater bodies during heavy rain events. This impact is occasional and restricted up to the road surface nature.

As such, the impact on the water quality in the area of the proposed project during operation is evaluated as neutral (O).

5.6.2 Air Quality

The rehabilitation of the proposed roads will improve the road condition thus reducing traffic related emissions by inducing a smoother traffic flow in the project area. Nevertheless, in the long run, as business opportunities will increase and different establishments will be newly constructed along the rehabilitated roads traffic levels might increase leading to increased vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area. The increase of such pollutants in the atmosphere may cause public health risks and other impacts on the environment.

As such, during operation, the impact on the air quality in the area of the proposed project is evaluated as negative (N).

5.6.3 Noise

During the operation, noise is expected to arise due to traffic related noise pollution; vibrations from engines and tires and use of pressure horns. Noise pollution might disturb wildlife and nearby residential areas. This impact is permanent and negative in nature (N).

5.6.4 Use of Natural Resources

5.6.4.1 Energy and Water Consumption

Energy will be consumed during the operation phase for lighting purposes thus slightly contributing in the depletion of natural resources if the new lighting infrastructure was not based on renewable energy. Also in some cases the cleaning of the roads include washing by water thus consuming a significant amount of water. However, this type of cleaning is infrequent and will not cause depletion in the water resources if properly used.

Thus the impact of energy and water consumption is evaluated as a negative impact (N).

5.6.5 Biological Environment

Improving the conditions of the proposed roads will increase the traffic load in the area. As a consequence, if some animals cross the roads they might be exposed to direct mortality or avoidance behaviour. The probability of crossing these roads is higher at night and the possible animal hitting accidents will be lower. However, this impact won't affect drastically the situation as the road already exists and this impact is existent.

As for the terrestrial ecosystem, the increase in traffic will lead to increased exhaust emissions from the vehicles passing through the proposed roads thus affecting the life cycle of the trees and vegetation around the roads.

Thus the impact on the biological environment is evaluated as a negative impact (N).

5.6.6 Visual intrusion

As the project is the rehabilitation of existing roads in Akkar Caza, the surrounding environment, vegetation, and the aesthetical value of the surrounding areas is not likely to be significantly affected.

5.6.7 Traffic and Road Safety

After the rehabilitation of the proposed roads an increase in traffic rates will occur as people will frequently use the rehabilitated roads. In addition, improving the conditions of the road will lead to enhanced vehicular movement and speed thus increasing the chances of road accidents. However, installing safety walls, safety signs, speed limit signs and speed bumps along the proposed roads will decrease the possibility of such accidents and protect pedestrians. In addition, the law enforcement in Lebanon is not always implemented in the country and limited law enforcement is anticipated in Akkar. As such, this impact is evaluated as negative(N).

5.7 Summary of Potential Impacts

After evaluating the potential negative and positive impacts that might arise from the proposed project during both phases (rehabilitation and operation), it was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated wastewater and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of heavy rehabilitation activities especially where new pavement is proposed for the roads. On the other hand, job opportunities will be created to the local community during the rehabilitation. It is worth to mention that these impacts are short in term and will diminish as soon as the project is completed. As for the operational phase, the assessed socioeconomic impacts were mostly positive in nature in terms of livelihood improvement within the project area. However, on the long term the proposed project will contribute in increasing vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area as well as traffic related noise causing public health problems and other impacts on the environment. The impacts during rehabilitation and operation phases are summarized in Table 5-2 and Table 5-3.

Table 5-2: Summary of Impacts during Rehabilitation Phase

Impact	Media	Nature
Environmental		
Air pollution from emissions of machinery, trucks or possible open burning activities	Air, nearby communities and workers	N
Dust pollution from rehabilitation and excavation activities	Air, nearby communities	N
Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators	Nearby communities and workers	N
Disturbance of nearby areas and animal escape from noise and vibrations	Biodiversity and sensitive habitats	N
Contamination of surface water from improper disposal of wastewater from workers, water coming from cleaning of machines and equipment Reduction in overall surface water quality due to improper disposal of construction waste Water pollution due to accidental spill of oils and chemicals	Water resources, soil, nearby communities	N
Contamination of soil from accidental spills of oils and chemicals on the soil from machines and trucks and from transportation of chemicals and oils	Soil, subsoil and land	N

Impact	Media	Nature
Improper disposal of cut volume may cause contamination of water bodies in rainy weather	Water resources	N
Surface water and soil pollution from improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Water resources, soil, subsoil and land	N
High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Energy resources	N
High consumption rates of water for construction related activities	Water resources	N
Over extraction of borrowing material and depletion of natural resources (sand, aggregates, …)	Soil, subsoil and land	N
Tree and floral species disturbance near the site during rehabilitation activities	Biodiversity and sensitive habitats	O
Disturbance of animals in the area	Biodiversity and sensitive habitats	N
Material falling from vehicles during transport may cause traffic accidents or congestion	Nearby communities	N
Accident and injuries to workers because of construction activities (mainly respiratory health risks)	Workers	2N
Dust generation and noise may cause health related problems to nearby residents	Nearby communities	N
Injuries from car accidents due to the presence of construction sites and closure of some roads	Nearby communities	N
	Socioeconomic	
Creation of job opportunities for local communities	Labor influx, socio-economic activities	P
Local garages will benefit from the equipment oil maintenance and residents will benefit from the rent fees of the offices and the equipment parking area.	Nearby communities, socio-economic activities	P
Discrimination from the local community against the foreign workers	Foreign Workers	N
Social tensions as a result of perception that foreign workers being offered a major proportion of the jobs created by the project	Local and foreign workers	N
Child labor for construction activities	Local and foreign children	2N
Traffic congestion in the concerned towns due to transport of construction materials, the material that may fall or due to temporal road closure	Nearby communities, socio-economic activities	N
Potential occurrence of sexual abuse and exploration incidents	Nearby communities	N
Disruption of local community to access services due to construction activities and temporal road closure	Nearby communities and socio-economic activities	N
Disruption to access to shops as a result of construction activities and temporal road closure thus affecting livelihood of shop's owners	Shops owners	N

Table 5-3: Summary of Impacts during Operation Phase

Impact	Media	Nature
Environmental		
Increased vehicular pollutant levels in the area causing public health risks and other impacts on the environment	Air, Nearby communities	N
Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Nearby communities, biodiversity and sensitive habitats	N
Depletion of natural resources (fuel) used for street lighting purposes	Energy resources	N
Disruption of animals movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Biodiversity and sensitive habitats	N
Possible oil spills events transported through runoff and polluting nearby surface and groundwater bodies	Water resources, soil, subsoil and land, nearby communities	O
Accident occurrence due to the enhancement of vehicular movement resulted from the improvement of road conditions	Socio-economic activities, nearby communities	N
	Socioeconomic	
Encouragement of new business opportunities, and marketing activities in project region, the increase in land values and facilitate the access to services and improve the living standards	Socio-economic activities, nearby communities	2P
Improvement in road conditions due to installation of proper safety signs	Socio-economic activities, nearby communities	P
Enhancement of tourism	Socio-economic activities, nearby communities	P

6. MITIGATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

This section outlines the measures required in order to mitigate all impacts identified in Section 5 as well as ensure proper monitoring. These measures have been included in an Environmental and Social Management Plan (ESMP).

6.1 Environmental Mitigation Measures during Rehabilitation

6.1.1 Soils and Water Quality

The contractor should install temporary structures (i.e.barriers) to prevent runoff from reaching nearby water bodies and avoid working in rainy weather. Also the contractor should ensure that the volume of cut will be disposed properly during the rehabilitation phase. As for the domestic wastewater generated from the workers on site, it is important to ensure the installation of the porta cabin toilets. These toilets should be connected to the existing network or to the polyethylene tank if sewerage network is not available within the project site. The collected wastewater in the polyethylene tank should be discharged into nearby operational wastewater treatment plants. In addition, the discharge of wastewater into nearby water bodies should be prohibited under any condition

6.1.2 Air Quality

In order to reduce the project's impact on air quality, the following mitigation measures must be implemented:

- Vehicles, equipment and machinery used for during rehabilitation should be regularly maintained;
- Open burning of solid waste must be prohibited;
- Vehicles must move at a low speed on unpaved;
- Loading of raw material should be done under dust preventive measures (i.e. water sprinkling);
- Raw material storage areas should be covered;
- Water should be sprinkled in order to suppress dust. During windy weathers, dust generating activities should be stopped;
- Transported material should be covered.

6.1.3 Noise

In order to reduce and control the noise generated during the rehabilitation phase especially in residential areas, the following mitigation measures must be implemented:

- Regular maintenance of all noisy equipment and machinery. This includes changing lubricants, replacing damaged parts, and installing mufflers;
- Drilling and excavation activities should be executed only during working hours;
- Heavy machinery such as percussion hammers and pneumatic drills should not be used during the night without prior approval of the municipality or client;

6.1.4 Use of Natural Resources

Several mitigation measures can be implemented in an effort to reduce natural resource depletion and consumption. These measures include:

- Reduce water wastage whenever possible;
- Whenever possible, use dry-cleaning instead wet cleaning;
- Training and awareness should be raised to workers concerning water usage best practices and water conservation;
- Water use for construction activities should be obtained in such a way that doesn't disturb the water availability and supply to the existing communities
- The light in the offices must be shut down during the night when offices are not in use;
- Machinery and equipment must be turned off when not in use;
- Avoid agriculture land for borrow materials;
- Ensure that the borrow material are extracted from legal quarrying sites.

6.1.5 Land Resources and Biological Environment

As mentioned earlier, the flora within the project site will not be affected significantly, however, landscape areas within the project site must be preserved as much as possible. This can be done by following a guideline developed for that purpose.
As for the fauna, the following mitigation measures must be implemented:

- Maintenance of vehicles and machinery
- Minimize noise by insulating machinery through installation of mufflers
- Drilling, excavation and any other noisy activity only during working hours

6.1.6 Visual Intrusion

Although visual intrusion during the rehabilitation phase is temporary and will diminish at project completion, some mitigation measures must be implemented during this phase to minimize the impact of visual intrusion on nearby residents. These measures include:

- All sources of light must be shut down during night time (offices light, projectors) to avoid disturbance from light pollution at night;
- Green landscape areas must be preserved whenever possible.

6.2 Environmental Mitigation Measures during Operation

6.2.1 Water and Soil Quality

The rehabilitation of the already existing roads will have a minimal negative impacts on groundwater and surface water during the operational phase. However, local authorities are responsible for maintaining the storm water network collection system in order to prevent the storm water runoff carrying pollutants, deposits and residues from road surfaces and reaching at the end surface and groundwater water resources and soil. It is recommended to maintain this system especially before the start of the rainy season and continually collect solid waste in order to prevent the blockage of the drainage system.

6.2.2 Air Quality

The following mitigation measures must be implemented in order to reduce traffic related pollutant emissions:

- Ensure that the road is regularly maintained to ensure good surface conditions
- Fixing speed limit along then roads

6.2.3 Noise

Mitigation measures that should be implemented in order to minimize the traffic related noise sound signs should be placed near sensitive areas to prevent people from using the pressure horns.

