

THE ALEXANDRIA RAML TRAM REHABILITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

SYSTRA eegis   

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		Issued Date	31 st of July 2022
			Rev 6 -

Report Issue Record

Project Title: Alexandria Raml Tram rehabilitation Project
Contract Number: 101M
Report Title: Environmental and Social Impact Assessment
Issue Number: 006

Revision	Date	Description
0	10 February 2021	First Issue
1	31 December 2021	Second Issue
2	14 February 2022	Third Issue
3	23 rd of February 2022	Fourth Issue
4	1 st of March 2022	Fifth version – approved by the European Investment Bank, the French Development Department, and the National Authority for Tunnels
5	31 st of March 2022	Sixth version – approved by the European Investment Bank, the French Development Department, and the National Authority for Tunnels
6	31 st of July 2022	The seventh version - after the public consultation session

Reference Documents

1. French Development Agency Alexandria Urban Transport Study Progress report 2 – Technical feasibility-2016
2. Design Inception Report, 101M-AEC-T1-ALL-REP-GEN-0001
3. Design Criteria and Standard Report -101M-T1-ALL-REP-GEN-0000

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EXECUTIVE SUMMARY

PROJECT BACKGROUND AND JUSTIFICATION

Alexandria's tramway network, which came into service in 1860, is the oldest in Africa and the Middle East. It consists of two lines: the Raml line and the Al Madina line. These lines are still in service today and are used by locals and tourists alike. The Alexandria Raml tram will be rehabilitated to transform the existing Raml line into a modern and efficient tram line, equipped with modern infrastructure, systems, and rolling stock, to reduce the travel time between the Raml and Victoria terminals while tripling capacity and improving comfort and accessibility for passengers. The rehabilitation of a 160 years old tram will represent a paradigm shift in the means of transportation within the Alexandria governorate.

The European Investment Bank (EIB) and Agence Française de Développement (AFD) group are providing a loan to the Arab Republic of Egypt, in addition to a contribution from the Egyptian Ministry of Investment and International Cooperation to finance the Raml Tram Rehabilitation Project. The ultimate beneficiary of the loan is the National Authority for Tunnels (NAT) to support the investments in the rehabilitation and expansion of metro and tram systems in Alexandria and Cairo. Financing of the Raml Tram Rehabilitation Project (hereinafter 'the Project') will contribute to increasing the availability and improving the quality of public transport systems in Alexandria and will lead to a greenhouse gas emissions reduction due to the expected modal shift.

The Project will be implemented in two phases. The first phase will be the tramway design phase which will last for approximately 12 months, followed by an implementation phase of at least 24 months. The latter includes the construction of viaducts, the installation of electronic signalling systems, and the complete renewal of the rolling stock. It also involves the relocation of some stations all of which will make the line more fluid for commuters.

According to the Egyptian Environmental Affairs Agency (EEAA) the Project (hereinafter the Project) falls under Category C Project. For Category C Projects, it is compulsory to submit the full Environmental and Social impact Assessment study (ESIA) including consultations and disclosure.

According to the World Bank Environmental and Social Framework issued in 2017 followed by the AFD, the Project is classified as Category B+ due to substantial environmental and social risks. Accordingly, the Project requires a full ESIA study including an ESMP and should have

public consultations and a disclosure process along with the preparation of Resettlement Action Policy (RAP) or Livelihood Restoration Plan (LRP) and a Stakeholder Engagement Plan (SEP).

In addition, based on the EIB Environmental and Social Standards issued in 2017, the Project is Category B – Medium risk in which Environmental and Social impacts can be readily identified and mitigation and/or remedial measures can be put in place.

In accordance with the World Bank's Environmental and Social Framework and the EIB Environmental and Social Standards, the objectives of this ESIA Study are to:

- i. Describe the Project components and activities as relevant to the environmental and social assessment;
- ii. Identify and address relevant national and international legal requirements and guidelines;
- iii. Describe the environmental and socioeconomic baseline conditions prior to the commencement of Project activities;
- iv. Assess Project alternatives, including the no Project alternative;
- v. Assess potential positive and negative site-specific environmental and social impacts of the Project during construction and operation phases; and
- vi. Develop environmental and social management and monitoring plans (ESMP) in compliance with the relevant laws in order to address the identified impacts.

PROJECT DESCRIPTION

The existing Raml Tram is a double-track rail system which runs east-west across the city from Victoria Station in the east to Raml Station in the west. It operates as two distinct lines with common tracks for most of the line. The total infrastructure length of the tramline is 14.4 km including both the Sidi Gaber and San Stefano loops which Line 1(Red) is 10.6 km long with 31 stops while Line 2(Green) is 10.180 km long consisting of 29 stops. The rehabilitated route of the tramway will consist of 2 lines with total number of 24 stations with a total length of about 13.2 km.

The main objective of the Alexandria Raml Tram Rehabilitation Project is to upgrade and enhance the Raml tram into a modern, reliable and efficient LRT system fit for the 21st century and which mirrors the grandeur and history of the city of Alexandria. It is therefore necessary to renew the civil and railway infrastructures paying particular attention to the rolling stock, the efficiency of the operating and maintenance regimes, and the safety of the travelling public.

The technical objectives of the Project include:

- Improve the commercial speed significantly, from an actual commercial speed of 10-12km/hr to 21 km/hr by optimizing the number of stations, without affecting the actual catchment area
- Implement cost efficient design of the infrastructure, by maintaining the Project at grade as much as possible and adoption solution of complex structures only when required.
- Increase the accessibility and reliability of the Project by optimizing the passengers' flows and using modern low-floor rolling stock
- Decrease the cost for operation and maintenance by implementing a new depot with a higher capacity and additional workshop and stabling area along the Project in accordance with the needs deriving from a much higher commercial speed and an optimized headway.
- Ensure safe access of the passengers and rolling stock to the stations
- Ensure safe access of the passengers to rolling stock
- Provide reduction of fuel consumption and reduction of operation and maintenance costs with vehicles and surface roads
- Provide reduction of air pollution in the areas served by the Project
- Ensure integration of all public transportation modes (trams, buses, shared taxis, etc.) and overall improvement of the travel time for all users for the public transportation
- Propose a connection between Raml Tram and the Abu Qir line according to the alignment of both lines and introduce an optimum solution to ensure an efficient flow of passengers between them

The rehabilitated route will be 13.2 km long and consist of 24 stations after removal of the Sidi Gaber North loop.



Figure 0-1 Proposed Corridor of the Rehabilitate Tram Route

Project activities include rehabilitation of the track, readjustment of station positions, removal of some existing stations to optimize efficiency, elevation of segments from; Azarita to El-Shatby, Sidi Gaber, Roushdy to Hedeya, El-Wezara to Schutz, and Victoria via viaducts. Stations will be reconstructed and rehabilitated to accommodate more passengers and improve loading and unloading efficiency. The project will also exhibit improvement of the fare collection systems, recruitment and operation of modern tram vehicles, design and construction of a new or refurbished depot for the Raml tram line, improvement of the power supply, replacement of the overhead catenary system with underground positive feeders, and implementation of a traffic signaling system to avoid congestion at critical junctions.

Pre-Construction and decommissioning activities will include mobilization of the contractor, clearance of the right of way and construction facilities zone, and preparatory works. The construction phase will entail civil works of the trackway to refurbish the existing trench, embankment if needed, and constructing the viaducts. In addition, construction activities will include construction of the power substation, the rail system, roads and sidewalks, system implementation, setting up station shelters and urban equipment, lighting, and testing and commissioning.

Operational and maintenance elements of the project will include the data transmission network, SCADA, automatic vehicle location system (AVLS), Public Address and Public Information System, time distribution, communication system, deployment of a CCTV system, access control system, and an operation control center.

LEGAL AND INSTITUTIONAL FRAMEWORK

1) Applicable Egyptian Legislation

- Law No. 4/1994, amended by Law No. 9/2009 and Law No. 105/2015 and its Executive Regulation (ER) 338/19995 amended by Decrees No. 1741/2005, 1095/2011, 710/2012, 964/2015, 618/2017, 1963/2017 and most recently Decree No. 202/ 2020 commonly known as the Law on Protection of the Environment
- Public Cleanliness Law No. 38/1967
- Solid Waste Management Regulation No. 202 /2020
- Industrial Wastewater Disposal Law 93/1962
- Article 22 of Law 9/2009 amending Law 4/1994 and article 17 of its modified ER by Decree No. 1741/2005, stipulate that establishments should maintain environmental registers for their activities.
- Monuments Law 117/1983
- articles 43 - 45 of Law No. 4/1994 and articles 44 - 47 of its modified ERs by Decrees No. 1095/2011 and 710/2012 on Occupational Health and Safety
- Labour Law No. 12/2003
- Ministerial Decree No. 211/2003 of the Ministry of Manpower
- Land Acquisition and Involuntary Resettlement law 187/2020
- Law no. 94/2003, Protection of communities Human Rights Laws
- Civil Code 131/1948
- Unified Building Law no.119/2008

2) IFI Requirements

WB Safeguard Requirements

- ESS 1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS 2: Labour and Working Conditions
- ESS 3: Resource Efficiency and Pollution Prevention and Management
- ESS 4: Community Health and Safety
- ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS 8: Cultural Heritage

- ESS 10: Stakeholder Engagement and Information Disclosure

EIB Environmental and Social Requirements

- EIB Standard 1: Assessment and Management of Environmental and Social Impacts and Risks.
- EIB Standard 2: Pollution Prevention and Abatement
- EIB Standard 3: Biodiversity and ecosystems.
- EIB Standard 4: Climate-Related Standards
- EIB Standard 5: Cultural heritage.
- EIB Standard 6: Involuntary Resettlement.
- EIB Standard 7: Rights and Interests of Vulnerable Groups
- EIB Standard 8: Labour standards.
- EIB Standards 9: Occupational and Public Health, Safety and Security.
- EIB Standard 10: Stakeholder engagement.

3) Permitting Requirements

Egyptian Permitting Requirements

The Competent Administrative Authority (CAA) is the licensing authority that is responsible for assessing the environmental impact of the establishment applying for a license in accordance with the elements, designs, specifications and conditions issued by the EEAA in agreement with the competent administrative body. The CAA for this project is NAT.

After completing the study in accordance with the General Principles and Guidelines by EEAA, the developer submits a copy to the competent administrative authority, along with a letter describing the nature and activity of the proposed project.

The CAA checks completeness and correctness of the documents and information contained within, against the relevant guidelines.

After reviewing the documents, the CAA will submit a formal application to the EEAA for review and evaluation. EEAA will submit the result of the evaluation within 30 days of receiving the study.

EEAA may request amendments to the study and additional mitigation measures, before issuing a final approval of the report.

The construction and operational management plans included within approved report is a legally binding obligation to the developer and need to be included in the contractor's scope of work within the tender documents.

IFI Authorization process

According to World Bank ESS, the Project is classified as Category B+ Project which requires full ESIA study including ESMP, should have public consultations, disclosure processes, and the development of a RAP or LRP and SEP are necessary. Based on EIB standard 1 it is Category B which Environmental and social impacts can be readily identified and mitigation and/or remedial measures can be put in place – Medium risk

PROJECT IMPACTS AND MITIGATIONS

Potential Impacts during Demolition / Pre-Construction and Construction Phases

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Job creation and local content	Creation of job and supplies opportunities is by nature a positive impact. However, if it is poorly managed, disputes might be faced with the community people of Alexandria City. The preliminary estimates of the number of direct job opportunities are about 500 jobs to be allocated for skilled, semi-skilled and unskilled labourers. Adding to this number, the jobs that will be provided to sub-contractors' workers. The majority of job opportunities to be created during pre-construction and construction phases will be Project based or temporary jobs.	- A recruitment and an employment plan should be developed - The creation of jobs should be properly managed in order to fairly implement recruitment process with no discrimination and transparently. A local content and procurement plan must be developed. The basic contents of this plan focus on: - Forecasting hiring and procurement needs - Points of Contact and Data Management - Optimizing Local Employment/Procurement - Communication	Positive

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	Additionally, there will be different supplies opportunities e.g. auxiliary facilities, water, food, services ...etc		
Ambient Air Quality	Increase dust emission	- A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected where practical and feasible as dust barrier. - Minimize movement of construction traffic around site and maintain appropriate speed limits. Vehicle speed will be minimized to control dust generation (for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr); - Preparation of Dust Management Plan for each specific site as part of the Contractor ESMP, including site map indicating	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		location of physical barriers such as fencing, location of stockpiles and storage areas, traffic routes and stabilized site access/exit points, presentation of dust control measures to be used on site, and dust management checklist.	
	Gaseous Emissions	- All machinery and vehicles need to be regularly maintained and in good working conditions such that fugitive/gaseous emissions are avoided/minimized. . During the tender phase and construction works, the Contractor must review documentations about construction machinery exhaust emissions. - Turning off engines when they are not used or working on minimum rpm.	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- The contractor is obliged to use at all times the latest technology to reduce exhaust emissions.	
Noise and Vibration propagation	Increase of allowable noise and vibration levels	- Prepare a Construction Management Plan (CMP) in agreement with Alexandria Governorate and NAT, in line with lenders' E&S Standards (i.e. EIB ESS, World Bank ESS) - A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected where practical and feasible as noise barrier. - Localized noise barriers will be erected as necessary around items such as generators or high duty compressors. - Machineries used during construction such, as excavator, generators, boring	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		machine, etc are certified and maintained - The contractor is obliged to use at all times the latest technology in terms of noise reduction. - Regular maintenance for all equipment and vehicles used in the construction activities to maintain the levels of noise and vibration within the allowable levels. - All works should take place during the day/evening, and only by exception at night. If works need to take place at night, the contractor shall ask written permission from promoter and shall inform residents at least 2 weeks in advance	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Groundwater	Interrupt nature and quality of groundwater due to improper waste handling and diversion activities	- Prior to construction activities, the Contractor must review the detailed hydrogeological study (to be developed by Systra before demolition and construction) and review the numerical models that represent groundwater presence, the expected scenarios of rising groundwater water levels, and the extent of the negative impacts on facilities and residential buildings. - Ensure proper maintenance equipment used for construction equipment are in good condition to minimize spills. - Systematic control over implementation of measures considered by the waste management plan; - Sewage holding tanks should be evacuated as frequently as-required, to	Moderate
	intercept the water table during utility diversion, it may be necessary to install a dewatering system		Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		prevent over flow. A schedule for regular sewage tanker evacuation of sewage holding tanks should be established	
Soil	Degradation of soil quality	- Identify the geological features of the sub areas to predict the impact that may occur. - The geotechnical surveys that will be carried out by ACE and provided to NAT and the Contractor pre-construction will give more information about the local conditions of the soil characteristics along the route of the tram way and location of depot.	Minor
Generated Waste	- o Solid hazardous and non-hazardous waste generated from construction activities - o Liquid waste includes dewatering water	- The contractor will prepare, submit to NAT's approval, and implement a waste management plan. The plan will, as a priority include the removal of all identified polluted wastes described in the ESIA.	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- NAT in cooperation with the responsible District authority has to guarantee the safe disposal and treatment of the generated waste. The recommended mitigation measures are as follow: - All types of hazardous waste will only be transported by licensed hazardous waste service providers and disposed of in licensed landfill. Both, the service providers and disposal sites have to be identified at the beginning of construction work - Ensure that the controlled dumpsites or landfill could accommodate the amount of wastes generate from the rehabilitation activities	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		– Arrange all administrative procedures for licensing the transport and disposal of waste; <u>The Waste Management Plan Will:</u> – Identify waste types and quantities – Allocate a separate bin for each type of waste – Contract a licensed solid waste contractor/scrap dealer to collect non hazardous solid waste and scrap on a regular basis and dispose in legally permitted facilities. – Contractors in charge of building concrete elements will manage the washing and maintenance of concrete mixer trucks to	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		avoid unmanaged spills of concrete residue at various locations. - Construction waste in Project sites should be collected in designated areas inside the construction site and hauled to properly managed sites. - Keep a register of the quantities that have been disposed of. - During Construction, the contractor should establish a direct line of contact with the local authority and Nahdet Misr to regularly dispose the waste in the case of illegal dumping and minimize any risks that can affect the workers. - The waste management areas will be allocated within the tram corridor. General	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		– Recycling and reuse will be prioritized over disposal by implementing the following: – Sell decommissioned rails as high value scrap instead of sending them for disposal. – The contractor is encouraged to setup contact with any construction and demolition waste recycling facilities and send their waste for recycling rather than disposal. – Implement a waste segregation plan onsite, utilizing different containers were possible for recyclable construction waste and non-recyclable (the same applies to domestic waste). – Maximize re-use of excavation waste as backfill and recycle viable materials;	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		– Implement a segregation system based on compatibility of different waste streams during each phase of Project implementation. – Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at designated sites. – Spent oils shall be collected, stored in sealed containers and recycled using a licensed company which also has to be identified by the contractor. – Prevent open burning of non-hazardous waste to avoid release of toxic pollutants into the ambient air through closing the informal openings that are used by people living in the surrounding to throw out their garbage.	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		<u>Hazardous waste and substances:</u> – Store hazardous waste, such as paint cans and epoxy containers, in separate bins. – Contract a hazardous waste contractor to regularly collect the hazardous waste and transport to legally permitted facilities such as Al Nassiriya landfill. – Enforce the use of proper PPEs and safety precautions when dealing with hazardous material. – Keep a register of the quantities that have been disposed of. <u>Liquid Waste</u> – Contractors should allocate certain areas within the construction site for the offices/camps of the construction staff	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- Collection tanks receiving domestic wastewater from offices/camps, needs to be made of waterproof material to avoid leaks and has to be evacuated frequently to operating WWTPs by tankers and disposed of in a WWTP with suitable capacity as determined by Alexandria Sewerage Company. - An agreement will be made with Alexandria Sewerage Company prior to preconstruction and construction to arrange for disposal. <u>Construction Dewatering Liquid</u> - The contractor will carry out site-specific assessments to determine the hydrogeological characterization of the site including all necessary information to determine the volume, quality and	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		duration of the dewatering discharge during construction. – Prioritize the use of dewatering liquid in construction activities such as dust suppression rather than using potable water – Once the findings of the hydrogeological survey are ready, the Contractor will arrange for its disposal in a rain drainage network <u>Waste Storage & Handling</u> – Assigning certain areas, for stockpiling soil and construction waste, these areas should be secured and protected to avoid any possible theft;	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- Waste will be stored in containers or skip bins. It will not be stockpiled directly on unsealed ground; - Collection tanks receiving wastewater from offices/camps, needs to be made of waterproof material to avoid leaks and have to be evacuated frequently to operating WWTPs. - Sewage/septage generated during construction should be removed by tankers and disposed of in a WWTP or city sewer. Contractors should allocate certain areas within the construction site for the offices/camps of the construction staff. An agreement will be made with Alexandria Sewerage Company at the beginning of the preconstruction phase. According to the estimated amount of wastewater, an	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		arrangement will be made with several wastewater treatment plants in Alexandria, depending on its individual capacity. - Recycling waste will be stored in separated areas or containers, and not mixed with other waste types; - Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable. - All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as "hazardous"; - Waste removal from the site will be scheduled, to always have a waste skip available for use on site, and to ensure	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		that waste skips/containers are not overfilled; - Any temporary waste storage areas (not contained in bins or containers) will be covered and/or surrounded by a screen mesh fence to prevent it being wind-blown across the site; - Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage. - Temporary storage is to take place in areas with impervious flooring. In case of spillage: - Avoid inhalation and sources of ignition. - Cover and mix with sufficient amounts of sand using PPE.	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- Collect contaminated sand in clearly marked secure containers/bags. <u>Waste Disposal</u> - The disposal of all the solid wastes generated during the pre-construction and construction phase is the responsibility of the contractor and should be disposed of through licensed contractor and transferred to controlled dumpsites or landfills. Hazardous waste will be sent to Nasiriya Landfill. Other solid wastes will be sent to Burj al Arab or El Hammam landfills - For the disposal of the old track components (rails, fastenings, etc.), it will undergo quality control check and it could be either reused in other railway lines or to be sold as scrap in auction. While the disposal of the wooden	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		sleepers, if contaminated, it should be disposed of sent to El Nasiriya landfill. - The old ballast will be sieved and screened and if contaminated, it will be disposed of in a hazardous landfill and if not, it will be reused onsite. - Sewage holding tanks should be evacuated as frequently as-required, to prevent over flow. A schedule for regular sewage tanker evacuation of sewage holding tanks should be established; - Conduct regular maintenance and inspection on the sewage holding tanks, plumbing and associated wastewater facilities to ensure good sanitary conditions; and	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- All tanks, drums, pipes and sewage holding tanks should be decommissioned and removed upon demobilization from the site. - Asbestos survey should be developed to indicate the existence of Asbestos. If it exists, an asbestos management plan should be developed that clearly identifies the locations where the Asbestos Containing Material (ACM) is present, its condition, procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. Repair or removal and disposal of existing ACM in buildings should be	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		performed only by specially trained personnel.	
Terrestrial Ecology	Impact the flora and fauna of the study area and roadside trees might have to be cut down for the construction of some the at-grade and viaduct sections.	- Restrict areas for dredging and soil moving activities or vegetation clearing as much as possible (minimal clearance); - Where possible, re-vegetate cleared areas by planting trees, shrubs and native grass; - During the design phase, the Contractor must identify the number of trees that will be cut down/ vegetated areas that will be excavated and compensate by designing revegetated areas along the route, surrounding passenger loading area, underneath viaducts etc.. - Trees removed during the construction phase should be transplanted, to avoid creating waste and to compensate for the removal of vegetation, near the new	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		stations where the existing trees would be damaged due to the construction works. - Systra will designate the area under the viaduct stations to either parking spaces or recreational green areas. The green areas may be fenced with sufficient waste bins and Nahdet Misr should be contracted with to ensure that the area is well-maintained and remains free of uncontrolled solid-waste dumping. - Trees can be replanted at the cancelled North Sidi Gaber Loop in addition to shrubs and grass.	
Impacts on Structural Integrity of buildings	- The structural integrity of neighbouring buildings in direct vicinity of the ROW of the corridor in the viaduct areas and stations can be put to risk during the construction phase due to:	- Carry out a survey before the start of construction along the whole tram route to assess the potential risk of damage, and indicate the dilapidation of buildings/structures. The Contractor will	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	- Soil settlement as a result of dewatering activities - Vibration as a result of Piling and use of heavy machinery	carry out all necessary models to evaluate potential degree of damage on sensitive receptors.	
Natural Risks - Seismic	- Seismic activity can pose potentially negative impacts on the time schedule of the construction activities in addition to possible injuries or fatalities to the workers.	- It is necessary that responsible employees and workers are trained to deal with such events and that such risks are incorporated in the contractor's emergency response plan. - It is necessary that Seismic Risk factors are taken into consideration and appropriate factor of safety/safety engineering criteria are incorporated in the design of the various components, including viaducts, stations, depot and tram catenary system to prevent failures due to earthquakes.	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Natural Risks - Flood	- Flood events can damage the overhead power supply lines causing secondary impacts on humans and biodiversity and posing serious life-threatening situations of electric shocks.	- Contractor will plan activities taking seasonal conditions into consideration, keeping all activities that could be affected outside the rainy season. - During Construction, the Contractor will build a site drainage system equipped to protect the site against potential flooding. This system will be built such that flood waters are rerouted away from the project area to the city's sewer network. - Avoid low lying areas on the work site which can become flooded - Ensure that material storage places are adequately drained	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- Adequate plastic sheeting to cover recently completed work and unfinished work that can be damaged by rain. Have adequate water pumps for dewatering on site and have a system in place to dispose of storm water and discharge the water to the sewer drainage network.	
Occupational Health and Safety	- Generic occupational risks associated with construction sites include: - Excavation and Trenching - Fall - Exposure to Noise - Construction equipment and vehicles/trucks - Weather conditions - Unstable surfaces - Falling objects	- The Contractor and NAT must prepare and adopt a Construction Environmental and Social Management Plan (CESMP) during the construction phase that consists of subplans including: • An Occupational Health and Safety Management Plan (OHSP); • An Environmental, Health, and Safety (EHS) plan; • A health surveillance program;	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	- Manual handling - Musculoskeletal injuries - Transmission of diseases: Workers might be affected by transmission of diseases, especially COVID 19, Hepatitis A, B & C and HIV Aids. Additionally, other communicable diseases might affect workers.	• A working conditions management plan; and • An emergency response plan. • COVID-19 Prevention and Management Plan; - The developed CESMP should be prepared in full compliance with World Bank Group Environmental, Health & Safety Guidelines and EIB E&S Standards - The contractual agreement with the contractor should include rigid commitments to apply the CESMP that should be prepared in full compliance with the WB EHS requirements and EIB E&S Standards.	
Community Health, Safety, and Security	- Increased risk of traffic hazards and incidents associated with the use of the	A community health, safety and security management plan must be developed by the	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	highway for freight and local roads for workers; - Increased incidence of communicable disease e.g. COVID 19 and Hepatitis; - Risks associated with the presence of security personnel on site (within the Project area) and at offsite operations and activities (within the community); and - Personal safety and well-being impacts associated with worker influx.	contractor. Additionally, the following plans should be developed: • Community Health, Safety and Security Plan • Traffic and Transportation Management Plan • Emergency preparedness and Response Plan • Stakeholder Engagement Plan • Severance Management Plan A health surveillance programme can be established within the CESMP to monitor the health condition of communities within the AoI with a significant exposure risk.	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		Medical examinations for all workers to be conducted by a registered medical officer (physician). Monitor the spread of potential illness e.g. COVID 19.	
Cultural heritage	Alexandria Governorate is one of the richest governorates in terms of cultural heritage aspects. Potential key impacts on archaeological and cultural heritage can be identified as follows: 1) Potential impact on historic and/or sites of architectural significance, 2) Risk of Damaging Chance-Find Buried Artefacts	In line with the WB ESS8. EIB standard 5 pertaining to cultural heritage and Law 17/1983 stipulates that, in situations where any culturally valuable object/monument is discovered during excavation works, the works should be stopped by the contractor and the nearest administrative authority must be informed within 48 hours. An SCA inspector shall then supervise any excavation on the site following any evident of artefacts or antiquities traces. NAT includes in its contracts for the	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		various lots within the Tram Project a term referring to the national law The contractor should develop a Cultural heritage Management Plan following standard mitigation for projects that are aligned with national and international standards: - A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with national and international requirements and guidelines. - The Cultural heritage Management Plan should be in place before construction begins.	
Visual-landscape changes	During construction of alleviated sections, visual impacts cannot be avoided but can only be minimized by fencing of the construction sites. Given the nature of	- Prior to pre-construction and construction activities, the contractor will have to provide fences, steel sheet piles hoarding and covers around the construction site in order to enable a safe construction site	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	structures located in the vicinity of the Tramway, which can be described as beautiful structures with some of them dated more than 100 years ago, the visual impacts tend to be of importance.	and to minimize noise, dust, storage of wastes and airborne particulates. The fences and steel piles appearance of will create a significant visual intrusion for the population during the construction period, which could last for 2 years.	
Utilities(infrastructure)	Impacts on public utility diversions (electricity cables, water and wastewater networks, telecommunication networks) may disturb the surrounding communities.	A Public Utilities Enhancement and Management Plan should be developed by the contractor in which infrastructure relocated by the Project (electric and telecommunication lines, water supply and irrigation pipes, etc.) will be developed in a way that allows neighbouring communities to benefit from them after construction is over.	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		The Plan will also consider the management of disruption to utilities through definition of clear procedures in close coordination with local utility companies. Utility diversion plans are important instruments for NAT to inform the population in time about possible disturbances which will emerge from construction and are important plans for the utility companies for implementation of utility diversions in the pre-construction phase but also during the construction phase. In addition, the diversion plans inform the contractor about the type and dimension of the connecting utility to the construction sites.	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Temporary Labour influx	The temporary workers may affect the Project areas in terms of: - Risk of social conflict - Increased risk of illicit behavior and crime - Increased risk of communicable diseases and burden on local health services - Accommodation of workers impacts - Local inflation of prices - Gender based violence - Overconsumption of community resources	- Reduce labour influx by tapping into the local workforce - Assess and manage labour influx risk based on appropriate instruments e.g. the ESIA - Prepare a Labour Influx Management Plan (if the number of workers is more than 400) - Incorporate social and environment mitigation measures into the civil works contract - The safeguards instruments are reflected in the contractor's ESMP (CESMP) - The Project is implemented in accordance with the CESMP, safeguards instruments and other relevant contractual provision	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Risk of Gender-Based Violence (GBV)	There is a probability that the presence of workers in the Project sites might evoke gender-based violence activities, as follows: - Harassment of women and young girls by workers, this might lead to honor crimes in extreme cases. - The probability of limitation of women and young girls' mobility around the Project area. - Discrimination against women in terms of employment.	- Prepare a Code of Conduct and insert it in the induction training to be provided to all workers - Engagement of community people: - Transparent engagement and participation of the local community - Provide accurate and timely information - Enhance local knowledge of potential risks and problems - There should be an accessible and Project-level grievance mechanism	Minor
Risk of child labour	Child labour is a common practise in Egypt. Despite all restrictions of child labour, children (below the age of 18 years) work almost in all Projects as they receive low	- NAT and its contractors will oversee if suppliers, contractors and subcontractors comply with all applicable child labour laws and only employ workers who meet the	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
	salaries and are less demanding. Therefore, there is a high probability of child labour.	applicable minimum legal age requirement in accordance with international standards; - Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers; and - In all contractor contracts the Project will make explicit reference to the need to abide by Egyptian law and international standards in relation to child labour and forced labour	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		Contractors and subcontractors will need to monitor closely the potential existence of irregular forms of child and forced labour in the supply chain. Action measures and notice to NAT will be carried out immediately if this is found.	
Impacts on homeless (children and old people)	Many homeless street children and old people residing in the stations of the tram might be expelled out of the stations. It was essential to recommend how to manage this category which can be classified as vulnerable groups.	The Ministry of Social Solidarity, the NGOs working with homeless people (e.g. CARITAS) should be reached out in order to find proper and acceptable measures to accommodate the homeless with full respect to their human rights. In full compliance with the Resettlement Policy Framework, the social solidarity directorate should cooperate in resettling all homeless old people and children based on a sort of	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		coordination arrangement or a protocol with NAT.	
Traffic and transportation	<i>Construction will disturb and delay the traffic flow that may affect the local communities and environmental conditions at the construction sites and may also directly or indirectly affect the surrounding areas.</i> Tram passengers will be deprived of their low cost means of public transportation, APTA is must provide an alternative means for the large number of passengers.	- A Traffic Management Plan should be developed to provide the maximum safety to the population and Project personnel. Additionally, to propose alternative solutions for transporting community people; - The contractor shall provide transport safety assessments and audits around the work sites, and the engineer shall approve these. - Target signage and outreach activities to improve public awareness of traffic changes and potential hazards; - Provide and identify alternative access routes, if necessary, with coordination between the local authorities and	Moderate

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		community leaders in the Project area and inform the residents about the alternative routes before construction begins; and - Review any complaints related to traffic and accident. - Mitigation Measures specific for City Tram Impacts from Ras El-Tin to San Stefano:	
Economic displacement impacts	The Alexandria Raml Tram Rehabilitation Project will result in a permanent adverse impact on livelihood of the tenants and workers of shops, mosque, kiosk and restaurant within the Ram tramway and stations.	- Prepare a Resettlement Action Plan - The Resettlement Action Plan (RAP) will be prepared in line with IFC Performance Standards and EIB Standards as well as Egyptian legislation. The RAP will address issues associated with physical and economic displacement, loss of	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		community infrastructure and other assets. - A Grievance Mechanism will be developed, whereby affected people can raise issues and concerns associated with displacement and the RAP processes. Establish KPIs for grievance resolution. - RAP implementation will be monitored until a point whereby it can be demonstrated that the standard of living and livelihoods of displaced households have been at least restored if not improved. As necessary corrective action will be put in place through implementation to achieve this outcome.	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
Working conditions	Working conditions describe all impacts on workers. Additionally, their welfare and the onsite facilities to be made available for workers. In light of creating job opportunities and generating income to overcome poverty and reinforce collective economic growth.	- Development of a Working Conditions Management Plan in the CESMP. The main contents are: - Providing protection and safety to workers - Facilities and Utilities in the site - Security & workers right - Enhancing Workers' Efficiency - Please consider the following mitigation in relation to labour conditions and rights as follows: ▪ Access to clear and understandable information regarding worker's labour and working conditions; ▪ Provision of reasonable working conditions and terms of employment;	Minor

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		- Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects; - Implementation of a grievance mechanism for the Project workers including subcontractor workforce; - Adoption of open attitude towards freedom of association and in conformance with Egyptian laws. - Retrenchment preventive measures will be implemented to reduce adverse impacts as a result of termination of contacts which will consider benefits to boost workers employment opportunities post	

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact
		construction where possible. Notice of dismissals will be done in due time and will manage employment expectations of the construction workforce -	

Potential Impacts during the Operation Phase

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
Job creation and local content	The Raml Tram Rehabilitation Project might generate a large number of job opportunities during the operation phase. Some of the developed jobs will be under NAT. However, the majority of job opportunities will go to the operator.	All measures adopted during construction will be applicable during operation phase.	Positive

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
Ambient Air Quality	- Increases in air pollution levels as a result of crowding of vehicles such as cars and buses around the stations. - Indirect emissions as a result of electricity generation.	- Proper housekeeping measures and maintenance of equipment at the depot. - All equipment in the depot areas need to be properly and regularly maintained - Adequate ventilation system in depot. - Vehicles around the stations are properly managed.	Insignificant
Noise and Vibration propagation	Increase in noise and vibration levels due to Tram runs on the track and maintenance in depot area	Measures that will be developed as part of the design process include (as much as feasible): - Fencing with concrete walls along the tram way as a wave barrier to reduce noise and vibration. - Use of modern non-metallic disc brakes, - Regular maintenance of wheels and tracks, and install jointed track with continuously welded rail	Minor

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- Use adequate friction modifiers (oil based or water based) is a suitable approach to the reduction of noise and vibrations. - Floating slabs, resiliently supported ties, high resilience, fasteners, and ballast mats have been used to reduce the levels of vibration. - Ballast mat consists of a rubber or other type of elastomer pads, that is placed under the ballast. - Modify the foundation conditions of the embankment stiffness by compaction of the embankment material. Measures that will be carried out during operational phase: - o Regular maintenance of wheels to reduce the friction between wheels and tracks	

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- Periodic monitoring needs to be carried out to ensure compliance to standards at the sensitive receptor locations. - The operator will ensure that close coordination is maintained with responsible agencies like traffic authorities to reduce the noise impact from clustering of vehicles at station locations	
Groundwater	Leakage of oily wastewater discharged from the depot which may pollute the soil and groundwater	- An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater. - Install adequate drainage system connected to the public sewer network. - Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.	Insignificant

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
Soil	Degradation of soil quality at depot area due to maintenance work	- Install adequate drainage system connected to the public sewer network. - An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater. - Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.	Insignificant
Generated waste	Solid (Non-Hazardous) waste including steel scrap, wood scrap and domestic waste around stations. The non-hazardous wastes generated during the operation phase normally have a high recycling potential. If not recycled, they should be sent to a	- Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable. - Provide adequate waste bins within the stations' locations. - The disposal of solid waste generated from the depot will be carried out by NAT.	Insignificant

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
	specialized contractor or a controlled dumping site. Liquid Waste including the oily wastewater discharged from the depot Hazardous waste including empty containers of chemicals, spent lubricating oils, and paint used for maintenance works, ballast and sleepers if contaminated with oil. Improper handling and storage of hazardous substances and/or waste, would result in environmental contamination.	- The EPC contractor will design the depot with plumbing connection in maintenance areas to an oil pit where the oil (oil/water separator) is separated and the water is discharged to the sewer network. - Spent mineral oils shall be collected, stored in sealed containers, and recycled using a licensed company. - All types of hazardous waste can only be transported by licensed hazardous waste service providers and disposed of in a licensed landfill. - Temporary storage is to take place in areas with impervious flooring. - In case of spillage: - Avoid inhalation and sources of ignition.	

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- Cover and mix with sufficient amounts of sand using PPE. - Collect contaminated sand in clearly marked secure containers/bags	
Natural Hazards	- Seismic Hazards (Earthquakes)	- Seismic Risk factors should be considered in the construction of the Raml Tram stations, viaducts and depot. For example, Integration of a safety engineering criteria in the design structures of the stations and electrical overhead contact system to prevent failures due to earthquakes.	Minor
Natural Hazards – Groundwater Salinity	Groundwater Salinity	- Resistible construction materials to salinity should be used for foundations of stations, viaducts and depot.	Minor
Natural Hazards – Flood	Flood risks on infrastructure, tracks and switches, energy and systems, rolling stock, and depot.	- Consider the flooding risk in the sizing of the drainage system	Minor

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- Increase the height of the platform. - Implement concrete track structure rather than ballast. - Implement asphalt or concrete trackway coverings - In modern tram systems, track equipment is designed to be submersed and the motors are made waterproof. However, these equipment require careful cleaning before restarting operations. - Proper drainage should be implemented on the infrastructure to protect signaling equipment. - Technical rooms for signaling should be positioned at locations where the flooding risk is limited or their height should be increased. - The Operating Control Center should be able to switch off power on the whole line rapidly.	

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- The operator can switch off power on one specific section of the line. In that case the operation can be maintained on the remaining part of the line. - Overhead wire support masts, along with their foundations, should be sized according to the weather conditions foreseen during flooding. - Specific measures can be included in the specifications of the rolling stock such as waterproofing devices for sensitive equipment (motors, antennas, electronic equipment...). - The flooding risk should be taken into account in the depot design. If the flooding risk is high, the height of maintenance and storage area floors can be slightly increased. Proper drainage should be implemented.	

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- Equipment that are located under the maintenance tracks can be equipped with pumps to prevent them from being submersed in case of flooding.	
Occupational Health and Safety	Occupational Health and Safety is one of the most important impacts related to the operation of the Tram. It is fundamental to shed light on the nature of tram workers who represent many different occupations with specific sets of working conditions and risks, and diversified demands.	- The Contractor and NAT must prepare and adopt an Operations Environmental and Social Management Plan (OESMP) during the operation phase that consists of subplans including: • An Occupational Health and Safety Management Plan (OHSP); • An Environmental, Health, and Safety (EHS) plan; • A health surveillance program; • A working conditions management plan; and • An emergency response plan.	Moderate

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		- COVID-19 Prevention and Management Plan - The developed OESMP should be prepared in full compliance with World Bank Group Environmental, Health & Safety Guidelines - The OESMP/ Procedures should be prepared, implemented and monitored. - Address emerging risks such as violence and fatigue, and cognitive injuries with specific monitoring, reporting and prevention measures. - It is essential to monitor fatigue. Step-wise alarm levels and routines to prevent fatigue-related incidents in case of unforeseen events would also be needed. - More efforts are needed to prevent and monitor violence in the transport sector. Transport workers need to be trained adequately and	

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
		encouraged to report violence, and effective reporting procedures need to be put in place. - Share information with the employment agencies on the specific OSH risks that might affect Tram workers. - Train employers and workers on how to better protect their health and safety. - Raise awareness of OSH issues in policy areas that may impact on the health and safety of transport workers. - Installation of active noise cancellation systems;	
Community Health, Safety, and Security	The Tram Rehabilitation Project will result in various impacts related to the community health, safety and security . They are as follows:	- An Emergency Response Plan should be prepared for the operations phase under the OESMP. - Availability of secure functional pedestrian accesses and paths	Moderate

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
	1- Accidents along the tramway line, particularly the older groups and children; 2- The risk of being hit by the tram causing injuries or fatal accidents; 3- Transmission of communicable diseases e.g. COVID-19; 4- Emergency accidents and fires that might affect community members and the Tram users	- Full engagement of the surrounding communities, especially, their grievances related to transmission of diseases.	
Visual-landscape changes	Visual intrusion and landscape are by nature a negative impact. However, in the Tram Project and considering the current deteriorated and unfavourable situation of fences, stations, shops and the used tram, there is a visual landscape	An expert in Fine Arts should be recruited in order to put a design for the fence, stations, viaducts and green areas design. The design should be shared with Technical Assistance Consultant, NAT and other stakeholders for approval and should consider:	Minor

Receptor/EHS Aspect	Impact description	Mitigation Measures	Residual Impact
	impacts will be considered positive after the rehabilitation. With regards to the viaducts, they might result in visual intrusion.	○ Availability of secure functional pedestrian accesses and paths, ○ Replanting of the green space combined with public places for recreation and shops ○ Availability of parking facilities with trees to provide shade.	
Working conditions	Working conditions describe all impacts on workers. Additionally, their welfare and on site facilities made available for them. In light of creating job opportunities and generating income to overcome poverty and reinforce collective economic growth, NAT can foster a healthy management strategy for workers and increase developmental benefits for the Project through adopting an intact management approach to labour condition, treating workers fairly, and providing a safe and healthy work conditions.	Development of a Working Conditions Management Plan under the OESMP. The main contents are: ○ Providing protection and safety to workers ○ Facilities and Utilities in the site ○ Security & workers right ○ Enhancing Workers' Efficiency	Minor

Carbon Footprint Assessment

The total carbon footprint of the project was calculated for the construction stage and 30 years of operation stage as follows:

- Construction: 44 410 TeqC (162 820 TeqCO₂)
- Operation: -3 070 TeqC / year (-11 257 TeqCO₂)
- Carbon Payback Time: 14 years
- 30 years of operation: -92 100 TeqC (337 700 TeqCO₂)
- Carbon footprint over 30 years: -47 690 TeqC (-174 863 TeqCO₂)

The carbon footprint assessment shows that over a duration of 30 years of operation, the Project will avoid the emission of 47 690 TeqC (174 863 TeqCO₂). Therefore, the Project will result in an overall positive impact with regards to Greenhouse gas emissions

PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT

The Stakeholder Engagement chapter aims at highlighting the key consultation and community engagement activities and their outcomes, in addition to outlining the validity and reliability of the data collected. The stakeholder engagement activities were carried out with reference to ESS10: Stakeholder Engagement and Information Disclosure.¹

The stakeholder engagement activities are based on national and international regulations. They are summarized as follows:

1- National legislations:

The Environmental Law no. 4/1994 and its executive amendment no. 9/2009, modified with Ministerial Decrees no. 1095/2011 and no. 710/2012, require that Public Consultation should be held prior to the approval of Projects which need an ESIA Study.