6.2.4 Use of Natural Resources

The following mitigation measures must be implemented in order to reduce the impact on natural resources:

- Use of eco-friendly light bulbs as during the operation phase of the project this will reduce the consumption of energy
- Cleaning activities that requires a lot of water must be replaced by dry cleaning techniques.

6.2.5 Biological Environment and Land Resources

In order to minimize the impact on the existing biological environment the following must be implemented:

- Install signs such as speed limit signs and animal crossing signs at areas where animals (i.e. cats, sheep, goats, dogs) cross from one side of the road to another.
- Plant trees on the roads sides as a fence to prevent the collision between animals and the passing vehicles.

6.2.6 Visual Intrusion

As the project is the rehabilitation of existing roads in Akkar caza, the surrounding environment, vegetation, and the aesthetical value of the surrounding areas is not likely to be significantly affected. Hence no mitigation measures are proposed.

6.3 Social Mitigation Measures during Rehabilitation

6.3.1 Socioeconomic

6.3.1.1 Economic Activities

The proposed project is considered to have a positive impact on the economical profile of the local community. In order to enhance this impact, priority of hiring should be giving to qualified local residents, especially for skilled and professional jobs. In addition, the contractor must abide by the following mitigation measures to prevent any disturbance to the local community:

- Warn the staff strictly not to involve in any unethical activities and to obey the local standards and cultural norms

- Select specific timings for the construction activities especially near residential areas in accordance with MOE Decision 52/1 for 1996 (National Environmental Quality Standards).
- Ensure that the generated solid waste and liquid waste is disposed or discharged of in an environmentally friendly way and in selected areas.

Moreover, as mentioned earlier, the owners of the identified shops within the project site will be affected during the rehabilitation phase. Some mitigation measures must be implemented during this phase to minimize this impact such as:

- Install overpass structures from the road to the shops
- Proper installation of sign boards
- Timely completion of the rehabilitation phase

6.3.1.2 Labor Influx

Furthermore, in order to reduce the risk of sexual abuse and exploitation induced by labor influx and sexual harassment as much as possible, the contractor should implement the following prior to project rehabilitation.

- Draft Codes of Conduct and the guidelines for a GBV and VAC Action Plan;
- Ensure that workers at the rehabilitation site sign the Code of Conduct, presented in annex 2hat targets GBV risks, specifically Sexual Exploitation and Abuse and/or Sexual Harassment induced by labor influx, and penalizes the perpetrators of GBV
- All workers including contractor, foreign workers and international consultants should sign codes of conduct written in a language that is appropriate;
- All workers are committed to prevent and report sexual abuse and exploitation incidents within the work site and in its immediate surrounding communities;
- Respond to the reported incidents as a matter of priority. The contractor should coordinate with a service provider in this regard.

6.3.1.3 Social Tensions

The following mitigation measures must be implemented in order to minimize the social tension between local and foreign workers during the rehabilitation works:

- Conduct awareness campaigns for the local community regarding foreign workers influx and how their engagement can affect the local economic sector in a positive way. Also these campaigns must inform the local community that these workers will sign code of conduct before stating the work and thus their behavior will be controlled.
- Ensure that all workers (locals and foreign, skilled and unskilled) will be compensated equally as per the scale of market price rates and have equal contractual benefits and working conditions.

6.3.1.4 Child Labor

The following mitigation measure must be implemented in order to ensure that the contractor will not recruit children who are under the legal age as workers on the site, especially in the case of the day laborers:

- Daily registrations of workers and verification of their age to prevent child labor
- Abide by the Labor Law and ensure that workers below 18 years are not engaged in construction works
- Ensure the contractor is aware of the penalties that Labor Law is imposing in the case of child labor

- The contractor should follow a code of labor practice that details the policy for hiring individuals and that prevents child labor

6.3.1.5 Traffic

The following mitigation measures must be implemented in order to minimize the traffic congestion and resident's inconvenience during the rehabilitation of the roads:

- Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage;
- Install proper warning signs;
- A flagman should be positioned on the proposed roads to warn the passing cars and ensure the traffic is not blocked;
- Coordinate with the municipality police to help in traffic management;
- Vehicles carrying construction materials will be restricted during the daytime;
- The contractor should also ensure that the transported material by the trucks is well covered.

6.3.2 Public and Worker Health and Safety

6.3.2.1 Personal Protective Equipment and Worker Safety

The contractor should ensure workers safety from any possible accident. Workers should wear personal protective equipment (PPE) and the contractor should supplement the working site by a first aid kit:

- Workers should wear hard hats to avoid any potential objects fall or accidental head contact with electrical hazards.
- Safety glasses should be worn during construction phase in order to avoid the exposure to flying particles or harmful chemicals.
- Workers should wear the right gloves to protect their hands. Different type of gloves could be used according to the undertaken construction activity.
- Boots with slip-resistant and puncture-resistant soles should be worn by the workers on construction site
- The contractor should abide by the assigned work schedule (OSHA, 2011)

6.3.2.2 Electrical Safety

The following mitigation measures must be implemented in order to minimize electrical hazards and accidents:

- The electrical activities and working on new and existing hot electrical circuits should be prohibited if all power is still turned on.
- All frayed, damaged or worn electrical cords or cables should be replaced and flexible cords and cables should be protected from damage.
- All electrical tools and equipment should be maintained and checked regularly for any defect.

6.3.2.3 Public Safety

Local residents' safety and passers-by should be ensured for this purpose; the following mitigation measures must be implemented:

- Proper safety and diversion signs must be installed at sensitive areas within the project area (i.e. near schools)
- Training of heavy machinery drivers about road safety
- Inform the local community about the construction schedule and abide by assigned timing
- Install pedestrian and vehicular passages near residential areas. Accidental oil spillage shall be well controlled

6.3.3 Access to Services

In case the works imply the temporary closure of some of the busy roads within the project site, traffic shall be secured via alternative routes to reach relevant destinations not to disturb the routinely activities of the local community including women, students and traders.

6.3.4 Cultural Heritage

The proposed project is located within an area that does not include cultural heritage and archaeological site. However, unknown artefacts may be uncovered during drilling activities. If any archaeological finding was therefore suspected during this phase, work should be halted immediately and the Directorate General of Antiquities must be informed.

6.4 Social Mitigation Measures during Operation

The socioeconomic conditions of the area where the proposed roads are rehabilitated will be improved positively. As such, no mitigation measures will be proposed for this section.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

7.1 Institutional Setup and Capacity Building

7.1.1 National Institutions

The project works will be executed on the main road network which is under the jurisdiction of the MoPWT. In Lebanon, donor-funded road works projects are implemented by CDR upon the request of the Council of Ministers (CoM). Therefore, in the context of REP project, CDR (Road and Transport Department) will execute the project on behalf of the Government/MoPWT.

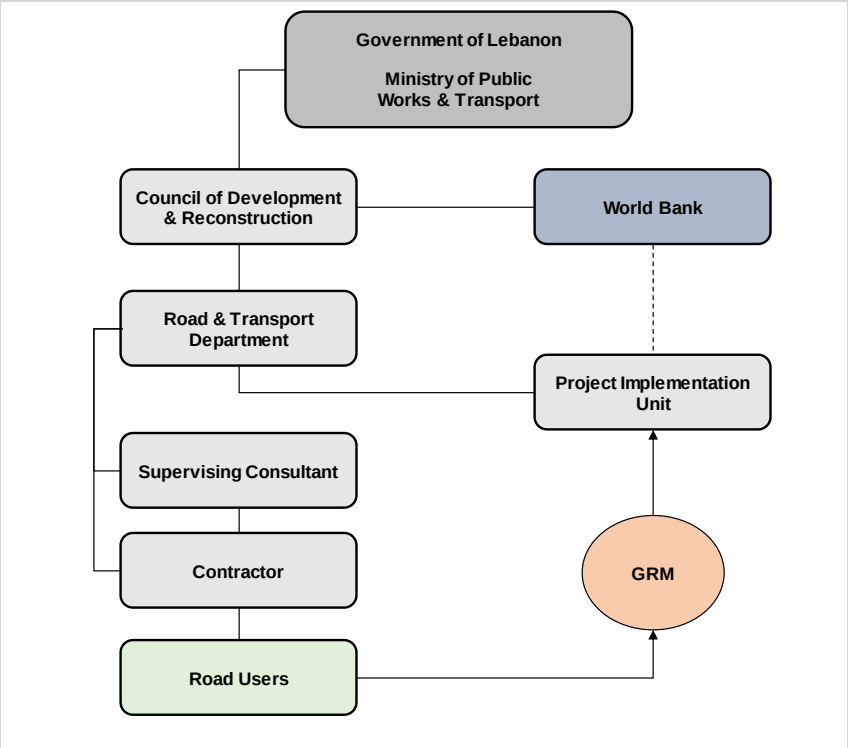
In order to achieve proper environmental management and monitoring, a clear, functional institutional structure was defined (refer to Figure 7 1). During the rehabilitation phase, the contractor would be the primary actor; ensuring compliance of works with the different items specified in the environmental and social management plan. Accordingly, the contractor will be supervised by several entities appointed by CDR. CDR will be responsible for constant monitoring of the rehabilitation works through weekly and/or monthly reports (sent by the contractor) and site visits, ensuring and enforcing mitigation measures.

More specifically, the CDR will develop a Project Implementation Unit (PIU) dedicated to the project, which includes social and environmental specialists to monitor and evaluate the project. Moreover, it will engage a supervising consultant to 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, technical support, appraisal and validation of environmental and social management plans, and monitoring of environmental compliance and progress reporting to the World Bank. The responsibility of implementation and management of environmental/social safeguards by the PIU will be coupled with the assignment of supervising consultant (focal point(s) for environmental and social safeguards) who will be in charge of ensuring sound application of the ESMP. Finally, implementation of the ESMPs will mainly be the Supervising Engineer duty and consequently the Supervising Engineer will have to appoint qualified environmental, health and safety consultant and a social development consultant in order to ensure that the Contractor is compliant with the ESMPs during the rehabilitation phase of the project.

The main concerned municipalities will be involved in managing and communicating local community's potential complaints to the CDR (PIU) through the GRM process.

Figure 7-1: Roads and Employment Project Management Structure



7.1.2 Training

In the context of the proposed project, the supervising consultant will prepare environmental training course (environmental management, health and safety issues) prior to the handover of the road project for the contractors and field supervision staff.

The main objective of the training is to:

- Meet regulatory requirements in capacity development in support of road rehabilitation;
- Develop technical and administrative procedures for monitoring air quality, traffic scheme recording accidents number;
- Implement data collection for monitoring activities;
- Establish a continuous improvement process for safety;
- Ensure that staff knows and understands the potential risks associated with road safety;
- Enhance knowledge and skills of municipality employees, enabling them to perform their responsibilities in the areas of health and safety.

Training programs must be incorporated with a feedback loop to ensure their relevance and acceptance by staff and will be reviewed periodically and updated when necessary. The implementation of the training programs will raise awareness to the involved municipalities of the Caza in the following topics:

- Environmental laws, regulations, and standards;
- Traffic and Road Management System;
- Occupational hazard and personal protective equipment;

- Emergency response and chemical spills;
- Sampling techniques and environmental monitoring guidelines;
- Risks associated with road conditions, lack of safety measures and signage;
- Pollution health impacts and prevention measures;
- Operating procedures on the rehabilitated roads (Incident Reporting and Investigation);
- Grievance Redress Mechanism (GRM)

7.2 Environmental and Social Mitigation Plan

Table 7-1 presents the Environmental Mitigation Plan for road rehabilitation project during the construction and operation phases respectively. The plan for the construction phase should be included in the contractor's tender documents to ensure that all requirements have been taken into consideration by them and will be implemented during the construction phase.

Table 7-1: Environmental Mitigation Plan during Construction and Operation Phase

Project Activity	Potential Impact	Proposed Mitigation Measures	Responsibility of Mitigation	Responsibility of direct supervision	Estimated cost
Construction	**Environmental Impacts**				
	Air pollution from emissions of machinery, trucks or open burning activities Dust pollution from rehabilitation and excavation activities	Use properly maintained equipment Abide by a dust management plan Water the ground when extremely windy Mix material in an enclosed space Cover material when transporting	Contractor	Supervision Engineer	4,000 $
	Noise pollution a result of transportation or delivery of raw materials, trucks movement, concrete mixing, drilling, construction and operation of heavy vehicle movement such as excavators Disturbance of nearby areas and animal escape through noise and vibrations	Maintenance of vehicles and machinery Excavation and any other noisy activity only during working hours	Contractor	Supervision Engineer	3,000 $
	Contamination of surface water and pollution of ground water from improper disposal of wastewater from workers and of wash water coming from cleaning of machines and equipment	Install temporary structures to prevent runoff from reaching nearby water bodies Avoid working in rainy weather Connect the generated wastewater from workers to the sewage network or to polyethylene tank Discharge the pumped wastewater from the polyethylene tank into nearby operational wastewater treatment plants Prohibit the discharge of wastewater into nearby water bodies under any condition	Contractor	Supervision Engineer	5,000 $
	Water pollution due to accidental spill of oils and chemicals from trucks and	Prepare and abide by a Spill Prevention & Management Plan	Contractor	Supervision Engineer	5,000 $

Project Activity	Potential Impact	Proposed Mitigation Measures	Responsibility of Mitigation	Responsibility of direct supervision	Estimated cost
	from transportation of chemicals and oils Improper disposal of cut volume may cause contamination of water bodies in rainy weather	Used oil from occasional maintenance of machinery or chemicals must be stored in an appropriate area until it's collected and disposed in licensed sites Minimize soil exposure time Proper storage of raw material including chemicals and fuel and handling must be on a paved and sealed floor Regular maintenance of vehicles Minimize the use of chemicals Reuse of excavated material whenever possible Disposal of excavated material in licensed sites			
	Contamination of soil and surface water bodies from the improper disposal of solid waste generated from workers and the used materials, construction waste from excavation and drilling activities	Proper disposal of construction waste Proper waste management practices Reuse or recycle the generated waste whenever possible Reuse of excavated material whenever possible Disposal of excavated material in licensed sites Train workers on waste reduction procedures	Contractor	Supervision Engineer	1,500 $
	High consumption rates of electricity, fossil fuel, etc. contributing to overconsumption and depletion of fuel	Maintenance of the generators and trucks Light in the site offices shut down during the night Construction workers must be trained and provided with awareness sheets on efficient energy use Machinery and equipment must be turned off when not in use	Contractor	Supervision Engineer	5,000 $
	High consumption rates of water for construction related activities Reduction in overall ground and surface water quality due to improper disposal of construction waste	Use water in the most efficient way and reduce wastage Regular site inspection to detect water leakages Whenever possible, use dry-cleaning instead wet cleaning Training and awareness should be raised to workers concerning water usage best practices and water conservation Proper disposal of construction waste	Contractor	Supervision Engineer	5,000 $

Project Activity	Potential Impact	Proposed Mitigation Measures	Responsibility of Mitigation	Responsibility of direct supervision	Estimated cost
	Depletion of natural resources due to the unsustainable extraction of borrowing material (sand, ,aggregates, …)	Ensure that the borrow material are extracted from legal sites Avoid agricultural lands to extract borrowing material In case extraction was done from agricultural sites, store the top soil layer for future rehabilitation Rehabilitate the site where excavation was done	Contractor of the quarry site	Supervision Engineer	
	Socioeconomic Impacts				
	Temporary Labour Influx	Priority hiring to qualified local community	Contractor	Supervision Engineer	-
	Economic Activities and its effect on the livelihood of the shops owners	Install overpass structures from the road to the shops Proper installation of sign boards Timely completion of the rehabilitation phase	Contractor	Supervision Engineer	-
	Discrimination from the local community against the foreign workers	Conduct awareness campaigns for the local community regarding foreign workers influx Inform the local community that worker will sign code of conduct before stating the work	Contractor	Supervision Engineer	-
	Possible unequal wage benefits between local and foreign workers	Ensure that all workers (locals and foreign, skilled and unskilled) shall be compensated equally as per the scale of market price rates	Contractor	Supervision Engineer	-
	Possible recruitment of children who are under the legal age as workers on the site, especially in the case of the day laborers	Daily registrations of workers and verification of their age to prevent child labor Abide by the Labor Law Ensure the contractor is aware of the penalties that Labor Law imposes in the case of child labor Oblige the contractor to strictly abide by the Labor Law through the CDR tender documents that should include prohibition of child labor	Contractor	Supervision Engineer	-
	Disruption of local community to access services due to	Traffic shall be secured via alternative routes to reach relevant destinations in case the works imply the temporary closure of this road	Contractor	Supervision Engineer	-

Project Activity	Potential Impact	Proposed Mitigation Measures	Responsibility of Mitigation	Responsibility of direct supervision	Estimated cost
	construction activities and temporal road closures	Inform the local community about the location of detours, road blockages or diversions through public announcements and proper diversion signage			
	Potential occurrence of sexual abuse and exploitation incidents	Draft Codes of Conduct and the guidelines for a GBV and VAC Action Plan All workers should sign codes of conduct written in their native language Respond to the reported incidents of sexual abuse exploitation as a matter of priority Training on gender-based aspects, internal GRM	Contractor	Supervision Engineer	-
	Slight increase in traffic due to the transport of construction materials or due to the material that may fall	Ensure traffic is not blocked during transportation Inform residents and place signs near the working areas Cover transported material Abide by traffic regulations Operate well maintained vehicles	Contractor	Supervision Engineer	1,500$
	Traffic congestion in the town due to temporal road closure				
	Material falling from vehicles during transport may cause traffic accidents or congestion				
	Accident and injuries to workers and public because of construction activities	Workers to wear proper safety gear (PPE) Presence of first aid kits (at least three) on the construction site Inform residents and place signs near the working areas Proper management of trucks and heavy machinery entering and exiting the construction site	Contractor	Supervision Engineer	3,000 $
	Dust generation and noise may cause health related problems for workers and disturbance to residents				
Operation	**Environmental Impacts**				
	Increased vehicular pollutant levels (CO, NOx, SOx, PM_{10}) in the area causing public health	Ensure that the road is regularly maintained to ensure good surface conditions	Local authorities	-	3,000 $

Project Activity	Potential Impact	Proposed Mitigation Measures	Responsibility of Mitigation	Responsibility of direct supervision	Estimated cost
	risks and other impacts on the environment.	Frequent air quality monitoring must be done along the roads area to ensure that ambient air quality parameters are within the standards			
	Noise pollution from traffic related noise pollution; vibrations from engines and tires and use of pressure horns disturbing wildlife and nearby residential areas	Installation of signs near sensitive areas to prevent people from using the pressure horns	Local authorities	-	4,500 $
	Depletion of natural resources (fuel) used for street lighting purposes	Install s eco-friendly light fixtures for the street light infrastructure to reduce the consumption of non-renewable sources of energy	Local authorities	-	Quotation to be provided from local or international suppliers
	Disruption of animals movement leading to direct mortality or avoidance behavior as a result of increased traffic load in the area	Install speed limit and animal crossing signs at areas were animals cross the roads Plant trees on the roads sides as a fence to prevent the collision between animals and the passing vehicles	Local authorities	-	2,500

7.3 Monitoring Plan

Continuous monitoring during both rehabilitation and operation of the project will be required to ensure the effectiveness of the proposed mitigation measures. Through sound environmental management and implementation of a monitoring plan, the rehabilitation of the roads in Akkar Caza will avoid incurring the major adverse impacts. The aims of the monitoring plan are:

- Verify the environmental and social impacts predicted in the ESMP study;
- Determine project compliance with national and international requirements and standards;
- Monitor the performance of the project and the effectiveness of mitigation measures;
- Take remedial action if unexpected problems and unanticipated impacts arise.

For additional information, refer to 7.2.2 for Reporting and Section 7.3 for Institutional setup and capacity building. Table 7-2 shows the Environmental Monitoring Plan for the rehabilitation and operation phases.

7.3.1 Monitoring Plan Implementation

To ensure implementation of the plan during construction a Health, Safety and Environmental Officer should be appointed on site by the Supervision Engineer at all times and at all the locations of the sensitive receptors that were presented in Figure 4-12 .

In order to properly implement the monitoring plan during operation, suitable equipment and technical skills are required. These are necessary to ensure the proper implementation of all proposed mitigations activities that this report recommends. The monitoring plan should be implemented in collaboration with CDR and local authorities.

7.3.2 Documentation and Reporting

7.3.2.1 During Rehabilitation

During the construction phase, regular monitoring results must be documented in order to track and analyze the frequency of potential impacts and accidents that might occur. The project supervision engineer is responsible for the reporting and establishing a comprehensive database for all monitoring activities. The report must include key indicators such as:

- Type of the activity monitored;
- Date of monitoring and weather conditions;
- Photographic documentation;
- Name of the person that is conducting the monitoring;
- Method of monitoring (sampling, visual inspection, …);
- Number and type of samples;
- Results of the monitoring (concentrations, accidents, frequency, etc.);
- Number of internal and external grievances as per the log
- Code of conduct trainings and number of signed forms

- Dates of trainings
- Mitigation measures undertaken.
- Title and dates of training programs

After documenting, the supervision engineer must submit the reports to the CDR and the WB on a quarterly basis.

7.3.2.2 During Operation

Quarterly environmental monitoring reports should be prepared to analyze the collected data, assess monitoring activities and provide recommendations to ensure the effectiveness of the overall environmental monitoring and management plan during the project life span.

An independent monitoring and evaluation consultant will be responsible for submission of an annual report concerning the different updates of the project status during post-completion phase.

Table 7-2: Environmental and Social Monitoring Planshows the Environmental Monitoring Plan for the rehabilitation and operation phases.