2- International Requirements

- The World Bank ESS 10 related to stakeholder engagement and information disclosure
- European Investment Bank Environmental and Social Standards (Standard Number 10. Stakeholder Engagement)

The consultant adopted various methods of consultation e.g. Structured questionnaire Focus Group Discussions, Key Informant Interviews, Meetings, Group meetings and Public Consultation events. The consultant also recruited female officers to enable women to talk freely.

¹ <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf>

Stakeholder identification has gone through many stages. The first stage of stakeholder identification was implemented during the preparation of the initial ESIA in 2016. Thereafter, further engagement activities took place during 2019-2020 in the form of periodic meetings with various stakeholders. Finally, in 2020-2021 various engagement activities took place in order to assess the stakeholders affected, in terms of their concerns and feedback.

Vulnerable groups are defined as those stakeholders that may experience impacts differently than the wider society and/or may experience restrictions during the community decision making process due to their socio-economic characteristics. Vulnerable groups may be affected by virtue of their physical disability, social or economic standing, limited education, lack of employment, or lack of access to land. The IFC requires that the Project engages vulnerable groups separately so as to ensure they receive Project information directly and that any issues, feedback, or grievances are captured by the Project. The Social Consultant managed to identify potential Vulnerable Groups.

The total number of consulted people without the final public consultation was 248 males and 63 females.

The main outcomes of consultation are as follows:

- Benefits of the Project in terms of providing proper means of transportation of reasonable cost. The tram is considerably safer than other means of transportation.
- The tram project is not only a transportation method but it is the identity of Alexandria Governorate that should be considered as cultural heritage.
- Drawbacks of the Project are limited to traffic concerns and potential environmental risks
- The Project Affected People were concerned about their entitlement and how they will be compensated
- Role of the NGOs in sharing information and support in accommodating homeless and street children was reported
- Perception of the current tram as of relatively inappropriate performance
- Recommendations to enhance tram performance
- Poverty Dimension in terms of proposing reasonable ticket value
- Community safety issues

- Low-income seniors use the tram as it is the cheapest method of public transportation. However, due to their limited-mobility it is difficult for them to use stairs at elevated and low sections of the current route
- The homeless use the tram as shelter at night time. Some NGOs, in cooperation with the Ministry of Social Solidarity, proposed to accommodate the homeless. Disabled persons
- Availability of restrooms at the tram stations will be useful to all community people

GRIEVANCE MECHANISM (GM)

The Community Grievance Mechanism (CGM) allows stakeholders to submit complaints and comments at no cost, without retribution. The CGM considers the gender dimension and proper presentation of women. The CGM also will be applicable throughout preconstruction, construction and operation phases. The grievance mechanism will be gender sensitive in terms of enabling female social officer (if needed) to communicate with the aggrieved females. All gender-based violence grievances should be carefully managed and taken seriously by the contractor, NAT and the operator.

NAT adopts a governmental unified grievance mechanism and NAT grievance mechanism. NAT Community liaison officer will be responsible with the Grievance Committee to manage all received grievance mechanism. The figure below summarizes the GRM:

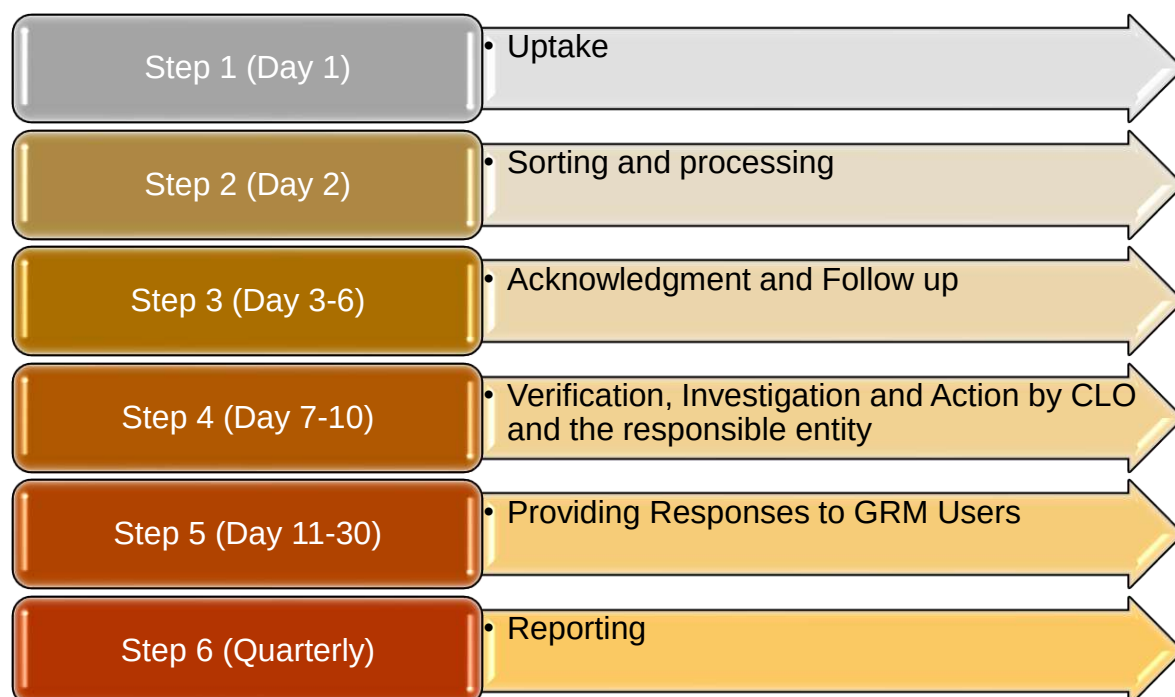


Figure 0-2 Grievance Management Process

The complaints will be received from the following channels:

- Governmental Complaint Portal (<https://www.shakwa.eg/GCP/Default.aspx>)
- Alexandria Governorate complaint channels
 - **034234065**
 - **alexportal@alexandria.cloud.gov.eg**
- Complaint Committee Contacts (**to be determined**)
- Phone calls and WhatsApp messages (**to be determined**)
- National Authority for Tunnels (complaint channels). The contacts of NAT are listed below:
 - **Land line: + 02 25742968**
 - **FAX+02 5742950**
 - **Email address infoc@nat.org.eg**
 - **Postal address Ramses Square Ramses Complex- Cairo- Arab Republic of Egypt- ZIP: 11794 p. B 466**

1. INTRODUCTION

Egypt's strategic vision for urban development aims to improve the quality of the urban environment in all governorates by increasing citizen dependence on modes of public transportation. Accordingly, positive environmental and health impacts will be implemented as traffic congestion is reduced and modes of commute are enhanced. Consequently, the nation has introduced multiple transportation Projects by rehabilitating pre-existing modes of public transportation and introducing new means to cover the on-going demand for transportation.

Alexandria's tramway network, which came into service in 1860, is the oldest in Africa and the Middle East. It consists of two lines: the Raml line and the Al Madina line. These lines are still in service today and are used by locals and tourists alike. The Alexandria Raml tram will be rehabilitated to transform the existing Raml line into a modern and efficient tram line, equipped with modern infrastructure, systems, and rolling stock, to reduce the travel time between the Raml and Victoria terminals while tripling capacity and improving comfort and accessibility for passengers. The rehabilitation of a 160 years old tram will represent a paradigm shift in the means of transportation within the Alexandria governorate.

The consortium, led by SYSTRA and comprising its partners Egis, ACE and Projacs, will provide services on behalf of NAT for the preliminary design, preparation and evaluation of tender documents, and supervision of works until the end of the guarantee period.

The European Investment Bank (EIB) and Agence Française de Développement (AFD) group are providing a loan of up to 521,000,000 USD to the Arab Republic of Egypt, in addition to a contribution of about 94,000,000 USD from the Egyptian Ministry of Investment and International Cooperation to finance the Raml Tram Rehabilitation Project. The ultimate beneficiary of the loan is the National Authority for Tunnels (NAT), which is a government agency under the jurisdiction of the Ministry of Transport (MoT) and will support the investments in the rehabilitation and expansion of metro and tram systems in Alexandria and Cairo.

Financing of the Raml Tram Rehabilitation Project (hereinafter 'the Project') will contribute to increasing the availability and improving the quality of public transport systems in Alexandria and will lead to a greenhouse gas emissions reduction due to the expected modal shift.

The Project will be implemented in two phases. The first phase will be the tramway design phase which will last for approximately 12 months, followed by an implementation phase of at least 24 months. The latter includes the construction of viaducts, the installation of electronic signalling systems, and the complete renewal of the rolling stock. It also involves the relocation of some stations all of which will make the line more fluid for commuters.

1.1 Purpose

According to the Egyptian Environmental Affairs Agency (EEAA) the Project (hereinafter the Project) falls under Category C Project. For Category C Projects, it is compulsory to submit the full Environmental and Social impact Assessment study (ESIA) including consultations and disclosure.

According to the World Bank Environmental and Social Framework issued in 2017 followed by the AFD, the Project is classified as Category B+ due to substantial environmental and social risks. Accordingly, the Project requires a full ESIA study including an ESMP and should have public consultations and a disclosure process along with the preparation of Resettlement Action Policy (RAP) or Livelihood Restoration Plan (LRP) and a Stakeholder Engagement Plan (SEP).

In addition, based on the EIB Environmental and Social Standards issued in 2017, the Project is Category B – Medium risk in which Environmental and Social impacts can be readily identified and mitigation and/or remedial measures can be put in place.

In accordance with the World Bank's Environmental and Social Framework and the EIB Environmental and Social Standards, the objectives of this ESIA Study are to:

- Describe the Project components and activities as relevant to the environmental and social assessment;
- Identify and address relevant national and international legal requirements and guidelines;
- Describe the environmental and socioeconomic baseline conditions prior to the commencement of Project activities;
- Assess Project alternatives, including the no Project alternative;

- Assess potential positive and negative site-specific environmental and social impacts of the Project during construction and operation phases; and
- Develop environmental and social management and monitoring plans (ESMP) in compliance with the relevant laws in order to address the identified impacts.

1.2 Application filed

This document is applicable to the Consultancy Services for the Alexandria Raml Tram rehabilitation Project. The total infrastructure length of the existing tramline is 14.4 km including both the Sidi Gaber and San Stefano loops. Moreover, Line 1 is 10.6 km long with 31 stops while Line 2 is 10.1 km long consisting of 29 stops.

1.3 Applicable Documents

- Sub-Consultancy Agreement Between SYSTRA And EcoConServ
- French Development Agency Alexandria Urban Transport Study Progress report 2 – Technical feasibility-2016
- Design Inception Report, 101M-AEC-T1-ALL-REP-GEN-0001
- Design Criteria and Standard Report -101M-T1-ALL-REP-GEN-0000

1.4 Study Approach and Methodology

1.4.1 Approach to the Study

The ESIA is prepared in accordance with the requirements of the World Bank's Environmental and Social Framework ESS1: Assessment and Management of Environmental and Social Risks and Impacts and EIB's Environmental and Social Standard 1: Assessment and Management of Environmental and Social Impacts and Risks.

1.4.2 Study Methodology

The study was prepared according to the following methodology:

- Obtain the information and documents available regarding the Project and familiarization with the Project objectives.

- Review the previously developed ESIA for Raml Tram Rehabilitation issued in 2016
- Conduct site visits to the Project site, to collect the baseline data regarding the current environmental and social baseline conditions.
- Review the World Bank Environmental and Social Framework policies and guidelines and the EIB Environmental and Social standards relevant to the scope of the Project.
- Define the Project area of influence, develop criteria for assessing receptor sensitivity and initially formulate expected environmental and social impacts
- Assess the potential environmental and social impacts associated with the proposed Project activities for their significance.
- Study the Project alternatives with the potential of minimizing the negative impacts of the Project and expected environmental health and safety risks.
- Develop mitigation measures for the expected environmental and social impacts of the Project.
- Prepare an environmental and social management plan (ESMP) for the mitigation of the potential negative impacts, including monitoring measures to verify the compliance with relevant environmental laws.

1.4.3 Data Collection Methodology

Data concerning the Project location and surrounding areas

The data required for the report preparation was gathered through meetings with the SYSTRA-led consortium, partnering with Egis Rail, ACE Moharram Bakhoun, and Projacs, detailing the engineering details of the Project including construction and operation activities. Other Project-specific data was gathered from the site visits conducted to inspect the status of the current tramway line, stations, rolling stock and the surrounding sensitive receptors.

A preliminary desk review and study of the maps of the Project area was carried out to identify the potential sensitive receptors around the Project site, and during the visit, the sensitive receptors were confirmed and the baseline measurements (air quality and noise) were conducted.

Data concerning the meteorological conditions, soil topography and geology as well as water availability and quality were collected through a desk review of current studies conducted in the Project area.

Social Project-related Data

This approach ensures that local community groups participated to the study. Data was collected in coordination with relevant stakeholders including local administration units (district and village levels) and the local NGO's.

The Consultant also reviewed relevant secondary data sources such as studies, reports and previous literature. The research team conducted several field visits to assess the socioeconomic baseline conditions.

A number of qualitative data collection tools were applied to ensure different community groups participated to the study.

1.4.4 Stakeholder Consultations

Stakeholder analysis is one of the tools that helped the consultant identify relevant groups of stakeholders and their interest in the Project as which may facilitate different Project activities. Stakeholder analysis is an important tool at the initial stages of the Project, which contributes to define and mitigate several negative impacts at an early stage. Stakeholders can help enhance the socioeconomic benefits related to the Project at the local community level.

Table 1-1 Stakeholder Analysis of the Project

Stakeholder Category	Stakeholder Group
Communities in the Area of Influence (Aoi)	The residents of the Districts located in the Vicinity of the Tramway (Central, East and Al Montazah-First)
	Members of the clubs, students of schools and university, employers and employees who use the tram
	Vulnerable groups within the local communities
	All commercial, health, tourism, and other economic activities
	Small business owners (e.g. restaurants and small shops)
Educational Sector	Educational facilities along the Tram way

Stakeholder Category	Stakeholder Group
Youth Sector	The Ministry of Sports, youth centres, clubs, and recreational areas
Health Sector	Health facilities, Health directorate and those who benefit from health facilities located in the proximity of the tram
NGOs and civil society	Community Development Associations along the route of the tram and Caritas-Egypt NGO
Transportation Sector	Ministry of Transport: The main ministry responsible for the Project
	NAT: The Project owners and are responsible for monitoring activities.
	APTA: Currently responsible for operating the tram. Responsible for providing passengers with alternative transportation during the construction phase.
Water Authority	Water and waste water company in Alexandria: The water company will secure potable water to the Project.
Local/ provincial Government Stakeholders	Alexandria Governorate Authority
National government stakeholders	Egyptian Environmental sector - EEAA Headquarter Cairo - EEAA regional branch in Alexandria - Environmental department in Alexandria Governorate - Environmental manager in Districts (Central, East and El Montazah)
	General Authority for Roads, Bridges and Land Transport
	Ministry of Defence
	The Egyptian General Authority for Land Survey (head quarter and Alexandria Directorate
	Ministry of Social Solidarity
	Ministry of Endowment (Awqaf)
	Housing and Utilities Directorate
	Natural Gas companies (Town Gas)
National Government stakeholders	Egyptian Electricity Transmission company (EETC)
	Egyptian telecom
	Antiquities Directorate

Stakeholder Category	Stakeholder Group
Media	Alexandria TV, Local Newspapers (Electronic newspaper) El Youm El Sabea...etc.: Public disclosure of Project information via Newspapers
Suppliers	The potential suppliers of construction materials and outsourcing

1.5 Definition, Acronyms and Abbreviations

1.5.1 Abbreviations

ABBREVIATIONS	DEFINITION
AC	Alternating Current
ACE	Associated Consulting Engineers
ACGIH	American Conference of Governmental Industrial Hygienists
ACM	Asbestos Containing Material
AFC	Automated Fare Collection
AFD	Agence Francaise de Developpement (French Development Agency)
AIDS	Acquired immunodeficiency syndrome
AoI	Area of Influence
APTA	Alexandria Passenger Transportation Authority
AVLS	Automatic Vehicle Location System
BOD	Biological Oxygen Demand
CAA	Competent Administrative Authorities
CAD	Computer Aided Design
CAPMAS	Central Agency for Public Mobilisation and Statistics
CCRA	Climate Change Risk Assessment
CCTV	Closed-Circuit Television
CEAlex	Centre d'etudes Alexandrines

CESMP	Construction Environmental and Social Management Plan
CMP	Construction Management Plan
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
COVID-19	Coronavirus Disease 2019
CRP	Climate Resilience Principles
dBA	A-Weighted Decibels
DC	Direct Current
DTN	Data Transmission Network
EC	European Commission
EEAA	Egyptian Environmental Affairs Agency
EEC	European Economic Community
EEHC	Egyptian Electricity Holding company
EETC	Egyptian Electricity Transmission company
EGAS	Egyptian Natural Gas Holding Company
EGDI	Egyptian Governorate Description by Information
EGP	Egyptian Pound
EHDR	Egyptian Company for Housing Development and Reconstruction
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment

EIB	European Investment Bank
EM	Environmental Management
EMU	Environmental Management Unit
ENE	East-North-East
ER	Executive Regulation
ESE	East-South-East
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
EU	European Union
FGD	Focus Group Discussions
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GHG	Greenhouse gas
GOPP	General Organization for Physical Planning
GRM	Grievance Redressal Mechanism
HC	Hydrocarbon
HIV	Human Immunodeficiency Virus
HSE	Health, Safety and Environment
HVAC	Heating, ventilation, and air conditioning

Hz	Hertz
IBA	Important Bird and Biodiversity Area
IDSC	Information and Decision Support Centre
IECS	Income, Expenditure, and Consumption Survey
IFC	International Finance Corporation
IFI	International Financial Institutions
ILO	International Labour Organisation
IN	Insignificant
IPA	Important Plant Area
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
ISRIC	International Soil Reference and Information Centre
IUCN	International Union for Conservation of Nature
KIIs	Key Informant Interview
LA	A-Weighted, Sound Level
LAeq	Equivalent Continuous Sound Pressure Level
LRP	Livelihood Restoration Plan
LRT	Light Rail Transit
LV	Low Voltage
LVS	Low Voltage System

MA	Major
MI	Minor
MO	Moderate
MoT	Ministry of Transport
MS-XVIII	Mediterranean – Sahara Regional Transition Zone
MW	Megawatt
NA	Not Applicable
NAT	National Authority for Tunnels
NCHR	National Council for Human Rights
NE	Northeast
NGO	Non-Governmental Organization
NH ₃	Ammonia
NNE	North-North-East
NNW	North-North-West
NO	Nitric oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen oxides
NTP	Network Time Protocol
NW	Northwest
OCC	Operation Control Centre

OCED	Organization for Economic Co-operation and Development
OCS	Overhead Catenary System
OHSP	Occupational Health and Safety Plan
OSH	Occupational Safety and Health
PA	Public Address
PAP	Project Affected Person
PIS	Public Information System
PM	Particulate Matter
PPE	Personal Protective Equipment
PR	Performance Requirements
PS	Performance Standards
QR	Quick response
RAP	Resettlement Action Plan
RoW	Right of Way
SCA	Supreme Council for Antiquities
SCADA	Supervisory Control and Data Acquisition
SE	Southeast
SEA	Strategic Environmental Assessment
SEP	Stakeholder Engagement Plan
SNTP	Simple Network Time Protocol
SO	Sulfur Monoxide

SO ₂	Sulfur Dioxide
SSE	South-South-East
SSW	South-South-West
STI	Sexual Transmitted Infections
SW	Southwest
TeqC	Total equivalent Carbon
TeqCO ₂	Total equivalent Carbon Dioxide
TSP	Total Suspended Particles
TSS	Total Suspended Solids
TVM	Ticket Validation Machine
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USD	U.S. Dollar
VDC	Volts Direct Current
VH	Very High
VL	Very Low
VOC	Volatile Organic Compound
WB	World Bank
WEEE	Waste Electrical and Electronic Equipment
WNW	West-North-West
WSW	West-South-West
WWTP	Wastewater Treatment Plant

2. LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

As the Project is funded by the European Investment Bank (“EIB”) and the Agence Française de Développement (AFD), therefore, the Project is subject to a number of national and International regulatory requirements and policies. This section summarizes the relevant Egyptian environmental and international legislations, regulations, and guidelines that govern the implementation of the Project.

According to the terms of reference, the study is based on the following:

- Relevant Egyptian laws;
- European Investment Bank (EIB); and
- World Bank Environmental and Social Framework issued in 2017² followed by AFD.

2.1 Project Categorization

In terms of EEAA classifications, the Project is classified as a Category C Project. For Category C Project, it is compulsory to submit the full ESIA study including consultations and disclosure. However, based on the World Bank ESS, the Project is classified as Category B+ Project which requires full ESIA study including ESMP, should have public consultations, disclosure processes, and the development of a RAP or LRP and SEP are necessary. Based on EIB standard 1 it is Category B which Environmental and social impacts can be readily identified and mitigation and/or remedial measures can be put in place – Medium risk.

2.2 National Administrative and Legal Framework

This section summarizes the relevant Egyptian environmental and social legislations, regulations and guidelines to the proposed Project in addition to the legal and regulatory requirements of the Egyptian Environmental Affairs Agency (EEAA).

2.2.1 Egyptian Environmental Affairs Agency (EEAA)

The EEAA is an authorized state body regulating environmental management issues. Egyptian laws identify three main roles of EEAA:

² <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf>

- Create the general policy and lay down the necessary plans for the protection and promotion of the environment and follow up the implementation of such plans in coordination with the competent administrative authorities.
- Evaluate ESIA's and evaluate the environmental and social impact assessment studies
- Lay down the criteria and conditions which owners of Projects and establishments must observe before the start of construction and during the operation of these Projects.
- A regulatory and coordinating role in most activities, as well as an executive role restricted to the management of natural protectorates and pilot Projects.
- The responsibility of formulating the environmental management (EM) policy framework, setting the required action plans to protect the environment and follow their execution in coordination with Competent Administrative Authorities (CAAs).
- The responsibility of EEAA in reviewing and approving the ESIA studies for new Projects/expansions undertaken as well as monitoring the implementation of the ESMP.

2.2.2 Environmental Management Unit (EMU)

The Environmental Management Unit (EMU), at Governorate and district level, is responsible for the environmental performance of all Projects/facilities within the Governorates premises. The Governorate has established EMUs at both Governorate and city/district levels. EMUs are responsible for the environmental protection within the Governorate boundaries. They are mandated to undertake both environmental planning and operation-oriented activities. EMU is mandated to:

- Follow-up the environmental performance of the Projects within the Governorate during both construction and operations phases to ensure the Project is in compliance with the laws and regulations as well as with the mitigation measures included in its ESIA approval.
- Investigate any environmental complaints filed against Projects within the Governorate.
- EMUs are administratively affiliated to the Governorate, yet technically to EEAA. EMUs submit monthly reports to EEAA with their achievements and inspection results.
- The Governorate has a solid waste management unit at Governorate and district level. The units are responsible for the supervision of solid waste management contracts.

2.2.3 Competent Administrative Authorities (CAAs)

The Competent Administrative Authorities (CAAs) are the entities responsible for issuing licenses for Project construction and operation. The ESIA is considered one of the requirements of licensing. The CAA for this Project is the National Authority for tunnels (NAT). NAT is thus responsible for receiving the ESIA studies, checking the information included in the documents concerning the location and for the suitability of the area to the Project activity. It is also responsible for ensuring that the activity does not negatively impact the surrounding activities and that the location is in compliance with the ministerial decrees related to the activity. NAT forwards the documents to EEAA for review and to issue its response in 30 days period. They are the main interface with the Project proponents in the ESIA system. The CAA is mandated to:

- Provide technical assistance to Project Proponents
- Ensure the approval of the Project Site
- Receive ESIA Documents and forward it to EEAA
- Follow-up the implementation of the ESIA requirements during post construction field investigation (before the operation license).

2.3 Relevant Egyptian Laws and Regulations:

The main legal instrument dealing with environmental issues in Egypt is Law No. 4/1994, amended by Law No. 9/2009 and Law No. 105/2015 and its Executive Regulation (ER) 338/19995 amended by Decrees No. 1741/2005, 1095/2011, 710/2012, 964/2015, 618/2017, 1963/2017 and most recently Decree No. 202/ 2020 commonly known as the Law on Protection of the Environment. The law deals mostly with the protection of the environment against pollution. Prime Ministerial Decree No. 631/1982 established the EEAA as the competent body for environmental matters in Egypt. Law No. 4/1994 also stipulates the role of the EEAA as the main regulatory agency for environmental matters.

According to Article 1 of Law No. 4/1994, the legal entity responsible for a given Project is required to carry out an assessment of the Project's potential impacts on the natural and socio-cultural environment before implementing that Project. The findings of the assessment are submitted to the EEAA for review and approval before other relevant governmental authorities can issue their permits for implementing the Project.

2.3.1 Ambient air quality

Air emissions limits and ambient air emissions are presented in Annexes 5 and 6 of the ER of Law No. 4/1994 amended by Laws No. 9/2009 and 105/2015. The Project shall comply with the maximum permissible limits of air pollutants in the gas emissions at the Project site (articles 34 through 47 of the law and Annex 6 of the regulations). Primary emission sources are construction machinery and transport vehicles. The following table presents the maximum permissible gas emissions and periods of exposure.

Table 2-1 Maximum limits of outdoor air pollutants (ambient air quality) – Urban areas

Pollutant	Maximum Limit [$\mu\text{g}/\text{m}^3$]			
	1 hour	8 hours	24 hours	1 Year
Sulphur Dioxide (SO_2)	300	-	125	50
Carbon Monoxide (CO)	30 mg/m^3	10 mg/m^3	-	-
Nitrogen Dioxide (NO_2)	300	-	150	60
Ozone	180	120	-	-
Total Suspended Particles (TSP)	-	-	230	125
Particulate Matter less than 10 μm (PM_{10})	-	-	150	70
Particulate Matter less than 25 μm ($\text{PM}_{2.5}$)	-	-	80	50
Suspended Particles Measured as Black Smokes	-	-	150	60
Lead	-	-	-	0.5
Ammonia (NH_3)	-	-	120	-

Article 35 of the Egyptian Law No. 4/1994 and article 34 of its modified ER by Decree No. 710/2012, provide the maximum allowable limits for ambient air pollutants.

Article 36 of the Egyptian Law No. 4/1994 amended by Law No. 9/2009 and article 37 of its modified ER by Decrees No. 710/2012 and 964/2015, provide the maximum allowable limits for exhaust gases from machines, engines and vehicles.

Article 40 of the Egyptian Law No. 4/1994 and article 42 of its modified ER by Decree No. 964/2015, provide the maximum allowable limits for the concentrations of pollutants resulting from burning of fuels.

Table 2-2 Maximum allowable emissions from power generation by diesel engines

Fuel Type	Maximum Emission Limits (mg/m ³)			
	TSP	CO	SO ₂	NO _x
Natural Gas	50	150	100	600
Diesel Oil (Solar)	100	250	400	600

**Table 2-3 Maximum allowable emissions from Vehicles using gasoline fuel
(Measured at Idle speed from 600 to 900 cycle/minute)**

Pollutants	Before 2003		From 2003 – 2009		From 2010 till present	
	HC ppm	%CO	HC ppm	%CO	HC ppm	%CO
Maximum limits	600	4	300	1.5	200	1.2

Table 2-4: Maximum Emission limit from asphalt mixing units (mg/m³)

TSP	CO	VOC
50	500	50

- Reference conditions: O₂ is 13% & Temperature 273K & Pressure 1 atm.
- It shall be considered that distance between any Asphalt mixing unit and any residential area is not less than 500m, taking into consideration the prevailing wind direction.

Table 2-5: Maximum Limits of allowable gas emissions generated from other sources

Pollutant	Maximum Limit (mg/m ³)
Total Organic Compounds (TOC)	50
Carbon Monoxide (CO)	250
Nitric Oxide (NO _x)	300

TSP	50
SO	100

Table 2-6 Maximum allowable emissions from Vehicles using diesel fuel

Year of manufacture (Model)	Before 2003	From 2003 till present
Smoke density Coefficient K (m^{-1})	2.8	2.65
Opacity* (%) measured at light flow device 127 mm.	30	25

2.3.2 Noise Intensity

Article 42 of the environmental law states that during the construction and operation phases of the Project, the resulting noise levels must not exceed the sound intensity levels given by Table 3 of Annex 7 pursuant to the Council of Ministers Resolution No. 1095/2011 amended by decree number 710/2012 of the ER when carrying out production, service or other activities, particularly when operating machinery and equipment or using sirens and loudspeakers.

Commitment to keep the ambient noise levels inside work environment and times of noise exposure according to the limits stipulated to by the Law. Also, prevention of causing the increase of ambient noise levels than the averages stipulated to by the Executive Regulation (Articles: 42 of the Law, and article 44 and Appendix 7 of the ER) outside the site must be performed.

Table 2-7 Maximum limits of noise level exposure in different areas

Area Type	Maximum Permissible Equivalent Noise Level [dB(A _{eq})]	
	Day (7am – 10pm)	Night (10pm – 7am)
Sensitive areas to noise (schools- hospitals – public parks – rural areas)	50	40

Area Type	Maximum Permissible Equivalent Noise Level [dB(A _{eq})]	
	Day (7am – 10pm)	Night (10pm – 7am)
Residential areas are located adjacent to roads which width is less than 12 m, and have some workshops or commercial activities or administrative activities or recreational activities ... etc.	65	55

Table 2-8 Permissible noise levels inside sites of productive activities

Type of place and activity	Maximum permissible equivalent noise level [dB(A)]
A) Work places (workshops and industries) with up to 8-hour shifts (licensed before 2014)	90
B) Work places (workshops and industries) with up to 8-hour shifts (licensed since 2014)	85
- According to article 1 (A and B), exposure to noise decreases to half while increasing the noise level by 3 dB (A) in order not to influence the sense of hearing and wearing appropriate ear plugs. - During working hours, the instantaneous noise level must not exceed 135 dB. - Noise is measured inside the workplace and indoor at level "LAeq" according to International Standards specifications (Part 1 and 2) ISO – 1996 / ISO – 9612 or Egyptian specifications number 2836 (Part 1 and 2) and number 5525 issued in this regard. - Equivalent noise level "LAeq" is the average sound pressure equivalent at measured level (A) during a specific time period and is expressed in decibels (dB).	

Table 2-9 Noise intensity and maximum number of intermitted impacts from heavy hammers

Noise Intensity Level (A) (L.Aeq) - Decibel	135	130	125	120	115
Number of permissible impacts	300	1000	3000	10000	30000

2.3.3 Vibration Limits

The following are the threshold limits of exposure to vibration according to the labour law 12/2003 (Table 10).

Table 2-10 The threshold limits of exposure to vibration according to Labour Law 12/2003

Daily exposure period	The square root of the dominant effect of any axis of the daily exposure period of the three axes, which should not be exceeded (m/s ²)
4 hours and less than 8 hours	4
2 hours and less than 4 hours	6
An hour and less than 2 hours	8
less than an hour (applicable to Tram Project)	12

2.3.4 Waste Management Regulations (Hazardous and non-hazardous)

The collection, transportation and safe disposal of solid wastes from houses, public places, commercial and industrial establishments is regulated through the Public Cleanliness Law No. 38/1967 amended by Law No. 31/1976 and Law No.202/2020, as well as the Environmental Law No. 4/1994 and its executive regulations.

Public Cleanliness Law No. 38/1967

Law No. 38/1967 amended by Law No. 31/1976 and Law No.202/2020 prohibit the dumping of solid wastes in any location other than those designated by the municipal authorities. This includes solid waste treatment and disposal, in addition to the temporary storage in undesignated containers.

Article 1 of the Ministry of Housing and Utilities Decree No. 134/1968 defines solid waste as any waste generated by persons, residential units, non-residential constructions such as commercial establishments, camps, animal cages, slaughterhouses, markets, public spaces, parks, and transportation methods.

Article 6 of Law 38/1967 and its executive regulations requires the local government authority responsible for general cleaning or a contractor licensed by the local authority to collect, transfer, and dispose of solid waste in accordance with the specifications in the executive regulations as well as those of the local council stated in articles 3 and 5 of the law and the relevant executive regulations.

If a local authority hired a solid waste services, the contractor is responsible for the actions of the hired waste collector firm.

Solid Waste Management Regulation No. 202 /2020

A public agency called (Waste Management Regulatory Authority) shall be established with public legal personality, and its main headquarters is in Cairo, and the competent minister is subordinate to it, and it is permissible, by a decision of the Chairman of the Board of Directors, to establish branches or offices of the Waste Management Regulatory Authority in other governorates.

The agency aims to regulate, follow up, monitor, evaluate and develop everything related to the activities of integrated waste management, and to attract and encourage investments in the field of integrated waste management activities to ensure sustainable development, and follow up the implementation of plans necessary to organize waste management in cooperation with state institutions, local administrations, the private sector, civil society organizations and International organizations. The agency also aims to support relations between the Arab Republic of Egypt and the countries and international and regional organizations in the field of waste management.

The Law expressly prohibits:

- (i) open burning of waste;
- (ii) mix without approval any type of waste with each other by the licensee to practice any of the activities of integrated waste management;
- (iii) throw, sort, or treat municipal waste except in the places designated for this;
- (iv) dump agricultural waste into waterways or disposed of in places other than those designated for this;
- (v) use empty packages of hazardous materials or use products resulting from their recycling except in accordance with the requirements specified by the Executive Regulations of this Law;
- (vi) export hazardous materials or waste to outside Egypt without approval;
- (vii) dump hazardous materials or waste into the regional sea, continental shelf, exclusive economic zone, or high seas of Egypt.

In addition, the Law classifies waste as (a) hazardous or (b) non-hazardous. The requirements for the management of each are as follows:

(a) Hazardous

- i. obtaining a special license for the integrated management of hazardous waste and substances
- ii. obtaining an approval from the Waste Management Authority for its circulation
- iii. maintaining a register of such waste and the methods of disposal; and
- iv. sterilizing and disinfecting the place where the facility producing such waste was established in case it was moved or its activities suspended;

(b) Non-hazardous

- i. obtaining a license for the integrated management of non-hazardous waste; and
- ii. taking all precautions required to avoid causing any harm to the environment.

Environmental Law No. 4/1994

The law prohibits the disposal of any solid wastes except in areas designated for this purpose through article 37, and articles 38, 39 and 41 of the ERs which require that during the Project's activities, the entity undertaking the work must take the necessary precautions to safely store and transport the resulting wastes in accordance with the set procedure. For example, the disposal of excavation/construction waste at licensed locations should be through the local authority. Regarding the hazardous wastes, and in accordance with the provisions of articles 29 to 33 of Law No. 4/1994 which is equivalent to Law No. 9/2009 and articles 28, 31 and 33 of the ERs, the entity producing hazardous wastes in gaseous, liquid or solid form is committed to collect and transport the generated waste to designated disposal sites which are predetermined by the local authorities, the competent administrative authorities and the Egyptian Environmental Affairs Agency.

2.3.5 Water and Wastewater Management Regulations

Industrial Wastewater Disposal Law 93/1962

The law regulates the discharge of liquid waste to sewerage networks, thus protecting such networks and sewerage utilities from polluting discharges. Provisions of this law apply to all parts of sewerage networks including final inspection chambers and their joints to the main

network and all pipelines whether constructed under public or private roads. Article 14 details the physical/chemical standards that should be complied with as indicated in the table below.

Table 2-11 Maximum pollutants to be discharged in drainage networks (Law 93/1962)

Parameter	Standards & Specifications
pH	6 – 9.5
Temperature	43 °C
Chemical Oxygen Demand (COD)	1100 ppm
Biological Oxygen Demand (BOD)	600 ppm
Total Suspended Solids (TSS)	800 ppm

2.3.6 Environmental Register

Article 22 of Law 9/2009 amending Law 4/1994 and article 17 of its modified ER by Decree No. 1741/2005, stipulate that establishments should maintain environmental registers for their activities.

Article 17 and Annex 3 of the ER provide the content of the environmental register and require that the owner of the facility informs the EEAA of any non-compliance.

Articles 28 - 32 of the modified ERs are concerned with the rules and procedures of hazardous substance handling and waste management. Accordingly, a register for hazardous waste should be maintained as well as a record for the hazardous substances used.

According to article 33 of Law 4/1994 and article 33 of the modified ERs, the owner of an establishment whose activity results in hazardous waste pursuant to the provisions of these ERs shall be held to keep a register of such waste and the method of its disposal, as well as of the names of the parties contracted with to receive the said waste, as follows:

- Name and address of the establishment.
- Name and job title of the person responsible for filling in the register.
- The period covered by the current data.
- The special conditions issued for the establishment by the EEAA.

- A list of the types and quantities of hazardous waste resulting from the establishment activity.
- Method of disposal thereof.
- The parties contracted with to receive the hazardous waste.
- Date on which the form is filled.
- Signature of the officer in charge

The EEAA shall follow up the information in the registers to ensure its conformity with reality.

2.3.7 Monuments Law 117/1983

Law No. 117/1983 concerning the protection of antiquities assigns the Supreme Council for Antiquities (SCA) the responsibility of management and protection and management of antiquities and archaeological sites. The law requires prior approval from the SCA on the plans for construction work on archaeological sites. Any legal person encountering any evidence of archaeological presence is required by law to report his finding to the General Authority for antiquities. The SCA is responsible for the following:

- Prehistoric, ancient Egyptian and Graeco- Roman sites in Egypt.
- Islamic and Coptic monuments and sites.
- Central and local museums.
- Architecture, restoration, engineering works concerning all antiquities.

2.3.8 Work Environment and Occupational Health and Safety

According to articles 43 - 45 of Law No. 4/1994 and articles 44 - 47 of its modified ERs by Decrees No. 1095/2011 and 710/2012, the protective equipment and all necessary safety measures should be provided for the work crew that will be involved in the construction activities. These precautions measures are necessary to ensure a safe and healthy work environment. Moreover, according to the requirements of the Labour Law No. 12/2003, workforce safety and assurance of the adequacy of the working environment should be addressed. The law also deals with the provision of protective equipment to workers and fire-fighting/emergency response plans.

Besides, Ministerial Decree No. 211/2003 of the Ministry of Manpower also addresses the requirements to prevent adverse physical, chemical, biological and mechanical hazards in the workplace.

Moreover, the following laws and decrees should be considered as it tackled occupational health and safety provisions, namely:

- Decree No. 126/2003 replacing Decree No. 75/1993 defining procedures and forms for the notification of work-related accidents, injuries, fatalities and diseases,
- Decree No. 211/2003 replacing Decree No. 55/1983 specifying conditions and precautions essential for the provision of OSH measures at the workplace,
- Decree No. 134/2003 replacing Decree No. 116/1991 defining the types of establishments covered, OSH services and committees, and related OSH training institutions.
- Decree No. 155/2003 identifies works, occupations and industries prohibited for women workers,
- Law 137/1981: Labour and Workforce Safety,
- Minister of industry Decree 91/1985 for implementing Law 2/1985,
- Law No. 79/1975 as amended by Law No. 25/1977 defining the Social (and Health) Insurance
- Minister of Manpower Decree No. 48/1967 for implementing Law No. 79/1975, requires employers to inform their employees that they are dealing with hazardous waste, accordingly every worker is required to follow protective measures and observe safety precautions set by the employer. The establishment is authorized to take disciplinary action against a worker who does not follow the safety precautions as prescribed (article 218 of the law, article 57 of Law No. 79/1975, and Decree No. 48/1967).

2.3.9 Land Acquisition and Involuntary Resettlement law 187/2020

In addition to the amendments that have been referred in Law 24/2018 of Articles (2, 6, 13) the law stipulates Article 12 of Law No. 10 of 1990 regarding land acquisition for the public benefit shall be replaced by Article (12)

- If the forms or the ministerial decision have not been deposited according to the procedures stipulated in the previous articles within three years from the date of the

public benefit decision in the official gazette; the decision shall be considered as if it was not for land acquisition for which the forms or the decision related to.

- The proposed amendment aims to address some of the drawbacks that have emerged because of the application of Law No. 10 of 1990 regarding land acquisition for the public benefit, which lead to obstructing the procedures of property dispute for the public benefit.
- The law also comes within the framework of creating a new constitution that aims to protect private property, through fair compensation paid in advance in accordance with the law; as this phrase was not found in the previous constitution

2.3.10 Law no. 94/2003, Protection of communities Human Rights Laws

The Law on Establishing the National Council for Human Rights (NCHR) aims to promote, ensure respect, set values, raise awareness and ensure observance of human rights. At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence.

2.3.11 Civil Code 131/1948

It is important to note that the Civil Code (No. 131 of 1948) recognizes (*Hiyaza*) (i.e. possession of immovable/movable property without ownership) as a legitimate channel to acquire ownership of the property in question through adverse possession, provided that the (*Hiyaza*) has been “peaceful, unchallenged and uninterrupted” for a period of 15 years³. By Law, ownership through adverse possession does not, however, apply to State lands.

2.3.12 Unified Building Law no.119/2008

This law states the following:

- Apply and a receive the construction permit before start of the implementation
- Ensure that all designs abide by the building codes of Egypt

³ The large majority of land in Egypt is public or State-owned desert land that is for the most part undeveloped (estimated to be 90-95% of the national territory).

2.4 International Labour Conventions⁴

Since 1936, Egypt has been party to many regional and international conventions, treaties and agreements addressing labour standards as well as environmental protection. Such regulations have also been incorporated in the different national laws; such as, Forced Labour - Freedom of Association – Discrimination - Child Labour.

2.5 World Bank Environmental and Social Standards

The World Bank Environmental and Social Framework⁵ sets out the World Bank's commitment to sustainable development, through a Bank Policy and the ten Environmental and Social Standards which are designed to guide borrowers to operate in compliance with good international practices in the key areas of environmental and social issues and impacts. The table below shows all the E&S standards as stipulated by the WB and indicates their applicability to the Project. Details of each ESS is presented in details in Appendix I. The ten Environmental and Social Standards establish the standards that the Borrower and the Project will meet through the Project life cycle, as follows:

Table 2-12 Applicability of WB Environmental and Social Standard (ESS) to the Project

Environmental and Social Standard (ESS)	Title of the ESS	Triggered or not (Y/N)
ESS 1	Assessment and Management of Environmental and Social Risks and Impacts	Yes
ESS 2	Labour and Working Conditions	Yes
ESS 3	Resource Efficiency and Pollution Prevention and Management	Yes
ESS 4	Community health, safety and security	Yes
ESS 5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Yes

⁴ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102915

⁵ <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf>

ESS 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes
ESS 7	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	No
ESS 8	Cultural Heritage	Yes
ESS 9	Financial Intermediaries	No
ESS 10	Stakeholder Engagement and Information Disclosure	Yes

2.6 EIB Environmental and Social Standards

The EIB finances Projects to achieve a number of priority EU policy objectives. The standards and principles are outlined in the statement of Environmental and Social Principles and Standards issued in October 2017⁶. Details of each standards presented in details in Appendix I.

Table 2-13 Applicability of EIB Environmental and Social Standards to the Project

Environmental and Social Standard	Title of the EIB Environmental and Social Standard	Triggered or not (Y/N)
1	Assessment and Management of Environmental and Social Impacts and Risks	Yes
2	Pollution Prevention and Abatement	Yes
3	Biodiversity and Ecosystems	Yes
4	EIB Climate -Related Standards	Yes
5	Cultural Heritage	Yes
6	Involuntary Resettlement	Yes

⁶ https://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

Environmental and Social Standard	Title of the EIB Environmental and Social Standard	Triggered or not (Y/N)
7	Rights and Interests of Vulnerable Groups	Yes
8	Labour Standards	Yes
9	Occupational and Public Health, Safety and Security	Yes
10	Stakeholder Engagement	Yes

2.7 Climate Resilience Principles (CRPs)

Since this Project is located centrally in Alexandria, climate change impact considerations must be made for this Project for the long term. Recently Alexandria has experienced a consistent trend of acute extreme weather events that have seriously impacted the livelihood of local residents and damaged infrastructure. Based on this, the consultant will consider the Climate Bonds Initiative's Climate Resilience Principles (CRPs)⁷, for the Project. The process includes assessing the adaptability and resilience of the Project to climate change. The principles can be utilized as the core of a climate change risk assessment methodology. The Principles considered for this Project include:

- Assets and activities being invested in must have clearly defined boundaries and identify interdependencies for assessing climate risks and resilience impacts
 - Boundaries of all activities must be clearly defined, as well as internal and external interdependency between assets.
 - Boundaries and interdependencies within those boundaries will include what is affected by the asset or activity and go beyond what the asset or activity owner has control over.
- Physical Climate Risk Assessment for Assets being invested in

⁷ Climate Resilience Principles ([CRPs](#))

Assessment of physical climate hazards, exposures and vulnerabilities must be undertaken to ensure changing climate conditions throughout the asset operating life or activity are identified and addressed as needed.

3. Risk reduction measures for the identified climate resilience risks

It must be demonstrated that risks identified throughout the risk assessment have been mitigated to a tolerable level such that the asset or activity is fit for purpose and does no significant harm to the resilience of the system of which it is a part.

4. Ongoing Monitoring and Evaluation

There should be a viable plan to undertake ongoing monitoring of climate risks and benefits linked to the assets and activities to enable them to determine whether they continue to be fit for purpose, and maintain any climate resilience benefits as climate hazards, exposures and vulnerabilities evolve.

2.8 Summary of EEAA, EIB and World Bank Safeguard Policies and Guidelines

Table 2-14 Applicability of EIB Environmental and Social Standards to the Project

No.	Safe guard	Policy Triggered (Yes/No)			Justification
		EEAA	EIB	WB	
1	Environmental Assessment	Yes	Yes	Yes	- ESIA is a compulsory study (in accordance to Egyptian and International guidelines and regulations); that has to be provided prior to the implementation of any Project. - This policy applies to the Raml tramway rehabilitation Project as it is classified as: - Category C of Egyptian Laws and Regulations 4/1994, - Category A of WB EES1 - Category C of EIB Standard 1 - In addition, the EIA is in accordance to EIA Policy summarize in Environmental Statement 2004 governed by Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC according to EIB guidelines. - All Environmental and Social aspects related to construction and operation of the rehabilitation Project will be adequately examined.

No.	Safe guard	Policy Triggered (Yes/No)			Justification
		EEAA	EIB	WB	
2	Biodiversity & Ecosystem conservation	No	Yes	Yes	- During the site visit, native grass growth has been identified on the tracks in a few areas, therefore triggering the biodiversity and ecosystems aspects. - However, given that the Project location is entirely situated in a residential area. In addition, the tramway network is already established, no natural habitat or natural protectorate property issues have been identified during site visits or desk studies, hence the risk of Project affecting natural habitats or physical cultural or natural protectorate property is considered minimal.
3	Land Acquisition & Involuntary Resettlemen t	Yes	Yes	Yes	- The involuntary resettlement may be triggered for the Project. - There is no private land acquisition or resettlement that will take place at the Project.
4	Stakeholder Engagement & Information Disclosure	No	Yes	Yes	- The Project requires public consultation activities during the construction phase of the Project. - Consultation activities will be designed according to EIB, WB standards and regulations. - According to Egyptian Law and Regulation, Disclosure is only applicable to category C Project; hence it is not applicable to the current Project. - However, as the Disclosure process is compulsory under the EIA Directive, it has been designed in according the EIB disclosure requirements.

No.	Safe guard	Policy Triggered (Yes/No)			Justification
		EEAA	EIB	WB	
5	Labour Standards	Yes	Yes	Yes	- The construction phase of the rehabilitation Project will require many workers in addition to those needed for the maintenance and operation of the new network. - EEAA Labour Law No. 12/2003 addresses workforce safety - EIB Standard 8 aims to ensure the adherence to Core Labour standards of the International Labour Organization (ILO) - WB ESS2 lays out extensive requirements to promote the health and safety of workers, ensure the protection of vulnerable groups, and institute a safe working environment.

2.9 Gap Analysis of National and International Requirements

The Project is required to apply the relevant national and international requirements and standards which contain the performance levels and measures that are normally acceptable and applicable to the Project. When host country regulations differ from the levels and measures presented in the EHS Guidelines, Projects are expected to achieve whichever is more stringent. The following tables are presenting comparisons between Egyptian, WB and EIB standards regarding ambient air quality and noise levels.

Table 2-15 Ambient Air Quality limits in the National legislations and International Standards

Ambient air parameters	Requirements of Egyptian legislations $\mu\text{g}/\text{m}^3$				Requirements of WB $\mu\text{g}/\text{m}^3$				EU-directive 2008 50			
	1 hr	8hr	24hr	1year	1 hr	8hr	24hr	1year	1 hr	8hr	24hr	1year
Carbon monoxide $\text{CO } \mu\text{g}/\text{m}^3$	30	10	NA	NA	NA	NA	NA	NA	NA	7 mg. m^{-3} Upper assessment threshold 5 mg. m^{-3} Lower assessment threshold 10 mg/ m^3 (limit value guideline)	NA	NA
Sulfur dioxide SO_2 $\mu\text{g}/\text{m}^3$	300	NA	125	50	NA	NA	125 (IT-1) 50 (IT-2) 20 (Guidelines)	N/A	NA	NA	125 Lower assessment threshold	NA

Nitrogen oxides NO _x µg/m ³	300	NA	150	60	200 (Guidelines)	NA	NA	40 (Guidelines)	200	NA	NA	24
Particulates PM ₁₀ µg/m ³	NA	NA	150	70	NA	NA	150 (IT-1) 100 (IT-2) 75 (IT-3) 50 (Guidelines)	70 (IT-1) 50 (IT-2) 30 (IT-3) 20 (Guidelines)	NA	NA	35 Upper assessment threshold 25 Lower assessment threshold 50 µg/m ³ , not to be exceeded more than 35 times a calendar year	28 Upper assessment threshold 20 Lower assessment threshold
Particulates PM _{2.5} µg/m ³	NA	NA	80	50	NA	NA	75 (IT-1) 50 (IT-2) 37.5 (IT-3) 25 (Guidelines)	35 (IT-1) 25 (IT-2) 15 (IT-3) 10 (Guidelines)	NA	NA	NA	17 Upper assessment threshold 12 Lower assessment threshold
TSP µg/m ³	NA	NA	230	125	NA	NA	NA	NA	NA	NA	NA	NA
Ozone µg/m ³	180	120	NA	NA	NA	160 (IT-1)	NA	NA	180	NA	NA	NA

						100 (Guidelines)						

Table 2-16 Maximum permissible limit for noise intensity in the different areas according to National and International requirements

Requirements of Egyptian Law 4 - 1994			Requirements of WB		International Permissible Directive 2002/49/EC	
Type of Area	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.
Sensitive Areas to noise (schools- hospitals- public parks- rural areas)	50	40				
Residential areas located adjacent to roads which width is less than 12m, and workshops or commercial or entertainments activities are found	65	55	55	45	75	70

Table 2-17 Maximum Limits for Noise exposure in the Work Environment as per National and International requirements

Egyptian Law Permissible Noise Level			WB Permissible noise levels			Directive 2003/10/EC
Type of place and activity	Maximum permissible equivalent noise level [dB(A)]	Exposure duration	Location/Activity	Equivalent Level, L_{Aeq} , 8 hrs(dB)	Maximum LA max, fast	It sets exposure limit values and exposure action values in respect to the daily and weekly noise exposure level as well as peak sound pressure.
a) Work places (workshops and industries) with up to 8 hour shifts (licensed before 2014)	90	8	Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)	Lower Value 80 dB
b) Work places (workshops and industries) with up to 8 hour shifts (licensed since 2014)	85	8	Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)	Upper value 85 dB
*: If the measured noise at the workplace increased over the maximum allowable limit by 3 dBA, the exposure period shall be reduced to half of the exposure period. In addition, wearing proper ear muffs is a must. Noise level at any time at the work place shall not exceed 135 dBA. Noise shall be measured inside working environment in L_{Aeq} unit in accordance with ISO 9612/ ISO 1996 or Egyptian standards.						

Table 2-18 The threshold limits of exposure to vibration according to National Labour Law 12/2003 ,ACGIH 8 and EU Directive 2002-/44/-EC

Daily exposure period (m/s ²)	National Labour Law	ACGIH	EU Directive 2002-/44/-EC
4 hours and less than 8 hours	4	4	Limit 8 hours: Daily Limit 5 (m/s ²)
2 hours and less than 4 hours	6	6	
An hour and less than 2 hours	8	8	
less than an hour	12	12	

2.10 Gap analysis between Environmental and Social national laws and international standards

Table 2-19 Gap analysis between Environmental and Social national laws and international standards

WB ESS	EIB	National Laws	Gap
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Standard 1: Assessment and Management of Environmental and Social Impacts and Risks	Law No. 4 of 1994 Amended by Law No. 9 of 2009 (Environment Law) and its amended Articles of Association amended by Resolution 1095 of 2011,	- Discrepancies in air quality and noise limits between the national laws and international standards. - Not addressing all social risks and impacts, including: (ii) temporary labour influx, and (iii) risk of gender-based violence. - Objectives related to avoiding impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged

⁸ Vibration values set by The American Conference of Governmental Industrial Hygienists (ACGIH) based on Environmental, Health, and Safety (EHS) Guidelines set by IFC ,a sister organization of the World Bank and member of the World Bank Group

WB ESS	EIB	National Laws	Gap
	Standard 4: Climate - Related Standards	Decree No. 710 of 2012, Decision of the Prime Minister No. 964 of 2015 and Decree No. 618 and 1963 of 2017 - Public cleanliness law 38/1967 amended by law 31/1976 and its executive regulations - Law no. 159 for the year 1953 regulates the cleanliness of fields, roads and streets as well as organization of collection and transport of waste. - Laws 106/1976 and 101/1996 allow local governments to include the management of construction and demolition waste in the permits required for construction activities - Law 202/2020 regarding solid waste management. - Law 140/ 1956 regarding occupation of public roads - Law 84/ 1968 regarding public roads - Law 93/1962 on Wastewater disposal into the drainage systems - Law 48/1982 on protection of Nile River Water and Egypt waterways from pollution	in sharing development benefits and opportunities resulting from the Project. The lack of a specific role for the official in charge of social aspects

WB ESS	EIB	National Laws	Gap
ESS 2: Labour and Working Conditions	Standards 8: Labour Standards	- Articles 43 - 45 of Law No. 4/1994 and articles 44 - 47 of its modified Executive Regulations by Decrees No. 1095/2011 and 710/2012 - Labour Law No. 12/2003	- The Egyptian labour law does not include clear articles that guarantee application to all Project workers including fulltime, part-time, contracted workers, primary supply workers, community workers, temporary, seasonal and migrant workers, - Egyptian Labour Law does not include an obligation to provide workers with facilities appropriate to the circumstances of their work, including access to canteens, hygiene facilities, and appropriate areas for rest. In addition to quality of accommodation, if needed. - The IFIs standards stipulates number of requirements related to labour safety, welfare and working conditions. The most common gap between the Egyptian labour law and those requirements are that the latter did not set clear provisions for GRM of labour nor the work-related facilities to be offered for labour. The law assumed equitable treatment for labour without classifying the various types of labour.
ESS 3: Resource Efficiency and Pollution Prevention and Management	Standard 2: Pollution Prevention and Abatement	Law No. 4 of 1994 Amended by Law No. 9 of 2009 (Environment Law) and its amended Articles of Association amended by Resolution 1095 of 2011, Decree No. 710 of 2012, Decision of the Prime Minister No. 964 of 2015 and Decree No. 618 and 1963 of 2017	No Gap identified
ESS4: Community health, safety and security	Standards 9: Occupational and Public Health, Safety and Security	Law no. 94/2003, Protection of communities Human Rights Laws	EIB Standard 9 applies the UE 2006/0249 (decent work agenda)/ILO guidelines on Occupational Safety and Health Management Systems/Directive 89/391 EEC amended by regulation EC 1882/2003 and Directive 2007/30/EC (OSH Framework)

WB ESS	EIB	National Laws	Gap
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Standard 6: Involuntary Resettlement	• Egyptian Constitution has preserved the right of private property, Egyptian Constitution (1971, amended in year 1980) and Egyptian Constitution (2014, articles 33 and 35) • Egyptian Civil code 131/1948, Articles 802-805 for private ownership right • Law No. 10 of year 1990 and its amendments by law No. 24 for the year of 2018, and law No. 1 for the year 2015 for property expropriation for public benefit	• The cut-off date: The WB and the EIB identifies a cut-off date in order to prevent people influx to the Project area. The Egyptian laws does not set a cut-off date, particularly if the impacts are related to agricultural lands that might experience changes in crops and tenancy. The cut- off date disclosed by NAT is the 31st of December 2020. It was disclosed to all entities and stakeholders in a meeting carried out with the Alexandria Governor on the 19th of January 2021. However, due to the absence of Public Interest Decree, the cut-off date was not abided to as NAT had no right on the route of the tram land. Accordingly, the cut-off date will be identified upon the finalization of the formal census that will be carried by the compensation committee. • Monitoring and Evaluation: Monitoring or evaluation measures are not stipulated in Egyptian regulation. • Valuation of compensation: Egyptian regulations use prevailing price in the affected areas to calculate and compensate Project affected people for their expropriated property. The prevailing price is assessed by a specialized committee created by the government. For crops, they are valued according to the price lists developed by the agriculture directorate. The amendment of the year 2018 entailed increase for the value of the compensation to include additional 20% above the prevailing market price for the interest of the affected persons (landowners), and Law 187/2020 which most importantly include committing the Project proponent to deposit the value of the compensation in no more than 3 months from the public interest decree issuance date. Previous Egyptian experiences show that the full replacement (providing assistance is not covered) principle as stated by ESS5 has not been realized by the affected group. • Income restoration (livelihoods): Egyptian law does not discuss compensation for loss of income, only land and assets.

WB ESS	EIB	National Laws	Gap
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Standard 3: Biodiversity and Ecosystems	Law No. 4 of 1994 Amended by Law No. 9 of 2009 (Environment Law) and its amended Articles of Association amended by Resolution 1095 of 2011, Decree No. 710 of 2012, Decision of the Prime Minister No. 964 of 2015 and Decree No. 618 and 1963 of 2017	- National and EIB standards are recommending to protect and conserve all levels of biodiversity and sustainably managing living natural resources are fundamental to sustainable development and it recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity. - ESS6 also addresses sustainable management of primary production and harvesting of living natural resources, and recognizes the need to consider the livelihood of Project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a Project.
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Standard 7: Rights and Interests of Vulnerable Groups	Standard 7 places emphasis on protecting indigenous communities, however, there are no indigenous communities residing in Egypt.	- With regard to vulnerable groups; Egyptian regulations have not addressed how vulnerable groups affected by Project activates and expropriation of property should be treated. - Definite identification of those groups, and their associated sizes and characteristics have not yet been clarified. In the coming stage, the Project needs to conduct a social survey in order to identify all vulnerable groups. Subsequently, the impacts of the Project have to be assessed.
ESS 8: Cultural Heritage	Standard 5: Cultural Heritage	- Law No. 117 of 1983 Amended by Law No. 12 of 1991 for the Protection of Archaeological Areas and Cultural Heritage - The Relevant International Treaties Signed by Egypt: Respect for cultural heritage and non-financing of Projects that threaten the safety of sites with a high level of protection for reasons of cultural heritage, for	No Gap identified

WB ESS	EIB	National Laws	Gap
		example UNESCO World Heritage Sites	
ESS 10: Stakeholder Engagement and Information Disclosure	Standards 10: Stakeholder Engagement	EEAA EIA guidelines related to the Public Consultation prior to the Project construction and implementation	- There are no regulations on committing the Project owner to conducting stakeholder engagement activities as well as disclosing information regarding the environmental and social risks and impacts of the Project to Project-affected parties as well as to community members, throughout the Project life cycle - There are no regulations on committing the Project owner in establishing a grievance mechanism

3. PROJECT DESCRIPTION

The existing Raml Tram is a double-track rail system which runs east-west across the city from Victoria Station in the east to Raml Station in the west. It operates as two distinct lines with common tracks for most of the line. The total infrastructure length of the tramline is 14.4 km including both the Sidi Gaber and San Stefano loops which Line 1(Red) is 10.6 km long with 31 stops while Line 2(Green) is 10.180 km long consisting of 29 stops.

The rehabilitated track of the tramway will consist of 2 lines with total number of 24 stations with a total length of about 13.2 km.

The main objective of the Alexandria Raml Tram Rehabilitation Project is to upgrade and enhance the Raml tram into a modern, reliable and efficient LRT system fit for the 21st century and which mirrors the grandeur and history of the city of Alexandria. It is therefore necessary to renew the civil and railway infrastructures paying particular attention to the rolling stock, the efficiency of the operating and maintenance regimes, and the safety of the travelling public.

The execution of the Project by the National Authority for Tunnels (NAT) in coordination with the city of Alexandria envisions a rehabilitated tram that is attractive to the residents of Alexandria and its high volume of tourists, while maintaining affordability for passengers. Accordingly, NAT aims to design and construct a cost-efficient rehabilitated tram by means of simplified construction works to be completed within the two-year period that is to be integrated with public transport systems including buses, taxis, and potential pedestrian routes. An efficient tramway network is long anticipated mainly by residents of Alexandria, in terms of availability, reliability, functionality, and regularity while maintaining catchment area. In addition, the city aims to see a sustainable, modern tram that will reduce noise and vibration pollution, and also decrease air pollution by establishing less reliability on vehicles, therefore reducing environmental pollution from transportation throughout the city as a whole. Most importantly, the safety of passengers, road users, and pedestrians is priority.

To address the abovementioned goals, the technical objectives of the Project include:

- Improve the commercial speed significantly, from and actual commercial speed of 10-12km/hr to 21 km/hr by optimizing the number of stations, without affecting the actual catchment area

- Implement cost efficient design of the infrastructure, by maintaining the Project at grade as much as possible and adoption solution of complex structures only when required.
- Increase the accessibility and reliability of the Project by optimizing the passengers' flows and using modern low-floor rolling stock
- Decrease the cost for operation and maintenance by implementing a new depot with a higher capacity and additional workshop and stabling area along the Project in accordance with the needs deriving from a much higher commercial speed and an optimized headway.
- Ensure safe access of the passengers and rolling stock to the stations
- Ensure safe access of the passengers to rolling stock
- Provide reduction of fuel consumption and reduction of operation and maintenance costs with vehicles and surface roads
- Provide reduction of air pollution in the areas served by the Project
- Ensure integration of all public transportation modes (trams, buses, shared taxis, etc.) and overall improvement of the travel time for all users for the public transportation
- Propose a connection between Raml Tram and the Abu Qir line according to the alignment of both lines and introduce an optimum solution to ensure an efficient flow of passengers between them

3.1 Tram Rehabilitation

The rehabilitation process of Raml Tram will include improvement of the current status and introducing some new operating systems. The following section shows the current status of the tram components and the enhancement of the same components that will be achieved after the implementation of the rehabilitation activities.

Component	Current Status/Future Status
Route	<u>Current Status</u> The two lines currently share large parts of the track which is segregated from the road traffic by unreliable fence except at road crossings. In addition, Line 5, known as Ukrainian Tram, is almost 10.8 km and it shares the same tracks as Lines 1 and 2 with a varied route. It takes the same route of line 2 from west to east and on its way back, it takes the same route of line 1 and then continues on the same track of line 2. The track and the track bed are generally in poor condition with the ballast having disappeared and replaced by vegetation. The rails themselves are joined by fishplates and these contribute to the noise generated by the tram. The track bed is of the same type throughout the line so there is no allowance made for noise or vibration attenuation at sensitive receptors. The overhead catenary poles appeared to be in relatively good condition. These were placed either centrally between the tracks or at the edge of the right of way depending on the local situation. The figures below present the current route of Raml Tram lines and the status of the existing track.

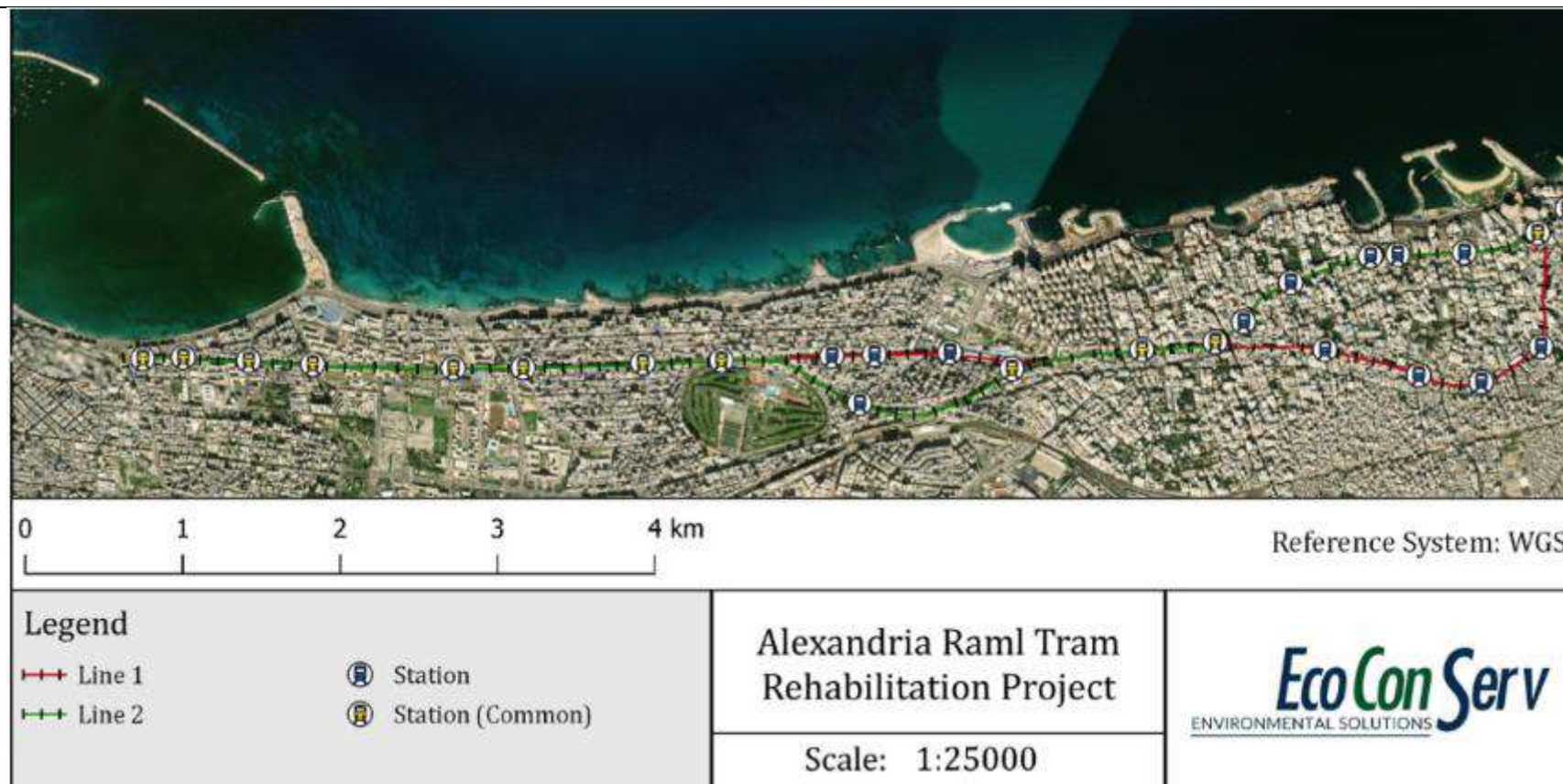


Figure 3-1 Route of Existing Raml Tram lines with stations



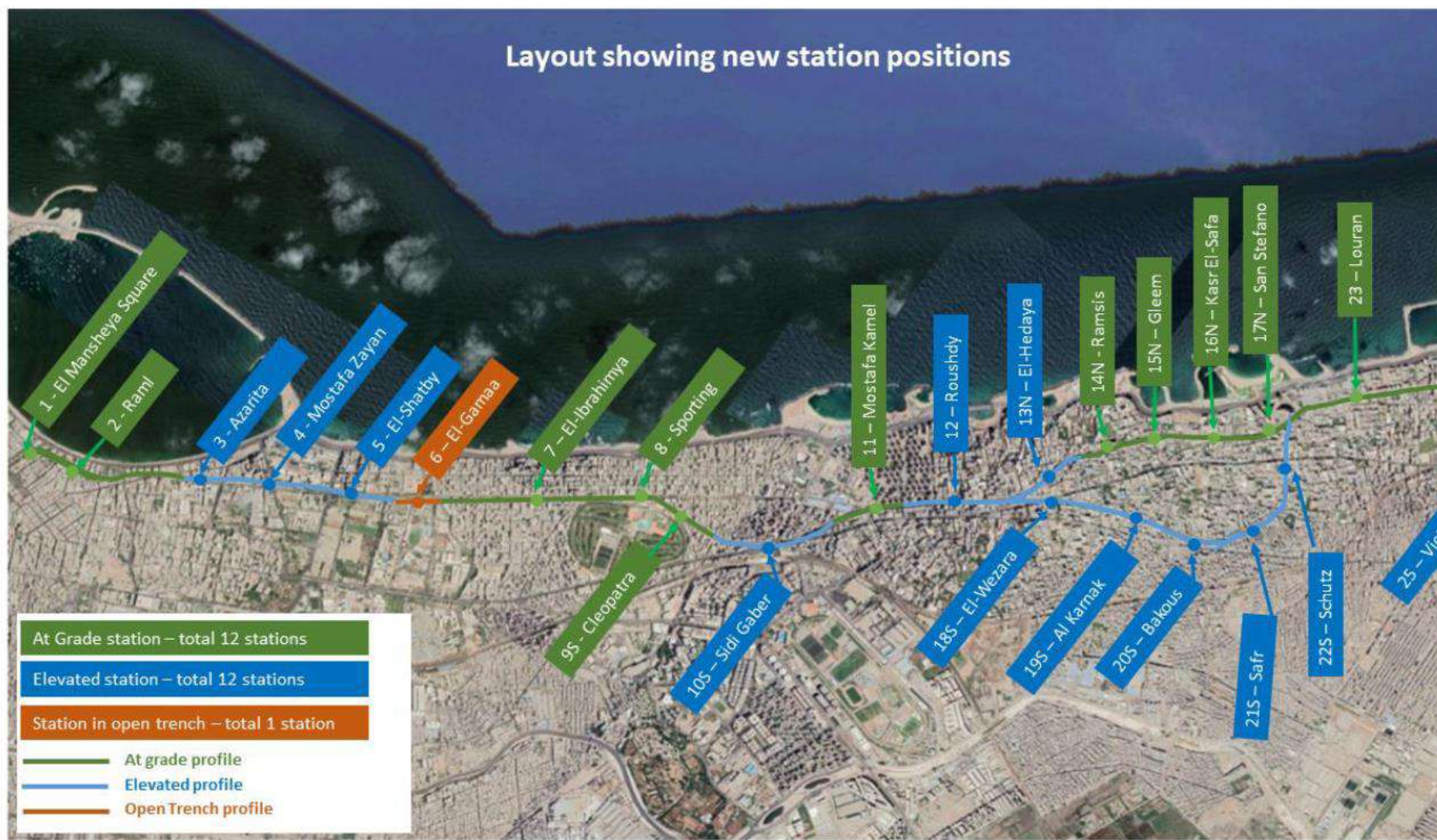
Figure 3-2 Track bed status in Tharwat (left) and Bakous (right) and Stations

Future Status

The rehabilitated route will be 13.2 km long and consist of 24 stations including removal of the Sidi Gaber North loop. Considering the technical alignment, the curves of the existing Raml Tram have radiuses that are mainly over 100 m and up to 1000 m. The only exceptions are two curves that have 65 and 80 m radiuses near the current Raml depot on the northern part of the Sidi Gaber loop.

As a result, it can be said that all the existing Raml Tram curves are suitable for a modern tramway rolling stock. Figure 3-3 shows an overview of the preferred corridor.

Figure 3-3 Proposed Corridor of the Rehabilitated Tram Route Further details about the proposed route and alignment is provided below:



Stations	<u>Current Status</u> The station stops are usually comprised of two-sided platform areas. The system is operated as an open system in which access to and from the platform is uncontrolled. The station furniture is generally comprised of a shelter and a map of the tram route. At most stations the width of the platforms is somewhat narrow thereby confining the movement of passengers when a tram is in the station. The infrastructure of the stations require attention given their age and have suffered from spalling concrete, cracks and irregular surface paving in places. The figures below present examples of the current stations. Total numbers of the current stations is 29.



Figure 3-4 Examples of Raml Tram Current Stations

As shown in the above figure that the pedestrian crossings are not set at regular intervals and are very minimal in which pedestrians normally cross anywhere along the line which is considered a safety hazard.

The disposition of the stations along the line is mostly at-grade with one station, Al Gamaa, in a retained open cut.

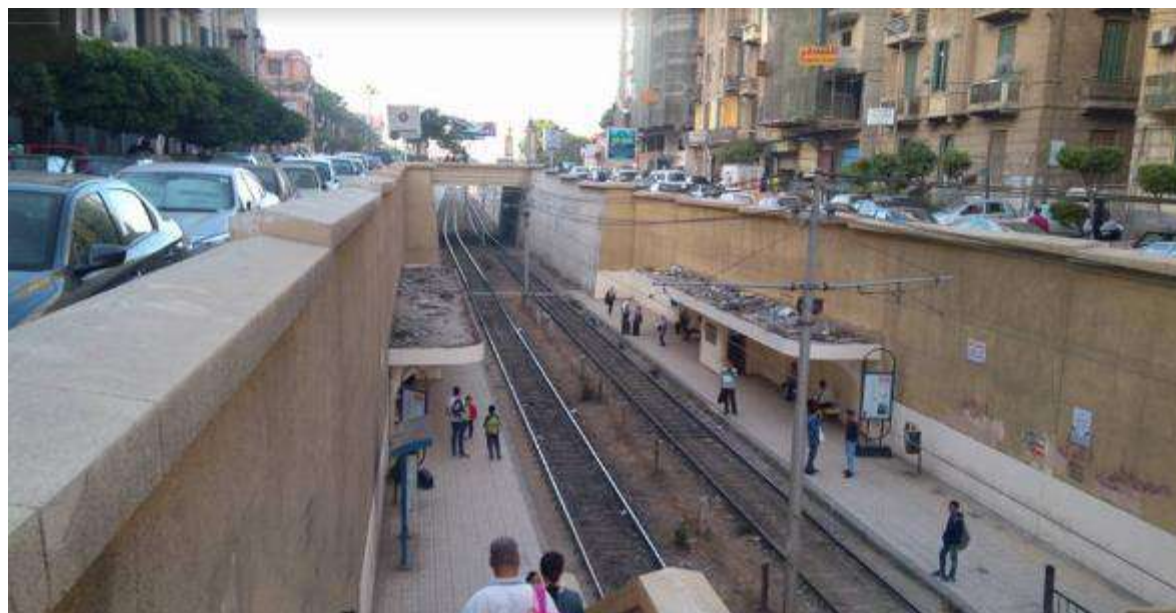


Figure 3-5 El Gamaa Tram Station

There are some stations that are slightly elevated (up or down) relative to their surrounding ground. Most are supported on earth embankments with natural slopes but some are artificially retained.



Figure 3-6 Example of elevated tram station (Camp Chezar (El Moasker))

Future Status

Alexandria Raml tram stations are currently designed to accommodate for 49.5m x 2.6m trains. In order to allow high capacities on the line, it would be appropriate to use standard 65m x 2.65m trams that can accommodate for 600 passengers (considering 6 passengers / m²). As a consequence, stations length will have to be increased by about 20m. The design of stations is considering the following:

- Both at grade and elevated Stations shall be provided.
- Platform length – kept to a minimum but to correspond with the proposed rolling stock length, in this instance 65m.
- Platform width – 3m wide for side platforms to safely cater for the pedestrian traffic or 4 to 5m for island platforms to safely cater for the pedestrian traffic
- Platform height – to correspond with the same level as the proposed low floor rolling stock, this will make the LRT network available to all including those passengers with reduced mobility.
- Shelter to protect passengers from the sun and rain.

The proposed location of new stations is shown in Figure 3-3.

Main station types are proposed, these being:

- Lateral face to face platforms

At grade

Elevated (Viaducts)

- In trench
- Central platform

- Staggered side platforms

- The stop policy has been reviewed in order to reduce the number of stations without hindering the catchment area. This allows increasing the overall performance of the line.

The length of the station's platforms of the rehabilitated Raml Tram will have to be 65 m in order to accommodate for the proposed rolling stock. It is not recommended to have longer stations, as an excessive length would impede their integration in Alexandria's dense urban environment. In order to serve the corridor in a proper manner, existing station locations will be reconsidered to increase commercial speed and decrease costs; the distance between stations will be set at a minimum of 500 m with exceptions. Proposed stations will be set so as to serve the main trips generators and to maintain a distance between stations which is acceptable in order to serve the area in an efficient way. As per the Preferred Alignment Report, the total number of stations will be 24 stations as detailed in the Table below.

Table 3-1 New Station Details

Station Number	Station Name	Type of Station		Distance Between Station (m)
1	Raml Station	At Grade	Opposite	917
2	Azarita	Elevated	Opposite	563
3	Mostafa Zayan	Elevated	Opposite	521
4	El-Shatby	Elevated	Opposite	607
5	El-Gamaa	Trench	Opposite	500
6	El-Ibrahimiya	At Grade	Opposite	591
7	Sporting	At Grade	Opposite	638
8	Cleopatra	At Grade	Opposite	624
9S	Sidi Gaber	Elevated	Opposite	554
10S	Mostafa Kamel	At Grade	Opposite	679
11	Roushdy	Elevated	Opposite	617
12	El-Hedaya	Elevated	Opposite	379
13N	Ramsis	At Grade	Staggered	585
14N	Gleem	At Grade	Staggered	512

		15N	Kasr El-Safa	At Grade	Staggered	546	
		16N	San Stefano	At Grade	Opposite	310	
		17N	El-Wezara	Elevated	Opposite	638	
		18S	Al-Karnak	Elevated	Staggered	519	
		19S	Bakous	Elevated	Opposite	355	
		20S	Safr	Elevated	Staggered	638	
		21S	Schutz	Elevated	Opposite	459	
		22S	Louran	At Grade	Staggered	613/ 879	
		23	Sidi Bishr	At Grade	Opposite	645	
		24	Victoria	Elevated	Opposite	564	

Fare Collection System	<u>Current Status</u> Fares are collected on board the trains by a conductor/ticket collector. <u>Future Status</u> The fare collection system to be implemented by APTA and NAT coordination include: ○ AFC gates are not required ○ Validators are to be on board the trams ○ Two ticket validation machines (TVM) shall be at at-grade stations (one on each platform) ○ Two TVMs shall be on elevated stations Ticket formats may include QR Codes for unitary trip (sold/printed on the spot and valid e.g. 1 hour after purchase) or contactless card for regular patrons.

**Rolling
Stocks**

Current Status

The Current rolling stock are in an unreliable state (uncontrolled doors, produce a very loud noise and vibration)



Figure 3-7 Current rolling stocks status

Future Status

The rehabilitated tram network is expected to have modern tram vehicles that is expected comply with international standards, be efficient, and attractive to Alexandria's citizens and visitors. The dominating rolling stock characteristics are as follow:

Main Rolling Stock Characteristics	Driver	Major impacts on the transportation system
Dynamic gauge	Urban Integration and Architectural Planning	Infrastructure

		Infrastructure costs Rolling stock international market trends		
	Vehicle capacity	Operations planning Rolling stock international market trends	Level of service	
	Vehicle overall dimensions (width, length, etc.) and consists (single or multiple units)	Vehicle capacity and gauge Operations planning	Stations Depot	
	Insertion capabilities (minimum curve radii of the main line and on the depot yard)	Rolling stock international market trends	Alignment Size of the depot yard	
	Main dynamic performances (design speed, acceleration rate etc.)	Operations planning Rolling stock international market trends	Level of service (trip time, headway, comfort etc.)	

Depot	<u>Current Status</u> The existing Raml Tram depot is required for the maintenance of the rolling stock and all other equipment like rail-road truck, washing machine, lathe in pit, paint cab. etc. It is located next to the Mostafa Kamel station on the Sidi Gaber loop near the Mostafa Kamel station with area of about 17 300 m² (as shown in the below figure). It is comprised of an administration block and two sheds where maintenance and overhaul activities take place. It is observed during the site visit that the sheds are quite old. The sheds are open at both ends so that they may be vented naturally. The existing depot is connected to public network for potable, sewage and electricity.