Table 7-2: Environmental and Social Monitoring Plan

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
Rehabilitation	**Environmental Impacts**						
	Air pollution (Dust /GHG Emissions)	• Total Suspended • Particles (TSP), PM10, • PM2.5 (wherever feasible), SOx, NOx and CO	Supervision Engineer	Weekly and during activities that generates significant amount of air pollutants	Throughout the project area near sensitive receptors	Visual observation of dust dispersion (scale and direction) and 1-hr and 24-hr measurements when significant amount of air pollutants are generated	$1,500/event
	Noise and Light Pollution	• Leq, Lmin and Lmax	Supervision Engineer	Weekly and during activities generating significant noise levels	Throughout the project area near sensitive receptors	Single sample per location (average 1hr reading-15minintervals) during morning (7-8am), evening (1-2pm) and night (4-5pm)	$300 (cost of noise monitoring machine)
	Contamination of surface water bodies and soil from the generated domestic wastewater	• Check for leakages in the connections between the porta cabin toilets and the existing network or polyethylene tank • Check the discharge	Supervision Engineer	Weekly	Throughout the project area and at the porta cabin toilet sites	Visual inspection	-No Cost

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
	from workers and liquid waste from rehabilitation activities	endpoint of the pumped wastewater from the polyethylene tank • Effluent from construction activities (Concrete mixing, dust minimizing, washing of equipment…)					
	Contamination of surface water bodies and soil from the generated solid waste	• Ensure active solid waste management plan • Construction and demolition waste • Waste of the workers on site	Supervision Engineer	Weekly	Collection points present on sites	Visual inspection	-
	Reduction in overall surface water and soil quality Accidental Releases	• Ensure active spill prevention and management plan • Chemicals, oils and fuel spill incidents	Supervision Engineer	Weekly	Active construction sites	Visual inspection	-
	Depletion of non-renewable energy resources	• Inspection of the quantities and types of the used fuel and oils	Supervision Engineer	Weekly	Fuel and oils purchase bills	Visual inspection	-
	Depletion of water resources	• Inspection of water quantities • Monitoring the different drilling and construction activities • Ensure active spill and	Supervision Engineer	Weekly	Water purchase bills	Visual inspection	-

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
		accident prevention plan					
	Destruction of existing Land Resources	• Check the infrastructure locations and that excavation works do not interfere with it	Supervision Engineer	Weekly	In location where excavation and drilling is planned (mainly where new pavement is assigned)	Visual inspection	-
	Tree and floral species disturbance near the site during rehabilitation activities	• Site observation	Supervision Engineer	Weekly	Around proposed roads		-
	Socioeconomic Impacts						
	Traffic congestion	• Check traffic conditions during transportation of materials • Ensure traffic is not blocked • Ensure traffic is relocated properly • Ensure all safety precautions are abided by	Supervision Engineer	Daily	Throughout the project area	Visual inspection	-
	Labor conditions	• Proportion of Lebanese versus Syrian workers • Worker's age • GRM log	Supervision Engineer	Monthly			

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
		• GBV trainings • Number of workers trained to SEA • Number of workers who signed Code of Conduct					
	Labor Influx	• Number of report Sexual abuse and exploitation (SEA) incidents	Supervision Engineer	Monthly			
		• Number of inappropriate communication and language among the workers	Supervision Engineer	Monthly			
	Accident and injuries to workers	• Ensure signs are in place before works begin • Visual inspections to ensure that all workers are wearing their PPEs • Recorded injuries and accidents within the workers	Supervision Engineer	Daily	Along the proposed roads	Visual inspection Accidents records	-
	Accident and injuries to the public	• Ensure the installation of pedestrian and vehicular passages near residential areas • Ensure road diversion and construction attention signs are in place before works begin	Supervision Engineer	Daily	Along the proposed roads	Visual inspection Accidents records	-

Project Activity	Impact	Monitoring Indicators	Responsibility	Frequency / Duration	Location	Methods	Estimated Cost
		• Record injuries and accidents within passers-by					
Operation	**Environmental Impacts**						
	Air pollution (dust emissions)	• Total Suspended • Particles (TSP), PM10, • PM2.5 (wherever feasible), SOx, NOx and CO	Local Authorities	Annually	At main receptors along the proposed roads	1-hr and 24-hrmeasurements, andvisual observation ofdust dispersion(scale and direction)	$1,500/ event
	Noise pollution	• Leq, Lmin and Lmax	Local Authorities	Bi-Annually	At main receptors along the proposed roads	Single sample perlocation (average1hr reading-15minintervals) duringmorning (7-8am),evening (1-2pm) andnight (4-5pm)	$300 (price of machine)
	Socioeconomic Impacts						
	Car accidents	• Number of car accidents • Cause of accidents • Location of accidents	Local Authorities	Annually	Along the proposed roads	Records of car accidents, cause of accidents and location of accidents	-

7.3.3 Guidelines for Health and Safety Plan during Construction

An effective Occupational Health and Safety Plan for construction should include at least the following components:

- Proper signage in and around the site in local languages;
- Fire-fighting measures;
- Guard rails and toe boards on all openings and edges;
- Proper storage and signage of materials including Material Safety Data Sheets;
- Safety measures during demolition works;
- Safety measures according to type of equipment;
- Personal safety equipment;
- Medical services which includes medical examination for all workers, first aid kit and personnel, and keeping logs of all medical records;
- Fencing around the construction site at all times;
- Sanitary facilities (toilet with shower, washing basin, urinal);
- Sanitary facilities to be covered, easily accessible, ventilated, well lit, maintained, and sanitized;
- Safe drinking water in accordance with regulations.

All construction staff should be trained on the Health & Safety Plan and the specific safety measures related to their own activities.

8. CONSULTATION, DISCLOSURE AND GRM

8.1 Public Consultation

A public hearing was held at the municipality of Halba on Wednesday, 16 October 2019. The purpose of the hearing was to inform the stakeholders and the local NGOs about the proposed project that will rehabilitate 10 roads in Akkar Caza and their accompanying infrastructural works and to take into account their concerns and feedback.

The hearing was organized in coordination with CDR and the municipality of Halba to ensure proper representation of various communities and different NGOs. During the hearing, the Consultant presented the design of the Project, preliminary findings of the ESMP study and obtained feedback of the participants in order to include in the report.

Over 25 people participated in the meeting including five women, two of them working in the municipality of Halba and the others are social activists indifferent NGOs mainly in the Lebanese Red Cross and women's organizations. During the session, the public proposed to install sidewalks in that area to ensure public safety and the importance of the continuous coordination with the municipalities throughout the rehabilitation phase. As for the impacts that might result from the rehabilitation of roads, the public does not see any major environmental, health and safety concerns. Employment opportunities were discussed for both Lebanese and Syrian workers. The latter contributes significantly in the construction sector throughout Lebanon including Akkar Caza. Besides private entities, the municipalities are resorting to Syrian labor in this sector in particular. There appears to be a clear split in job types between the two communities. The delineation line is between skilled jobs (mainly taken by the Lebanese workforce) and unskilled labor (filled primarily by Syrian workers). This split has resulted in a control of potential tensions or conflict between the communities.

Moreover, the women that participated in the women's session stated the following:

- They believe the project will contribute positively to improving women's participation in the economy by making transportation safer and more convenient.
- There must be regular supervision on the workers not to communicate in an improper manner with the residents especially where the roads are located near schools or residential areas.

The list of attendees, in addition to the proceedings of the hearing, along with the presentation made to the public hearing participants can be found in Annex 3.

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

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

Local NGOs were invited to the public hearing that was held at the municipality of Halba on Wednesday, 16 October 2019. Table 8 1 represents the name of the invited NGOs and their field of activity. Those local NGOs may play a role in bringing pressure against contractors when needed. They also serve as advocates to reduce projects' social and environmental risks and promote good practice.

Table 8-1: Invited Local NGOs to the Public Hearing and their Activities

Name of the NGOs	Activity
Committee of Employee Women Union (CEWU)	Economic Empowerment, Gender equality, livelihoods, and Education
Aandaqet Cultural Forum	Cultural awareness
Berqael Women's Charity Union	Akkar's cultural and social development and empower women charitable works
Environmental Council – Qobayyat	Protection and Conservation of the environment
North Lebanon Society for Humanitarian and Social Services	Provide medical and social services
Norwegian Refugee Council	Humanitarian organization helping people forced to flee
Lebanese Rescue Committee – Akkar Branch	Provide health services
Akkar Development Society	The development of Akkar area economically, socially and culturally
Social Movement	Encourage active citizenship through socio-economic development projects
Awareness and Reform Society	Awareness and reform for youth
North Lebanon Women's Charity Union	Empower women working for charitable activities
Be My Friend Society	Provides various social, medical and psychological services and the protection of the environment
Peace Society – Halba	Development of the youth at all levels
Ma'kom Society	Awareness campaigns for youth and provide various services for the needy persons

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.

c) This ESMP consulted International NGOs (see Table 8-2) to inform them about the Project, disseminate it, ask them to circulate its impacts and activities among Syrian and tell them that they can inquire about additional information and/or submit a complaint (if any) by contacting the Grievance Redress Mechanism (GRM) Unit on 01980096 ext:317 or send an Email to rstephan@cdr.gov.lb or register by hand an official letter at the CDR .
In Akkar Caza, the total number of registered Syrian is 106,333 individuals (UNHCR, 2019). They were contacted through the International NGOs to seek their feedback about the Project. Accordingly, this ESMP did not receive any concern about the Project.

Table 8-2: Consulted International NGOs and their Activities

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 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.

8.2 Grievance Redress Mechanism (GRM)

The purpose of a grievance mechanism is to ensure that all feedback and complaints received from stakeholders, customers, employees, contractor staff and the public in general are documented, considered and addressed in an acceptable and timely manner. It is important to note that this mechanism was shared with the participants and that there are two mechanisms for filing a grievance, one for the surrounding communities and one for the workers. . Anonymous grievances will be addressed in both levels and the maximum anticipated time needed to close a GRM case is 45 days.