Figure 3-8 Depot Layout



Figure 3-9 Depot

Future Status

A major component of the Raml rehabilitation Project is to design and construct a new or refurbished depot for Raml tram line that will:

- o Perfectly fit to the needs of modern tram vehicles,
- o Provide higher stabling and maintenance capacities to cope with the enlarged fleet,
- o Improve the efficiency of the maintenance activities,
- o Bring better working conditions for the operation and maintenance staff

The newly designed depot will take into account constraints such as:

- o Diverse land dimensions, shape and topography
- o Extension of existing depots,
- o Different operational and environmental constraints

In addition to the depot, the stabling yard is expected to be located at the depot as well and store up to 30 tramways of 65 meters (two vehicle units of 32 meters). The stabling yard shall allow for access to and from the workshop with transit in daily maintenance facilities or access to the tracks on which the lines are operating. The yard shall enable drivers and clear access to the interior of the tramway on every track with a minimum, a circulation width of 1.5m along one side of the tramways and 1m along the other side. Also, facilities to accommodate the cleaners will be provided. The proposed location of the stabling yard is above the existing and planned depot to avoid land acquisition, yet will require the installation of ramps, slopes for access to the tramways, reinforced ceilings of the depot, and construction at heights.



Figure 3-10 The Workshop part (Maintenance) will be at grade

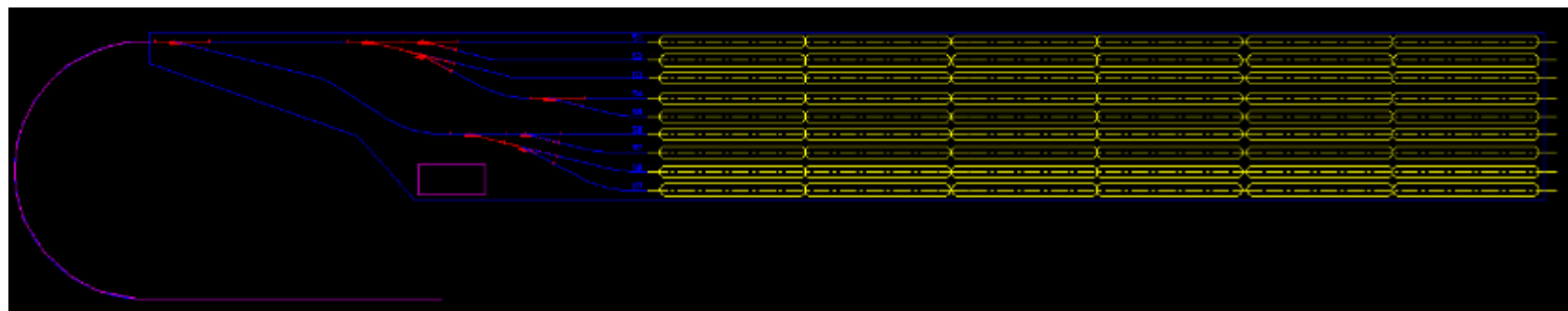


Figure 3-11 The Stabling yard above the maintenance building

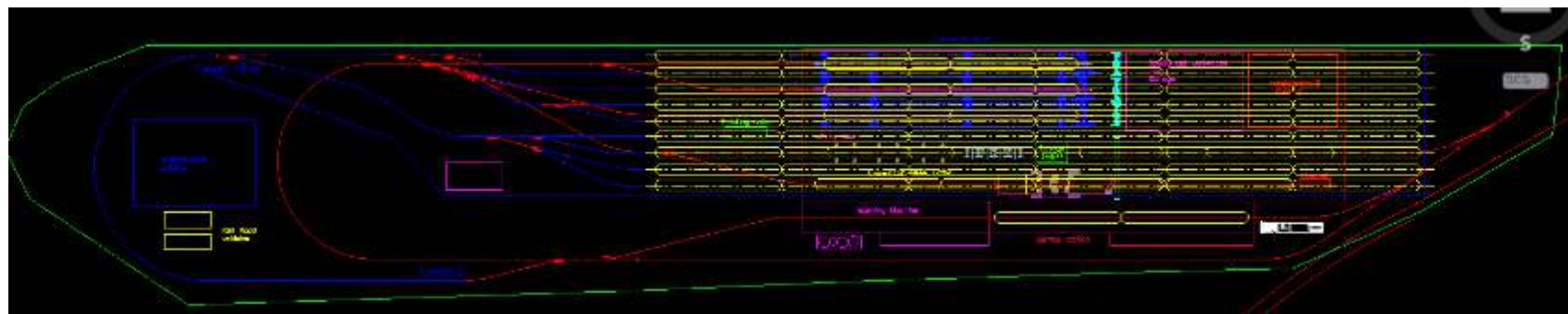


Figure 3-12 Maintenance at grade + elevated Stabling above



Figure 3-13 Section with ramp access to the Stabling

The existing depot is connected to public network for potable, sewage and electricity. However, the existing connections to public network will be renovated.

Power Supply	<u>Current Status <</u> Electrical power is provided by substations to the rolling stock via overhead wires. Current returns to the substation through running rails, which are electrically insulated from the ground. Substations also provide Low Voltage power for auxiliary facilities (stations, depot, etc.). Power supply sub-system includes High Voltage (HV), traction, and Low Voltage (LV) devices. Currently, there are three 600VDC power substations on the Raml tram: ○ A 6.4 MW substation located in Shabti next to APTA headquarters ○ A 6.4 MW substation located in Mostafa Kamel next to the depot ○ A 3.2 MW substation located near the San Stefano station. Each substation is powered by two 11 kV AC cables, one in use and one for backup. These substations provide 600 V DC for traction. Given that the tram will be operated in either 1500 V DC most of the substation equipment will have to be replaced, such as the transformers.



Figure 3-14 Location of existing power substations

Future Status

Although the three current substation locations are expected to be sufficient for the regular operation of the rehabilitated Raml Tram, there is the potential of power shortage in Mansheya, in the case of a failure from the Shatby substation. Accordingly, a 2.2 MW substation located near Orabi Square could be allocated and connected to the Raml Tram in order to provide sufficient power in case of a failure of one of the three main substations.

Overhead Catenary System (OCS)

Current Status

Power is provided to the rolling stock by overhead wires (20 mm diameter made of copper). There is one wire per track. Four aerial feeder cables allow reducing the voltage drop along the line.

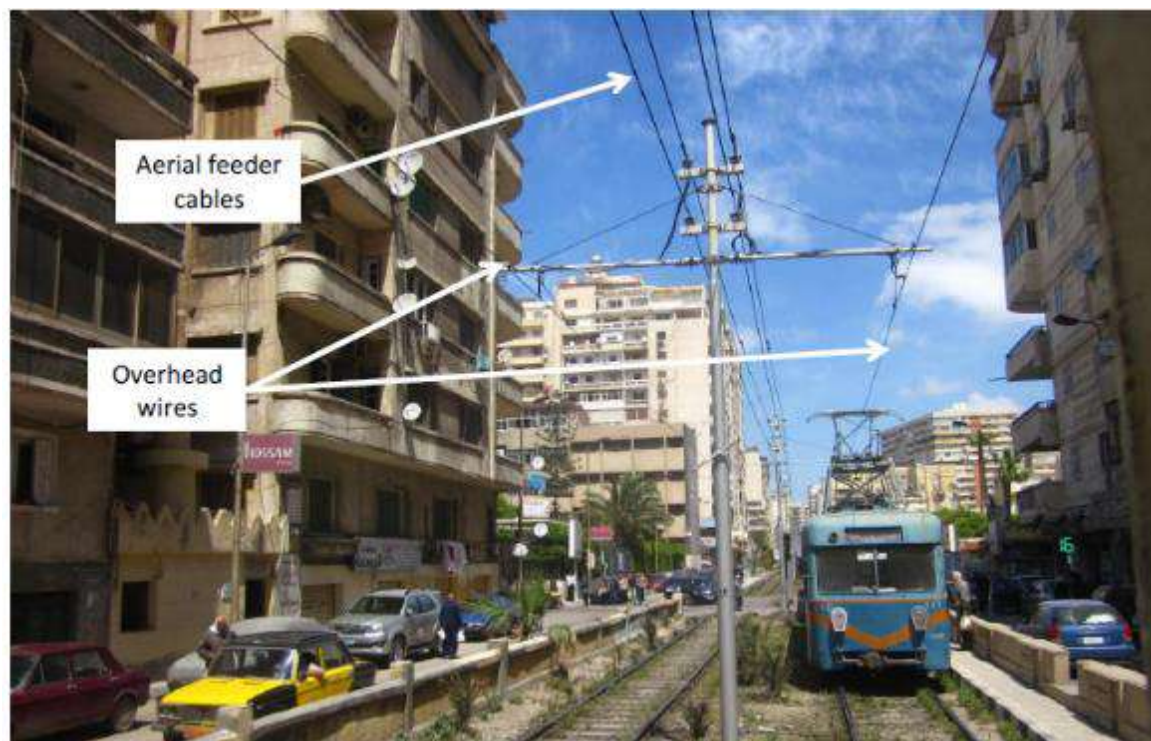


Figure 3-15 Existing power substations (OCS)

Future Status

The existing overhead feeders can be eliminated and replaced with undergrounded positive feeders. OCS integration and topology will depend on:

- o The consolidated track alignment
- o Power supply features: minimal wires section, substation locations, sub-sectioning insulators, wires, isolating and pole grounding
- o Visual impact of the OCS and possibility of facade/wall anchoring
- o Possibilities to cumulate street lighting and OCS on single poles

Safety and risk reduction principles (clearance, grounding, voltage limitation device, etc.)

- o Consolidated technical constraints along the line (bridges, building frontage, track crossovers, etc.)
- o Underground impediments and pipelines
- o Urban site description including building heights and materials, aesthetical requirements especially for passenger stations and outstanding monuments
- o Rolling stock requirements: gauge, speed, electrical power needs.

LRT Signalling/Road Signalling	<u>Current Status</u> Currently, the tramway operation is a drive on sight type in which all movement is based on the driver's discretion. Moreover, the safety of the tram movement primarily relies on the driver. No LRT signalling system is provided in the current situation. <u>Future Status</u> One of the major objectives of the rehabilitated tramway is to improve the reliability and timing of the tramway, accordingly a Traffic (road) signalling system is to be implemented to avoid the trams being stalled at junctions and to move in a more systematic manner. A Rail signalling system will address the areas of concern and analyse the movement of vehicles accordingly. Shunting areas will be introduced to ensure the safe movement of the tram, especially near turnout areas, in particular before and after the Loops, at the terminus and depot. The Rail signalling system will consider technical aspects such as; track circuits or axle counters, interlocking type, local command by driver/staff or command by the AVLS. A road signalling system will mainly address traffic management to ensure systematic coordination between road vehicles and the tramway. The system will account for tri-colour traffic lights, pedestrian lights, car loop detection, traffic controller, road marking, etc. Traffic light equipment are to be used for managing the tram priority at the junctions and the system will include; a tram ground detection loop (embedded in the track), tram on-board emitter, Traffic road signalling lights (for Trams : lights distinctive from the road traffic lights for the cars, but synchronized with it), and interfaces with rail systems (SCADA, power supply).

3.2 Terminal Design

The proposed design of the terminal at Victoria is presented in the below figure.

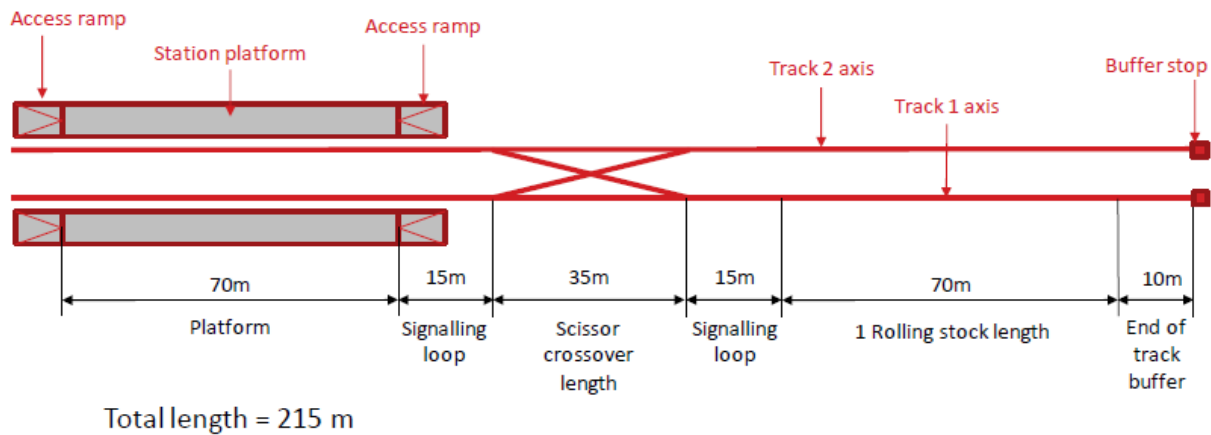


Figure 3-16 Proposed design and dimensions of the Raml Tram terminals

3.3 Pre-construction, Decommissioning and Construction activities

3.3.1 Pre-construction and Decommissioning

Prior to the civil works of the Project, the contractor will carry out the following preliminary activities:

- **Mobilization:** the contractor prepares for the commencement of the works on site.
- **Clearing the right of way (RoW) and the construction facilities zones:** the construction activities will take place on the pre-existing tramway network with exception to areas where the proposed extension will be built. Moreover, the organization of the works will require additional areas for storage and construction facilities.
- **Preparatory works:** The work site will be prepared for the planned construction works. Activities at this stage include, but are not limited to; defining temporary roads for traffic diversions, basing work site facilities, setting up temporary lighting, and clearing the area of trees. If needed, archaeological works will also be performed during this phase.

The current tram infrastructure and systems will be removed. Tracks, overhead wires, and stations will be entirely removed for further reconstruction. In addition, the underground utility networks located underneath the tram RoW will also be removed as part of utilities diversion. The current depot located at Mostafa Kamel station will be demolished and the land will be cleared for the construction of the new depot and stabling area.

Currently, SYSTRA is preparing a 'Removal and Demolition of Existing Raml Tramway' Report present in details the activities that will be done during this phase.

3.3.2 Construction

According to the last meeting with Alexandria Governorate, the construction activities will not be divided into segments but it will be implemented altogether along the tramway.

The following activities will be implemented during the construction of the tramway network.

- **Civil works:** the land on which the trackway will be laid will be constructed by refurbishing the existing trench, embankment if needed, and constructing the viaducts.

- Construction of the power substation buildings: the existing buildings will be reused. As mentioned earlier, the buildings are located at; Shatby next to the APTA headquarters, Mostafa Kamel next to the depot, and near the San Stefano station. However, given the tram will be operated in 1500 V DC, most of the substation equipment will have to be replaced. Also, the substation near Orabi Square may be allocated for additional power supply.
- Construction of the trackway and the rail systems: these works encompass earthworks, cable ducts and concrete trackway construction, and rail systems implementation.
- Final roads and sidewalks construction.
- Systems implementation: including the overhead contact wire and its support masts.
- Setting up station shelters and urban equipment: activities include setting up lighting, benches, fences, guard rails, and other urban finishing such as planting.
- Testing and commissioning of all systems.
- Lighting: The existing public lighting will be identified and necessary modifications made to the existing network to ensure sufficient light is provided during the temporary situation and in the final operation mode. The lighting system will identify pole type and height, foundation details, lighting devices and all other relevant data to ensure an appropriate system is put in place.

During the design and construction of viaducts, the following factors are to be taken into consideration:

- Space requirements
- Land availability
- Static and dynamic loads
- Geotechnical conditions
- Construction methods
- Project scheduling and cost management
- Power supply
- Electrical and mechanical systems

- Electrical installations: traction power/overhead contact system, LV, low currents and lighting
- Drainage and (where applicable), pumping systems, sewage
- Expansion joints
- Emergency evacuation arrangements signposting etc., all in accordance with applicable laws and regulations
- Identification of track support arrangements
- Protection and support of potentially affected utilities or structures
- Ease and safety of access for maintenance purposes (in accordance with urban conditions and public service conditions).

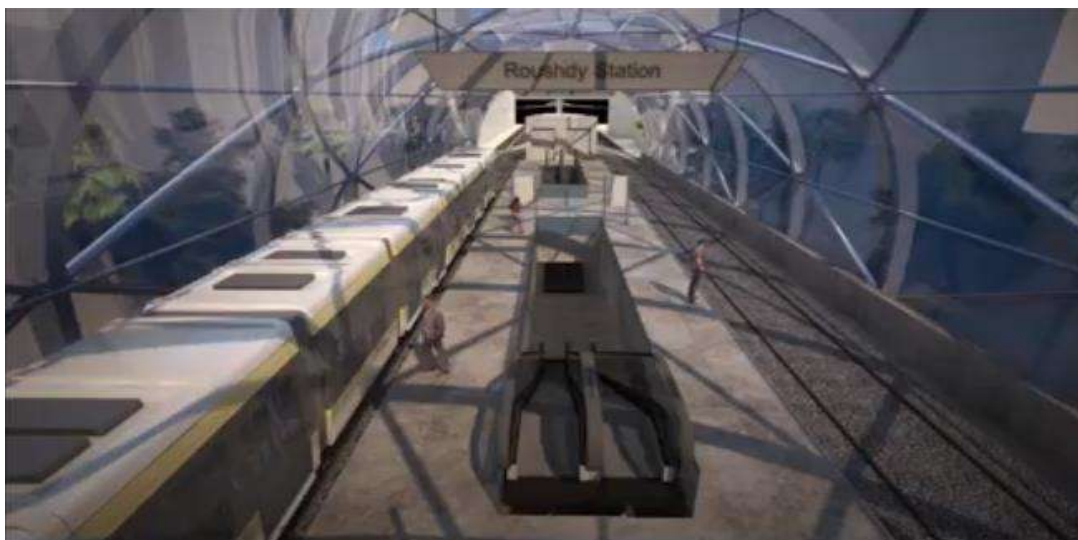


Figure 3-17 Example of viaduct stations

3.3.3 Construction Facilities

Construction facilities are required at the Project sites while works are being carried out. The size of the facilities relies on the number of workers expected on site. For tram works, 300 to 400 m² of prefab temporary buildings is expected and should include a room for coordination meetings, locker rooms, canteen, and sanitary facilities with a holding tank. In addition, a parking lot for a few cars can be useful. The exact location of these facilities will be decided during the detailed design. Considering the available land, facilities can be located at the following locations corresponding to the six works section identified earlier:

- Orabi Square
- East of Shatby station
- Current depot/workshop
- Near San Stefano station
- Near Sidi Bisher station (North of Victoria)

In addition, storage areas are expected to be set next to construction facilities for easy access to materials required and continuous supervision. Storage areas are used for the storage of construction materials (concrete, ducts, rails, etc.) and large building site machinery that cannot be parked on the works site at night. It should be noted that during particular works such as viaduct and substation works stocks should be limited to 2 or 3 days works so that the storage areas can be limited to 500 to 600 m² each.

3.4 Operation and Maintenance

3.4.1 Data Transmission Network (DTN)

The proposed data transmission network is composed of two main elements.

- Backbone: this set of optical fibres will link together the different equipment all along the line and in particular will connect the OCC and SCADA to each station
- Radio Transmission system: the radio will be used both for data transmission (from the vehicle to OCC for example) and for voice communication between staff

3.4.2 SCADA

The SCADA enables the operator to have full monitoring and control over the transportation systems from the OCC. The SCADA aims at proving a single-entry point for the operator or maintainer to supervise his transportation system.

3.4.3 Automatic Vehicle Location System (AVLS)

The AVLS holds an important role to help the operator manage its fleet (ensure headway, Automatic Route Setting, react to delay, etc.) and inform passengers (delay before next vehicle). AVLS takes into account factors such as; trackside equipment's including loops, beacons, and connection to data network.

3.4.4 Public Address and Public Information System (PA/PIS)

The PA/PIS is an automated system critical for passengers' accommodation as it provides users of the tramway with information about the nature and state of the tram service, through visual, voice or other media. Implementing an electronic system comprising of microphones, amplifiers, and loudspeakers, in addition to visual screens with real-time information and schedule information allows for journey planning while taking into consideration automatic vehicle locations. It is critical for the PA/PIS devices to be integrated well within the stations and allows for integration with other modes of public transportation. A central PA/PIS server will take into consideration station layout to optimize access of the system to passengers.

3.4.5 Time Distribution

The time distribution ensures all transportation systems use the same time reference through widely used protocols such as Network Time Protocol (NTP) or Simple-NTP (SNTP). In particular, it is key for the maintainer troubleshooting and log analysis, especially if several systems are involved in an incident.

3.4.6 Communication System

A communication system will be integrated to ensure smooth communication between staff or between the OCC and customers. Mobile devices (staff phones) and fixed (interphone in

stations) devices will be used and communication with third parties such as the police department will be accounted for.

3.4.7 CCTV System

Deployment of CCTV is performed according to security constraints and to ease operation. CCTV systems are employed to ensure:

- Safety of rolling stock movement: turnout, depot
- Safety of vehicle movements regarding road traffic: road-crossing and junctions
- Security of passengers: stations
- Security of Staff and restricted access rights: Depot & OCC

3.4.8 Access Control

Different type of areas within the depot and operator buildings (parking, visitor area, OCC, staff offices, rolling stock maintenance area...) require access by personnel. However an access control system is put in place to avoid potential hazards which might occur (technical room with sensitive data or equipment, areas with moving rolling stock, etc.).

3.4.9 Operation Control Centre (OCC)

The OCC enables the operator to control the entire network, plan his maintenance activities, interface with third parties (police department, fire-fighters department, etc.), train his staff. It is therefore a multi-purpose room designed to ensure efficient and comfortable working conditions.

3.5 Waste Generation

3.5.1 During Construction

Solid waste, during the construction phase, will comprise domestic (general) as well as construction & demolition waste. It is worth mentioning that construction wastes will be generated only during a relatively short period at work sites. The waste is expected to include the following waste streams:

Solid (Non-hazardous) Wastes:

- Soil;

- Demolition waste;
- Old rails, fastenings, turnouts, sleepers;
- Un-contaminated ballast; and
- Domestic waste (garbage).

Hazardous Wastes:

- Contaminated ballast/wooden sleepers;
- Spent welding materials;
- Waste Electrical and Electronic Equipment (WEEE); and
- Empty containers of chemicals, spent lubricating oils, and paint used for construction machinery.

Liquid Waste:

In addition to sanitary waste (domestic wastewater) that will be generated from the temporary construction facilities (workers caravans). The wastewater will be collected in temporary holding tanks and regularly evacuated by the local authority to the centralized wastewater treatment plant or sewage pumping station.

3.5.2 During Operation Phase

The Project is expected to dispose relatively small amount of waste during the operation and maintenance phases including:

Solid (Non-Hazardous) Waste including steel scrap, wood scrap and domestic waste. Passenger-generated waste (leftover food, paper, plastics, and glass) is expected to be generated on-site during the operation phase.

Liquid Waste: Wash water for the rolling stock after finishing the trips as well as the sewage generated from the passengers.

Hazardous Waste including Waste Electrical and Electronic Equipment (WEEE), empty containers of chemicals, spent lubricating oils, and paint used for maintenance works, ballast and sleepers if contaminated with oil. Improper handling and storage of hazardous substances and/or waste, would result in environmental contamination

3.5.3 Waste Handling and Disposal

During Construction Phase

The disposal of all the solid wastes generated during the construction phase is the responsibility of the contractor and should be disposed through specialized and certified solid waste contractors in public dumpsites.

For the disposal of the old track components (rails, fastenings, etc.), it will undergo quality control check and it could be either reused in other railway lines or sold as scrap in auction.

For the disposal of the wooden sleepers, if contaminated, it should be disposed in a hazardous landfill and if not, it will be sold in auction.

The old ballast will be sieved and screened and if contaminated, it will be disposed in a hazardous landfill and if not, it will be reused onsite.

Transportation and disposal of hazardous wastes is the responsibility of the contractor and should be done through licensed and approved hazardous waste contractors and in compliance with the legal requirements and instructions to be disposed to the approved landfill.

The domestic wastewater generated during the construction phase will be collected in holding tanks and evacuated regularly and transported to the nearest wastewater treatment plant or sewage pumping station.

Since the Project will rely on local labour, there will be no extra load on the public sanitary facilities in the Project sites.

During Operation Phase

The disposal of solid waste generated at stations (garbage) is the responsibility of APTA. APTA has contracted a private cleaning company to carry out all cleaning activities.

With respect to the liquid waste, there are several central cleaning stations at the largest stations all over Egypt to clean up trains after completing their assigned trips. Central washing stations have their own wastewater treatment plants to treat wash water before being disposed and to ensure full compliance with the national regulations.

3.6 Workers

The Project activities will require engineers, skilled and unskilled labour. They are expected to be residents of the districts surrounding the Project site. The expected daily number of workers will range from 20 -30 in each site depending on the activities planned on that day.

The contractor must ensure no child labour less than 18 years. Child labour is prohibited specially for hard works that might put them in risk.

The contractor should provide health care, food and drinking water to the workers from the local market, as well as portable toilets associated to holding tanks.

In light of the COVID-19 Pandemic, the contractor should adhere to all COVID-related precautionary measures to prevent infection among the workforce and neighbouring communities.

As the project is situated in a highly residential area, the Contractor must follow prevention and mitigation measures among the workforce to avoid gender-based violence (GBV) in the neighbouring communities.

During operation phase, the Alexandria Passenger Transportation Authority (APTA) will be responsible for operation and maintenance of the tramway.

3.7 Resources Consumption

3.7.1 During construction Phase

Water

The water used for construction activities will be sourced from trucks. The contractor will be responsible for providing drinking water to the labour force during the construction phase.

The exact amount of water to be used during the construction phase will be determined by the contractor of this Project.

Fuel

The Alexandria Electricity Distribution Company serves the governorate of Alexandria thus electricity is already available at the Project location. Generators will only be used in the case of power cuts.

Diesel fuel will be mainly used for diesel generators that supplies electricity to construction activities including welding. In addition, diesel will be the fuel used by the trucks and excavators.

3.7.2 During Operation Phase

The resources during operation phase will only be consumed in the depot for maintenance activities. The depot will be connected to the existing public services network (sewage, potable, electricity public network which the current depot already connects to.

3.8 Project Duration

The complete rehabilitation of the existing line cannot exceed 2 years. All construction phasing arrangement of the Project (tracks, energy, depot, etc.) should be prepared in order to scope with this major constraint.

4. ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

4.1 Description of the environmental baseline conditions

This section will describe the environmental baseline and conditions within the Project assessment area. The tramway line runs east-west across the city of Alexandria and passes through several residential areas along the way. The geographical scope of the Project is located in a densely populated area of the city. The concerned assessment areas are those in close proximity of the tramway line. **This section is subject to updates once finalizing the geotechnical, hydrogeology and topographical studies which SYSTRA is currently conducting and collecting the data about natural hazards forecast requested from local research institutes.**

4.2 Physical Environment

4.2.1 Meteorological Conditions

Alexandria's climate is categorized as BWh on the Köppen-Geiger classification, which corresponds to tropical and subtropical deserts, characterized by hot arid conditions and clear skies as a desert climate. Stable descending air and high pressure aloft create unfavourable conditions for rainfall, and as a result, the region's climate is mostly dry. The following climate diagrams are based on 30 years of hourly weather model simulations⁹.

Temperature

The coldest month in Alexandria is January with an average low-temperature of 9°C and an average high temperature of 18°C¹⁰. On the other hand, the warmest month in Alexandria is August with an average low temperature of 23.1°C and an average high temperature of 30.4°C. Annual average temperatures range between 13.5°C during the winter and 27°C during the summer, with an overall annual average temperature in Alexandria at 20.6°C. The highest temperature on record was 42.2°C in May and the lowest recorded temperature was 2.8°C in January¹¹. **Figure 4-1** shows the average annual temperatures in the major cities within the

⁹ MeteoBlue - [Alexandria](#)

¹⁰ Egyptian Metrological Authority - [EMA](#)

¹¹ [Weatherbase](#)

Project assessment area and **Figure 4-2** shows the maximum temperatures recorded for each month in Alexandria.

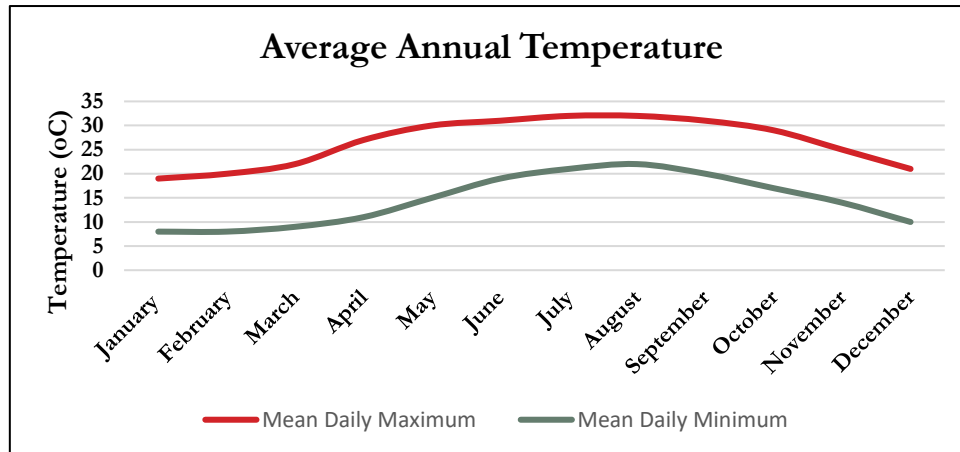


Figure 4-1 Average annual temperatures in the Alexandria

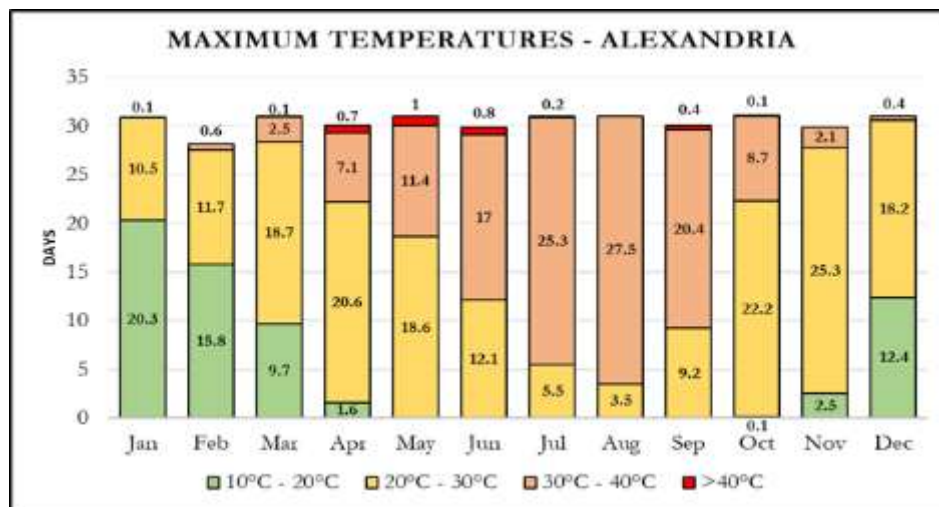


Figure 4-2 Maximum Temperatures Recorded in Alexandria

Precipitation

While the area is mostly arid, rainfall is expected during the winter, with most precipitation occurring in January. The average total annual amount of precipitation in Alexandria is 195.9 mm with the highest amount of precipitation, 52.8 mm, in January. There is an average of 44 days of precipitation, with the most precipitation occurring for an average of 10 days in January

and the least precipitation is seen in June, July, and August with no precipitation¹². **Figure 4-3** shows the average precipitation rates in Alexandria^{13,14}. It is Projected that with current modelling sciences, the frequency is expected to consistently worsen with the impacts of climate change on rising sea levels and increase in extreme flooding¹⁵.

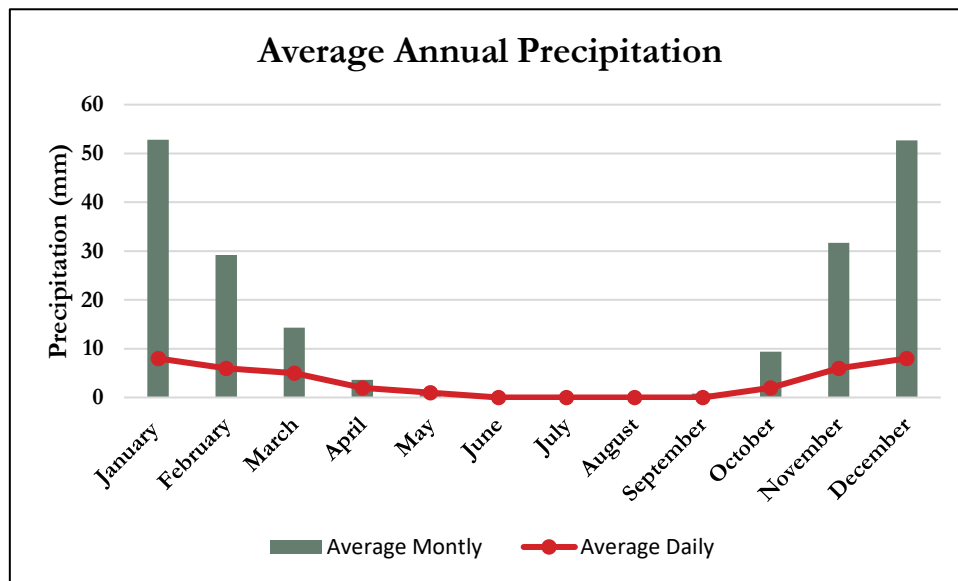


Figure 4-3 Average annual precipitation rates in Alexandria

Humidity

The Mediterranean coast is known to be the most humid area in Egypt. The variation in humidity is very little across the year in Alexandria, with the highest relative humidity recorded being at 71% during the months of July and August. On the other hand, the lowest relative humidity recorded is 65% during the month of April. **Figure 4-4** indicates the average humidity in Alexandria.

¹² [Weatherbase](#)

¹³ [Weather-Atlas](#)

¹⁴ MeteoBlue - [Alexandria](#)

¹⁵ Mohamed Shaltout et al., 2015 ([Article](#))

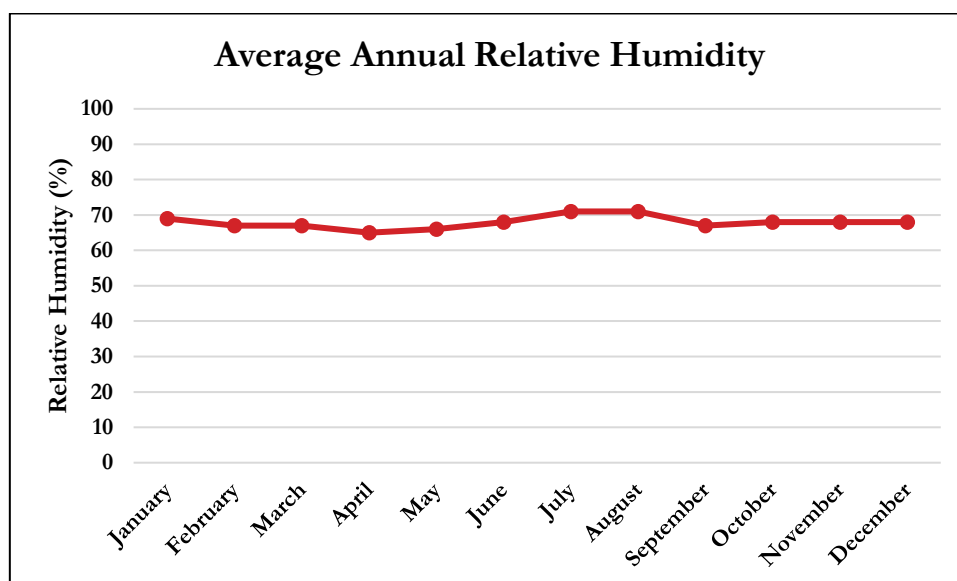


Figure 4-4 Average annual relative humidity in Alexandria

Wind

Given that the city of Alexandria is situated along the Mediterranean Sea it is known to generally experience higher wind speeds. As for the wind conditions in Alexandria, the majority of wind across the year from the north west (NW), west-north west (WNW) and north-north west (NNW). The maximum recorded windspeed can reach up to 55 km/hr and occurs from the west-southwest direction¹⁶. **Figure 4-5** indicates the average wind speed, during the warmer months of April to October, the city experiences steady moderate winds usually greater than 19 km/hr. Whereas, during the cooler months from November to March the city may experience strong winds especially from December to February. The wind rose in **Figure 4-6** shows that the winds normally blow in the northwest direction¹⁶.

Table 4-1 Number of Days recorded for Every Windspeed in every direction

Direction	0-10 km/hr	10-20 km/hr	20-30 km/hr	30-40 km/hr	40-50 km/hr	50-60 km/hr	>60 km/hr
N	390	305	142	6	0	0	0
NNE	281	234	92	7	0	0	0
NE	204	175	58	4	0	0	0

¹⁶ MeteoBlue - [Alexandria](#)

ENE	217	152	46	3	0	0	0
E	138	108	26	2	0	0	0
ESE	116	73	12	0	0	0	0
SE	80	40	5	0	0	0	0
SSE	62	37	8	1	0	0	0
S	65	38	13	2	0	0	0
SSW	49	34	16	5	0	0	0
SW	60	37	28	14	2	0	0
WSW	68	66	51	28	5	1	0
W	280	257	130	54	12	0	0
WNW	392	579	445	103	9	0	0
NW	475	654	627	47	2	0	0
NNW	388	406	249	9	2	0	0

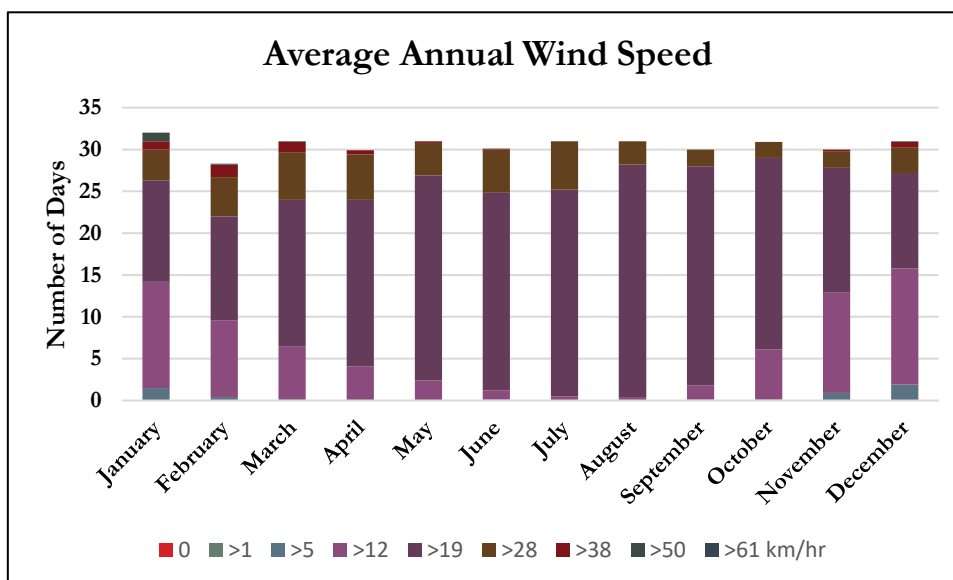


Figure 4-5 Average Annual Wind Speed in Alexandria

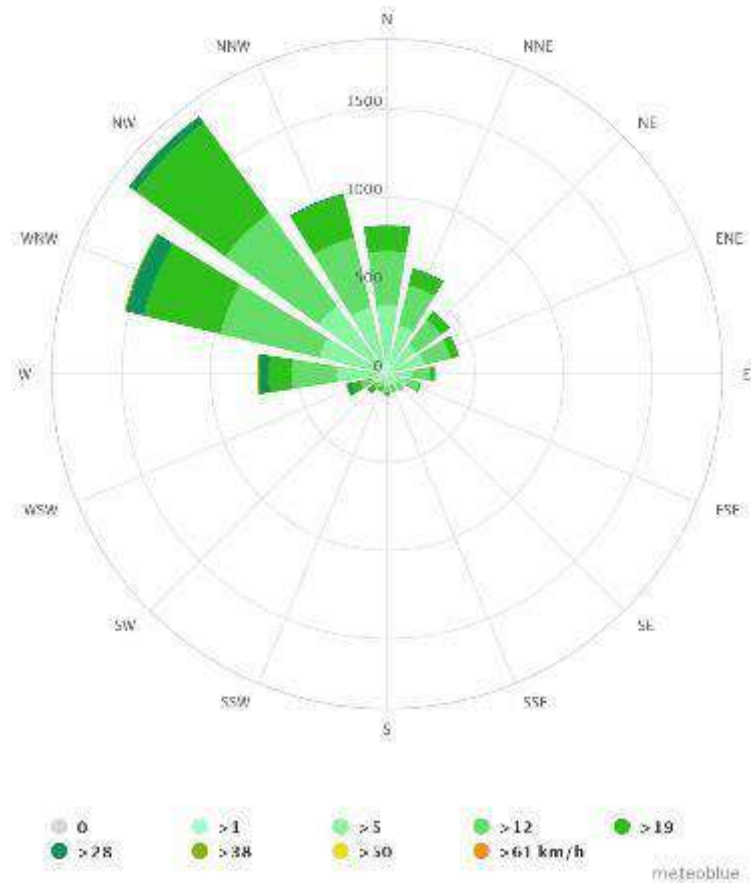


Figure 4-6 Wind Rose for Alexandria (taken from MeteoBlue¹⁶)

4.2.2 Topography

Alexandria is an intensely urbanized city, with areas that are alarmingly congested with structures and narrow roads. Alexandria can be considered flat with some elevation shifts experienced in the urban area closer to the coast and the east Al Montazah zone of the city. The highest elevation points in Alexandria can be found near Borg Al Arab International Airport and the New Borg el Arab district which can go up to 95m. The elevation of the surface level consistently increases from the western zone of the city to the eastern zone.