8.2.1 GRM for Communities

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

The GRM levels of the project are the following (see Figure 8-1):

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

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

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

The Complaints Register form (refer to Annex 4) includes the following:

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

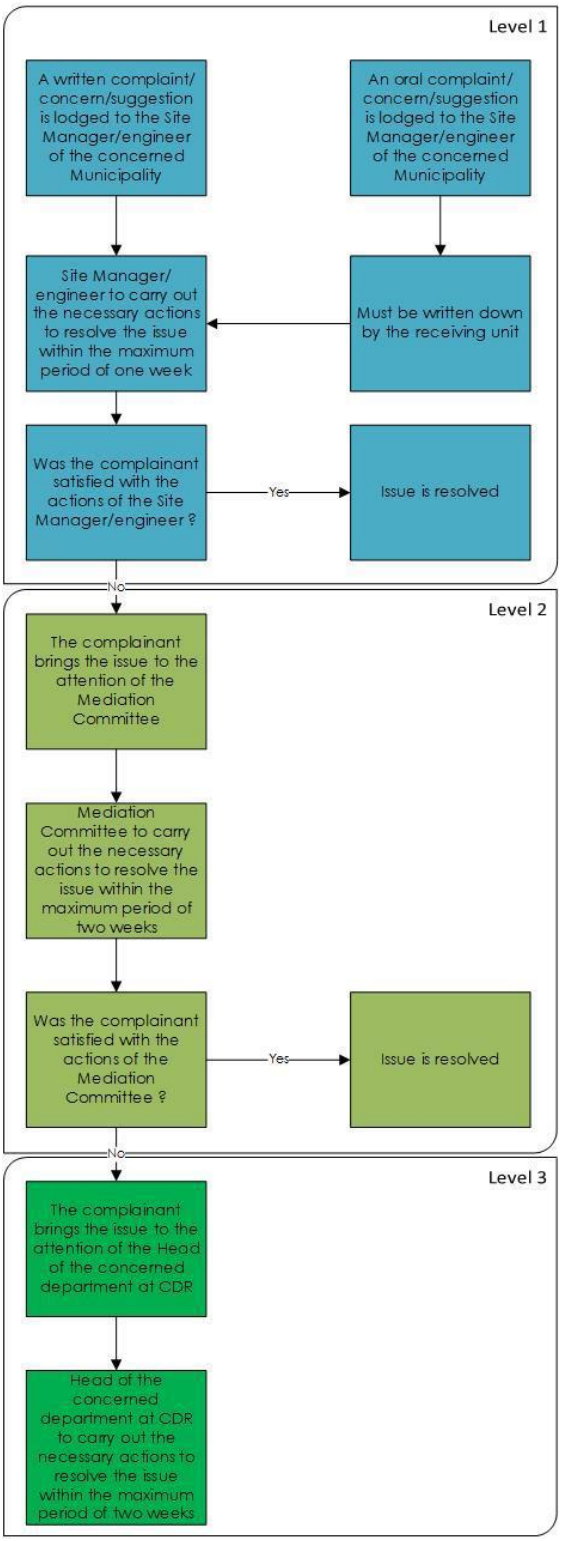
The GRM does not exclude the formal legal process of the national law. If a grievance remains unresolved following application of the project GRM process, the affected person can initiate legal proceedings in accordance with national law and may have recourse to the Appeals Court as warranted.

Error! Reference source not found. (overleaf) presents a detailed flowchart describing the process of grievance starting form reception of grievance to implementation of corrective measures.

8.2.2 GRM for Workers

A GRM for internal employees, namely the laborers onsite are also necessary. It aims to allow labors to report any wrongdoings in their favor or important concerns they might have. This internal GRM is similar in nature to the one previously discussed (in terms of accessibility, reporting means, etc…). The only main difference is the contact people for each level. In this context, the first level involves reporting to the health and safety officer and has a duration of one week. The second level involves reporting to the PMU Director and should be resolved within one weeks. It also follows the Complaints Register form (refer to Annex 4).

Figure 8-1: Grievance Mechanism Process



9. CONCLUSION

After evaluating the potential negative and positive impacts that might arise from the proposed project during both phases (rehabilitation and operation), it was concluded that most of the negative impacts will occur during the rehabilitation phase. These impacts are mainly related to the disruption of nearby residents from the rehabilitation activities along with some impacts on the surrounding environment such as deterioration of soil and water quality if the generated liquid waste and solid waste were not managed properly. In addition to the negative impact on the air quality that might arise as a result of rehabilitation activities especially where new pavement is proposed for the roads.

On the other hand, job opportunities will be created to the local community during the rehabilitation phase. It is worth to mention that these impacts are short in term and will diminish as soon as the project is completed. As for the operational phase, the assessed socioeconomic impacts were mostly positive in nature in terms of traffic and road safety and livelihood improvement within the project area. However, on the long term the proposed project will contribute in increasing vehicular pollutant levels (CO, NO_x, SO_x, PM_{10}) in the area as well as traffic related noise causing public health problems and other impacts on the environment.

However, the negative environmental impacts that might arise from the rehabilitation of the proposed roads in Akkar caza can be minimized and even eliminated through proper management and mitigation practices. The proponents of the proposed project are committed to putting in place several measures to mitigate the negative environmental and social impacts associated with the rehabilitation and operation of the proposed project. It is recommended that in addition to this commitment, the proponents shall focus on implementing the measures stated in the ESMP as well as abiding with all relevant national and international policies, standards and regulations.

BIBLIOGRAPHY

BirdLife International. (2019). Important Bird Areas factsheet: Upper Mountains of Akkar-Donnieh. Available at http://www.birdlife.org. Accessed on 11/11/2019

CAS. (2019). Labour Force and Household Living Conditions Survey (LFHLCS), 2018-2020, Lebanon. Central Administration of Statistics. Lebanon

Climate data Website. (2019). Bebnine village. Available at https://en.climate-data.org/asia/lebanon/qada-akkar/bebnine-420276/#climate-gra Accessed on 6/11/2019

Climate data Website. (2019). Bzal village. Available at https://en.climate-data.org/asia/lebanon/qada-akkar/bzal-420296/

Council of Development and Reconstruction (CDR). (2018). Roads and Employment Project (REP). ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF).

GFA Consulting group. (2014). Projet d'Appui au Développement Local dans le Nord du Liban (ADELNORD). Elaboration d'un schéma régional d'aménagement et de développement durable du territoire

IDAL. (2018). Invest Opportunities in Akkar. Baseline Analysis

Knauer, H. S., Pedersen, S., Reherman, C. N., Rochat, J. L., Thalheimer, E. S., Lau, M. C., ... &Corbisier, C. (2006). FHWA highway construction noise handbook (No. DOT-VNTSC-FHWA-06-02). United States. Federal Highway Administration

Mada Association. (2008). Forgotten Akkar. Socio-Economic Reality of the Akkar Region.

MOE. (2006). Protected Areas in Lebanon. Categories. Available at http://www.moe.gov.lb/ProtectedAreas/categories.htm. Accessed on 20/12/2019.

MOT. (2011). North Lebanon. Qada' Akkar. Promenade. Ministry of Tourism

OCHA. (2016). Lebanon, North and Akkar Governorates Profile. The United Nations Office for the Coordination of Humanitarian Affairs.

OCHA. (2018). North and Akkar Governorates Profile. The United Nations Office for the Coordination of Humanitarian Affairs.

OSHA. (2011). Occupational Safety and Health Administration. Workers Safety Series. Protecting Yourself from Noise in Construction.

SPNL. (2019). Hima Upper Akkar. Society for the Protection of Nature in Lebanon. Available at https://www.spnl.org/hima/hima-upper-akkar/ Accessed on 6/12/2019.

Taylor, K. C. (1984). Automobile catalytic converters. In Catalysis (pp. 119-170). Springer, Berlin, Heidelberg.

Transport Global Practice (GGITR) and the Gender Group (GTGDR) (2018). Good Practice Note: Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works.

Retrieved from: http://documents.worldbank.org/curated/en/399881538336159607/Environment-and-Social-Framework-ESF-Good-Practice-Note-on-Gender-based-Violence-English.pdf

UNHCR. (2019). SYRIA REFUGEE RESPONSE LEBANON, Akkar Governorate. Distribution of the Registered Syrian Refugees at the Cadastral Level. The UN Refugee Agency.

WHO. (2005). Air Quality Guidelines Global Update. PM 24-hour value is the 99th percentile. World Health Organization.
World Food Programme (WFP). (2016). Lebanon Road Network.

ANNEX 1: ENVIRONMNETAL COMPONENTS ALONG THE ROADS

Road	Socio-Economic (Shops, Residential areas, traffic)	Natural Environment (Trees, land use, surface water)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals)
L4-AK-RD3A-1	S0: traffic, residential, car maintenance shop, irregular parking on the sides S190: organization S230: small vegetable shops on the right S300: one-dollar shop, car maintenance shops, residential S520: mosque, minimarkets S800-S1070: small shops (vegetables, minimarkets, coffee shops, car maintenance shops, directly on the side of the road) S1220-S1400: traffic, 2 story buildings S1300: Al Jawhara School S2030: cell phone shops S2060: irregular parking on the sides S2110: health care center S2220: sweets shops and small restaurants S2300: art institution S2420: health care center, cemeteries S2600: small shops S2770: Bibneen public school for girls S2950: school, gas station S3500: small houses, small shops ALL OF THE ABOVE STATIONS: URBAN S4270:no traffic S5240-S6620: small houses, small shops here and there S6810-S6960: start of urban area S7040: homes to the right	S190: green areas S540: olive trees to the left S640-S730: green areas to the left S2990: olive trees S3040-S3090: wild pine trees S3090-S3140: trees planted on the sidewalks S3140-S3370: olive trees, wild pine, cypress S3930-S6620: end of urban area, start of green areas (mainly olive trees) S7040: green areas to the left	S0: light S430: solid waste bins S2030: light on solar energy S2060: no side walks S2420: narrow road, need safety S2890: light on solar energy S2990: sidewalks on the left S4010-S6430: road in good conditions
L4-AK-RD3A-2	S0: residential (at the beginning of the road there 2 story buildings) S380: minimarkets directly on the edge of the road S430: mosque to the right S530: vegetable shops to the right S710-S1530: two story buildings here and there S2190: mosque and some small buildings S2330: car maintenance shops S2470-S3080: some small building S3110: residential	S70-S260: greenhouses S630: trees on the edge of the road S650: olive trees to the left and right S710-S1530: agricultural areas (greenhouses) S1870-2150: olive trees to the right and left of the road S2330: green areas to the left S2470-S3080: olive trees and some other kind of trees S3300: green areas next to houses S3510: olive trees nest to houses (2 story buildings) S3850: olive trees to the right	There is light all through the road S4340: light with solar panels S4470: waste bins

Road	Socio-Economic (Shops, Residential areas, traffic)	Natural Environment (Trees, land use, surface water)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals)
	S3270: Mosque to the left S3410: 1$ shop, minimarkets, vegetable shops S5020-S5080: residential	S4000: green areas S4140: olive trees to the left S4600-S4730: olive trees to the left	
L4-AK-RD3A-3	S0-S190: small shops and buildings S310: gas station S400: clothes shops, cell phone shops S630: gas station S2410-S2600: buildings with shops S4700: gas station S5000: start of traffic, haphazard parking, shops	S0-S310: palm and salix trees on the side walks S330-S4210: olive trees groves	S0-S190: sidewalks, light S3250: no light S4300: water tank S5130: waste bins S5430: majrameyah
L4-AK-RD3A-4	S0: buildings to the left S1030: building under construction S2670: start of Majdala S2900: house S3200-S3300: urban area, houses S3370: bus station S3410: mosque S3420: Akkar Association for Social Services S3520: Majdaly Municipality and next to it a health center S3610: narrow street S3200-S3750: urban area S4000: Al Hamayri S4600: urban S4800-S6950: narrow road, agricultural road S7250: end of agricultural road and start of urban areas	S0-S1096: olive groves S2760-S3110: pine and orange trees on the side of the road S2850-S2880: olive trees to the left of the road S2970-S3000: cypress used as fence for a green land S3660-S3730: green grass land fenced with concrete walls S3730: pine trees on the right S3750: start of agricultural area (olive groves) S3900: cow farm S4100-S4110: pine trees to the left and right S4110-S4220: olive trees S4250-S4330: almond and pine trees S4460: pine and oaks S4800-S6950: olive groves to the left and right S6120: river S6250: olive grove fenced with cypress trees S6400: cow farm S6830: chicken farm S6900: land fenced with cypress trees S7200: Diospyros kaki groves to the left and right	No street light Widening the road to the right, bad conditions S2000: acceptable conditions of the road S2670: street light on solar panels S4600: light S4800-S6950: bad conditions, no light S5500-S5550: retaining wall S6980: water channel
L4-AK-RD3A-5	S800: buildings S360: urban, Haddara S560: DairDalloum School	S500: olive trees S620: big tree near the school	S270: barrier to the left S620-S1050: road to serve a specific house, nothing of interest exists on the road
L4-AK-RD3A-6	S0: souk al shaabi for vegetables and fruits S170-S260: residential area, minimarkets, cell phone shops, pharmacies	S680: trees below the road S1100: sharp curve and valley S1200: trees on the sides of the road	S20: underpass S170: culvert There is light all through the road

Road	Socio-Economic (Shops, Residential areas, traffic)	Natural Environment (Trees, land use, surface water)	Infrastructure (Lighting, Phone/Electricity lines, culverts, water canals)
	S740: small shops, cell phone shop, MALHAME S1270: residential area, minimarkets S1360: mosque to the right S1910: car maintenance shop S2220-S2390: local road S2480: school to the left S2560-S2950: local road, residential S3000: pharmacy, car maintenance	S1300-S140: olive and figs on both sides S1650: down the road olive trees to the left and right S1700: green areas S1990: green trees S2480: cypress next to the school S2530: palm, nut tree, olive next to a house S2800: olive trees S3170: olive trees S3330-S3460: olive trees to the upper left	S1270: waste bins S1650: barriers to the left S1910: valley to the left No traffic was notices all through this road
L4-AK-RD3A-7	S200: buildings S380-S400: buildings S780: new building under construction S1180: house with garden on the left S1300: Mar Touma Municipality Building S1380: Mosque S1400: small village houses (end of road)	S0-S180: olive trees groves S230-S330: olive trees S460: livestock S460-S580: olive trees S560: cypress trees on the edge of the road S780-S1100: olive groves S1100: olive grove fenced with cypress trees S1230: pine trees S1400: pine tree	There is light S1070: windmill serving a house
L4-AK-RD3A-8	S0: urban (Bkarzat) S200: gas station S230: 1$ shop, mini markets S360: pharmacy S370: end of urban area S600: bus station S1630: gas station S1940: start of urban area S2000: cemeteries to the left S2280: mosque S2340-S3000: urban area S3100: end of Housnieh, less urban, olive groves to the left S3320: pharmacy S380: urban area S3640: car maintenance shop S3720: end of road, at the intersection of Abdeh-Halba	S370-1830: olive groves S1000-S1600: small pine trees newly planted to the right of the road S2000: River S3440: agricultural area to the right	S570-S780: water channel There is street light

ANNEX 2: CODE OF CONDUCT

1. Background

The purpose of these *Codes of Conduct and Action Plan to Prevent Gender-based Violence (GBV) and Child Abuse/Exploitation (CAE)* is to introduce a set of key definitions, core Codes of Conduct and guidelines that establish mechanisms for reporting, addressing, monitoring and sanctioning GBV and CAE within the work site and in its immediate surrounding communities.

The Codes of Conduct aim to prevent and/or mitigate the risks of GBV and CAE within the context of Roads and Employment Project for the Government of Lebanon to be funded under the World Bank financed Roads and Employment Project (REP). These Codes of Conduct are to be adopted by the civil works contractors, as well as supervision consultants.

Mutual respect and fair treatment by all parties, that include an understanding on the impact their presence has on the communities living in the areas targeted by the project, are deemed of utmost importance to create a respectful, pleasant and productive work environment. This will help prevent issues with GBV and CAE, thereby guaranteeing a safe environment to work in and around. The Codes also present clear guidelines for sanctions of staff should they be warranted. By ensuring that the project's staff respects the project environment and its communities, a successful attainment of the project objectives will be achieved.

2. Definitions

The following definitions apply:

- **Gender-Based Violence (GBV)** – is defined as any conduct, comment, gesture, or contact perpetrated by an individual (the perpetrator) on the work site or in its surroundings, or in any place that results in, or is likely to result in, physical, sexual or psychological harm or suffering to another individual (the survivor) without his/her consent, including threats of such acts, coercion, or arbitrary deprivations of liberty.

- **Child Abuse and Exploitation** (CAE)- is defined as physical, sexual or psychological harm of minor children (i.e. under the age of 18) including using for profit, labor, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, or video and digital cameras appropriately, and never to exploit or harass children or to access child pornography through any mediums

- **Child Protection (CP)** - An activity or initiative designed to protect children from any form of harm, particularly arising from CAE.

- **Child-** is used interchangeably with the term 'minor' and, in accordance with the United Nations
  United Nations Glossary on Sexual Exploitation and Abuse, refers to a person under the age of 18

- **Grooming** – is defined as behaviors that make it easier for a perpetrator to procure a child for sexual activity. For example, an offender might build a relationship of trust with the child, and then seek to sexualize that relationship (for example by encouraging romantic feelings or exposing the child to sexual concepts through pornography).

- **Online Grooming-** is the act of sending an electronic message with indecent content to a recipient who the sender believes to be a minor, with the intention of procuring the recipient to engage in or submit to sexual activity with another person, including but not necessarily the sender. For further details, refer to the *Criminal Code Act 1995,* Division 474 (telecommunications offences, subdivision C).

- **Survivor/Survivors-** is defined as the person(s) adversely affected by GBV or CAE. Women, men and children can be survivors ofGBV; children of CAE.

- **Perpetrator-** is defined as the person(s) who commit(s) or threaten(s) to commit an act or acts of GBVorCAE.

- **Work site-** is defined its the area in which Roads Rehabilitation works are being conducted, as ·part of interventions planned under the World-Bank-funded Roads and Employment Project (REP).

- **Work site surroundings-** are defined as the' Project Area of Influence' which are any area, urban or rural, directly affected by the project, or located within the distance of three kilometers radius from the work site and/or worker's camps, including all human settlements found on it.

- **Consent** – is defined as the informed choice underlying an individual's free and voluntary intention, acceptance or agreement to do something. No consent can be found when such acceptance or agreement is obtained through the use of threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. Any use of a threat to withhold a benefit, or of a promise to provide a benefit, or actual provision of that benefit (monetary and non-monetary), aimed at obtaining an individual's agreement to do something, constitutes an abuse of power; any agreement obtained in presence of an abuse of power shall be considered non-consensual. In accordance with the United Nations, the World Bank considers that consent cannot be given by children under the age of 18, even in the event that national legislation of the country into which the code of conduct is introduced has a lower age Mistaken belief regarding the age of the child and consent from the child is not a defense.

- **Contractor** – is defined as any fim1, company, organization or other institution that has been awarded a contract to conduct Roads Rehabilitation works in the context of the Roads and Employment Project (REP) and has hired managers and/or employees to conduct this work.

- **Consultant** – is defined as .any firm, company, organization or other institution that has been awarded a contract to provide consulting services in the context of the REP, and has hired managers and/or employees to conduct this work.
- **Manager-** is defined as any individual offering labor to the contractor or consultant, on or off the work site, under a formal employment contract and in exchange for a salary, with responsibility to control or direct the activities of a contractor's team, unit, division or similar, and to supervise and manage a pre-defined number of employees.

- **Employee-** is defined as any individual offering labor to the contractor or consultant on or off the work site, under a formal or informal employment contract or arrangement, typically but not necessarily in exchange for a salary (e.g. including unpaid interns and volunteers), with no responsibility to manage or supervise other employees.

- **Grievance Response Mechanism (GRM) -** the process established by the REP project to receive and address complaints.

- **Standard Reporting Procedure** – is defined as the prescribed procedure to be followed when reporting cases of GBV or CAE.

- **Accountability Measures-** is defined as the measures put in place to ensure the confidentiality of survivors and to hold contractors, consultants and the client responsible for instituting a fair system of addressing cases of GBV and CAE.

- **Response Protocol** – is defined as the mechanisms set in place to respond to cases of GBV and CAE.

- **GBV and CAE Compliance Team:** A team established by the Contractor and/or Consultant to address GBV and CAE issues with the work force.

3. Codes of Conduct

This chapter presents three Codes of Conduct for use:

- **Company Code of Conduct:** Commits the company to addressing GBV and CAE issues;

- **Manager's Code of Conduct:** Commits managers to implementing the Company Code of Conduct, as well as those signed by individuals; and,

- **Individual Code of Conduct:** Code of Conduct for each individual working on REP.

Company Gender Based Violence and Child Abuse/Exploitation Code of Conduct

Contractors and consultants are obliged to create and maintain an environment which prevents gender based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project. In order to prevent GBV and CAE, the following core principles and minimum standards of behavior will apply to all employees without exception:
1. GBV or CAE constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All fonns of GBV and CAE including grooming are unacceptable be it on the work site, the work site surroundings, or at worker's camps. Prosecution of those who c01mnit GBV or CAE will be pursued.
2. Treat women and children (persons under the age of 1·8) with respect regardless of race, color, language, religion, political or other opinion, national, etlmic or social origin, property, disability, birth or other status.
3. Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Sexual activity with children under 18-including through digital media-is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
5. Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
6. Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited (see definition of consent above). This includes relationships involving the withholding, promise of actual provision of benefit (monetary or nonmonetary) to community members in exchange for sex- such sexual activity is considered "nonconsensual" within the scope of this Code.
7. Where an employee develops concems or suspicions regarding acts of GBV or CAE by a fellow worker, whether in the same contracting finn or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
8. All employees are required to attend an induction training course prior to commencing work on site to ensure they are familiar with the GBV and CAE Code of Conduct.
9. All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV and CAE Code of Conduct.
l 0. All employees will be required to sign an individual Code of Conduct confirming their agreement to support GBV and CAE activities.

Company Gender Based Violence and Child Abuse/Exploitation Code of Conduct

Contractors and consultants are obliged to create and maintain an environment which prevents gender based violence (GBV) and child abuse/exploitation (CAE) issues, and where the unacceptability of GBV and actions against children are clearly communicated to all those engaged on the project. In order to prevent GBV and CAE, the following core principles and minimum standards of behavior will apply to all employees without exception:

1. GBV or CAE constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV and CAE including grooming are unacceptable be it on the work site, the work site surroundings, or at worker's camps. Prosecution of those who commit GBV or CAE will be pursued.
2. Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
3. Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Sexual activity with children under 18—including through digital media—is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
5. Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
6. Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited (see definition of consent above). This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.
7. Where an employee develops concerns or suspicions regarding acts of GBV or CAE by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
8. All employees are required to attend an induction training course prior to commencing work on site to ensure they are familiar with the GBV and CAE Code of Conduct.
9. All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV and CAE Code of Conduct.
10. All employees will be required to sign an individual Code of Conduct confirming their agreement to support GBV and CAE activities.