The elevation profile for the tramline heavily fluctuates from Raml station up until Victoria Station. There is a total of five peaks for the elevation, with the highest elevation point on the operational tramline being 26m at Mohamed Mahfouz station. The second highest elevation

point on the profile is at Cleopatra El Soghra with 25m. The average elevation for the tramline is 12m, with a low point of 0m elevation near Sidi Bishr station.

The elevation profile between Raml Station and Azaritah experiences a maximum positive slope of 10.9% and reaches 23m before dropping and fluctuating until Cleopatra El Soghra station. The elevation profile then drops with a maximum of -9.5% and then recovers with a maximum slope of 13.2% to reach the highest point at Mohamed Mahfouz station. Then the elevation profile experiences a stable fluctuation in elevation until reaching El Saraya station where there is a large drop in Elevation followed by a slight recovery to end with 8m at Victoria station. The maximum positive slope throughout the elevation profile is 22.4% and maximum negative slope of -41.5%.

4.2.3 Geomorphology and Geology

The land in Alexandria is largely covered by wetlands, with no desert background, given that it is located on the coast of Mediterranean Sea and the house Lake Maryout. The surface of the land in Alexandria is relatively low, close to that of the Mediterranean Sea level. Rock chains run parallel to the sea coast and are confined to long valleys in the same direction. The land in the Alexandria governorate also contains silt from the Nile in the far east, followed by sabkha deposits, and evaporites along the coastal strip, in the area from Lake Maryout to the east. South of the Maryout lake, quaternary sediments form from coastal modern sediments, sand, and gravel, and are further interspersed with stable dunes in the city centre. Further south, are the Haji formation, which is a shallow white marine limestone with layers of marl which gradually progresses westward. To the south, the ocher formation consists of a shallow continental maritime channel sequence and includes white sand limestone layers, vertebrates and fossilized wood, interspersed with gravel and sand dunes of various shapes²⁰.

Alexandria is bordered to the east by agricultural sediments extending from the west for long distances from the borders, which extends 61.5 km west of the Alexandria-Matrouh highway. The current coast line of the delta may have been formed by the deltoid sediments at the beginning of the Nile river, at the Rashid branch, and as an additional effect from the Mediterranean Sea. The sand that forms the dunes is soft to moderately hard sand with a mixture of clay minerals. Sand dunes that extend along the coastal strip occasionally suffer from intrusions particularly from the sea water penetrating through channels as result of high

tidal waves. Finally, the city of Alexandria as a strip of land along the coast consists of successive hills.

The coastal strip of Alexandria has a number of elongated ridges with intervening depressions and are parallel to the shoreline. The coastal plain is characterized by low relief and low gradients except on the slopes of the carbonate ridges. The ridge that extends across the Tramline area is 10-20m high and 400m in width, gently sloping seaward side and steep landward slope consisting of unlithified pure white oolitic sand.

The study area has tertiary and quaternary age rocks¹⁷. On the coastal plain of the study area, Pleistocene rocks are covered by the different deposits. The Quaternary deposits include:

- Holocene – this includes beach deposits, dune sands, limestone crust, and alluvial deposits
- Pleistocene – Oolitic limestone and cardium limestone

Modern loose deposits are known to be found along the Mediterranean coast which are composed of calcareous white Oolitic sands. Modern dune sands are loose deposits and are found in the low northern coastal plain. They are composed from calcareous Oolitic grains. Alluvial deposits are widely distributed in topographically low areas as found in the Tram line and are generally dominated by calcareous loam.

The Pleistocene limestone bedrock consists mainly of algal biosparite. The allochems of the algal biosparite consist mainly of coralline and codiacean algae and several benthonic foraminifera. The bulk of the intergranular pores remain open for the allochems. Some of the calcretized limestone was affected by aggrading neomorphism, thus the calcretes are different from the underlying Pleistocene limestone.

4.2.3.1 General Soil Description

The Project area transects a zone that has a unified soil group, Solonchak. It is defined as a salt affected soil group¹⁸, which is defined as Typic Salorthids that is usually present in arid and semi-arid climatic zones, more specifically in coastal regions. The International Soil Reference and Information Centre (ISRIC) has defined Solonchaks as soils saline groundwater

¹⁷ Geotechnical Report of Alexandria Regional Metro Abou Qir to Aamiria BD-S1-GS-T1

¹⁸ [Soil Association Map of Egypt](#) - 1975

risers near the surface level¹⁹, which is certainly the case found with soil in the coastal area occupied by Alexandria. This type of soil requires nutrient-rich irrigation water and drainage to be utilized for agricultural purposes, particularly due to the high level of salinity. The high level of salinity found in the soil and the ground can be attributed to saltwater intrusion from the Mediterranean Sea over the years. Nearby surface water bodies such as Lake Mariout, which is considered a brackish water body, are negatively affected by the drainage of water that is utilized in the high salinity soils.

Site Specific Soil characteristics

In 2015, a Geotechnical Survey was conducted to investigate and describe the soil classification along the Raml Tram Axis at the stations for the design of the foundations for the civil works (Elevated right of way – Elevated stations). A number of (38) Drive Borings had been executed at each station starting from El Raml to Victoria except (Raml Station) due to technical and authorization difficulties. The bores were executed mechanically at the nearest available site on or to the Raml Tram Stations with depth from 12.00m to 30.00m based on the location of the bores and the soil profile. The detailed Geotechnical report is in Appendix II.

The Tram Track can be divided into several sections according to the soil profile as follows:

- **Section (1): From Raml Station (Note: No soil investigation could be performed at Raml Station as stated earlier)**
 - First Layer: Starts at the surface level and extends to 5.00m depth from the ground level consisting of Silty Clayey Fill.
 - Second Layer: Starts at the end of the previous layer and extends to 8.00m depth consisting of Limestone Fragments.
 - Third Layer: Starts at the end of the previous layer and extends to 18.00m depth consisting of Sandy Limestone.
 - Fourth Layer: Starts at the end of the previous layer and extends to the end of the boring level at 20.00m depth from ground level consisting of silty fine to medium sand with a small interfering layer of 0.30 depth consisting of silty clay.
- **Section (2): From Raml Station to Ibrahim Mosque**

¹⁹ ISRIC - [Solonchaks](#) - 2014

- First Layer: Starts at the surface level and extends to 4.00m depth from the ground level consisting of Silty Sand Fill and crushed Stones.
- Second Layer: Starts at the end of the previous layer and extends to 13.00m depth consisting of Sandy Silty Clay and Sandy Clay.
- Third Layer: Starts at the end of the previous layer and extends to the end of the boring level at 20.00m depth from ground level consisting of medium to fine sand with some cemented sand pebbles / Pieces.
- **Section (3): From Ibrahim Mosque to Suez Canal Road (El Shoban El Moslemin Station)**
 - First Layer: Starts at the surface level and extends to a depth ranging from 2.00m to 4.00m below the ground level at the boring sites, this layer consists mainly of Silty Sand Fill and crushed Stones.
 - Second Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of (Yellow/ Brown / Grey) Fine / Medium / Coarse Sand with the existence of cemented sand pebbles/pieces. This layer is interrupted with a small layer of Sandy Clay (2.00 m Depth) at Soter.
- **Section (4): Suez Canal Road**
 - First Layer: Starts at the surface level and extends to 4.00m depth measured from the ground level at the boring site; this layer consists mainly of Silty Sand Fill and crushed Stones.
 - Second Layer: Starts at the end of the previous layer and extends to 8.00m depth consisting of Sandy Silty Clay and some crushed stones.
 - Third Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of medium to fine and Medium to coarse sand with some cemented sand pebbles / Pieces and traces of silt. A layer of 2.00m depth of silty sand interrupts the previous profile at 8.00 m depth.
- **Section (5): From EL Shabti to El Moasker Station (Camp Cesar)**
 - First Layer: Starts at the surface level and extends to 2.00m depth consisting of Silty Sand Fill and crushed Stones.

- Second Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of Medium to Fine and Medium to coarse sand with some cemented sand pebbles / Pieces. A layer of almost 5.00m thickness of Cemented Sand is observed at the depth of 6.00m in all bores.
- **Section (6): From El Ibrahimeya To Sporting El Soghra**
 - First Layer: Starts at the surface level and extends from 2.00m to 4.00m depth consisting of Silty Clay and crushed Stones.
 - Second Layer: Starts at the end of the previous layer and extends to 6.00m depth consisting of clayey Silty sand with traces of silt and crushed stones / shells.
 - Third Layer: Starts at the end of the previous layer and extends to 9.00 / 9.50 m depth consisting of soft clay, silt and crushed shells.
 - Fourth Layer: Starts at the end of the previous layer and extends to 13.00 /13.50 m depth consisting of Brown Sandy Silty Clay.
 - Fifth Layer: Starts at the end of the previous layer and extends to 15.00 m depth consisting of Silty Fine Sand and cemented sand pebbles.
 - Sixth Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of cemented sand pieces and medium sand.
- **Section (7): From Sporting El Kobra to Sidi Gaber (At Sidi Gaber Railway Station)**
 - First Layer: Starts at the surface and extends to a depth of 2.00 m depth consisting of yellowish brown to brown filling of clayey silt – sand and silt with crushed stones / potteries.
 - Second Layer: Starts at the end of the previous layer and extends to 4.00m depth consisting of Silty Sand with cemented sand pieces.
 - Third Layer: Starts at the end of the previous layer and extends to 9.50m depth consisting of Fine / Medium Sand to medium / coarse sand.
 - Fourth Layer: Starts at the end of the previous layer and extends to the end of the bores consisting of Silty Sand with cemented sand pebbles, except a layer of 5.50 m of soft clay / silty clay at one location at the Sidi Gaber Boring site.
- **Section (8): The North Loop of Sporting (From Sporting to Sidi Gaber El Sheikh)**

- First Layer: Starts at the surface level and extends to 2.00m depth consisting of Silty Sand Fill and Sandy Silty Clay Fill and crushed Stones.
- Second Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of Medium to Fine and Medium to coarse sand with some cemented sand pebbles / Pieces.

N.B: The Bore executed at Cleopatra El Soghra consists mainly of layers of silty medium / Fine Sand.

○ **Section (9): From Mostafa Kamel To Bolkly**

- First Layer: Starts at the surface level and extends to 3.00m depth consisting of Silty Sand Fill and Sandy Silty Clay Fill and crushed Stones.
- Second Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of Medium to Fine and Medium to coarse sand with some cemented sand pebbles / Pieces.

○ **Section (10): North Loop San Stefano Starting from El Hedaya to San Stefano**

- First Layer: Starts at the surface level and extends to 1.00 / 1.50 m depth consisting of Silty Sand Fill and crushed Stones.
- Second Layer: Starts at the end of the previous layer and extends at depths ranging from
- 13.50 / 19.00m consisting of medium / fine sand and medium / coarse sand.
- Third Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of crushed cemented Sand.

○ **Section (11): From El Wezara To Janaklees**

- First Layer: Starts at the surface level and extends to 4.00 / 9.00m depth consisting of Filling of Silty Sand / Clayey Silty Sand / Soft and Silty Sandy Clay with some crushed stones.
- Second Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of Medium / Fine and Medium / Coarse Sand and crushed cemented Sand.

○ **Section (12): From San Stefano To Victoria**

- First Layer: Starts at the surface level and extends to 1.00 /2.00m depth of Medium to Fine Sand Filling.
- Second Layer: Starts from the end of the previous layer and extend to a depth ranging from
- 17.00 / 19.00 m and consists of Medium / Fine Sand to Medium / Coarse Sand.
- Third Layer: Starts at the end of the previous layer and extends to the end of the boring level at 25.00m depth from ground level consisting of crushed cemented Sand.

4.2.4 Hydrology

The governorate of Alexandria comprises of a variety of water resources. The governorate is situated along the Mediterranean Sea in which the coast extends 90 km from the east to the west. In addition, Alexandria houses important surface water including; the Mahmoudiyah sub-canal, Maryout lake and El-Mex and Abu Qir bay. As covered in the Meteorological Conditions, Alexandria experiences rainfall mainly during the winter season, however it typically does not exceed 200 mm annually. The city of Alexandria is connected to the Nile River by means of the Mahmoudiyah sub-canal which is a section of the Rashid branch of the Nile delta. The Mahmoudiyah canal extends for 77 km from the Rashid-port of the Nile to the Mediterranean Sea and is considered the primary supply for potable water, and industrial and agricultural requirements in the city.

Another important surface waterbody is Lake Maryout, which is located in the north of the Egyptian delta region. Lake Maryout is considered a critical environmental component in the region as the city of Alexandria developed around the lake which has had a great impact on shaping urbanization of the city, purifying the climate, and preserving the ecological balance of the region over the past years. Lake Maryout is one of the four shallow lakes in Egypt in the north of the delta and is the smallest lake in the area with no natural connection to the Mediterranean Sea. However, Lake Maryout is one of the most polluted water bodies in Egypt.²⁰ Near the Maryout lake, the artificial Airport Farm lake is located south east of the Tramline. This artificial lake receives its water intake from the Mahmoudiyah canal.

²⁰ EEAA Environmental Characterization Report for the Governorate of Alexandria (2007)
<http://www.eeaa.gov.eg/portals/0/eeaaReports/GovProfiles/final/Alex%20Des.pdf>



Figure 4-7 Surface Water near the Project area

4.2.5 Hydrogeology

As mentioned earlier, Alexandria is connected to the Nile by means of the Rashid branch of the Nile Delta. The Nile Delta is located in the Northern part of Egypt and is bounded by the Mediterranean Sea in the north, the Nile River in the south, the Suez Canal and Ismailia canal in the east, and El Nubaria canal in the west. The Nile Delta receives approximately 35.5 km³/year of surface water from the Nile River and accordingly recharges the Nile Delta aquifer through infiltration of excess irrigation water and seepage from highly intensive irrigation canals. Climate change on the Nile Delta region, specifically in the Alexandria region, has impacted the Nile Delta aquifer in which seawater from the Mediterranean Sea has moved towards the aquifer through seawater intrusion and also as a result of decline of water levels in the canal. The clay layer in the northern part of the Nile Delta aquifer is considered an

aquiclude given that its thickness reaches approximately 50 meters.²¹ The Groundwater depth in the eastern region of Alexandria ranges from 2-10m.²² Aquifer salinity within the city is predominately low (range of 1500-2000 ppm) but there are minor zones close to the shore that have a high ppm ranging from 9941 – 15,000.

A geotechnical survey was conducted in 2015 for the Tramline. This included an identification of the Groundwater table along the Tramline. The Groundwater was found to be at very shallow depths in the old city of Alexandria. As the tramline progressively moves east, the surface level increases making the Groundwater Table depth from the surface much deeper. The farthest Ground Water Table point recorded was 9.10 m at El Saraya and the shallowest location recorded was at Sidi Bishr with a recording of 0.6m²³. The detailed report is included in Appendix II.

4.2.6 Air Quality

Air pollution is defined as the state in which foreign contaminants are present in the air at irregular ratios and can consequently harm human and environmental health. Given the Project is directly located in a strictly residential area, air quality in the Project area may suffer from moderate pollution due to presence of PM 2.5 in the air, vehicle exhaust, and dust from residential activities such as construction. Some regions in Alexandria suffer from less than moderate air quality due to being in closer proximity to industrial areas, however the Project location is relatively far from the industrial area of Alexandria.²⁴

4.2.7 Noise Quality and Vibration Levels

Noise pollution is considered a concern in the city of Alexandria. Industrial buildings are a source of noise pollution for neighbourhoods that have expanded out of the city. Residential areas within the city are subject to noise pollution mainly from human and commercial-related

²¹ Armanuos, A. M., Ibrahim, M. G., Mahmod, W. E., Negm, A., Yoshimura, C., Takemura, J., & Zidan, B. A. (2017). Evaluation of the potential impact of Grand Ethiopian Renaissance Dam and pumping scenarios on groundwater level in the Nile Delta aquifer. *Water Science and Technology: Water Supply*, 17(5), 1356-1367.

²² Mariam G. Salim, - Selection of groundwater sites in Egypt, using geographic information systems, for desalination by solar energy in order to reduce greenhouse gases, *Journal of Advanced Research*, Volume 3, Issue 1, 2012, Pages 11-19, ISSN 2090-1232, <https://doi.org/10.1016/j.jare.2011.02.008>.

²³ Geotechnical Survey Report for Alexandria Urban Transport Project Construction of Civil Works along RAML track – December 2015 – Arab Consultants Group (this is to be updated with a more recent study and data in the final draft)

²⁴ EEAA Environmental Characterization [Report](#) for the Governorate of Alexandria (2007)

activities, construction, HVAC and external air-conditioning units, vehicles, and railways including the current tram.²⁵

A study conducted in 2012 to assess ambient noise levels in Alexandria in areas of high traffic density, which applies to the Project areas, was conducted to compare the reality with the Egyptian Standards set in the executive regulations of Law 4/1994. The result found that, L_{Aeq} – which is the A weighted ambient noise level, to range from 71 dB to 62.8 dB which exceeded the permissible limits within the executive regulations (late night was considered quiet) showing how traffic plays a major role in Noise pollution in Alexandria.²⁶

4.2.7.1 Site Specific baseline measurements

In December 2020, site-specific ambient air quality and noise and vibration measurements were undertaken for a continuous period of 24 hours in 6 different locations along the tramway except for vibration, it was conducted for 20 hours only as it is the working hours of the tram (Detailed Report is in Appendix III). The results were compared to the National and international limits. If there is difference between national and international limits, the more stringent limit is applied

Given that the entire Project passes through residential areas, sensitive receptors are located along the entire line. The locations chosen are those proposed to be implemented as viaduct structures. The construction and operation of viaduct structures will result in major civil works and a number of impacts. Moreover, the chosen locations are classified as critical junctions according to Design Inception Phase, heavily trafficked junctions according to Alexandria Traffic Department and highly congested areas. Therefore, baseline measurements were prioritized at those stations. The table below presents the closest sensitive areas surrounding the stations and the traffic volume.

Table 4-2 Baseline measurements locations

Station Name	Sensitive Receptors/Traffic Volume	Photos

²⁵ EEAA Environmental Characterization [Report](#) for the Governorate of Alexandria (2007)

²⁶ Gehan Zaki - Assessment of ambient noise levels in the urban residential streets of Eastern Alexandria, [Egypt](#)

El Shoban El Moslemi	- o Young Muslims Organization - o Coptic-Orthodox Cemetery - o Church of the Great Martyr George Shabti Traffic volume at this station is <i>high</i> according to Alexandria Traffic Department	
El Reyada El Kobra (Sporting Kobra)	The Sporting Club. Traffic volume at this station is <i>high</i> according to Alexandria Traffic Department	

Sidi Gaber El Mahata	Sensitive receptors near this station include: ○ Sidi Gaber Railway Station ○ Sidi Gaber Specialized Hospital	
Mohamed Mahfouz	The sensitive receptors near this station are the houses that are directly adjacent to the track.	

El Wezara	Traffic volume at this station is <i>high</i> according to Alexandria Traffic Department	
Janaklees	Sensitive receptors near this station include: ○ Comprehensive Cancer Centre ○ The Martyr Khaled Kamal Othman High School for Boys	

Air measurements Conclusion

The table below presents the national limits for all parameters that results were compared to except for PM10, the results were compared to international limits as it is more stringent than the national limit.

Table 4-3 National and International limits for Ambient Air Parameters

Ambient Air Parameters	Requirements Egyptian Legislations	Requirements of WB	EU-Directive 2008 50

Carbon Monoxide CO (mg/m ³)	10	NA	NA
Sulfur dioxide SO ₂ (µg/m ³)	125	125 (IT-1) 50 (IT-2) 20 (Guidelines)	125
Nitrogen oxides NO _x (µg/m ³)	150	NA	NA
Particulates PM ₁₀ (µg/m ³)	150	150	35 - Upper assessment threshold 25 - Lower assessment threshold 50 - not to be exceeded more than 35 times a calendar year
TSP (µg/m ³)	230	NA	NA

All measured parameters comply with both Egyptian legislative requirements as well as EU limits, except for PM₁₀, which exceeds permissible limits as per EU Directive but is still compliant with national legislation. Dust concentrations (PM₁₀) in the Project site are increased due to the high traffic in the area.

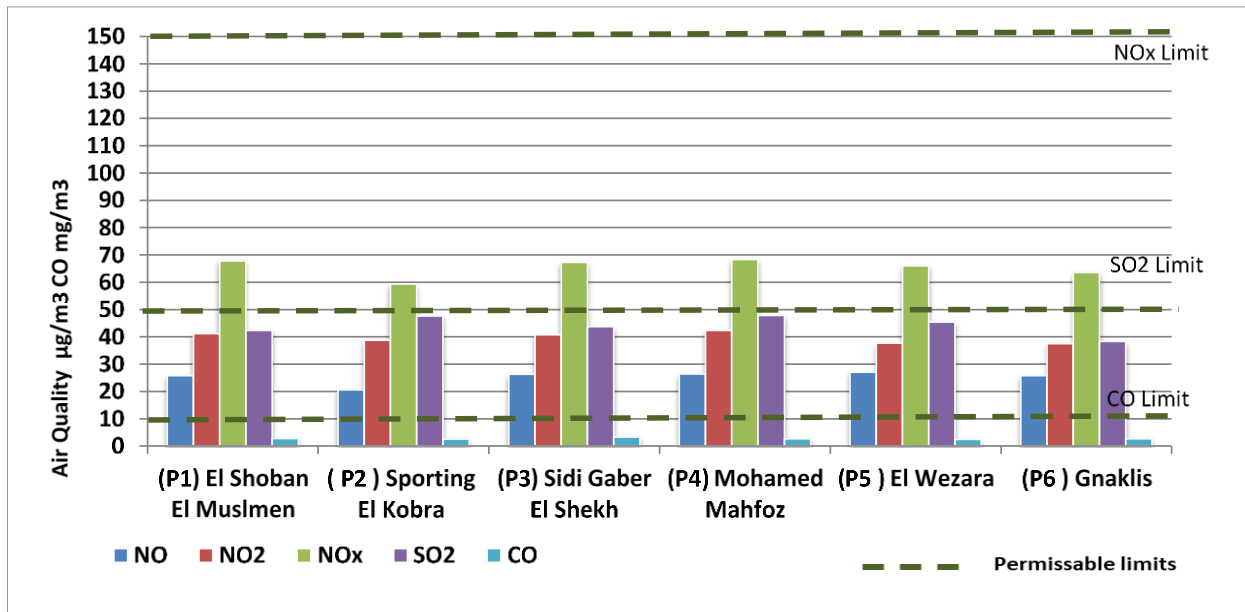


Figure 4-8 Comparing results of Nitric Oxides (NOX), Sulphur Dioxide (SO2) & Carbon Monoxide (CO) versus applicable limits

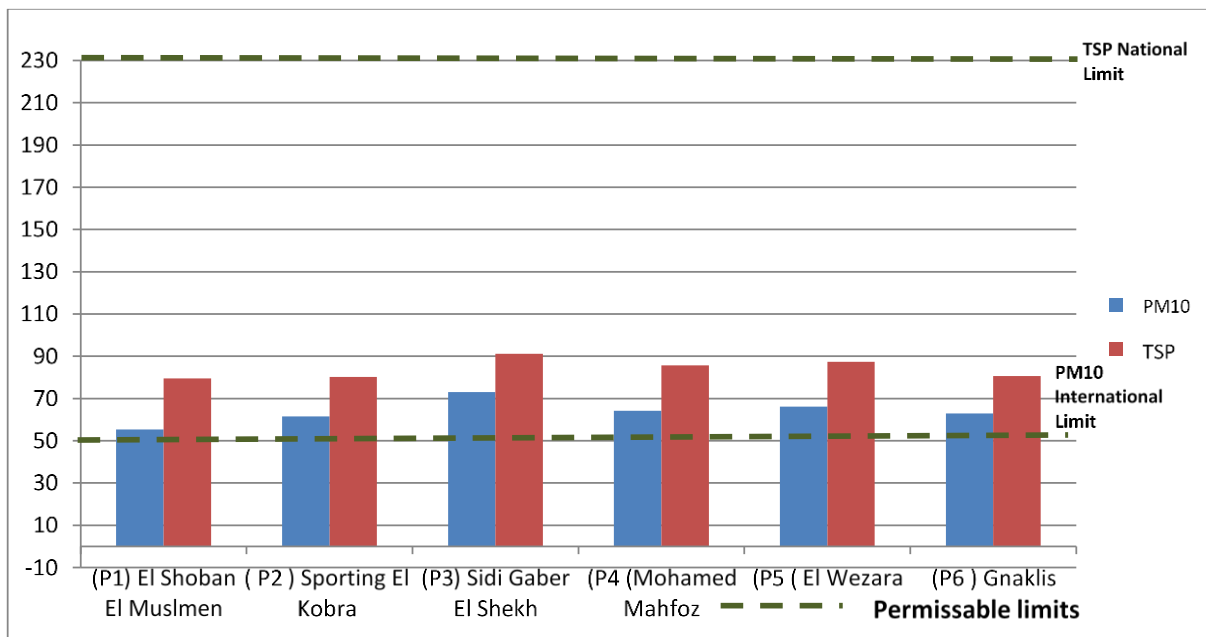


Figure 4-9 Comparing results of PM10 and TSP versus applicable limits

Noise measurements Conclusion

The table below presents the national limits and international that results were compared to. The results were compared to national limits as it is more stringent than the international limit.

Table 4-4 Applicable National and international Permissible Limits for Ambient Noise Levels

Requirements of Egyptian Law 4 – 1994 (dBA)			Requirements of WB (dBA)		International Permissible Directive 2002/49/EC (dBA)	
Type of Area	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.	DAY 7 a.m. to 10p.m.	NIGHT 10 p.m. to 7a.m.
Sensitive Areas to noise	50	40				
Residential areas	65	55	55	45	54	44

- Day: 7a.m. to 10 p.m. & Night: 10 p.m. to 7 a.m.
- Sensitive areas to noise include; schools, hospitals, public parks, rural areas, etc.
- Residential areas must be located adjacent to roads which width is less than 12m, and workshops or commercial or entertainments activities are found

Results show average ambient noise levels of 62 dBA and 70 dBA which exceeding the National and International Guidelines.

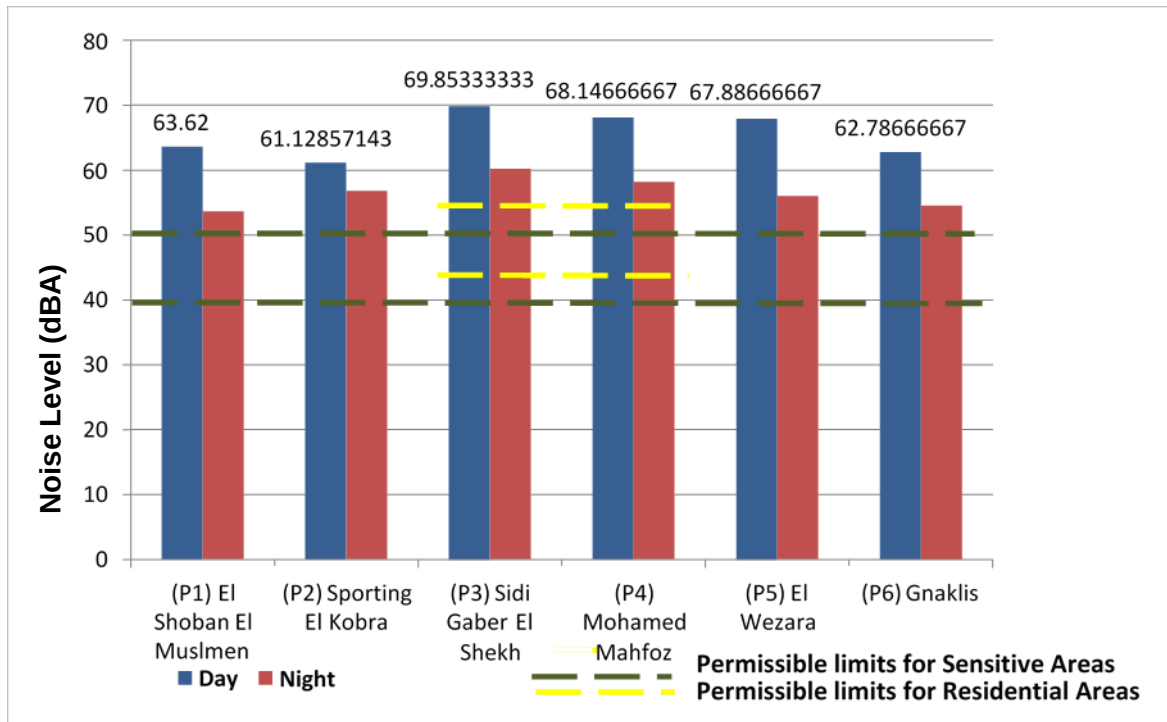


Figure 4-10 Comparing results noise levels versus applicable limits

Vibration Measurements Conclusion

The table below presents the national and international limits in which the vibration measurements were compared to. The national vibration exposure limits applicable to the Project are 12m/s^2 in 1 hour, while the duration of the tram trip of the 2 lines does not exceed 90 minutes. On the other hand, the exposure of passengers at tram stations is less than 5 minutes, which is the amount of time it takes for the tram to enter and exit a station. The measurement results shows that the vibration limits are exceeding the applicable limits.

Table 4-5 National and International limits for Vibration

Egyptian Law	WB/EU	EU
Limit 1 hour : $12(\text{m/s}^2)$	---	Limit 8 hours: Daily Limit $5 (\text{m/s}^2)$

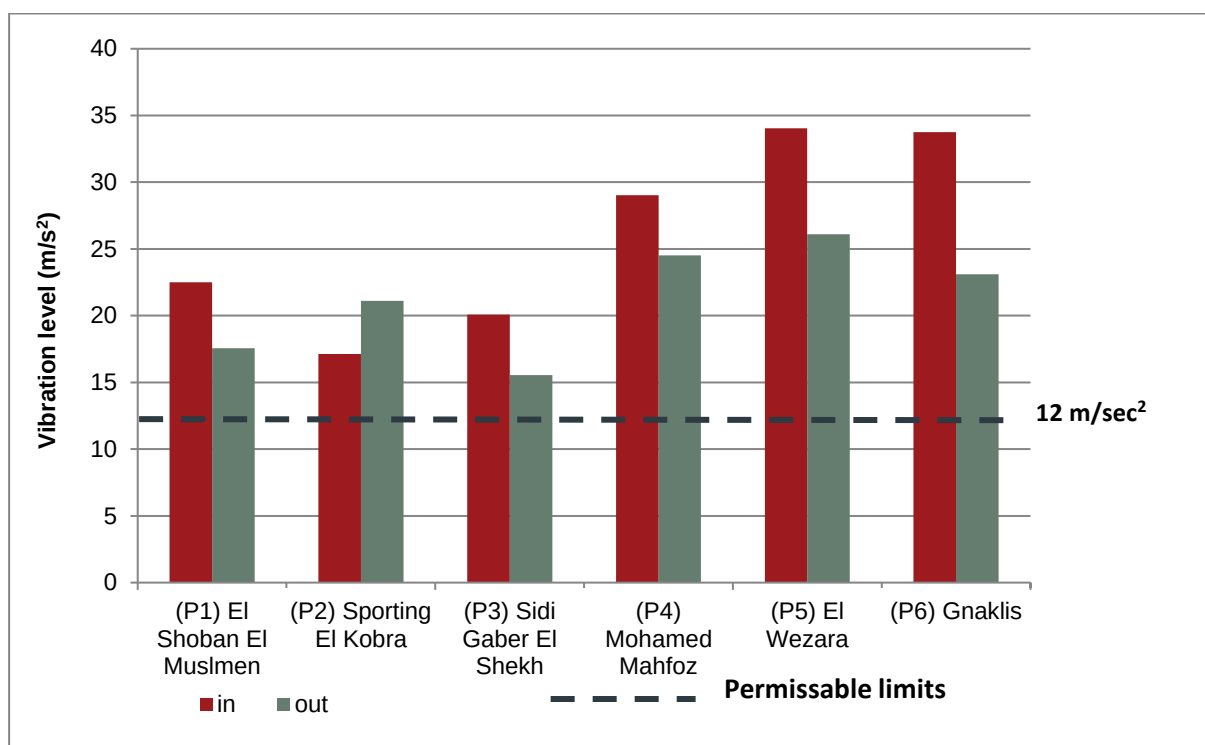


Figure 4-11 Comparing measured vibration levels versus applicable limits

4.2.8 Waste Management

Municipal Solid Waste Management in Alexandria is a service provided by Nahdet Misr for Environmental Services, a governmental Company that is owned by Arab Contractors Co.²⁷ and is also responsible for street sweeping and beautification services of the city. According to the last characterization study conducted in the city²⁸ in 2012, the daily generated municipal waste in Alexandria is 4,000 t/d. This approximation is expected to have increased to a range between 4,500 t/d to 5,000 t/d with population growth and migration to the city. Waste management along the tramway is also serviced by Nahdet Misr. The city has a waste collection coverage of 65%, and 2 formal landfills that are accompanied by informal dumpsites usually located outside the urban areas. Due to the rapid urbanization and population growth

²⁷ [Nahdet Misr Environmental Services](#)

²⁸ [Annual Report for Solid Waste Management in Egypt](#), 2013

in the governorate, the existing services have not been able to cope with increased municipal waste generation.

According to the last data survey, Egypt generates annually 4 million tons of construction and demolition waste.²⁹ There was no formal means established for construction and demolition waste disposal in Egypt, with the primary responsibility left on the waste producer. This has been clarified in the new waste management law of 202/2020.

4.2.9 Natural Hazards

Due to the global climate change phenomena, the city of Alexandria is exposed to severe environmental dangers as a result of the Mediterranean Sea levels rising. The rising sea levels threatens Alexandria for many reasons. To begin with, in the past eight years, the sea level has been rising 3.2 millimetres each year and is expected to rise by a minimum of two feet by the end of the century. Likewise, measurements by the Egyptian Ministry of Water Resources and Irrigation show that the land on which Alexandria is built is also sinking at same rate. Consequently, some neighbourhoods are at risk of becoming completely submerged. Not only does the accelerated sea-level rise risk pose a threat to ground levels in the city but increasing sea-levels result in increasing height of sea waves especially during the winter season.^{30,31}

A major concern for the city of Alexandria is its exposure to occasional flooding. Although the city normally does not experience annual rainfall greater than 200mm, harmful flooding threatens the city due to the lack of compatible infrastructure, the sinking ground-levels, and the rising wave levels. In 2015, Alexandria suffered from a disastrous flood impairing the entire city. In particular, the overhead power supply line of the tram line in Moharram Bey snapped

²⁹ [Country Report for Solid Waste Management in Egypt](#), 2014

³⁰ <https://english.alarabiya.net/en/features/2018/05/09/Is-Egypt-s-Alexandria-in-serious-environmental-danger->

³¹ <https://abcnews.go.com/Technology/wireStory/rising-seas-threaten-egypts-fabled-port-city-alexandria-65286853>

and collapsed into the flooding roads killing seven people due to electric shock.^{32,33} These points are further discussed in the Climate Change Baseline in Section 4.4

Given that Alexandria is a coastal city, the city also suffers from the risk of earthquakes. During the twentieth century Alexandria was shaken by five major earthquakes from both near and far-field sources. Earthquake risk profiles indicate that Al-Montazah, Al-Amriya, and Shark districts lie in high-seismic areas and are threatened by more than 90% of estimated earthquake risks. Moreover, moderate seismic risk level areas are Gharb and Wasat districts, while Al-Gomrok and Burg El-Arab districts are located in low seismic risk level areas. In addition, the Mediterranean Sea endangers the city of Alexandria with the risk of tsunamis. The most hazardous tsunamis that occurred in Alexandria were in the years 365, 1222, and 1303. Although, the risk of tsunamis is not as frequent, it is worth noting given that it does put districts such as Al-Amriya under high tsunami risks.^{34,35}

4.3 Biological Environment

4.3.1 Terrestrial Ecology

Given the Project is located in a strictly residential area, there are no recorded studies on flora or fauna, only native grass growing on the tracks noted during the site visit.

³² Zevenbergen, C., Bhattacharya, B., Wahaab, R. A., Elbarki, W. A. I., Busker, T., & Rodriguez, C. S. (2017). In the aftermath of the October 2015 Alexandria Flood Challenges of an Arab city to deal with extreme rainfall storms. *Natural hazards*, 86(2), 901-917.

³³ <https://egyptianstreets.com/2015/10/25/alexandria-drowned-by-floods-leaving-seven-dead/>

³⁴ Badawy, A., Gaber, H., & Ibrahim, H. (2015). Earthquake risk assessment of Alexandria, Egypt. *Journal of Seismology*, 19(1), 159-170.

³⁵ Hassan, H. M., Frischknecht, C., ElGabry, M. N., Hussein, H., & ElWazir, M. (2020). Tsunami hazard and risk assessment for Alexandria (Egypt) based on the maximum credible earthquake. *Journal of African Earth Sciences*, 162, 103735.



Figure 4-12 Native Grass observed during the site visit and trees

In addition, the Project is considered relatively far from the Mediterranean Sea coast, hence aquatic marine life is not considered. The only existing fauna are birds, stray cats and dogs. The Project area does not include any Important Bird and Biodiversity Area (IBAs). **Figure 4-7** indicates the different floral zones of Egypt, where Alexandria lies in the Mediterranean – Sahara Regional Transition Zone (MS-XVIII).³⁶

The only Identified Important Plant Area (IPA) is Lake Maryout, which is located in the southwestern part of Alexandria. The sediment in the lake consists of fluvial deltaic formations and brackish lagoon mud.³⁷ The lake is considered to house endemic plant species, which are severely threatened due to negative impacts arising from pollution and Aquaculture. This Lake will not be affected by the Project, since it is relatively far from the Project's operational area.

³⁶ El-Hadidi and Hosni, [2002](#)

³⁷ Kamal Hussein and Ebrahim Eid, [2016](#)

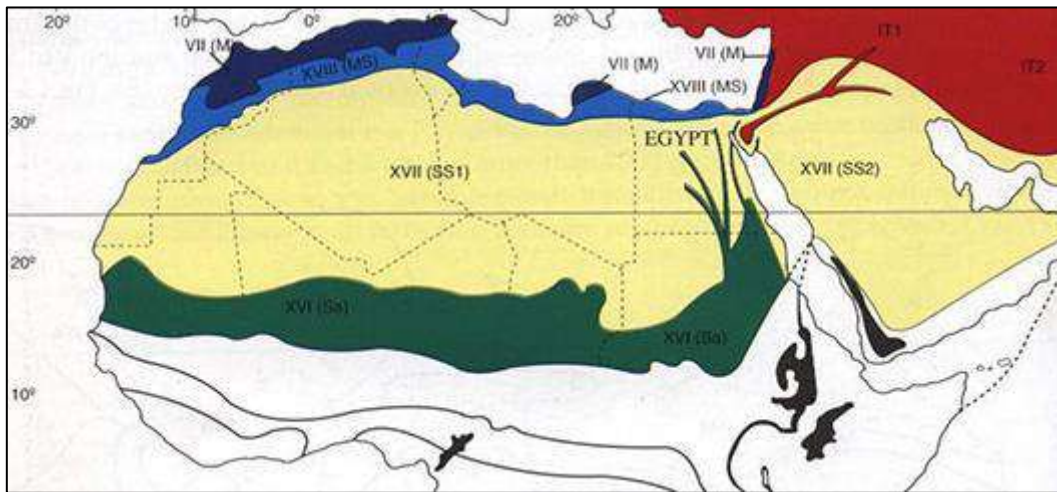


Figure 4-13 Floral Zones of Egypt (Hadidi and Hosni, 2002)

4.3.2 Habitats

The predominant type of habitat found across the Tramway corridor is that of an Urban habitat. This type of habitat is usually limited in terms of flora and fauna. Some the Fauna that can be found in the Urban habitat of the tram corridor include Hooded Crow (*Corvus corone*), Black Rat (*Rattus rattus*), Weasel (*Mustela Nivalis*), House Sparrow (*Passer domesticus*) and House mouse of Egypt (*Mus Musculus*). These urban faunae usually thrive in an urban habitat, especially if there are waste accumulation points that are easily accessible and exposed for these animals to feed on.