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

FOR THE COMPANY

Signed by _____

Title: _____

Date: _____

Manager's Gender Based Violence and Child Protection Code of Conduct

Managers at all levels play an important role in creating and maintaining an environment which prevents GBV and prevents CAE. They need to support and promote the implementation of the Company and Individual Codes of Conduct. To that end, they must adhere to the Manager's Codes of Conduct. This commits them to support and developing systems which maintain a GBV-free and child safe work environment. These responsibilities include but are not limited to:

1. Mobilization

1. Establish a GBV and CAE Compliance Team (GCCT) from the contractor's and consultant's staff to write an Action Plan that will implement the GBV and CAE Codes of Conduct.
2. The Action Plan shall, as a minimum, include the
    a. **Standard Reporting Procedure** to report GBV and CAE issues through the project Grievance Response Mechanism (GRM);
    b. **Accountability Measures** which will be taken against perpetrators; and,
    c. **Response Protocol** applicable to GBV survivors/survivors and perpetrators.
3. Coordinate and monitor the development of the Action Plan and submit for review to the CDR and the PIU safeguards specialist , as well as the World Bank prior to mobilization.
4. Update the Action Plan to reflect feedback and ensure the Action Plan is carried out in its entirety.
5. Provide appropriate resources and training opportunities for capacity building so members of the GCCT feel confident in performing their duties. Participation in the GCCT will be recognized in employee's scope of work and performance evaluations.
6. Ensure that contractor, consultant and client staff are familiar with the REP GRM and that they can use it to anonymously report concerns over GPV and CAE (See Section 4.2 in the Action Plan).
7. Hold quarterly update meetings with the GCCT to discuss ways to strengthen resources and GBV and CAE support for employees and community members.

2. Training

1. All managers are required to attend an induction manager training course prior to commencing work on site to ensure that they are familiar with their roles and responsibilities in upholding the GBV and CAE Codes of Conduct. This training will be separate from the induction training course required of all employees and will provide managers with the necessary understanding and technical support needed to begin to develop the Action Plan for addressing GBV and CAE issues.
2. Provide time during work hours to ensure that direct reports attend the mandatory REP facilitated induction GBV and CAE training required of all employees prior to commencing work on site.
3. Ensure that direct reports attend the monthly mandatory training course required of all employees to combat increased risk of GBV and CAE during civil works.
4. Managers are required to attend and assist with the REP facilitated monthly training courses for all employees. Managers will be required to introduce the trainings and announce the self- evaluations.
5. Collect satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of training.

3. Prevention

1. All managers and employees shall receive a clear written statement of the company's requirements with regards to preventing GBV and CAE in addition to the training.

2. Managers must verbally and in writing explain the company and individual codes of conduct to all direct reports.
3. All managers and employees are to sign the individual 'Code of Conduct for GBV and CAE', including acknowledgment that they have read and agree with the code of conduct.
4. To ensure maximum effectiveness of the Codes of Conduct, managers are required to prominently display the Company and Individual Codes of Conduct in clear view in public areas of the work space. Examples of areas include waiting, rest and lobby areas of sites, canteen areas, health clinics.
5. All posted and distributed copies of the Company and Individual Codes of Conduct should be translated into the appropriate language of use in the work site areas (ex. Arabic, French, English).
6. Managers will encourage employees to notify the GRM of any acts of threats or violence to women or children they have witnessed or received, or have been told that another person has witnessed or received, or any breaches of this code of conduct.
7. Mangers should also promote internal sensitization initiatives (e.g. workshops, campaigns, on-site demonstrations etc.) throughout the entire duration of their appointment in collaboration with the GCCT and in accordance to the Action Plan.
8. Managers must provide support and resources to the GCCT to create and disseminate the internal sensitization initiatives through the Awareness-raising strategy under the Action Plan.

4. Response

1. Managers will be required to provide input, final decisions and sign off on the **Standard Reporting Procedures** and **Response Protocol** developed by the GCCT as part of the Action Plan.
2. Once signed off, managers will uphold the **Accountability Measures** set forth in the Action Plan to maintain the confidentiality of all employees who report or (allegedly) perpetrate incidences of GBV and CAE (unless a breach of confidentiality is required to protect persons or property from serious harm or where required by law).
3. If a manager develops concerns or suspicions regarding any form of GBV or CAE by one of his/her direct reports, or by an employee working for another contractor on the same work site, s/he shall immediately refer the case to the competent authorities (Police) and, at the same time, report the case to the GRM and the GCCT for internal processing according to the established reporting and accountability measures. Always respecting the survivor's choices if a survivor has been identified.
4. Once a sanction has been determined, the relevant manager(s) is/are expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision was made.
5. Managers failing to comply with such provision can be in turn subject to disciplinary measures, to be determined and enacted by the company's CEO, Managing Director or equivalent highest-ranking manager. Those measures may include:
    a. Informal warning
    b. Formal warning
    c. Additional Training
    d. Loss of up to one week's salary.
    e. Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
    f. Termination of employment.
6. Ultimately, failure to effectively respond to GBV and CAE cases on the work site by the contractor's managers or CEO may provide grounds for legal actions by authorities.

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

FOR THE EMPLOYER

Signed by _____

Title: _____

Date: _____

ANNEX 3: PUBLIC DISCLOSURE HEARING

Roads and Employment Project
Public Hearing Session
ESMP for the Rehabilitation of Selected Roads in AkkarCaza

Location: Halba Municipality
Date & Time: 16/10/2019 from 10:00 to 12:00
Attendees: Attendance sheet is attached

Proceedings:

1. Welcome Remarks

The public hearing opened with a word from ACE representative who introduced the overall project and its objectives and relevant organizations including CDR and the World Bank.

2. Presentation

The Environmental Expert from ACE provided a detailed description of the roads and proposed rehabilitation works, purpose of the hearing, ESMP process, World Bank requirements, and listed the potential negative and positive environmental and social issues associated with construction and operation of the project.

3. Discussion

The floor was then opened for discussion and questions. The main issues that were raised are as follows:

- The President of Halba municipality and other municipalities (Berqayel, beit el Houch, Jdeidet el Qayteh, Zouq el Housnieh, Karkaf, and Ouyn El Ghezlen) asked about the criteria that were taken into consideration when selecting the roads. The consultant and CDR responded to this comment by noting that a study was done for the selection of roads taking into account the current conditions of the roads and available budget.
- All municipality representatives requested to reconsider the selection of roads since in their opinion there is a group of roads in the caza that needs rehabilitation as they are in worse conditions than the selected ones and one of them leads to a university. CDR and the consultant responded to this comment by noting that the current roads were already selected and approved by the Council of Ministers and the World Bank and modifications cannot be made at this stage. However, CDR asked the municipality representatives to raise their concern by sending an official letter to CDR stating the roads that they request to rehabilitate in the caza.
- It was requested to coordinate with the municipalities before starting the road rehabilitation work in order to avoid repeating the excavation by the municipality for infrastructure works (sewerage networks, electricity cables, etc.…).
- It was noted that there is a lot of pedestrian traffic due to commercial activity on some of the selected roads but there are no sidewalks. It was clarified that only existing sidewalks should be rehabilitated. New sidewalks cannot be installed since this will require expropriation.

- Questions were raised on the timing and budget for the proposed roads in Akkarcaza, which were responded to by the consultant and CDR.
- As for the impacts that might result from the rehabilitation of roads, the public do not see any major environmental, health and safety concerns.

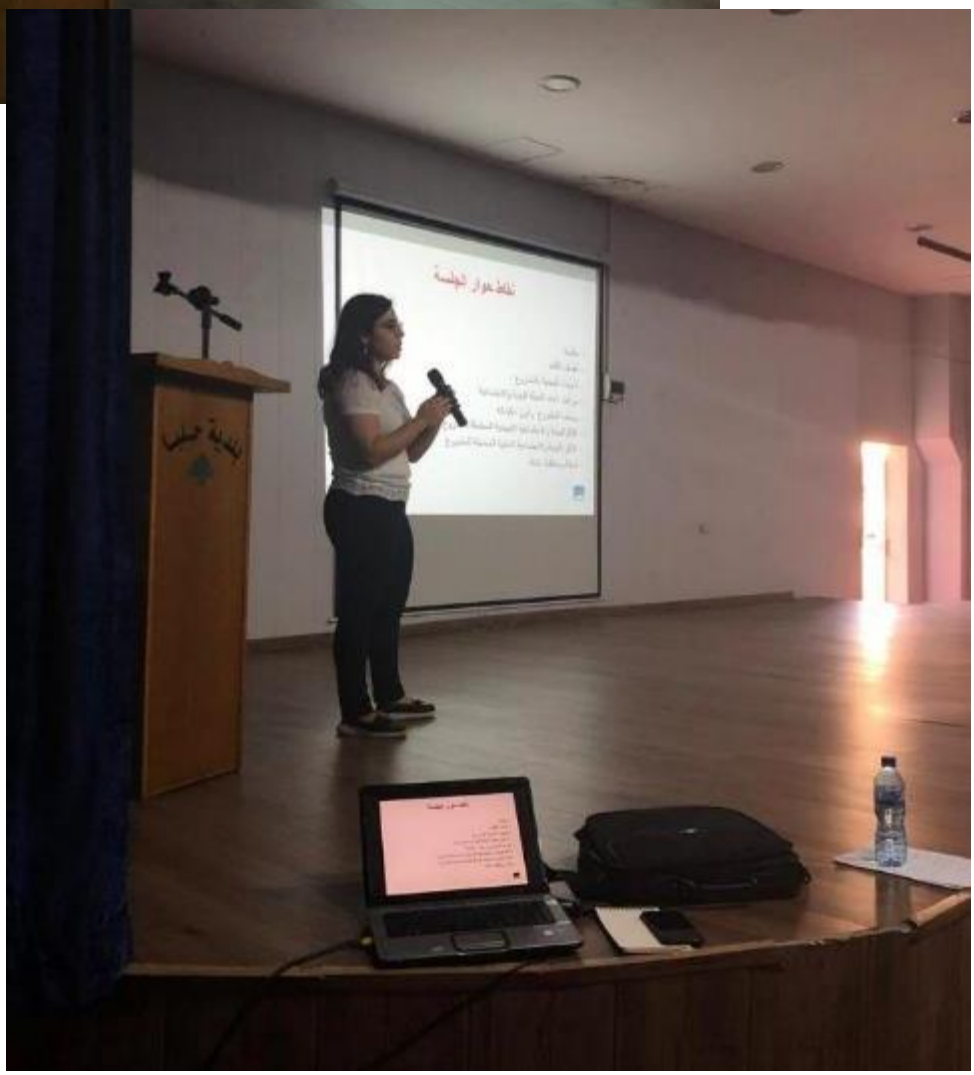
4. Women's Session

Following the main discussion, a separate session was held with women who were attending the public hearing. The purpose of the session was to obtain women's feedback on the project and focus on their concerns and suggestions. The main issues raised during this session are as follows:

- None of the women expressed any concerns about restriction of movement during the rehabilitation works due to the influx of workers to the area.
- Most of the women agreed that for Akkar, it would be highly desirable for both the residents and the contractor to conduct all rehabilitation works during the summer, as there will be no schools during this period, minimizing exposure of students commuting on roads to ongoing construction works.
- The women suggested to avoid the works in roads before the period of holidays so that the transportation and traffic are not affected.
- All women participants stressed on the need of clear coordination mechanism with municipalities to quickly address potential problems, such as a burst water or wastewater pipes.
- It was suggested to install and rehabilitate the sidewalks in order to have areas for jogging.
- Regarding the workers that are going to be involved during the rehabilitation phase, all women mentioned that there must be regular supervision on the workers not to communicate in an improper manner with the residents especially where the roads are located near schools or residential areas. In addition, women prefer that the contractor hire workers from the Lebanese nationality and to be chosen from the villages.
- Women participants felt that during rehabilitation, the project will positively contribute to improving women's participation in the economy by providing catering services to the workers.
- The female participants felt that during operation, the project will contribute positively to improving women's participation in the economy by making transportation safer and more convenient.

Photographic documentation of the public hearing can be found on the following pages.


مشروع الطرق والعمالة
في لبنان
LOT 4
بلدية حلبا


نقاط حوار الجلسة
بلدية حلبا

List of Attendees to Public Hearing

PUBLIC HEARING - ATTENDANCE SHEET جلسة مشاركة عامة - الحضور

مشروع الطرق والعمالة في لبنان

4.3 - ~~Minnieh - Denniah~~ Akkar

حلبا

Date: 16-Oct-19

الإمضاء Signature	الهاتف Telephone	الصفة Position	البلدة Town	المؤسسة Institution	الاسم Name
[signature]	[illegible]	رئيس البلدية	القرقف	بلدية القرقف	الشيخ يحيى الرفاعي
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	70/669942	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	03-114499	CDR [illegible]		CDR	[illegible]
[signature]	78-619935		حلبا	[illegible]	[illegible]
[signature]	71061387	[illegible]		[illegible]	[illegible]
			حلبا	[illegible]	[illegible]
[signature]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PUBLIC HEARING - ATTENDANCE SHEET جلسة مشاركة عامة - الحضور

مشروع الطرق والعمالة في لبنان

4.3 - ~~Minnieh - Denniah~~ Akkar

حلبا

Date: 16-Oct-19

الإمضاء Signature	الهاتف Telephone	الصفة Position	البلدة Town	المؤسسة Institution	الاسم Name
[signature]	70-151964	مدير قسم الطرق		ACE	هشام الخليلي
[signature]	03-721296	Senior Environmental Consultant		ACE	[illegible]
[signature]	71/060524	Environmental Researcher		ACE	[illegible]
[signature]	03/525410	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	رئيس البلدية	[illegible]	[illegible]	[illegible]
[signature]	[illegible]	مختار	[illegible]	[illegible]	[illegible]
[signature]	70234528	ناشط	حلبا	Red cross	[illegible]
[signature]	70/520019	رئيسة الجمعية	حلبا	[illegible]	[illegible]
[signature]	70/163376	[illegible]	[illegible]	[illegible]	[illegible]
[signature]	03/092950	عضو البلدية	عكار	بلدية بقرزلا?	[illegible]

Presentation during Public Hearing


مشروع الطرق والعمالة
في لبنان

THE WORLD BANK

خطة الإدارة البيئية والاجتماعية

LOT 4
4.2 - قضاء عكار

جلسة مشاركة العامة

ACE


نقاط حوار الجلسة

- مقدمة
- أهداف اللقاء
- الجهات المعنية بالمشروع
- مراحل اعداد الخطة البيئية والاجتماعية
- وصف المشروع وأبرز مكوناته
- الآثار البيئية والاجتماعية الايجابية المحتملة للمشروع
- الآثار البيئية والاجتماعية السلبية المحتملة للمشروع
- أسئلة ومناقشة عامة


مقدمة

- تتمتع شبكة الطرق في لبنان بتدفق وتغطية كافيين بشكل عام
- لكن نسبة كبيرة من تلك الطرق في حالة سيئة وهو الأمر الذي يؤدي إلى إعاقة التنمية المحلية والاقتصادية، خاصة في المناطق الريفية التي تعتبر فيها حالة شبكة الطرق أدنى مستوىً من حالة الطرقات على المستوى الوطني ككل


مقدمة

- يخطّط مجلس الانماء والاعمار لتنفيذ مشروع الطرق والعمالة في لبنان بقرض تمويل من البنك الدولي
- يشمل المشروع أعمال تأهيل عدة طرق في بلدات من كافة الأقضية اللبنانية
- يهدف هذا المشروع إلى تحسين كفاءة قطاع الطرق من خلال تحديد أولويات أعمال الطرق وتحسين تقنيات إدارة شبكة الطرق والعلامة العامة


1. أهداف اللقاء

- إعلام الرأي العام بالمشروع لإبداء ملاحظاتهم وفقاً لسياسة ضمانات البنك الدولي (سياسة تشغيلية رقم 4.01)
- عرض لأهم الآثار البيئية والاجتماعية والتدابير التخفيفية المرتبطة بتنفيذ المشروع
- مشاركة الحضور بمناقشة القضايا المطروحة وطرحهم لقضايا جديدة لم تذكر
- مناقشة خطة الإدارة البيئية والاجتماعية للمشروع


2. الجهات المعنية بالمشروع

الجهة	الصفة
البنك الدولي	ممول المشروع
مجلس الانماء والاعمار	إدارة وتنفيذ
المكتب الهندسي الإستشاري ACE	استشاري هندسي و بيئي


3. مراحل إعداد الخطة البيئية والإجتماعية

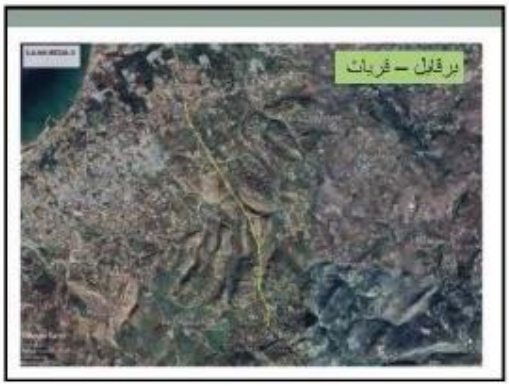

4. وصف المشروع
4.1 الطرق التي سيتم إعادة تاهيلها في قضاء عكار
مجموع طول الطرق المذكورة أعلاه: 39.4 كيلومتر


4.2 موقع المشروع في قضاء عكار


4.3 الطرق المقترح تاهيلها في قضاء عكار


العبدة – ببنين – بيت حوش – برقايل


برقايل – وادي الجاموس - العبدة


برقايل – قربات


دير دالوم – مار توما – محدلا –
بقرزلا – زوق الحصنة


ذوق المكشرين


برقايل – برال


دير مار توما


برقايل - زوق الحصنة


بيت الحوش – جنيدة القيطع


بيت الحوش – عيون العرلان


4.4 صور لحة موقع ضمن المشروع في قضاء عكار


4.4 صور لحة موقع ضمن المشروع في قضاء عكار


4.4 صور لحة موقع ضمن المشروع في قضاء عكار


4.4 صور لحة موقع ضمن المشروع في قضاء عكار

4.4 صور لعدة مواقع ضمن المشروع في قضاء عكار

5. ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

بناءً على الدراسات الهندسية، إن أعمال التأهيل المقترحة خلال مرحلة التنفيذ تضمّ التالي حسب المتطلبات الفنية و السلامة العامة:

- تأمين/تأهيل الطبقات الإسفلتية والاسس
- تأمين/تأهيل إشارات سير و تخطيط الطرقات
- تأمين/تأهيل جدران دعم إستنادية
- تأمين/تأهيل حواجز سلامة جانبية

5. ماذا يتضمن المشروع خلال مرحلة التنفيذ؟

بناءً على الدراسات الهندسية، إن أعمال التأهيل المقترحة خلال مرحلة التنفيذ تضمّ التالي حسب المتطلبات الفنية و السلامة العامة:

- تأمين/تأهيل أقنية، عبارات لتصريف مياه الأمطار
- تأهيل شبكات إنارة
- تأهيل أرصفة

6. الآثار البيئية والاجتماعية الإيجابية للمشروع

- تقليل الازدحام المروري وتسهيل التنقل في وإلى القضاء
- خلق فرص عمل لأبناء المنطقة والمساهمة في التنمية الاقتصادية المحلية
- المحافظة على السلامة العامة في الطرقات من خلال تقليل حوادث السير والانجرافات
- تشجيع الشركات المحلية من خلال بيع المواد الخام والآلات والسلع
- ازدهار التنمية الاقتصادية والاجتماعية في المناطق الريفية
- التقليل من تلوث الهواء والغبار

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

النشاط	الأثر المحتمل
أعمال بناء أو إصلاح مجاري مياه الأمطار	أضرار على البنية التحتية
قلع الأشجار والنباتات	ضرر على التنوع البيولوجي
التخلص غير السليم من النفايات الصلبة	تلوث التربة والمياه
احتمال حدوث حوادث تسرب	تلوث التربة والمياه

التدابير التخفيفية

- التخلص السليم من النفايات الصلبة الناتجة عن أعمال التنفيذ
- صيانة كافة الآليات بشكل دوري لمنع حوادث التسرب

7. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التنفيذ

النشاط	الأثر المحتمل
حركة الآليات والمركبات	زيادة احتمال حوادث السير
انبعاثات الغبار وزيادة نسبة الضجيج	ضرر على السلامة العامة وسلامة العمال

التدابير التخفيفية

- إدارة حركة المرور أثناء تنفيذ المشروع وتأمين مواقف لهذه الغاية
- التأكد من أن الإشارات التحذيرية وعلامة الإصابة ظاهرة وموجودة في الأماكن المكتظة وخاصة قرب المدارس والمستشفيات والمناطق التجارية
- حصر أعمال التنفيذ خلال فترة النهار


8. الآثار البيئية والاجتماعية السلبية المحتملة للمشروع خلال مرحلة التشغيل
النشاط
الأثر المحتمل
زيادة حركة المرور
زيادة احتمال حوادث السير
زيادة حركة التنقل على الطرق
زيادة انبعاث مخلفات الهواء والضجيج والاهتزازات
زيادة الاستكانات والتعريضات الناتجة عن المركبات المتنقلة
تلوث التربة والمياه
تدابير التخفيف
• الصيانة الدورية للطرق
• معالجة المنحدرات المعرضة للانزلاق على الطرق
• تطبيق حركة مرور السلحفات قبالة بيوت المحافظة على الطرق


أسئلة ومناقشة عامة
يسعدكم إبداء رأيكم عبر التواصل مع
المكتب الهندسي الإستشاري
هاتف 01/497250
فاكس 01/497550


شكـــــراً لحضوركم
ومشاركتكم

ANNEX 4: GRIEVANCE REDRESS MECHANISM (GRM) FORM

Reference No:	
Contact Information **Please mark how you wish to be contacted (mail, telephone, e-mail).**	☐ **By Post: Please provide mailing address:** _____ _____ _____ ☐ **By Telephone:** _____ ☐ **By E-mail** _____
Preferred Language for communication	☐ **Arabic** ☐ **English**

Description of Incident or Grievance:	What happened? Where did it happen? Who did it happen to? What is the result of the problem?
Date of Incident/Grievance	
	☐ **One time incident/grievance (date _____)** ☐ **Happened more than once (how many times? _____)** ☐ **On-going (currently experiencing problem)**
What would you like to see happen to resolve the problem?	

Signature: _____

Date: _____

GRM Log Book

Name/group of commenter/complainant	Complaint Received date	Description of Issues	Proposed Corrective Actions	Date of Response	Status		
					Solved	Ongoing	Pending