The El Montazah Park and Palace is located 5 km far from the Tramline, which includes a large park filled with grass and palm trees. This type of artificial green habitat attracts different types of bugs, and insects. Aside from that, the Mahmoudiyah irrigation canal and the Mediterranean Sea coasts are not within the vicinity of the project area and these habitats will not interact with the project's influence zones. The same applies to the Maryout Lake and the Airport farm Lake. The Montazah Palace and Gardens contains a special habitat that attracts a list of different birds, either in their migration or as their primary habitat location, that would otherwise not inhabit the densely populated urban zones of Alexandria. The list includes:

- Barn Swallow – *Hirundo rustica*
- Sandwich Tern – *Thalasseus sandvicensis*
- Mediterranean Gull - *Ichthyiaetus melanocephalus*

- Little Gull - *Hydrocoloeus minutus*
- Black-Headed Gull - *Chroicocephalus ridibundus*
- Common Linnet - *Linaria cannabina*
- Black Redstart - *Phoenicurus ochruros*
- Lesser Black-backed Gull - *Larus fuscus*
- Pied Wagtail/White Wagtail - *Motacilla alba*
- Isabelline Wheatear - *Oenanthe isabelline*
- Lesser Whitethroat - *Sylvia curruca*
- Eurasian Blackcap - *Sylvia atricapilla*
- Common Bulbul - *Pycnonotus barbatus*
- Graceful Prinia - *Prinia gracilis*
- Common Kestrel - *Falco tinnunculus*
- Armenian Gull - *Larus armenicus*
- Caspian Gull - *Larus cachinnans*
- Laughing Dove - *Streptopelia senegalensis*

The Gardens also attract Hooded Crows, Eurasian Hoopoes, House Sparrows, and Rock Doves from the other urban and agricultural habitats in Alexandria. A large number of the species mentioned above are coastal birds that would remain in the coastal zone of the Montazah Palace and Gardens. Many of those bird species can also be observed in the urban zones of Alexandria and not just the Montazah Palace.

Thus, the Project zone is primarily made from artificial or man-made areas, with no observations of any endemic or endangered species or rare species observed passing by or living in the vicinity of the Project area. With regards to Flora, the majority if not all the flora in the area surrounding the Raml Tram line is introduced species of trees and weeds. There is some vegetation found throughout the tramline as shown in the Project description, with weed or grass lying beside the track or within the corridor of the current train track. Where possible, this flora should be preserved as they have a number of positive benefits to the soil and ground.

4.4 Climate change considerations

4.4.1 Background

Climate Change is the gradual change in the state of the global climate that has been occurring over the time due to a diverse range of natural and human activities.³⁸ This phenomenon has been exaggerated after the industrial revolution and especially during the recent manufacturing boom experienced globally over the past six decades. Climate change is expected to impact weather conditions, food production/agriculture, erosion and frequency of extreme conditions. It is also expected to indirectly cause human displacement and be the catalyst to increased conflict for water resources during periods of drought.³⁹

Egypt is Projected to experience different types of Climate Change impacts over the next century, and the IPCC considers Egypt as one of the most vulnerable countries with regards to climate change impacts.³⁸ First, coastal regions of Egypt are expected to experience more coastal erosion with higher tides and the rise in sea level. This puts coastal regions and cities in a large of risk of inundation due to these factors³⁹. The recent trend of flash floods is only expected to increase due to climate change in Egypt. This is posing a serious impact on the infrastructure in Egypt, since it was not built nor equipped to deal with such events. The level of damage experienced in recent flood events, primarily induced by heavy precipitation, was a demonstration regarding the impact severity of flooding that could be caused and further increased by climate change.⁴⁰

Egypt is expected to also experience physical water scarcity and prolonged periods of drought over the next fifty years, due to the drying of the Nile and other non-climate related events that will lead to the reduction in water flow. This is can cause a severe impact on livelihood and public health in the country, since over 90% of Egypt's water reliance comes from the Nile river.⁴¹ Heatwaves and cold waves during the peak of summer and winter respectively are also Projected to become more intense.

³⁸ Intergovernmental Panel on Climate Change ([IPCC](#))

³⁹ UNFCCC – [Impacts, Vulnerabilities and Adaptation in Developing Countries](#)

⁴⁰ Negm, A. (2020). Flash Floods in Egypt. Springer International Publishing.

⁴¹ Ouda, S. and Zohry, A.E.H. (2016). *Management of Climate Induced Drought and Water Scarcity in Egypt*|SpringerLink

The last expected major impact due to climate change in Egypt, is saltwater intrusion in groundwater aquifers especially in coastal areas with high water table. This can increase the salinity of groundwater and eventually increase treatment costs of groundwater for recreational purposes.⁴² Since the water table is usually higher in coastal zones of Egypt, which are expected to experience erosion due to sea level rise, saltwater intrusion is expected to occur in those areas. This is another serious challenge faced by the country, since the majority of structures and houses do not have appropriate insulation, as they were not designed for these weather conditions.

Alexandria governorate, which is located on the North Coast of Egypt with the Mediterranean Sea, and is expected to be severely affected by different climate change impacts over the next century. First, the city of Alexandria is expected to experience more severe flooding from unstable weather conditions during the month of November and December.⁴³ Occurrences of flash flooding will be caused primarily due to heavy precipitation and high tides. Alongside flash floods, increased heavy precipitation during the winter can expose the city's old infrastructure to corrosion and structural risks.

The groundwater in Alexandria will be affected by further saltwater intrusion due to the rise in sea level from the Mediterranean Sea. Since the water table in the urban zone of the city ranges from 2-10m,⁴⁴ the groundwater utilized in this zone will require further treatment for recreational usage and by that increasing the financial burden on water management and treatment. While water scarcity and drought will affect all of Egypt, the impact is not as severe in Alexandria due to the proximity to different surface water bodies. Sea Level rise is also expected to severely affect the land usage in Alexandria and cause human displacement. A Study conducted in 2004 by the Organization for Economic Co-operation and Development (OCED), found that up to 30% of land in Alexandria will be lost to rise in sea level⁴⁵ which will cause nearly 1.5 million inhabitants to lose their homes (Projections for 2050). To this date,

⁴² Safi, A., Rachid, G., El-Fadel, M., Doummar, J., Abou Najm, M. and Alameddine, I. (2018). [Synergy of climate change and local pressures on saltwater intrusion in coastal urban areas: effective adaptation for policy planning. Water International](#), 43(2), pp.145–164.

⁴³ Abou-Zeid, Mohamed & Ismail, Hend. (2019). Climate Change and Its Impacts on Coastal Cities: A Case Study from Alexandria.

⁴⁴ Salim, M.G. (2012). Selection of groundwater sites in Egypt, using geographic information systems, for desalination by solar energy in order to reduce greenhouse gases. *Journal of Advanced Research*, 3(1), pp.11–19.

⁴⁵ OCED – Development and Climate Change in Egypt: Focus on Coastal Resources in the Nile (2004)

these Projections still stand and threats due to rise in sea level have not been met with appropriate erosion defences.

4.4.2 Further Assessment and Methodology

Thus, based on this brief literature review it is crucial for any infrastructure Projects that will be located in the Alexandria, which is considered one of the most vulnerable cities in Egypt to climate change impacts,⁴⁶ to take into consideration the serious risks posed by climate change on the long term. There are different approaches that integrate climate change risks into the Project's preliminary assessment phase. The most appropriate method is to conduct a climate change risk assessment of the proposed Project, which is primarily revolved around the following three topics:

1. The Project's **contribution** to the causes of Climate Change
2. The Project's capability to **adapt** to the unpredictable conditions caused by climate change
3. The Project's **resilience** to different impacts caused by climate change.

The climate change risk assessment (CCRA) adopted for this Project, utilized **two** methodologies to create a condensed and qualitative methodology for this Project. The purpose of the CCRA for this ESIA, is purely to have a strategic CCRA with regards to the Alexandria Tramline and not a detailed risk assessment. The findings are incorporated into the Impacts, Mitigation, and Environmental and Social Management Plan (ESMP). The first methodology is the official CCRA process recommended and adopted by the European Environment Agency.⁴⁷ The second approach and considerations, where from the Climate Change Resilience Principles (CRPs) which have been developed by the Climate Bonds Initiatives, which was "established to provide direction and guarantee to investors on green bond credentials in a voluntary market"⁴⁸. The purpose of this qualitative risk assessment process, is to articulate the adaptability of the Alexandria Tramline to the Projected impacts or threats posed by the change in climate.

⁴⁶ Egypt's [Third National Communication](#) Under the UNFCCC

⁴⁷ [European Environment Agency](#) – Strategic Methodology adopted in "National climate change vulnerability and risk assessments in Europe, 2018"

⁴⁸ [Climate Bonds](#)

The key definitions used in developing the methodology are summarized in the following table⁴⁹:

Table 4-6 Climate Change Methodology Terminology

Terminology	Definition
Adaptation	The process of adjustment to actual or expected climate and its effects.
Resilience	The assets' capacity to cope with hazardous event or disturbance, responding in ways that maintain their functionality, and structure, while also maintaining the capacity for adaptation
Time Horizon	The timeframe by which the CCRA is conducted, which includes an integration of the operational lifetime of the asset and how long they are expected to last.
Climate Change Hazard	The specific climate related events or variations that have the potential to materially impact the asset or Project.
Chronic Hazard	A prolonged event that has the potential to material impact the Project on the long term
Acute Hazard	An event that has the potential to material impact the Project on the short term or suddenly .
Climate Change Exposure	The degree to which the asset or Project is exposed to climate change hazards, based on its geographical and sectoral position.
Climate Change Vulnerability	The degree to which the asset, or Project is sensitive to related losses from exposure to climate change hazards.

⁴⁹ Climate Resilience Principles ([CRPs](#)) - 2019

The methodology developed adopts the following process:



1. **Screening:** First a screening process is conducted to understand which climate risks are to be considered for the Project. This includes screening the geographical location of the asset, the proposed design and the context of the analysis being conducted. This phase must clearly define the Project's boundary and interdependencies.
2. **Scoping:** This phase revolves around clear identification of the CCRA's scope, the information needed, the predicted knowledge gaps and the physical risk that could be caused by climate change
3. **Risk Assessment:** A strategic risk assessment of the identified physical risks and hazards, and the potential implications on the Project based on exposure and vulnerability. The process for the risk assessment is as follows:
 - a. Hazard Assessment (anticipated scenario)
 - b. Vulnerability Assessment
 - c. Impact/Risk Identification
 - d. Adaptation/Resilience measures

The risk assessment will be revolved around **hazards**, and the Project's adaptability and resilience to the different climate related hazards. This is covered in the Potential Impacts

4. **Adaptation, Mitigation and Considerations:** Since this CCRA is part of a wider ESIA study and since the Project is still in the feasibility phase with certain elements still subject to change, adaptation and resilience recommendations will be articulated for the management, design and operation of the Project. This is covered in the Environmental and social Management Plan.

The classification of Climate – Related Hazards for this Project include:

Table 4-7 Climate Related Hazards Identification for the Project⁵⁰

Type	Temperature	Wind	Water	Land and Soil
Chronic	○ Temperature Variability ○ Heat Stress	○ Varying Wind Patterns	○ Saltwater intrusion ○ Water stress ○ Changed precipitation patterns/types	○ Coastal Erosion ○ Soil Erosion and Degradation
Acute	○ Heatwaves ○ Cold wave	○ Storms	○ Drought ○ Heavy Precipitation ○ Flash Flooding	○ Soil Subsidence

4.4.3 Screening and Scoping

The Alexandria Raml Tram is geographically located in the eastern zone of the city. The Project's activities are Projected to be within the existing tramline that is currently being used by the Raml tram, new proposed paths/lines for the tram, the existing stations and new proposed stations. The Project includes the construction of Viaducts and the enhancement of the overall tram infrastructure. This includes the construction of new stations and the replacement/rehabilitation of older stations with newer stations more fit for the new tram and that can accommodate areas with viaducts.

There are two key reasons why this Project is considered to have a positive impact on the causes of climate change:

- **Transportation Services** – The tram line will have a much larger capacity than the previous tram and will be able to accommodate a very large volume of people in Alexandria.

⁵⁰ Adopted from [Climate Resilience Principles](#) – Based on the EU Taxonomy [Technical Report](#) (2019)

This will reduce the overall traffic on the streets of the city, which in turn reduces the emissions produced through Cars. The transportation provided by the tram is crucial for the local community, and thus enhancing this transport link that will be able to accommodate more people on an hourly basis will overall reduce traffic congestion.

- **Energy and Emissions** – The current tram that runs between Raml Station and Victoria station has a number of issues due to being outdated. The older tram is not efficient in terms of energy consumption, which in turn means more Energy emissions via the Tram. The new proposed tram infrastructure and rolling stock will be much more energy efficient and release less negative noise, vibration and electromagnetic field that could negatively affect the nearby community

One of the negative aspects regarding the Project is during construction phase, which is expected to generate carbon emissions due to the various construction and rehabilitation works that must be conducted.

The Project is currently at its feasibility stage. With regards to climate change impacts, The Table above covers the different chronic and acute climate related hazards that are relevant to the Project. The hazards indicated have the potential to cause a variety of different physical risks on the tram line during its design life. In the context of Alexandria, **flash flooding**, **saltwater intrusion**, **heavy precipitation**, and **soil segregation** are expected to pose the highest level of risk with regards to climate change related hazards on the Project. It will be crucial to design a tram line that is capable of adapting to the unpredictability of weather conditions and the surrounding environment due to climate change and has the resilience to withstand those impacts.

4.2 Description of the socio-economic baseline conditions

This section will describe the socio-economic baseline and conditions within the Project assessment area

4.2.1 Objectives of the socio-economic baseline

The overall objective of the socio-economic baseline is to provide a comprehensive overview of the area of influence (AoI) and the sensitive receptors that might be more vulnerable to Project impacts. This necessitates measuring and highlighting the following:

1. Presenting the baseline characteristics of the AoI hosting the Project in order to measure the severity of impacts;
2. Provide detailed information about demographic characteristics and human development profile of the AoI;
3. Outline the vulnerable groups that might be severely affected by the Project and identify the appropriate mitigation measures in order to minimize the probability of causing hardship to the Project affected persons
4. Address the land use in the areas and investigate the probability of land expropriation;
5. Identify potential obstacles that might face the Project and how to overcome them;
6. Shed light on the overall utilities and facilities within the area of influence;
7. Collect required information to better understand various stakeholders, their influence on the Project and their perceptions

4.2.2 Methodology of socio-economic baseline

The study team adopted a Participatory Rapid Appraisal approach that employs multi-levels of data collection. A Rapid Appraisal Approach enabled collecting plentiful data from secondary and primary resources within limited time that has not exceeded a period of five weeks. Therefore, the team has developed cross-sectional tools that enabled the team obtaining a multi-data sources approach including:

Secondary Data

Primary Data

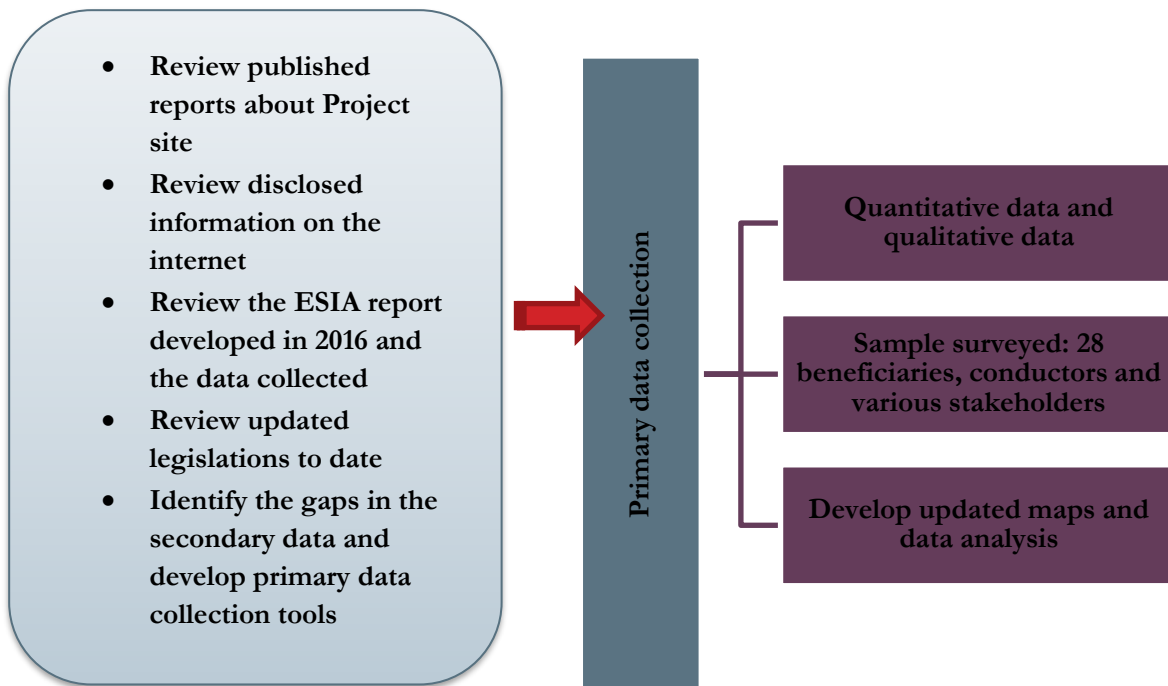


Figure 4-14 Summary of Study Methodology

4.2.2.1 Secondary Data

The consultant has reviewed previous studies, reports, data sources and information available on the internet, in addition to data provided by NAT. Additionally, a thorough review was applied on various published national report and available information uploaded to websites in order to identify the gaps that should be collected from various stakeholders. A team of experienced reviewers analysed the most recent data it aims. The secondary data analysis method was used to review official reliable documents. Moreover, provide a clear socioeconomic profile the communities that will host the Project. Thus, the following reports have been reviewed:

- Statistical Year Book of Alexandria Governorate 2019
- Egyptian Governorate Description by Information 2014 (EGDI 2014)
- Egyptian National Census (2017)
- Updated laws that govern land expropriation process

Data collected from the aforementioned reports was analysed and summarized in a comprehensive section in order to highlight the current socioeconomic conditions of the target

areas. Moreover, a comparison between the secondary and primary data allowed the team to verify the quality of primary data collected.

4.2.2.2 Primary Data

Primary data was collected using different methods such as structured questionnaires and interviews. Primary data sources are an important source of information that the consultant has used to provide deep understanding of the surrounding community, as well as, identify potential impacts related to the Project. The consultant has applied three data collection methods: quantitative data, qualitative data and field observation. First data collection tools were designed, later the field research team was trained to the designed data collection tools, and field supervision was applied to ensure quality of the collected data.

- **Quantitative data:**

The research team has collected quantitative data from the direct beneficiaries of the tram in order to provide a complete picture about their characteristics type of transportation systems and problems related to the current tram. The total interviewed sample is 28 individuals fourteen of them were females.

- **Qualitative data:**

Qualitative research aimed to collect in-depth information from the operators about the current problems associated with the train and the possible impacts. The study team has engaged a wide range of operators and stakeholders in the qualitative research. The total qualitative samples are:

- NGO
- Vulnerable women/ elders/ people with disabilities
- Alexandria Passenger Transportation Authority (APTA), Head of Central Division for Tram Affair
- Central District (Wasat)
- East District (Sharq)
- Sporting Club
- Shops tenants
- Housing and Utilities Directorate

- EETC
- Egyptian telecom
- Health Directorate
- Antiquities Directorate
- Roads Directorate
- Traffic Authority
- Beneficiaries of the tram

4.2.2 Identification of the Area of Influence

The Area of Influence that might be affected by the Tram Rehabilitation Project is relatively wide as transportation Projects are utilized by the people who might be residing in remote areas. Therefore, the study team identified the Area of Influence as follows: The direct area of influence that is located in the proximity of Raml Tramway, and the indirect area of influence located in other areas within Alexandria City.

Based on the current administrative division of Alexandria Governorate, the Project will pass through three main Districts, namely, Wasat (Central), Sharq (East) and El Montazah Awal. Within the three districts, the Project will be implemented in four sub-districts (Kism). The Project will pass through Kism Al Montazah First, Al Raml First, Sidi Gaber and Bab Sharqi. Kism El Raml Second is also close to the Project but the Project will not pass through it. The map below reflects the administrative division by Kism. The presentation of data will focus on the area of influence. However, in case of absence of information, the data will be presented on the Alexandria Governorate level.

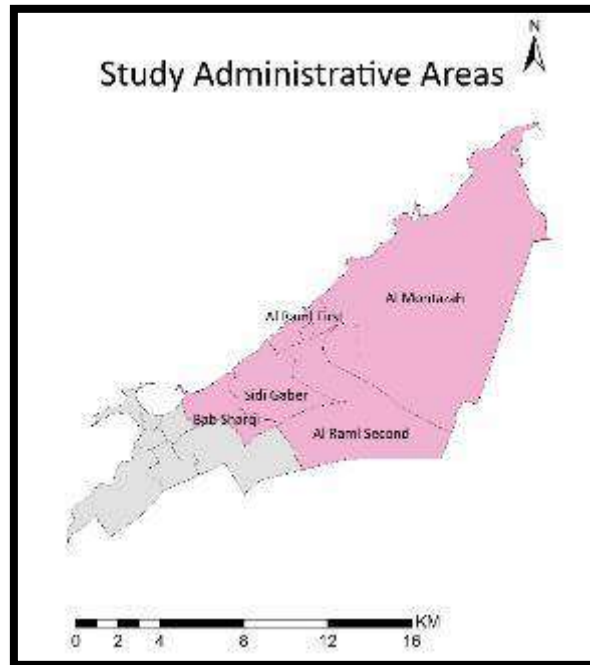


Figure 4-15: Project Area of Influence (Districts)

Each Kism is divided into Shiakhas. The Project will be implemented in the Shiakhas presented below:

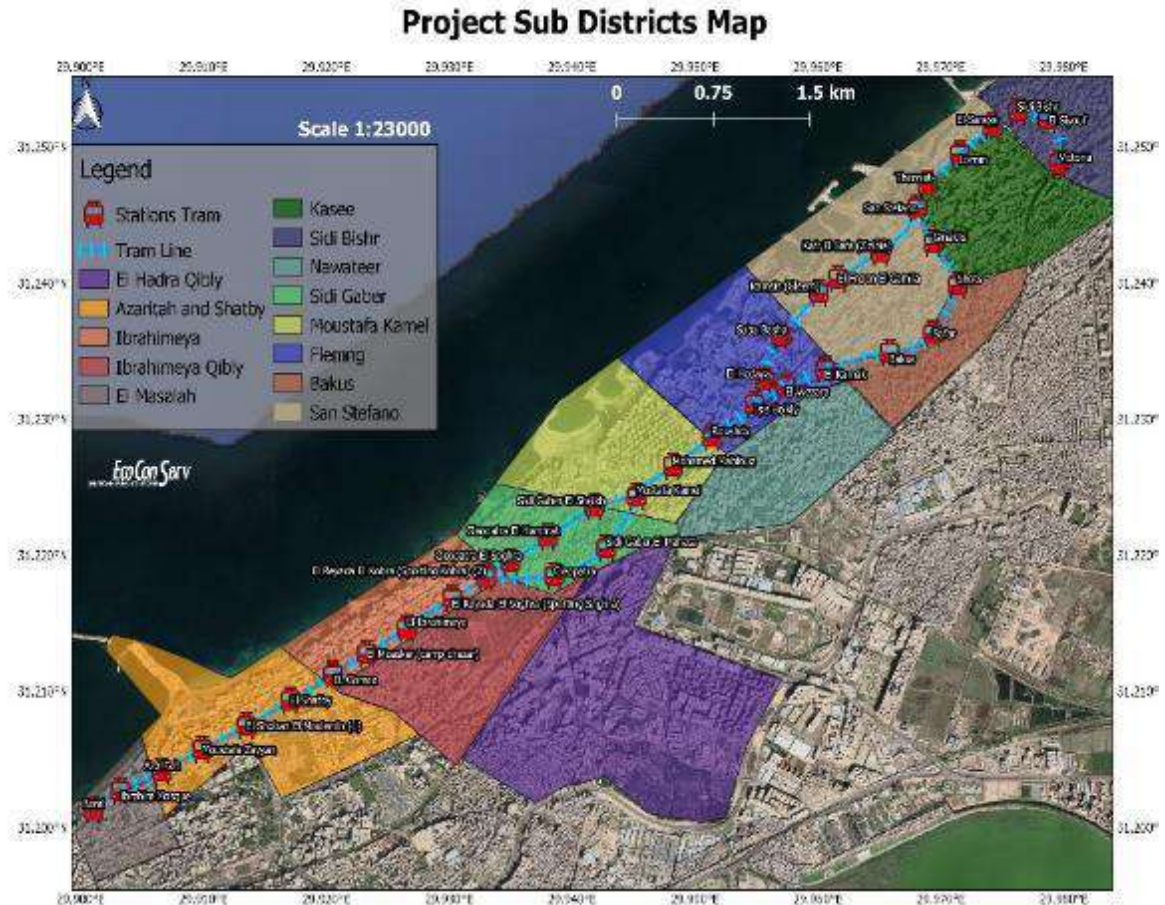


Figure 4-16: Project Area of Influence (Sub-districts)

The above-mentioned districts, Kism and Sheiakha will be directly influenced by the Project. However, the remaining districts of Alexandria City will be influenced by the rehabilitation of the tram. The remaining districts are: El Agamy, Gharb (West) and El Gomrok.

The socioeconomic baseline will employ the data available on the *Sheiakha* level, alternatively will present the data on the District or Governorate level.

4.2.3 Government, Local Authority and Governance

Egypt is divided administratively into 27 governorates (*muhāfazah*) The Egyptian governorates are the top tier of the country's five-tier jurisdiction hierarchy. A governorate is administered by a governor, who is appointed by the President of Egypt and serves at the president's discretion.

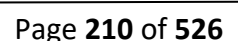
Governorates are either fully "urban" or else an admixture of "urban" and "rural". The official distinction between "urban" and "rural" is reflected in the lower tiers: i.e. fully urban governorates have no regions (*Markaz*), as the *Markaz* is, natively, a conglomeration of villages. Moreover, governorates may comprise of just one city, as in the case of Cairo Hence, these one-city governorates are only divided into districts (urban neighbourhoods).

Generally speaking, Alexandria is divided into one main city and eight districts. The eight districts are divided into 18 Kism and 138 Sheiakha (source- National Census 2017 Central Agency for Public Mobilization and Statistics CAPMAS).

Table 4-8 Administrative Division

Administrative division	Alexandria Governorate
Number of cities	1
Number of districts	8
Local Governmental units	3
Affiliated villages	2
Villages outside Local Unit	73
Kism	18
Sheiakha	138
Izbet, Hamlet	241

Source: Statistical Year Book 2015



The Statistical Year Book 2015 reported that the total area of the Project Aol is 185 km². The total housing and scattering areas are 96.7 km². The table below presents to a total area of lands within the Project area of influence and on the Governorate level.

Table 4-10: Total area of Alexandria Governorate

District	El Montazah	East (Sharq)	Central (Wasaf)	Total governorate
Total area without desert border	82	35	68	2300
Populated area Km 2	82	35.5	53.1	1675.6
Housing and scattering areas	22	22	52.7	622.4
Facilities and cemeteries	5.3	0	0.4	65.4
Ponds and fallow	0.6	0	0	135.3
Agricultural land within agricultural borders	54.1	13.5	0	227.8
Agricultural land outside agricultural borders	0	0	0	624.7
Total Area	82	35	68	2300

Source: Statistical Year Book 2015

4.2.4 Community demographic profile

As it was mentioned above, the area of influence is mainly El Montazah First, El Raml First, Sidi Gaber and Bab Sharqi Kisms. These are the directly affected areas. However, the majority of Alexandria City will likely be influenced by the Project activities.

The total population of Alexandria Governorate as per the final National Census - 2017 is 5,163,750 persons. 51.4% of the total population is males.

4.2.4.1 Population

The distribution of population by Shiakha reflects that El Seyouf Qebli and Derbal has the largest population 278,181 representing about 23.5% of the total population of the AoI. The second largest population is in Sidi Bishr Qebli.

Kism El Montazah First accommodates the largest population with a percentage of 61.28%, followed by Kism Bab Sharqi that is inhabited by 18.91% of the total AoI population.

Table 4-11: Area of Influence Population Distribution by Kism and Shiakha

Kism	Sub-district (Shiakha)	Males	Females	Total	Percentage
El Montazah First	El_Seyouf Bahri	57214	55174	112388	9.48
	El Seyouf Qebli and Derbala	144886	133295	278181	23.47
	Sidi Bishr Bahri	52671	51068	103739	8.75
	Sidi Bishr Qebli	118260	113639	231900	19.57
El Raml First	Bakous	23312	22194	45506	3.84
	San Stephano	30606	27526	58132	4.91
	Fleming	30510	31242	61753	5.21
Sidi Gaber	El_Reyada	5775	5358	11133	0.94
	Sidi Gaber	21833	21598	43430	3.66
	Mostafa Kamel and Bolkly	7750	7128	14879	1.26
Bab Sharqi	El_Ibrahimeya Bahri	12598	13522	26120	2.20
	El_Ibrahimeya Qebli and El_Hadra Bahri	28026	29412	57438	4.85
	El_Azareta and El_Shatsby	5732	6148	11880	1.00
	El_Hadra Qebli	28155	27967	56122	4.74

Kism	Sub-district (Shiakha)	Males	Females	Total	Percentage
	Ezbat El_Gamea	37452	35054	72506	6.12

4.2.4.2 Age

The distribution of age was available on the level of the Aol. It was reported that about a quarter of the population is below 10 years old. Those who are below 5 years represent about 18.0% of the total population. On the contrary, those who are above 70 years represent about 1.5% of the total population. This is an indication about the nature of the community that tends to be young and growing rapidly.

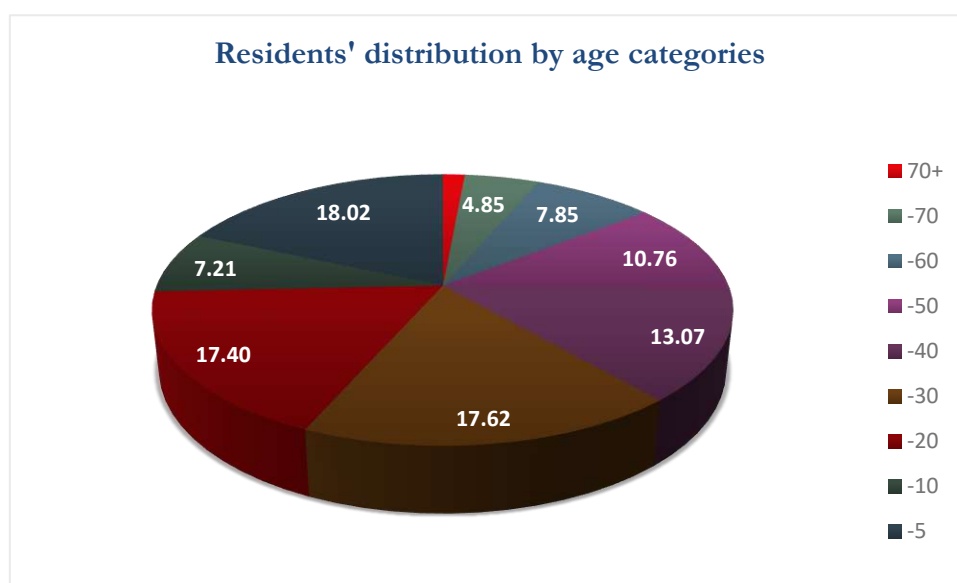


Figure 4-18: Project Aol residents' distribution by age categories

Source: CAPMAS National Census 2017

4.2.4.3 Natural increase and household size

The total population of Alexandria Governorate as reported by the National Census 2017 is 5,163,750 people. The birth rate is counted at 29.10 live births/ 1000 persons. However, the death rate is 8.5 dead persons/ 1000 people. The annual natural increase ratio reported by Governorates' Description by Information, IDSC 2014 is 20.6 per thousand people.

The average household size is about 3.83 persons per each household. Based on this figure, the total number of households within the direct Project AoI is estimated to be 309,427 households

Table 4-12: Natural increase of Alexandria Governorate

Item	Unit	Alexandria Governorate
Total population	Thousand persons	*5,164
Birth rate	Live birth/ Thousand persons	29.10
Mortality rate	Dead person/ Thousand persons	8.50
Population natural increase rate	Per thousand persons	20.60
Average of household size*	Person	3.83

* Source: National Census 2017

Source: Governorates' Description by Information, IDSC 2014

4.2.5 Migration trends

Alexandria Governorate is one of the metropolitan governorates in Egypt. There are three types of migration trends to and from the governorate. They can be summarized as follows:

- 1- Migration from other Egyptian Governorates to Alexandria for the purpose of tourism, particularly during summer time, and for work. The main governorates' residents that migrate to Alexandria Governorate are Sohag, Gharbeia, Menoufia, Cairo, Dakahlia, and Assuit. (source: <http://gopp.gov.eg/wp>)
- 2- Migration from Alexandria Governorate to Europe where not only the residents of Alexandria but also the people from other governorates might migrate to European countries. The migration trend might be described as illegal (source: un.org/ar/audio/2015/06/331462)
- 3- The third type of migration is mainly from outside Egypt to Alexandria Governorate for shelter and work, particularly from Libya, Syria and Yemen where disputes and wars erupted.

4.2.6 Human Development Profile

4.2.6.1 Educational status

The distribution of the population according to their educational level reflects that 19.0% of the total population (10 years +) in Alexandria Governorate are illiterate. Illiteracy rate increases slightly among females as it reaches 21.8%. Intermediate education is still the main type of education among the governorate as 19.6% of the population (10+) in Alexandria are intermediate graduates. The university graduates represent 17.0% of the total population. There is a slight difference between males and females that does not exceed 2.0%

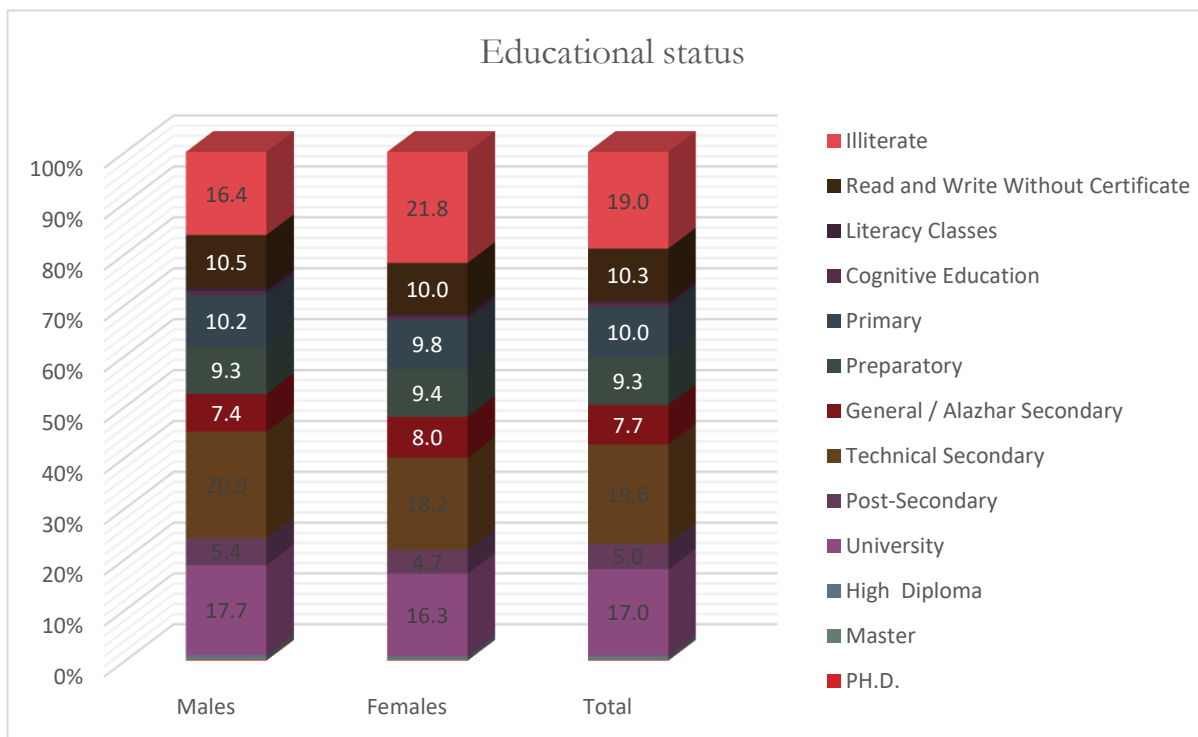


Figure 4-19: % distribution of population in Alexandria Governorate by educational level and sex

Source: National Census 2017

Description of Egypt by Information 2014 report stated that Alexandria has up to 2,080 general schools. The total number of students is estimated to be 1086.41 million students. Azhar

educational facilities are estimated to be 143 institutes and the number of students is 41.11 thousand students.

Within the direct AoI, there are 20 schools. The map below presents the location of the educational facilities within the AoI. It is worth mentioning that the students rely on the tram to reach their schools and universities.



Figure 4-20: Victoria College School



Figure 4-21: El Raml Secondary School



Figure 4-22: Educational Facilities within the Aol

In addition to the above mentioned schools there are universities and colleges located in the vicinity of the Project site. Based on the site visits carried out in 2016 and December 2020, students rely upon the tram as it provides them with low cost and quick means of transportation.

The Project will be implemented in areas that host many universities i.e. El Fonon El Gameila (Fine Art College)

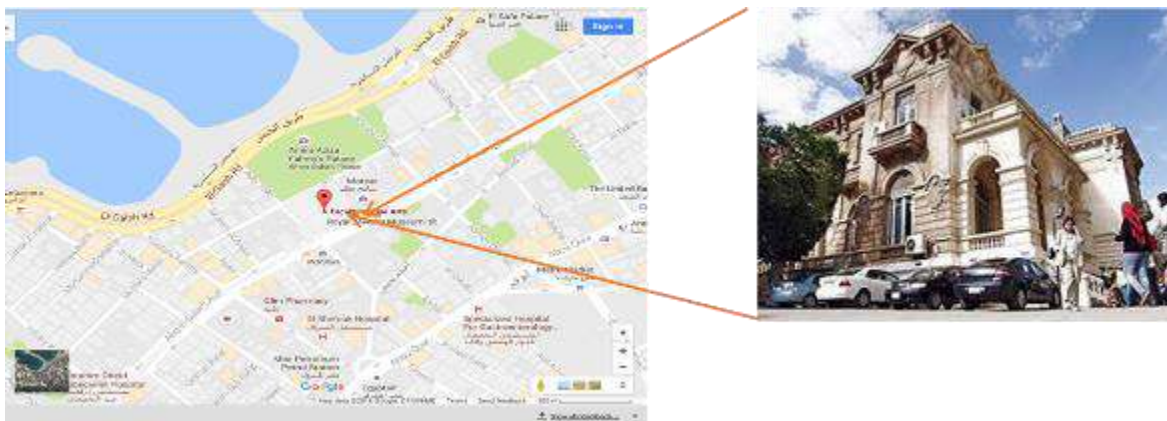


Figure 4-23: Fine Arts college in Alexandria



Figure 4-24: Faculty of Dentistry

As the Project might entail provision of capacity building initiatives. Alexandria governorate hosts a large number of training centers. The total number of vocational training centers in Alexandria Governorate is 51 centers. The total capacity of vocational training centers is 10,114. The Project might utilize such centers to disclose any job opportunities available at the Raml Tram Project.

Table 4-13 :Vocational Training Centers in Alexandria Governorate

Vocational Training Centers:	Unit	Alexandria
No. of vocational training centers	Center	51
Total capacity of vocational training centers	Trainee	10114
No. of trainees	Trainee	13229
Share of labour force per vocational training center	Thousand persons/ Center	28.18

Source: Governorates' Description by Information, IDSC 2014

4.2.6.2 Access to basic services

Access to basic services, water supply, sanitation and electricity is one of the main pillars that determine the economic well-being of the community.

- **Access to potable water**

The majority of the Project areas rely upon water from the Nile River. 99.0% of the people residing in Alexandria Governorate have access to a proper water supply. The total produced water by the Alexandria water company is estimated to be 976,716 thousand cubic meters/year. The total consumed water is estimated with 722,391 thousand cubic meter/year. This is a positive indicator about the availability of potable water supply.

Any water will be needed for the Project during construction and operation phases will be obtained from the national water network.

Table 4-14 Water consumption in Alexandria Governorate

District	Total potable water produced (thousand m ³ /year)	Total potable water consumed (thousand m ³ /year)
El Montazah	177,146	173,672
East	144,486	140,106
Central	100,204	60,597
Total	976,716	722,391

Statistical Year Book Alexandria Governorate 2015

- **Access to Electricity and Natural Gas**

The secondary data revealed that almost the entire population in the Alexandria Governorate has access to electricity. The total number of subscribers reported in 2015 is estimated to be 2,375,831 households. The total subscribers of industrial facilities are estimated as 13,556

enterprises. The following table provides detailed information about electricity consumption in various areas:

Table 4-15: Electricity consumption in Alexandria Governorate

District	Number of subscribers		Total consumed electricity (million kv/yearly)	
	Light	Industrial	Light	Industrial
El Montazah	711,538	1,274	1,733.89	257.335
East	408,765	1,412	1,174.15	242.069
Central	469,900	4,792	1,522.4	524.906
Total	2,375,831	13,556	6,237.56	2501.69

Statistical Year Book Alexandria Governorate 2015

The total subscribers to Natural Gas is estimated to be 642,331 households. That represent about 56.1% of the total households in Alexandria. The Egyptian Natural Gas Holding Company (EGAS) is responsible for natural gas connections with its local distribution companies (Towngas- Natgas, etc) is now adopting a rapid plan to expand the natural gas connection in Alexandria.

Table 4-16 :Access to Natural gas in Alexandria Governorate

No.	District	Total number of subscribers	Total households	% of subscribers
1	El Montazah	231,753	321,658	72.0
2	East	179,085	269,429	66.5
3	Central	117,103	142,516	82.2
Total		642,331	1,145,759	56.1

- **Access to Sanitation**

The community access to sanitation is relatively high in Alexandria. The total houses connected to sewage system are 1,145,759 households. They reside about 139,506 dwellings. The total number of households using septic tanks are 1529 households. Those who have no access to the public sewage system reside the areas of East and West Alexandria.

Table 4-17 Households and buildings connected to sanitary network in Alexandria Governorate

District/town	Area Type	Households connected to public network	Buildings connected to public network	Households connected to Septic tanks
El Montazah	Urban	321,658	33161	0
	Rural		4075	77
East	Urban	269,429	27729	0
	Rural		10231	111
Central	Urban	142,516	14722	0
	Rural		3499	15
Total governorate		1,145,759	139,506	1529

4.2.7 Health Facilities Available

Alexandria hosts a significant number of health facilities. There are 149 hospitals of different categories. They can provide health services to the workers of the Project. The hospitals are accessible within the Project areas.

Table 4-18 Health facilities in Alexandria Governorate

Ministry of Health Hospitals & other Entities:	Unit	Alexandria

No. of hospitals affiliated with the Ministry of Health's Public Bureau	Hospital	2
No. of public and central hospitals	Hospital	6
No. of specialized hospitals	Hospital	10
Hospitals of The Public Authority of Health Insurance	Hospital	4
Medical treatment institutions	Institution	4
University hospitals	Hospital	8
Private sector hospitals	Hospital	112
Police and prison hospitals	Hospital	3
Railway hospitals	Hospital	0
No. of pharmacies	Pharmacy	4732
No. of hemodialysis centers affiliated with the Public Authority of Health Insurance	Center	34

Source: Governorates' Description by Information, IDSC 2012

The photos below present some of the nearest health facilities located in the AoI.



Figure 4-25: El Nor Hospital



Figure 4-26: Mohamed Rashed Center for
Cancer disease

Alexandria is one of the governorates that benefits from full coverage of vaccination, 94.40% of the target beneficiaries have been vaccinated. The newly born mortality rate is about 11.4 dead births per thousand births. Whereas, the infant mortality rate is about 19.6 dead births per thousand births. Below five-years child mortality rate is 24.2 dead births per thousand live births. Family planning units are 134, whereas the mobile clinic is 21 clinics.

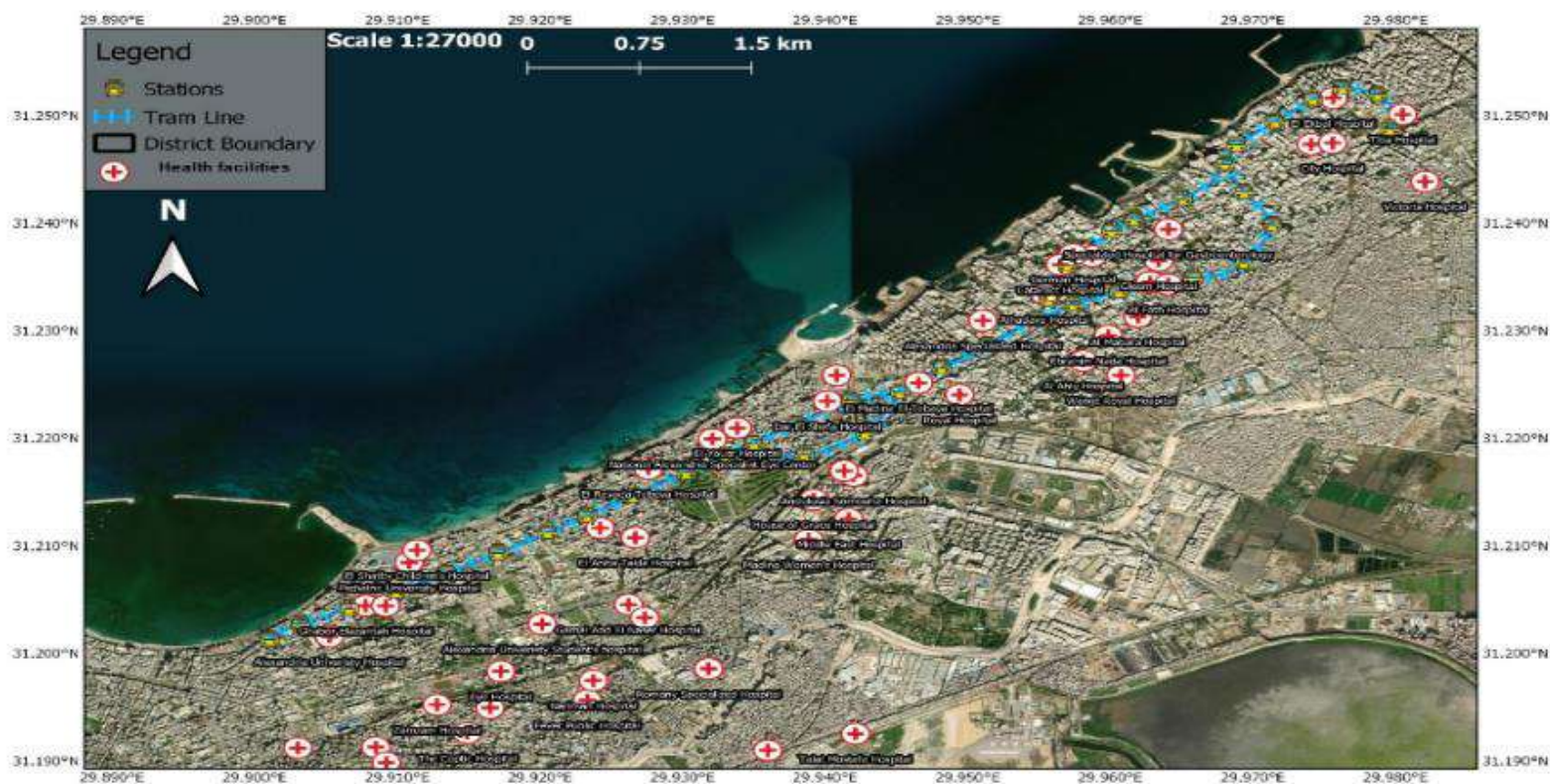


Figure 4-27: Health facilities in Alexandria Governorate



Figure 4-28: Infant treatment centre (incubators)



Figure 4-29: El Sehaba Hospital

4.2.8 Women and children in Alexandria Governorate

4.2.8.1 Women Conditions

The secondary data collected revealed that the percentage of women from the total population is about 49.0%. However, within the AoI and based on the National Census carried out in 2017, the percentage of women within the AoI is limited to 48.4%.

Women represent about 20.13% of the total labour force⁵¹. Females represent 17.31% of the total employed population in Alexandria. However, unemployment⁵² among females is about 28.9%. It is worth mentioning that the contribution of women in construction activities is limited. This is not attributed to discriminatory actions, however women themselves are reluctant to work in construction sites.

In terms of the illiteracy rate among females, it is relatively high reaching up to 22.0%. However, many females try to improve this by attending literacy classes. The percentage of women who attend literacy classes is about 24.4% of the total attendees.

Below is a full list of indicators related to status of women in Alexandria Governorate. There is no data available on the level of AoI.

⁵¹ The labour force participation rate is the percent of the population ages 15 -65 is economically active. That includes the employed and the unemployed individuals.

⁵² : Unemployment refers to the share of the labour force that is without work but available for and seeking employment.

Table 4-19: Gender related indicators

Gender indicators	Alexandria (%)
Females (% of total population)	49.05
Females (% of total labour force)	20.13
Females (% of total employed persons)	17.31
Female unemployment rate	28.9
Female illiteracy (% of total females)	22
Females enrolled in illiteracy eradication classes (% of total enrollment)	24.37
No. of females who have attained reading and writing (% of total persons who have their illiteracy eradicated)	22.19
Females (% of total students)	48.55
Females in technical education (% of total enrollment in technical education)	40.3
Females trainees (% of total trainees in vocational training centers)	8.42
Female researchers (% of total researchers in research centers)	48.98

Source: Governorates' Description by Information, IDSC 2015

Regarding gender dimension in the construction activities and based on analyzing similar construction Project that were implemented by NAT, women were not seen performing any works that need muscle strength. They might be working as engineers, administrative staff, cleaning and housekeeping staff. Their contribution in the construction work is not attributed to any discriminatory actions. It is mainly due to the reluctance of women, particularly, married women to work for long hours in hard construction activities. Therefore, the Project will enable women to work in the Raml Tram Project. However, they might be reluctant to perform such works.

The safety of woman on the tramway and inside the station might be presented as follows:

- 1- Old women were seen falling on the tramway and got injured. There was no primary health care or first aid box to provide support and immediate medical treatment to women;
- 2- Some women, of all age categories, might lose their conscious for many health reasons. They did not receive any health care support within the stations. On other hand, the passengers got accustomed to help these women. Despite the kindness of the passengers, few numbers of passengers used to steal the bags and cell phones of these women. Such illicit behavior was encouraged by the absence of respectable support system in the stations.
- 3- Women at the age category from 15-50 years old reported confronting with harassment behaviors. As a matter of fact, many types of harassment were reported e.g. verbal and touching. The consulted groups reported that they have been harassed and touched several times in the mixed wagons. Therefore, they prefer to use women wagons designated for women.
- 4- It was reported that there are significant numbers of women who work as vendors in the tram. They are classified as daily wage workers with no social or health insurance coverage. Some of them might have their children with them. They try to sell goods that of low value.
- 5- Based on the assessment of Raml Tram, no women work as conductors or drivers. Additionally, almost no women were working in the depot. This is not attributed to discriminatory actions; however, it is foreseen that transportation operation sector is not an appealing option for women. Engineers and administrative staff can be seen in APTA. This might be applicable to the Raml Tram in Alexandria. However, NAT in full cooperation with the operator might exert efforts to engage women during construction and operation phases.
- 6- The tenants of the shops and workers are mainly men. Women are reluctant to lease shops in the stations. Such attitude is not attributed to discriminatory action, as women lease number of shops. However, women, particularly, young women are reluctant to work at the shops due to long working hours and relatively limited salaries.

4.2.8.2 Child labour and street children

Child labour is widespread in Egypt. A CAPMAS and ILO survey in 2011 found that 9.3% of children in the age group of 5-17 were involved in child labour (three quarter of them were males). Around one

quarter of child labourers were aged less than 12. Slightly less than half the child labourers were working in agriculture, and around 15% were working in workshops.⁵³ Child labour is also noticed in the AoI as some children were working inside the shops and trading some goods.



Figure 4-30: A young boy working as shoe polisher

Children within the Tram stations can be seen sleeping on the benches as some of them use the stations as shelter for some of them. They also might sell trivial goods in the tram. Children using the tram for labour, shelter, selling goods, and improper riding are prone to the risk of accidents, especially during the night time.

⁵³ Country Office Portal, Annual Report 2011 for Egypt, MENA



Figure 4-31: Homeless street children

Based on consultation activities with the drivers and conductors, the conductors and drivers disregard street children. As a matter of fact, the drivers and conductors consider street children as a potential crisis because they might be killed or hit by the Tram at any moment causing a critical problem to the drivers. There is no data available about street children accidents inside the Tram as the majority of street children's accident are not reported on.

Many NGOs support street children and provide them with food, shelter and clothes e.g. Caritas-Egypt and Hope Village. The children were willing to benefit from the services provided by the NGOs. However, they were reluctant to get away of the streets and be sent back to their families. Based on consultation carried out with the social solidarity directorate, the street children went out to street due to conflicts and disputes with their families. Additionally, some of them became drug addicts and dealers. Additionally, some of them work as sex workers.

Street children have proper knowledge about the services provided by the NGOs and are fully aware about the type of service provided by each NGO and when *"We provide meat and chicken twice a week and the rest of week we provide vegetables and rice. the children come only when we cook meat ... they are selective ... they go to other NGOs to get the best meals"* reported by an NGO working with street children (December 2020).

No female street children were noticed in the stations. The consulted groups had no justifications for the absence of young girls.

4.2.9 Economic characteristics

4.2.9.1 Poverty index

The Income, Expenditure and Consumption Survey (IECS) 2017-2018 reported that the total percentage of poor people in Alexandria Governorate is 21.8%. This is much lower than the national level which is 32.5%⁵⁴. The per capita consumption rate was higher in Alexandria Governorate 5,139 EGP/year. The percentage of poor persons to the total population is 6.4%. The Gross Domestic Product (GDP) ⁵⁵per capita is 8978.3 EGP.

4.2.9.2 Work Status and Unemployment

The Statistical Year Book 2015 reported that total labour force (15+) is estimated as 1,465,920 people in Alexandria (30.46% of the total population). 36.14% of the total population are employed. The percentage of women in labour force is estimated as 21.7% (EHDR 2010). 63.3% of the labour force work in service fields such as; tourism, education, trading, and administrative work. 33.7% of the labour force work in industrial fields. Only 3.0% work in agriculture related works. The professional and technical staff represent 22.6%. Such percentage is relatively the highest among Egyptian Governorate.

The unemployment rate according to the Statistical Year Book 2015 is 11.4% in Alexandria. The rate of unemployment has escalated over the past four years due to uprisings that erupted several times in the region. The unemployment rate is higher among vocational secondary school graduates 51.6%, whereas the university graduates' unemployment rate is about 34.9%. For those below secondary education the unemployment rate does not exceed 14.0% of the total labour force.

⁵⁴ Poverty line is 736 EGP per person per month and 2691 per household composed of two adults and two children.

⁵⁵ Gross domestic product (GDP) is the monetary value of all the finished goods and services produced within a country's borders in a specific time period. Though GDP is usually calculated on an annual basis, it can be calculated on a quarterly basis as well.

Table 4-20: Labour Market Indicators

Item	Unit	Alexandria
Total labour force:	Thousand persons	1437.30
No. of employed persons	Thousand employed	1188.80
No. of unemployed persons	Thousand unemployed	249.00
Labour force (% of population)	%	81.18
Rate of unemployment	%	17.82

4.2.9.3 Commercial activities

The Project Aol hosts thousands of commercial activities. Following is a summary of the types of these activities:

- Shops and cafes are situated in the stations. The majority of shops mainly trade in candy and soft drinks. The total area of shops varies in accordance to its location. The shops were leased on annual basis. Some of them have longer lease contracts that exceed 3 years. (Based on the meetings conducted with the shopkeepers) the monthly renting fees vary between 500 EGP (31.8 \$) per month to 23,000 EGP (1464\$) per month based on the total area of shops. It is worth noting that some of the shops hire labourers to assist the shopkeepers. The total number of labourers within each shop varies between 2 to 12 persons. The monthly average revenue for each shop is estimated at 5,000 EGP. The shopkeepers and the workers will be severely affected due to the loss of their income during the construction phase. Additionally, during the operation phase the number of customers might be reduced due to the construction of fences around the path of the tram.
- The second type of commercial activities is the shops, restaurants, cafés, hair dressing, ready-made garments, fruits and vegetables, grocery, bakeries and other trading facilities.
- The third type is the street itinerant vendors who use a small van or rely on carts. They trade in many types of goods.
- Small markets and street vendors were observed in the proximity of Ibrahimya and El Shoban El Moslemin station. The market will not be affected due to the Project implementation as it has proper access from various sites



Figure 4-32: Bookstores located inside the Tram stations in San Stephanou



Figure 4-33: Candy shops located in the stations



Figure 4-34: Shops within the Aol



Figure 4-35: Markets in the Aol



Figure 4-36: Itinerant street vendors



Figure 4-37: Cafés located inside Tram stations

In addition to the above-mentioned activities, mega stores were observed in the Project Aol. There is a remarkable land mark at the San Stefano station, San Stefano Grand Plaza Mall where shops, stores, Cinemas and a hotel can be found. This mall is one of the largest shopping destinations in Alexandria Governorate.



Figure 4-38: San Stefano Mall

4.2.10 Touristic Activities

Alexandria is one of the most important touristic areas in Egypt. More than two million tourists visit the city during the summer time. Alexandria has up to 44 hotels that are distributed in the 7 districts. The total number of rooms within the aforementioned hotels is 573 rooms. The following table presents the distribution of hotels within the AoI.

Table 4-21 :Tourism sector facilities in Alexandria Governorate

District	Hotels	Rooms	Beds
El Montazah	8	1039	2044
East	13	1464	2832
Central	13	678	1326
Total Governorate	44	4249	8257

Source: Statistical Year Book of Alexandria Governorate 2015



Figure 4-39: Steigenberger Cecil Hotel



Figure 4-40: Royal Jewel El Raml Hotel

4.2.11 Industrial Activities

Regarding the industrial activities within the Project areas, there are about 10,846 workshops. Almost a third of them are located in Amerya District. The total number of workers within the workshops are 135,443 persons.

Total number of industrial enterprises is 10,867 with a total number of 188,333 workers. Alexandria attracts a diverse number workers from all over the country to work in those facilities.

The total number of workshops and industrial enterprises within the Aol are presented below:

Table 4-22 Industrial activities in Alexandria Governorate

District	Workshops		Industrial enterprises	
	Total workshops	Total workers	Total enterprises	Total workers
El Montazah	593	1091	240	22,918
East	275	31480	1225	41,612
Central	954	26114	964	25,710

District	Workshops		Industrial enterprises	
	Total workshops	Total workers	Total enterprises	Total workers
Total Governorate	10,846	135,443	10,867	188,333

Source: Statistical Year Book of Alexandria Governorate 2015

4.2.12 Traffic, Roads and Transport

Alexandria Governorate is privileged with long paved roads; 355 km of regional paved roads are constructed in Alexandria Governorate. The total length of the internal paved roads is about 2,353.731 km. Such paved roads facilitate the transportation of all types of commute to, from, and within the governorate.

The total number of licensed vehicles is about 590,845 (Traffic Department 2015). Public buses, minibuses, rikshaws (Tuk Tuk), and taxis work in most of the Project areas. Additionally, El Raml Tram which serves many of the Project areas. That might facilitate moving workers to and from the Project sites. In case of the decommissioning of the current tram and the implementation of upgrading works, the impacts of the beneficiaries will be limited.

Table 4-23 Roads and transport in Alexandria Governorate

District	Total paved roads affiliated to local units	
	Regional paved roads (km)	Internal paved roads (km)
El Montazah	-	361.332
East	11 km double road	561.486
Central	11 km double road	373.256
El Gomrok	-	98.07
West	4 km double road	339.254

District	Total paved roads affiliated to local units	
	Regional paved roads (km)	Internal paved roads (km)
Total governorate	355 km road	2,353.731

Source: Statistical Year Book of Alexandria Governorate 2015



Figure 4-41: Taxis and Tuk Tuks



Figure 4-42: Microbuses stop in the Aol

4.2.12.1 Traffic in Alexandria

Alexandria governorate is connected to the rest of the Egyptian governorates by the following inter-provincial road networks:

- Alexandria –Cairo Agriculture Road
- Alexandria –Cairo Desert Road
- Alexandria –Marssa Matrouh Road
- Alexandria –Rashid Road
- International North Coastal road

The different highways are listed below:

- The International Coastal Road (Alexandria - Port Said)
- The Desert Road (Alexandria - Cairo /220 km 6-8 lanes, mostly lit)
- The Agricultural Road (Alexandria - Cairo)

- The Ring road (the turnpike)
- Ta'ameer Road "Mehwar El-Ta'ameer" (Alexandria - North Coast)

Inside the city, a network of roads exists and includes bridges and tunnels. The width of major roads varies between 12 m to 45 m. Major streets within the city join the city with its villages.

The most important bridges are: Moharam Bek Bridge, Abis on-fly Bridge, Al-Namous Bridge, Bab 27 Bridge, Merghem Bridge, Al-Amreya Bridge and bridges of Al-Taamir road and also bridges on top of Mahmoudeya Lake. Concerning the tunnels, there is the Abd Al-Meneem Reyad tunnel, the 45 street tunnel, the Mohamed Naguib Tunnel and also rail ways.

The city characterized by vertical and horizontal main roads, two main road serves the east of the city EL –Kornaich road and Al-Horeya road. Other sub roads which connect the east of the city with the west are the Al-Mahmoudeya lake road, Moharam Bek road, and Al-Quabary Fast road.

Other main roads which contact the main city with the highway/governorates roads are: AL-Sad AL-Ali road which joins El-Max area with Alexandria –Cairo desert road and Al-Zeraa Al-Bahary road which joins the North Coast with Alexandria. Another important road which connect the city with Borg El Arab industrial area without entering residential areas is Al-Taamir road. There is also a Ring road which connects the Cairo-Alexandria road with the east side of the city.

Types of streets in Alexandria city include:

- **Urban Primary Arterial Street**

It carries major portions of traffic inside the urban areas. It is normally constructed at-grade and intersects with other grades of the road system. It is composed of 3 or 4 lanes in each direction of travel. Public transport services exist with frequent bus stops; preferably in a lay-by to avoid disruptions to through traffic. On-street parking is normally prohibited to maximize the road's throughput.

- **Urban Secondary Arterial Street**

Is an arterial type of a lower grade than the primary arterial network (e.g. lower number of lanes). It serves trips of moderate length in the urban area. On-street parking is permitted along this type of streets.

- **Distributor Street**

Is considered the main street in a residential or commercial unit surrounded by the primary and secondary arterial network. It collects and distributes the local traffic to/from the primary

and secondary arterial street network. It comprises of two lanes in each direction with on-street parking. Public transport services may exist.

4.2.12.2 Alexandria Railways

Alexandria is linked with other cities through a network of railway lines including:

- Alexandria – Tanta – Cairo
- Alexandria – Al-Saloum Al Saheli
- Alexandria – Rashid
- Al-Dekhila port to Matruh





Figure 4-44: Key transportation corridors in Alexandria

Source: Alexandria climate report of Alexandria (World Bank), map by General Organization for Physical Planning (GOPP)2006

4.2.12.3 Airports

Alexandria is served by Borg al Arab Airport located about 25 km away from the city center. In March 2010, the former airport, Alexandria International Airport was restricted to commercial operations while all airlines operate out of Borg al Arab Airport where a new terminal was began operating in February 2010.

4.2.12.4 Train

Alexandria's intercity commuter rail system extends from Misr Station (Alexandria's primary intercity railway station) to Abu Kir, parallel to the tram line. There is also one commuter line to Borg El Arab, but with much lower frequencies. The commuter line's locomotives operate on diesel, as opposed to the overhead-electric tram.

Alexandria hosts two intercity rail stations: the aforementioned Misr Station (in the older Manshia district in the western part of the city) and Sidi Gaber Station (in the district of Sidi Gaber in the center of the eastern expansion in which most Alexandrines reside), both of which also serve the commuter rail line. Intercity passenger service is operated by Egyptian National Railways.

4.2.12.5 Tram, Taxis, and Buses

An extensive tramway network was built in 1860 and is the oldest in Africa. The Project concerns one line of this existing tramway network. Taxis in Alexandria sport a yellow-and-black color and are widely available. While Egyptian law requires all cabs to carry meters, not all do so.

Recently, many means of transportation started operation in Alexandria. For example, tuk tuk and micobuses that are being operated by private sector. There is sufficient information about the numbers of microbuses and tuk tuks as some of them might come from surrounding governorates to work inside Alexandria.

In addition to the above mentioned category, private sector also contributed in transportation through two e-booking cars applications (Uber and Karim), where any private car or taxi can work in transportation of community people. There is also no available data about the number of private cars and taxis contributing in these two applications.

Public buses are operated by Alexandria Governorate's Agency for Public Transport Authority (APTA).

The collective taxi system operates along most traffic arteries and carries a significant share of the overall number of trips performed in the city.



Figure 4-45: Crossing areas



Figure 4-46: Streets near the tram



Figure 4-47: Tuk Tuks (Rickshaws)



Figure 4-48: Traffic congestion near tram junctions



Figure 4-49: Raml Tram



Figure 4-50: Tram El Madina (City-line Tram)

4.2.12.6 Ports

Alexandria hosts Egypt's oldest and largest port. The biggest part of Egypt's foreign trade passes through this port whose capacity is estimated to be 75% of the total capacity of Egypt's ports on the Mediterranean Sea. 55% of the total number of ships incoming to Egyptian ports on the Mediterranean Sea pass through the Alexandria Port. For this reason, the Egyptian government applied strategies followed by worldwide ports management systems to enhance and develop the Alexandrian port.

The main ports in Alexandria are:

- The Eastern Harbour
- The Western Harbour (which is the main harbour of the country that handles about 60% of the country's trade)
- El-Dekahlia Harbour

Material imported for the Raml Tram Rehabilitation Project may enter the Governorate from these ports

4.2.13 Public safety and security services

One of the state's priorities is to guarantee security in Alexandria. After the 25th of January 2011 uprising, security authorities faced many terrorist attacks. In 2015, security services retained their power and

managed to eliminate the threat of attacks through active cooperation between the Police force, Army and civilians.

In Alexandria Governorate, there are 17 police stations and 23 courts. The police stations are found in the main districts. However, the Project site should be secured by either the police or independent security firms. The practices and experience gained from the renovation of 200 km railways showed that construction site are robbed easily.

It is worth mentioning that there is no police service inside the Tram way stations. However, they are mainly secured by the police force located within the Aol.

Table 4-24: Police and security services in Alexandria Governorate

Security	Unit	Alexandria
No. of departments / police stations	Police station	17
No. of prisons	Prison	3
No. of courts	Court	23

Alexandria Governorate has 35 firefighting stations. The total number of firefighting vehicles is 41. Such a sufficiency in the firefighting system will be useful to the Project in case of any fire eruption.

Table 4-25 Firefighting facilities in Alexandria Governorate

District	Total number of Firefighting stations and points	Total number of Firefighting vehicles
El Montazah	6	6
East	7	7

Central	5	8
Total governorate	35	41

Statistical Year Book Alexandria Governorate 2015

4.2.14 Environmental facilities

Alexandria Governorate hosts the Nasria dumping site in Egypt which is located in Borg El Arab District. However, there is no protectorate or landfills there. One waste disposal company serves the Central District. Other cleaning services are provided by Local Units or the individual scavengers (*zabaleen*).

Nahdet Misr is the firm responsible for cleaning and transportation of waste to the dump site and landfills. The contractor will be in need to sign a contract with a waste disposal company in order to collect both hazards and domestic wastes. This will relatively not be a problem due to the availability of those service providers.

Table 4-26: Environmental facilities in Alexandria Governorate

District	Environmental Monitoring station	Dumping site	Recycling factory	Waste company	Public parks
El Montazah	4		1		31
East	1				39
Central	6		2	1	8
El Gomrok	4				30
West	0				24
Total Governorate	17	1	3	1	173

Statistical Year Book Alexandria Governorate 2015

The Project sites suffer from a mild solid waste management problem. Based on various site visits, it was notable that the sites are used by some of the community members as dumping sites. Additionally, there was a some primary segregation of wastes.



Figure 4-51: Waste accumulated in the Project areas

4.2.15 Types of dwelling

The Project will pass by different types of dwellings as there is no unified building system in Alexandria. Based on the site visits carried out in 2016 and 2020, the diversity between dwellings is stark. The types of dwelling noticed are as follows:

- 1- Old houses that cannot be classified as historic, but they remain of human value to the surrounding communities.
- 2- Newly constructed buildings and luxurious buildings, particularly, in the areas located within the vicinity of El Wezara station.
- 3- Historic buildings that were constructed more than one hundred years ago.

Based on the discussions carried out with community members in 2020-2021, some of these buildings have no foundations. They are mainly the older ones. Therefore, it will be useful to manage the construction activities carefully beside such buildings, particularly in Raml neighborhood.



Figure 4-52: Newly constructed buildings



Figure 4-53: Old buildings



Figure 4-54: Historic buildings



Figure 4-55: Buildings close to the tram fence



Figure 4-56: Buildings located directly adjacent to the tram line

4.2.16 Civil society

The civil society in Alexandria is relatively active and their contribution to the development of marginalized and vulnerable groups including young people is noteworthy.

There are different types of civil society organizations, the majority of them located in Alexandria City. The study team managed to meet with some of the non-governmental organizations (NGOs). There are two main types of the NGO within the Aol:

- 1- The NGOs of developmental nature i.e. Caritas-Egypt that focus on serving the community, particularly, women, young people and children. They rely on their resources to provide acceptable services to the community people.
- 2- The second type is charity NGOs which provide food, and charitable supplies to community people.

The NGOs also provide information about COVID-19 and orient the community about preventive methods.

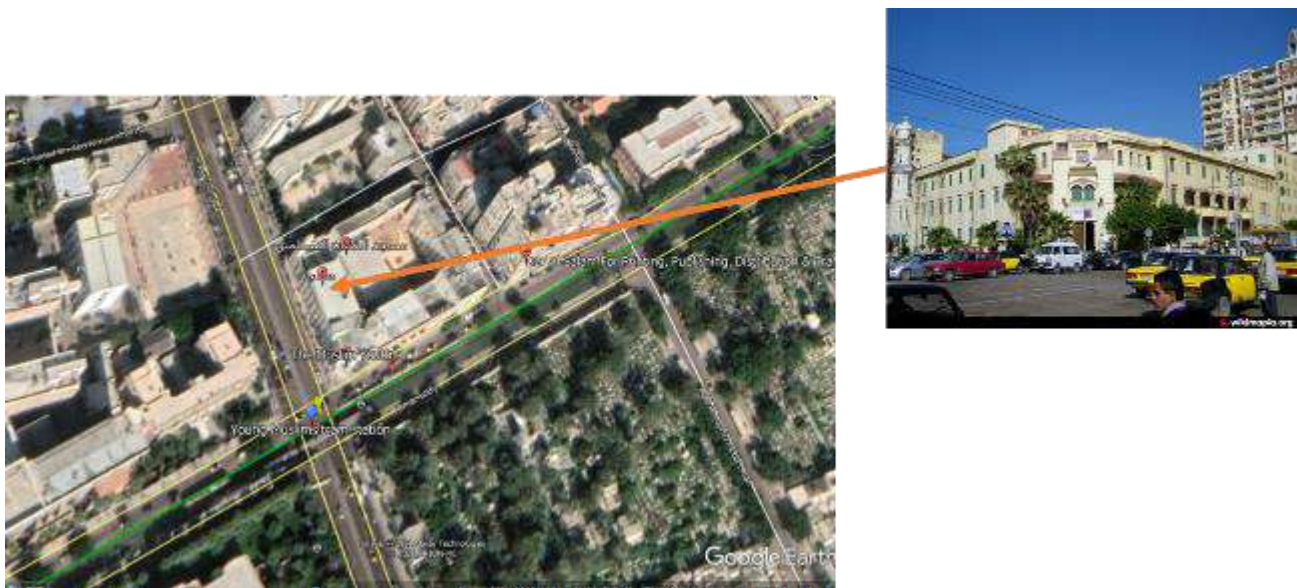


Figure 4-57: Muslim Youth NGO

4.2.17 Land Use

The secondary data collected from the Ministry of Planning and Economic Development revealed that the majority of the Project AoI is considered as residential areas. Moreover, within these areas commercial, educational, and health facilities can be found.

The AoI includes many landmarks that are considered as destinations for the residents of the AoI and the other community members, not only resident of Alexandria, but also for tourists from all over the country. The maps below shed light on the land use and main land marks within the AoI.



Figure 4-58: Land Use in Montazah District

Source: <https://mped.gov.eg/>

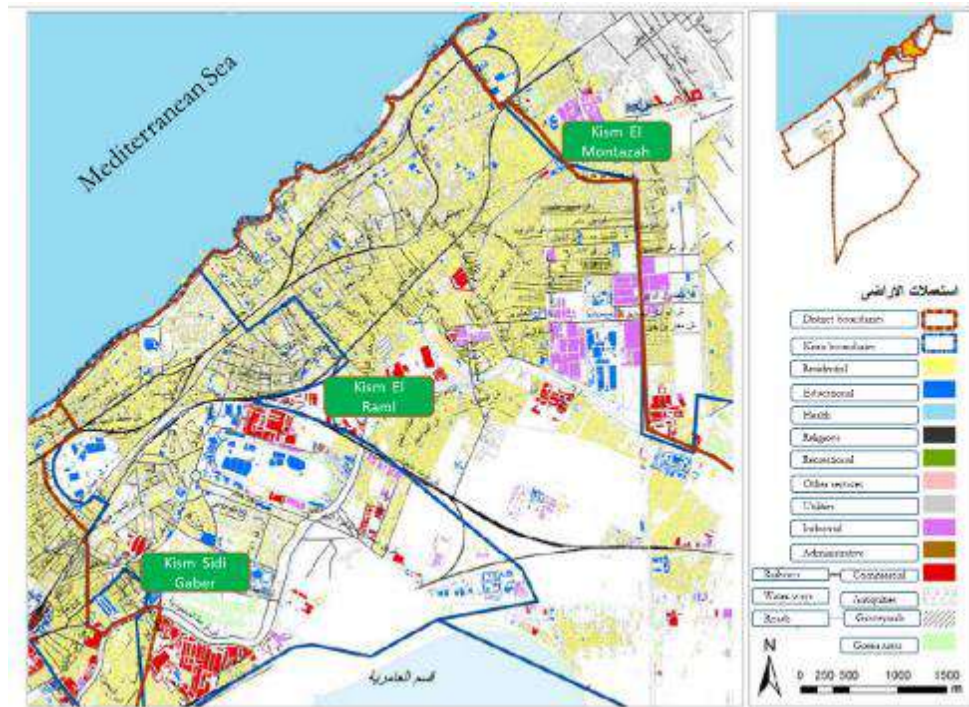


Figure 4-59: Land Use in East (Sharq) District

Source: <https://mped.gov.eg/>

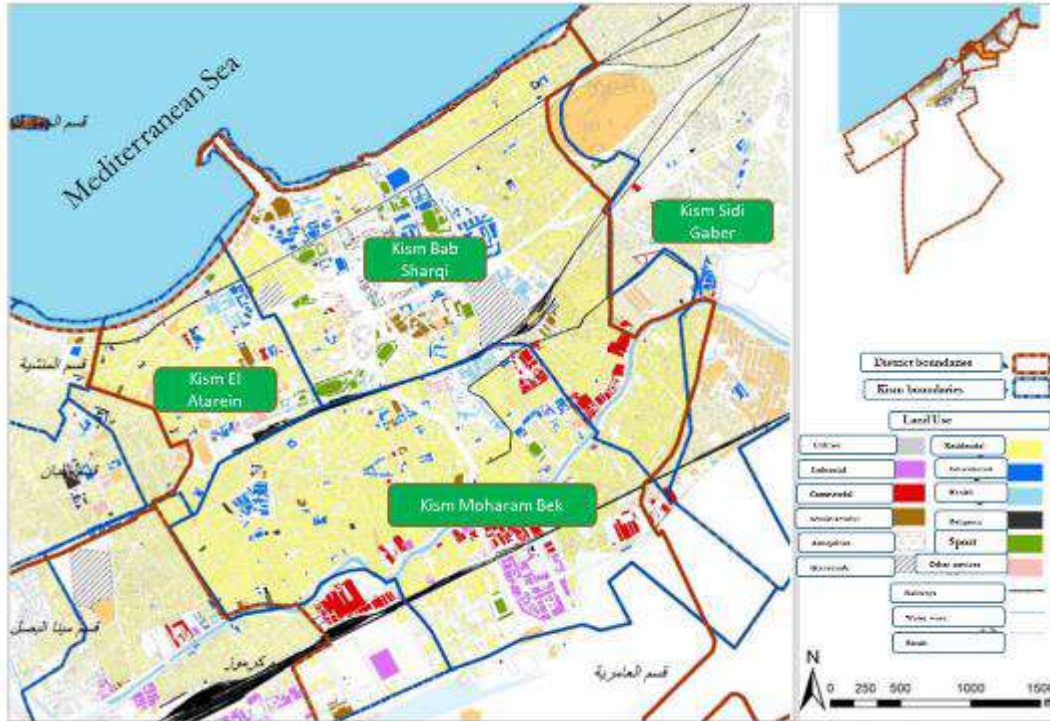


Figure 4-60: Land Use in Central (Wasat)

Source: <https://mped.gov.eg/>



4.2.18 Community Health, Safety and Security

4.2.18.1 Community health, safety and security

Alexandria Governorate is one of the biggest governorates in Egypt. There are about 5.5 million residents about one million of commuters from other governorates. Added to this number, another 2 million tourists. The large number of residents and commuters increases the likelihood of transmitting diseases in the Governorate, particularly, COVID-19.

The demographic and Health Survey-2014 showed that 12.7% of children in lower Egypt governorates, including Alexandria, have suffered from diarrheal attack during the last two weeks preceding the survey. Only 30% of the diseased children were receiving proper care by either increasing fluid and food intake or given oral rehydration therapy. Like all Egyptian children the prevalence of malnutrition in lower Egypt governorates is very high. The percentage of children suffering from stunted growth is close to the national average (28%), while 4.2% of children below five years suffer from wasting. This is indicative to the bad eating habits and weaning practices. The high prevalence of chronic diarrheal diseases due to bad sanitation is also a major factor contributing to the malnutrition problem in Egypt

Egypt is reported to have a growing HIV epidemic especially among injecting drug users and men who have sex with men. There is no published research studying disclosure among those living with HIV in Egypt. A study was carried out on eighty (80) people living with HIV (16 years-old and above) that were selected from those regularly attending Alexandria National AIDS program center for treatment supply. The main outcome of this study is that the HIV affected persons are reluctant to tell about their disease. The majority of them became infected due to drug use and sexual behaviors⁵⁶.

In Egypt, the available information on Sexual Transmitted Infections (STIs) epidemiological status is limited and the situation cannot be quantified, a guide program cannot be planned, and impacts of interventions cannot be assessed. STIs epidemiological data are largely driven from fragmented

⁵⁶ https://ejcm.journals.ekb.eg/article_30910_ba6cd6acb48253713469f4ea1150889e.pdf, Disclosure of HIV Positive Status: A Challenge Facing HIV Control, Alexandria, Egypt 1Mona Hamdy Ashry, 2Maha Abdel Hameed and 3 Fatma Tharwat Mohammed 2018

researches focusing chiefly on HIV-related aspects, with negligence of other STIs. The prevalence and incidence of STIs in Egypt is predominantly unknown, and its impact on public health was largely undetermined despite the apparent social changes, the emergent risk groups, the demographic and migratory trends. Patients with STIs are receiving suboptimal treatment. Based on scattered information about STIs in Alexandria Governorate, it is foreseen that the governorate has significant number of people infected with STIs.

4.2.18.2 Road and tram users' safety

- Crossing of the tramway line

Based on the observations carried out in December 2020, it was noticeable that the crossings of the tramway line are divided into two categories:

- 1- Crossings of the vehicle: along the tramway, there are many intersections that the tramway and vehicles (cars, tuktuk, minibuses, etc.) cross. The crossings tend to be of high traffic congestion, particularly, between 7a.m. to 5 p.m. during the winter season and 8 a.m. to 10 p.m. during the summer time. Residents living near the tramway complain due to the traffic congestion in the crossings.
- 2- Pedestrian crossing: the tramway to move from one destination to another. The elderly suffer due to the absence of paved pathways crossing the tramway and suffer from falls and injuries. During the site visit, the study team witnessed a fall of one old woman in San Stefano station. During the consultation with Sporting Club, the members complained due to the severe congestion of traffic in front of the club gate.



Figure 4-62: Traffic congestions on the tram crossings



Figure 4-63: Traffic congestions in front of Sporting Club

It is important to shed light on another problem that contributes to traffic congestion, which is the lack of parking areas across the city. Therefore, the majority of cars in the Aol park close to the fence of the Tram causing limited space for cars to cross.

- Mobility of people / children outside the tram

With regards to the mobility of people and children, in some areas, i.e. Victoria Station and Sidi Gaber El Mahata, it is relatively difficult for people to walk due to reckless driving and congestions. Many accidents took place and have been reported in newspapers (e.g. an accident in the vicinity of El Shoban El Moslemin Station).



Figure 4-64: Tuk tuk traveling among pedestrians

4.2.19 Cultural heritage

Alexandria has a number of prestigious museums such as the Greco-Roman, the Royal Jewelry, the Fine Arts, the Cavafy and the Mahmoud Said Museums. Some of them have recently undergone renovation or, as in the case of the Alexandria National Museum and the ones housed in the Bibliotheca Alexandrina (Antiquities, Manuscripts, History of Science) have only been opened for a few years.

Starting from the west, the Raml tram begins from the Raml station, which is located near a large number of landmarks. The important City tram line is located a few minutes' walk from the Unknown Soldier Monument.



Figure 4-65: The Unknown Soldier Memorial



Figure 4-66: Roman and Greek Museum

To the west of the direct area of influence, is the memorial of the former Khedive Ismail and the area of Kom al-Dikka archeology, the Roman theater and the University. The home of Sheikh Al-Sayed Darwish, the Alexandrian musician, is also located in Kom a-Dikka neighborhood.

Iconic buildings can be seen at Nabi Daniel Street and Fouad Street (Present-day Freedom Road, and Canopic Street in Greco-Roman Alexandria). These buildings reflect Alexandrian architecture in the Khedive and Royal period. Among these buildings is a famous church, the Church of Marcos.

Unique archeological and cultural heritage assets spanning various eras can be seen as modern landmarks such as the Bibliotheca Alexandrina, which attracts alone one million visitors every year, and constitute the rich urban fabric of Alexandria.



Figure 4-67: Locations where interesting archaeological remains have been found (source: CEAlex)

In addition to the above-mentioned human heritage objects, there are many mosques with shrines located in the vicinity of the Project Aol. Each year a big celebration takes place for each one of the people buried inside these shrines. Their names are Sidi Bishr mosque, Sidi Gaber, and El Moursy Abu el Abbas. During the celebration, thousands of people gather in the mosque area in order to listen to religious lyrics and reciting the Holy Quran. The traffic tends to be highly congested during these celebrations. It is worth mentioning that all celebrations were suspended due to COVID-19 last year.



Figure 4-68 Sidi Bishr Mosque



Figure 4-69 Sidi Gaber Mosque



Figure 4-70: El Moursy Abu El Abbas Mosque



Figure 4-71: El Moursy Abu El Abbas Celebration

4.2.20 Project affected assets

4.2.20.1 Shops Tenants and Labourers

The Alexandria Raml Tram Rehabilitation Project will have a permanent adverse impact on the livelihood of the tenants of shops within the Ram tramway and stations. The total number of affected assets is 129 located in 22 stations of the tram. Bakous station hosts 24 out of the 129 representing about 18.6% of the total affected shops.

Based on the meetings carried out with NAT, it is possible to avoid a certain number of these shops based on the final Project alignment. However, the study team presents the impact as per the available data to date.

The shops will be temporary closed during the construction phase. On the other hand, some of the shops might be demolished in order to rehabilitate the stations. There is no specific number to date about the potential shops that might be demolished.

It is worth mentioning that three of the tenants sub-leased their shops to other people. Such arrangement is not acceptable by APTA, however, were noticed during data collection.

Table 4-27: Project Affected Assets segregated by Tram Station

Tram station	Frequency	Percent (%)
1- Bakous	24	18.6
2- Sidi Gaber Station	13	10.1

Tram station	Frequency	Percent (%)
3- Bolkly	12	9.3
4- Sidi Bishr	12	9.3
5- Roushdy	10	7.8
6- San Stefanou	9	7.0
7- Victoria	9	7.0
8- Ibrahemia	8	6.2
9- Cleopatra Hammamet	6	4.7
10- El Raml station	5	3.9
11- El Qaed Ibraheim	4	3.1
12- Sporting El Kobra	3	2.3
13- Camp Shezar	3	2.3
14- El Seyouf	2	1.6
15- Shots	2	1.6
16- El Gamea	1	.8
17- Shatby	1	.8
18- Tharwat	1	.8
19- Sidi Jaber Sheikh	1	.8
20- Seft	1	.8
21- Laurent	1	.8
22- Mustafa Kamel	1	.8
Total	129	100.0

The collected data revealed that 31 shops are not operating. This number represents about a quarter of the affected shops. It is obvious that each shop might trade in more than one type of good. For instance, some candy shops sell books and accessories for cell phones. Therefore, the study team identified the major trading activities of each shop including; candy, sandwiches, newspapers and books, cell phone and accessories, and souvenirs. A full list of all Project people is in Appendix IV.

Table 4-28: Project Affected Assets segregated by Tram Station

Type of shops	Frequency	Percent (%)
Candy	21	16.3
Sandwiches	14	10.9
Newspaper and books	13	10.1
Cell phone/computer accessories	8	6.2
Souvenirs	8	6.2
Juice and fruits	5	3.9
Stationary	5	3.9
Coffee shop	5	3.9
Hand watch shop	3	2.3
Flower shop	2	1.6
Railway ticket booth	2	1.6
Dairy products	1	.8
Electric appliances	1	.8
Barber shop	1	.8
Pharmacy	1	.8

Type of shops	Frequency	Percent (%)
Laundry shop	1	.8
Small fish and bird shop	1	.8
Cleaning firm	1	.8
Supermarket for APTA workers	1	.8
(We) cell phone service	1	.8
Traffic point	1	.8
Garden	1	.8
Mosque	1	.8
Not leased	31	24.0

In addition to the shop tenants (89), there are sales persons who work inside the shops. The exact number of sales persons is not identified as about 60% of them are daily wage workers. The total number reported by shop owners is about 65 where 5% of them are females. Daily wage workers may be replaced on daily basis. Therefore, the study team carried out meetings with permanent workers.

The total area of affected shops varies. About 43% of the shops have an area of 5 to 9 meters-squared. On the other hand, about 20% of the shops have an area less than 5 meters-squared. 16% of the shops have a larger area which exceeds 30 meters-squared. This is an indication that there will be significant variation based on the shop area. Some of the shops are small kiosks. However, other shops that are larger may require more construction. Figure 4-72 indicates the distribution of PAPs according to the total area of shops.

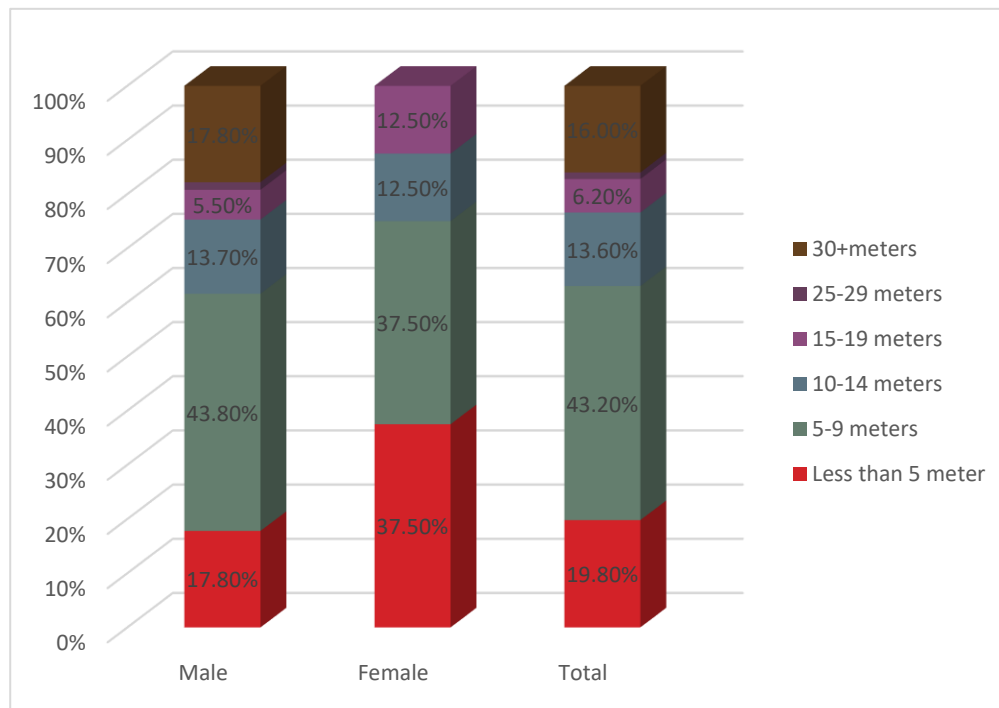


Figure 4-72: Percentage Distribution of PAPs by the Total Area of their Shops

4.2.20.2 A Mosque

One mosque will be expropriated. This mosque is owned by APTA and was leased to an NGO. There is likely that the Ministry of Endowment will claim the right for compensation as all mosques are affiliated to the Ministry of Endowment.

4.2.20.3 APTA

The Alexandria Passenger Transportation Authority (APTA) is the Governmental entity that owns and operates Raml Tram to date. They are also the owners of the shops located in the tram corridor and therefore may lose the revenue generated from leasing the shops.

The total number of shops owned by APTA are 129 shops. 64 of the shops have a valid contract to date. However, 46 contracts have come to their ends without being expelled out of their shops. For more clarifications, APTA was asked about these shops. They replied that the tenants still commit to paying the monthly rent. Therefore, APTA has allowed them to seize the shops without an official contract. Additionally, 29 shops are not leased and they are in the tender process now.

There is also a garden within the tramway. All these assets will be subject to transfer of ownership.

Aside from the abovementioned long list of tram benefits, there is still a remarkable number of drawbacks reported by the community members. 55.9% of the sample reported that the tram is always late. Such perception has a logic as the right of way in the crossings is given to other vehicles not for the tram. 31.4% reported that it is slow as the speed limit does not exceed 20 km per hour. 17.0% reported that the tram is always crowded, especially, during summer time as tourists permanently use it. Lack of cleanliness and maintenance were reported by about 10.0% of the sample. All drawbacks were reported in order to enable the decision makers to identify the drawbacks and propose solutions.

4.2.21 Current Raml Tram conditions

4.2.21.1 Tram wagons

There are two types of trams used now on the Raml Tram. The old one which is the blue tram that is of deteriorated conditions. It has two main classes, namely first and second. The second class's ticket costs 1 EGP (0.06 \$) and the first-class ticket costs 2 EGP (0.12\$). This tram is overcrowded as students, employees, and workers use it. The wagons are in unclean conditions in the second class. However, in the first class, the conditions of wagons are much better. There is a wagon designated for women. Such wagons were recommended in 2016 in order to protect women from harassment. A few number of blue double decker trams are also present and are similar to the blue tram.

In 2019 the Ukrainian Tram was introduced; the conditions of its wagons are new and clean. However, it is much smaller in size rather than the conventional blue trams. Accordingly, it has a smaller capacity for passengers. The cost of its ticket is 5 EGP (0.30 \$).

Below are some photos that present various types of trams:



Figure 4-73: Ukrainian Tram



Figure 4-74: Regular Tram



Figure 4-75: Double decker Tram



Figure 4-76: Double decker Tram

4.2.21.2 Tram stations

The conditions of tram stations vary greatly. Some stations are renovated and tend to be of good conditions in terms of constructed buildings and the cleanliness of the station e.g. Raml station. However, other stations are deteriorated. Some of the stations retained their old constructions (the majority of stations), whereas, few of them were modernized using up to date facilities.



Figure 4-77: Sidi Gaber El Mahata station



Figure 4-78: Deteriorated station



Figure 4-79: Rehabilitated San Stefano station

4.2.21.3 Tram fences

In general, there is a fence along the tram line to somewhat segregate between the tram and surroundings. Near the Raml station, there is a metal fence with appropriate structure. However, close to Cleopatra, a marble fence might be seen. Other stations might have a constructed fence made from concrete. A few number of stations are only segregated by as small wired fence. Finally, some stations have no fence at all.

Regarding the availability of stairs, some stations have escalators, while other have no stairs as they are ground based stations. On the other hand, some of them have long stairs which impair elderly and people with disabilities.



Figure 4-80: Fence close to Raml station



Figure 4-81: Marble fence



Figure 4-82: Concrete constructed fence



Figure 4-83: No fence



Figure 4-84: Fence made of wire



Figure 4-85: Thin wire fence

Waste management inside the Tram stations tends to be acceptable as no waste is accumulated in any stations. However, there is still piles of waste accumulated in the surrounding areas. Nahdet Misr is the firm responsible for cleaning and transporting waste.



Figure 4-86: Waste accumulated outside the fence of the Tram



Figure 4-87. A metal waste bin in the station

4.2.22 Utilization of the current tram

Based on the meetings carried out in 2016 and 2020-2021, it was reported that the Tram is not used by lower economic classes only but by all economic classes. The tram constitutes a significant portion of the Alexandria residents' identity, in which all classes use the Tram. About 43% of the total surveyed sample in 2016 reported that they always use the tram. This

percentage increased to 61.5% in 2020-2021. This can be attributed to the low cost of the tram and being faster than other modes of transportation.

Additionally, prior to 2016, there was no wagon designated for women; however, the enforcement of allocated a specific wagon for women was applied to increase safety and security among females.

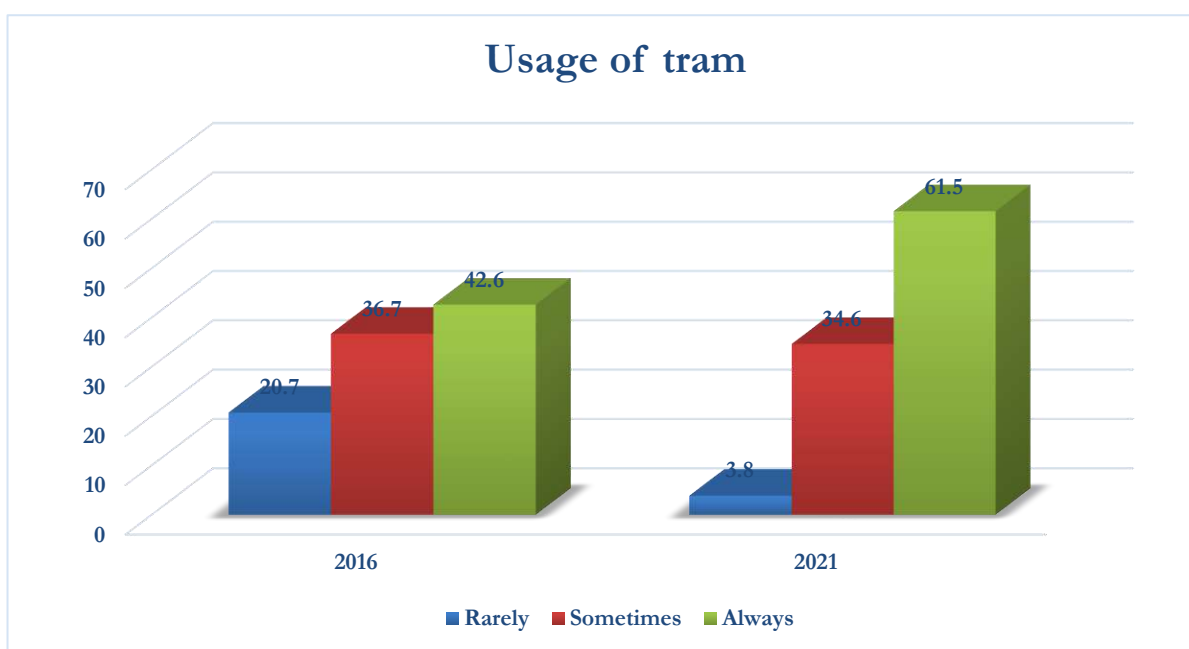


Figure 4-88: Percentage distribution of the samples surveyed by their regularity of usage of tram

It was relatively important to understand when passengers use the tram. In 2016, about a third of passengers reported that they use tram during their leisure time. However, in 2021 this percentage reduced to be about 10.0% only. This can be attributed to the mobility limitation that resulted due to the COVID-19 pandemic and the consequent curfew. The majority of surveyed sample reported that they use the tram to go to their work or schools (47.8% in 2016 and 44.8% in 2021). About 45.0% of the passengers in 2021 reported that they use the tram all the time. The table below presents the reasons why passengers ride the tram.

Table 4-29: Tram use types

Tram use	2016	2021
For leisure	28.5%	10.3%

Tram use	2016	2021
Going to work/school	47.8%	44.8%
Running errands	15.5%	
In case the roads are crowded	1.4%	
Going to near places	.5%	
Private car is not available	.5%	
All the time	5.8%	44.8%

It was useful to understand the benefits of the tram. Being fast is one of the most useful benefits of the Project. About 26.0% of the respondents reported that the tram is of low cost. 10.5% of the sample surveyed in 2021 reported that it is safe. The table below summarizes all the benefit of the tram.

Table 4-30: Benefits of the tram

Benefits of the tram	2016	2021
Fast	17.2%	
Of lower cost	14.3%	26.3%
Available	13.9%	
Straight path	11.3%	
Comfortable	8.4%	10.5%
Safe	4.6%	7.9%
Entertainment	3.4%	
Clean	2.5%	2.6%
Near to my house	1.7%	7.9%
Special wagon for women	1.7%	15.8%

Benefits of the tram	2016	2021
Serves many people	.8%	5.3%
Better than the microbus	.4%	
No benefits	19.7%	15.8%
Other		7.9%

The tram has many disadvantages that might be summarized as follows: 55.9% of the sample surveyed in 2016 reported that the tram is always late. The trip duration might exceed 1.30 hour. 31.4% of the surveyed sample in 2016 reported that sometimes the tram is slow. However, it is still faster than other means of transportation. Additionally, being crowded was reported by 17.0% of the total sample in 2016 and 28.2% of the sample in 2021. The table below presents all disadvantages of the tram. The study team presented each one of the drawbacks in order for the Project designers to be able to solve such problems.

Table 4-31: Disadvantages of the current Tram

Disadvantage	2016	2021
Always late	55.9%	30.8%
Slow	31.4%	
Crowded	17.0%	28.2%
Lack of cleanliness	10.6%	2.6%
Lack of maintenance	9.0%	
It moves while doors are open	6.4%	10.3%
No ventilation/ closed windows	5.9%	
No drawback	4.8%	7.7%
High cost of ticket	3.7%	

Disadvantage	2016	2021
Lack of rehabilitation	2.7%	
Noisy	2.1%	2.6%
Not covering all areas	2.1%	
Quarrels	1.6%	
Mixed in gender	1.6%	
Lack of safety	1.6%	
Robbery	1.6%	
No police/ security	1.6%	
Lack of seats	1.1%	
Lack of trams	1.1%	
Many trams move in the same time		5.1%
Not applying prepaid transportation card (Ishtarak)	1.1%	
Conductors mistreatment to people	1.1%	
The ticket is not unified	1.1%	5.1%
No signals	.5%	
Lack of lights	.5%	
Vendors and beggars	1.1%	
Not adhering to using face mask		7.7%
Don't know	.5%	

'What needs to be done to upgrade the tram?' Was a question raised with the whole sample surveyed in 2016. 30.6% of the sample surveyed reported that the tram should be faster. 25.3% of the sample reported that it should be organized. 15.1% reported that it should be cleaner. The following table presents in detail the recommendation raised by the sample:

Table 4-32: Distribution of the sample by upgrading requirements

Recommended upgrading requirements	Responses (N)	Percent of Cases
Be faster	57	30.6%
Be organized	47	25.3%
Cleaner	28	15.1%
Should be like Cairo Metro	27	14.5%
Air conditioned	26	14.0%
Increase the number of trips	24	12.9%
Increase the number of vehicles	20	10.8%
Shut the doors and windows	11	5.9%
Reach all areas	10	5.4%
Separate path with lights	9	4.8%
Enhance the seats (number- quality)	8	4.3%
More safety measures	8	4.3%
Appropriate price for ticket	7	3.8%
Reduce crowdedness	5	2.7%
Renovate the stations	5	2.7%
Regular maintenance	5	2.7%

Recommended upgrading requirements	Responses (N)	Percent of Cases
Security	4	2.2%
More vehicles for women	3	1.6%
Proper treatment by conductors	3	1.6%
Cancellation of stations	3	1.6%
Ventilation	3	1.6%
Enhance the shape of vehicles	3	1.6%
Reduce noise	2	1.1%
Digital display of stations names	2	1.1%
Other	5	2.7%

The Project is appreciated by the majority of the sample surveyed. However, it is anticipated during construction phase the Project might result in severe traffic diversions and congestions. *“The Project will result in a problem to the community as a severe traffic jam might occur. The crossings also will be closed that will affect the traffic in Alex.”* reported one of the NGOs. During operation the Project will result in many benefits. However, it might affect the income of microbus drivers as the Project will encourage people to use the tram.

4.2.23 Project Affected People Socioeconomic Baseline

The socioeconomic baseline shed light on various categories of the affected people. The table below summarizes the potential PAPs socioeconomic characteristics. (please read the full description in the RPF)

Table 4-33: Categories of Affected People Socioeconomic Baseline

Ref#	Primary Category	Secondary Category	Description
I	Tenants of Shops and Kiosks owned by APTA	I1- Tenants of shop/Kiosk with contract ending before June 2022 I2- Tenants of Shops/ kiosks with valid contract after June 2022 I.3: Tenants of APTA shop/Kiosk with contracts that ended before 2014 but continued to pay low rents I.4 : Sub-tenants	- The tenants of the shops (91) have signed contracts with APTA. (36) of them have contracts that will expire before 2022. - All the tenants whose contracts expired continue paying the lease value until end of 2021. APTA informed them that their contracts came to their end and they are obliged to leave their shops along time ago. However, the tenants still operating their shops and pay the tenancy fees. 90.7% of the affected tenants are males. However, females represent only 9.3% (8 tenants). - The age distribution of the PAPs reveals that 26.3% of the total affected people fall under the age category of 40-49 years. - The main two dominant levels of education are secondary vocational schooling (31.3%) and university education (30.1%). Alexandria governorate pays attention to education. Yet, there is still a significant number of those who have basic education, 9.6%, in addition to illiterate groups 4.1%. - About 90% of the surveyed tenants reported that they are the main family supporter (bread winner), while approximately 10% of the surveyed tenants reported that they partially support their family. - The majority of PAPs preferred not to share information about their income, either due to being reluctant or not being aware of the exact amount as the tenants do not possess accurate financial records. Accordingly, indirect question was asked about the net revenue of similar business. The reluctance to respond to this question was limited to about 18.0%. - The collected data revealed that about 26.4% gain between 1,000-1,999 EGP net per month (accounting for the diversity of shop size and type). However, those who reported earning more than 5000 EGP were about 18.1%. 25.0% of the surveyed tenants pay less than 500 EGP as a lease fee. The second dominant value is between 1,000-1,999 EGP (23.3%) of the surveyed tenants. About 19.0% of the surveyed sample pay more than 5,000 EGP. The average monthly lease for old leased shops is 326.8 EGP per month. However, it is 3,959.94 EGP for the newly

Ref#	Primary Category	Secondary Category	Description
			signed contracts. The total monthly cost of all rented shops reported by APTA was 262,258 EGP (16811.4 US\$). - Tax registers and commercial registers in the process of compensation are very important for assessing compensation, particularly the Tax register which is the basis for valuation of annual revenue. It was reported that 68.0% of the surveyed sample have a Tax register. However, 30.2% have no tax register. Small size shops whose contract period lasts less than one-year prefer not to have such official documents as business success is not guaranteed. - Regarding the commercial registry, 67.1% of the total number of tenants interviewed reported having the commercial registry.
II	Individuals engaged in labour	II.1: Individuals with formal permanent contract with public firms (e.g. United Republic Newspaper Distribution Company, El Akhbar Foundation Dar Al Hilal Foundation) II.2: Individuals with formal permanent contract with the shops' tenants II.3: Individuals with informal contracts II.4 Individuals engaged in casual work (work in restaurants and cafés) II.5 Workers of the tram who are working in the Raml Tram now and are	- The total number of affected workers is about 148 persons. There is no official census of workers to date as the Public Interest Decree has just been issued on the 22nd of December 2021. It is anticipated that the census will take about 2-3 months. Additionally, their turnover rate is relatively high. Accordingly, after the development of the census, workers might not be the same who work at the shops now. Therefore, the social team consulted with 39 workers in October – November 2021. 94.9% of the surveyed workers are males versus only 5.1% female workers. - The consulted workers reported that they all have attended schools. 41.0% of the total surveyed workers have completed their university education. However, only 20.5% have completed their basic education. - About 60% of the consulted workers are recruited on permanent basis. However, the casual workers represent 35.9% of the sample. Aside from being a permanent worker, the majority of workers consulted have no contracts. Accordingly, no health or social insurance coverage of workers were found. The workers who have contracts are those working mainly with firms e.g. Al Akhbar foundation. The daily wage workers have the right to have unpaid days off and holidays. It is obvious that the working conditions are not in line with National Labor law No 12 of 2003. - About 95.0% of the workers reported that they have no social insurance. Aside from being permanent, seasonal, part time or casual workers, they all have no insurance. - With regards to marital status of workers, about 48.0% are divorced. However, the remaining workers have never married. Accordingly, about 50% of the workers still live

Ref#	Primary Category	Secondary Category	Description
		permanently recruited by APTA II.6 Workers of the mosque	with their parents. The majority of consulted workers support their family by spending more than half of their income on their household. The workers of the mosque at Bakous station (4 people) are of vulnerable conditions as three of them are above 50 years old. They have been working in the mosque as cleaning laborers for more than 10 years. They have limited education and their capacity to be trained on other profession is not assured.
III	Informal vendors	Street III 1: Semi-mobile Vendors who have a stable hand cart/ table/ stall III 2: Mobile Vendors who have no fixed workplace and III 3: Mobile Vendors who work inside the tram wagons	- The study team managed to meet with eight of the vendors in October -November 2021. Given their wide mobility, during each site visit new vendors have been noticed and the old ones were not available. Those who have semi-mobile nature were consulted with, as they can be found during the implementation of the RAP. - The majority of street vendors are illiterate or barely completed their basic education. Their ability to adopt to the hard times is outstanding as they work under harsh and rigid circumstances. The discipline police force always prohibit them from standing in the streets as they affect the mobility of people and the traffic flow. - Street vendors age varies from 14 years to more than 60 years. The majority of consulted vendors are at the age category between 30 – 45 years. The average age is 39.75 years. - The total number of family members of street vendors vary between 2 – 6 persons per each household with an average household size 3.88 person per each household. - Street vendors are the sole supporter of their households. Their daily income varies based on many factors e.g. the season (winter- summer), feasts, holidays, rains, etc.. The average daily income is about 151.25 EGP (9.7 US\$). Assuming that they work for 26 days per month, the total monthly income accounts to 3,932.5 EGP. Accordingly, they are above poverty line (which is 3,226 EGP for households consisting of 5 persons⁵⁷). The vendor is supported by one family member who works as well. - They are not covered by any social protection (health insurance or social insurance). "If we don't work for one day we will not find food" reported by one of the vendors.

⁵⁷ Source: Egyptian Income, Expenditure and Consumption Study 2017-2018

Ref#	Primary Category	Secondary Category	Description
			However, about half of the consulted groups pay attention to educating their children. The average number of children at school is about 1.75 child per household. - Street vendors face many problems as they have to deal with the police force who got accustomed to taking their goods and penalizing the vendors. Additionally, other street vendors might compete to attract customers. The competition might escalate to quarrels and fights. Aside from that, the vendors have to deal with the bullies who must get paid to leave them working in specific areas of street. - Two of the consulted vendors reported that they receive financial support from one of the NGOs and the Ministry of Social Solidarity. However, the majority of vendors receive no support. - Regarding health burden, the majority of the surveyed vendors have no health burden. However, two of them each have one family member who has health problems.
IV	Street children	IV 1: Street children with no alternative accommodation arrangement IV 2: Street children who have shelters or families IV 3: Street children engaged in illegal business (e.g. drug dealing)	- Street children left their houses due to having separated parents. After divorce, the children cannot stand the mistreatment on the father in law and the mother in law. Accordingly, they prefer to live in the street. After staying in the streets for long time, they can form a gang that trade in drugs. Some of them might work as sex worker. The latest two categories need to be sent to correction department/ facility for youth. The majority of street children are young men below 15 years old. - They suffer from abuse and mistreatment by people, as well as the leaders of children who might exploit them. Their willingness to be sent back to their families is not assured. Accordingly, the social solidarity directorate gives them the right to choose whether to go back to their families, reside in a shelter or stay in the streets. However, the children below 12 are not given the right to choose as they are too young to choose for themselves. - The consulted NGO (CARITAS) reported that street children have relatively wide mobility ability and they sleep at various areas (not necessarily the tram). They escaped from their houses due to having quarrels with their parents and guardians. Additionally, they do not attend schools. They gain their income through begging, collecting recyclables and trading in trivial goods. They earn their income from all over Alexandria

Ref#	Primary Category	Secondary Category	Description
			City. The social solidarity directorate adopts many initiatives to support street children. Additionally, many NGOs provide them with shelter, food and health services.
V	Homeless people and beggars	V 1: Homeless people with mental disability V 2: Homeless people who have no accommodation V 3: Homeless people who work as beggars and have alternative accommodation	Based on the discussion with social solidarity directorate, the homeless are classified to the following categories: 1. Homeless with mental disability 2. Homeless people who have no accommodation 3. Homeless people who work as beggars and have alternative accommodation • The first and second category are the most vulnerable groups as they have no families or social arrangement that they can rely on. The government provides shelter to this category in form of "Homeless without shelter program". • The majority of this category are old men with no medical coverage. However, the NGOs and community people provide them with food and medicine. Street beggars are of better conditions as they have a house and a family. The daily income from begging is estimated to be 150-250 EGP. They are not working only at the tram; they also work close to the coffee shops and restaurants along Alexandria Cornish. They claim that they are poor people with health burden. However, the consulted shops reported that the beggars earn lots of money, particularly during summer season.
VI	Garden	VI.1 Shop tenant who planted decoration trees (in the garden or in the vicinity of shop)	• The tenant data is included in tenant section above (see Cat I). In Bakous station, a male tenant has leased a shop in 1982 and the contract was ended in 1983. The tenant was passed away and his inheritants still use the rented shop. Instead of using the shop for economic activities, the tenant planted decoration trees and left the shop as an open garden (number of the shop is 15/23). The garden is used solely by the tenant of the shop and surrounded by a concrete fence. The total area of this garden is 41 meter square.
VII	Religious/Community buildings	VII.1 Mosque managed by an NGO and small one built at the station	• Gafaar Ibn Aby Taleb NGO has established a mosque instead of shops owned by APTA. The lease contract was signed on the 1st of July 1984 for 6 months. The contract was automatically extended as the NGO is still paying the renting fees to date.

Ref#	Primary Category	Secondary Category	Description
			- The NGO was established and disclosed in 1980 as per a statement of announcement number 724. The NGO provides a wide scope of services e.g. nursery and day care, orphans support, women financial aids, etc. - Regarding the mosque, it was established for praying purposes on an area of 424.36 meter square. It consists of two floors. The mosque, as being run by the NGO, has a standalone operation system. However, the other workers (3 workers for cleaning) one part time maintenance worker and a person responsible for collecting medicine from people to be given free of charge to poor people. Additionally, an Imam is assigned by the Ministry of Endowment. The mosque is supervised by 4 board members who work on voluntary basis. - The mosque might collect charity donations (Zakat) from the community people to be sent to the NGO. Thereafter, the NGO provides financial support to the community people, particularly, poor women (divorced-widowed). The monthly support given to women varies between 50 EGP- 100 EGP (3.21-6.41 US\$). As a matter of fact, such amount of money is of no value to needy people. However, the NGO provides this donation based on a concept of "it is better than nothing". The donations were relatively reduced during the previous couple of years due to the quarantine and closure of mosques. Women are not allowed till now to pray inside the mosques based on the ministerial decrees.
VIII	VIII. Local community	VIII.1 Users of the mosques VIII.2 Buyers and clients of the shops VIII.3 Users of public transportation (e.g. tram, metro, microbuses, buses, taxis)	No information available

Ref#	Primary Category	Secondary Category	Description
IX	Drivers and co-drivers	VIII.1 Tuk tuk drivers/ co-drivers VIII.2 Microbus drivers / co drivers VIII.3 Bus drivers and conductors	- The Raml tram project is not anticipated to adversely affect the operators and owners of other means of transportation, e.g. tuk tuk, minibuses and buses. The discussion of impacts on the operators of means of transportations reflected the following: - During construction phase: - Public transportation will continue working and additional buses might come to service as to substitute the absence of the Tram. - All means of transportation will benefit from tram closure during construction phase in terms of transporting those who got accustomed to using the tram. Despite, the traffic impacts related to the construction activities, other means of transportation will be able to transport Tram Raml beneficiaries, particularly as the traffic impacts will be managed through proper traffic management plan. The consulted drivers of tuk tuks and minibuses reported that they will not be affected by the project construction if the crossings remained open. In the event that streets need to be closed, they should be informed prior to any street closure. - During operation phase: - Raml Tram has a specific route that does not serve all passengers of Alexandria. Accordingly, the customers of buses, minibuses and tuk tuk are not anticipated to rely on Raml Tram. Additionally, the coverage areas of tuk tuks, minibuses and buses are much wider than the Tram. As a matter of fact, the tuk tuk and minibuses might also benefit from transporting people to the Tram, particularly, if the Tram service is enhanced.

4.2.24 Gender dimension and vulnerability

Vulnerable groups are defined as those who are more exposed to the implications of various impacts and are more likely threatened to get in more impoverishment. Vulnerable populations are defined as those groups typically excluded, disadvantaged or marginalized based on their economic, environmental, social, or cultural characteristics. While various groups could fit within this description (e.g., women, youth, people with disabilities, refugees), a more specific and focused definition to identify the vulnerable groups relevant to the Project is needed.

The level of vulnerability of a certain group and the severity of the impact on these groups has been assessed. Analysis of the vulnerability issues has been considered as a crosscutting issue in each of the impacts. It is believed that certain groups are more vulnerable than others due to higher level of exposure to these impacts or lack of alternatives or survival methods that allow for coping with these impacts.

Women are ranked as one of the main vulnerable groups as they suffer from physical harassment in various means of transportation. Consequently, assigning a wagon for women is always appreciated by women as it put limitation to the physical harassment. One wagon for women is not sufficient to lessen the hardship the women face. Therefore, it is strongly recommended by both men and woman to have more than one wagon.



Figure 4-89: Women entering the tram station



Figure 4-90: Homeless persons and street children



Figure 4-91: Homeless man in Raml Station

His face was hidden in full respect to his right



Figure 4-92: Person with disability begging

His face was hidden in full respect to his right

The second groups defined in the vulnerable category, that is likely to be affected by the Project are the daily wage workers. They have limited working skills. In addition, they do not follow health and safety procedures. Given the fact that they are daily wage workers, they are not covered by any health or social insurance.

The third category befitting from the current tram are homeless people and street children. A majority of them use the tram stations for shelter and use the seats to sleep on. The number of street children varies between summer time and winter, the number increases dramatically during summer time. The tram station is their so called “hotel”.

Some of the shopkeepers who lease kiosks in the tram stations are ranked as the fourth vulnerable groups as their main source of income will be affected during the construction phase.

Old people and disabled persons were ranked as the last category as they will be deprived of benefiting from the Project if accommodations are not made for them. They require facilities that enable them to step into the tram and Electric stairs and elevators. Additionally, as the crossings will be closed, it will be extremely difficult to them to cross the tramway. Tunnels and viaducts are not suitable to old people and disabled persons

In addition to any benefits of the Project, the female sample were much in favour of the Project as it will provide them with safe means of transportation” *In the microbus the drivers are mean to us. They sometimes harass us. The tram will provide us with proper transportation method of low cost. We can go with our children to their schools with no problem”* reported by females consulted in the FGD

4.2.25 Willingness to pay

The sample surveyed in 2016 reported that they are willing to pay for the tram ticket on average 1.25 EGP. 39.4% were willing to pay one EGP. Additionally, 19.7% reported their willingness to pay 2 EGP. 15.4% reported paying 0.5 EGP. The tram café proposed ticket value was about 5 EGP. Some of the sample reported that it is strongly recommended to have a prepaid ticket. It was also recommended not to have a unified ticket. It was recommended that the ticket should be passed on the total number of stations: 10 stations ticket costs 1 EGP, while 11-20 stations ticket should cost 2 EGP.

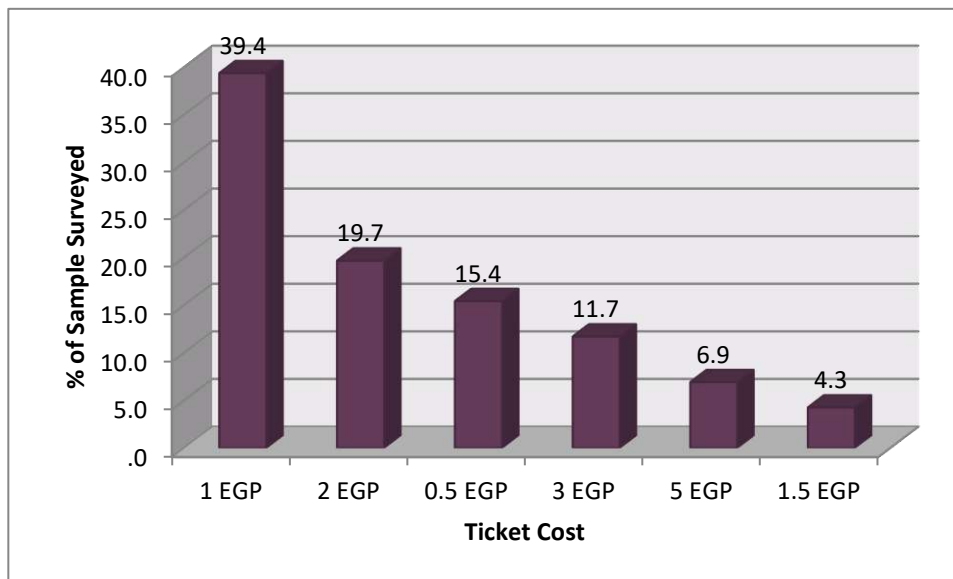


Figure 4-93: Willingness to pay

The collected data in 2021 reported that the minimum they can pay is 2 EGP for one-way ticket. However, the maximum is 5 EGP. This was applicable to all passengers surveyed including those who use the Ukrainian tram.

Table 4-34: Willingness to pay

Tram Type		Willingness to pay
Regular (1 EGP ticket)	Mean	3.07
	Minimum	2
	Maximum	5
Regular (2EGP ticket)	Mean	2.44
	Minimum	2
	Maximum	3
Ukrainian (5 EGP ticket)	Mean	3.75
	Minimum	2
	Maximum	5
Total	Mean	2.96
	Minimum	2
	Maximum	5

5. ANALYSIS OF ALTERNATIVES

This Chapter presents the analysis of alternatives carried out for the Project's activities. Given that the design of the alignment has considered a range of alternatives during the planning phase, further technical alternatives will not be proposed and instead relative environmental and social benefits of selected elements will be assessed.

5.1 No Project Alternative

To continue operating the Raml tramway with the existing system, given its inefficient operational capability, places a major additional burden on NAT and APTA's efforts to improve its services to the public. If the current situation remains as is, the following drawback will continue to worsen:

- Low quality of service and ageing lines
- Increased congestion, especially at junctions increases the traffic time
- Commuters rely more on private operators which are more costly, such as; taxi, minibuses, etc., and less on APTA modes of transportation
- The inadequate capacity of public transports and the erratic headways and travel times lead to a situation where only those who do not have any other alternative use public transportation. This drives away the solvent customers from the public transport, resulting in a situation where tariffs cannot be increased to fund new investments.
- The overall efficiency and image of the public transport network is so badly damaged that its improvement will require major investments in backbone lines and adequate feeding system. This will require significant and continuous financial efforts from the public stakeholders to implement and operate such a network

The "No Action" alternative, in other words, leaving the present situation as is, is not a viable option as it will lead to increased road traffic congestion and ongoing decrease of the overall public transport ridership. As the city of Alexandria continues to grow, this option will further degrade citizens' urban mobility.

However, the upgrading to Raml tram Project will introduce various environmental and social gains including the following:

- Reduced air and noise emissions from the current diesel operated train.
- Shorter traveling time
- Reduced road traffic congestions

Since the benefits of the Project outweigh the impacts (that are considered manageable), the no Project alternative has not been taken to further analysis.

5.2 Assessment of Alternatives

5.2.1 Site alternatives

Raml Tram will be constructed along the same tramway track. If the Project were to be built in a new area, much higher costs will be incurred in providing all the necessary utilities for the new Project and land use impacts will be much more significant.

Hence, the current location is suitable since it will decrease the number of resources used.

5.2.2 Junction Management

The critical junctions are located at; Suez Canal, Sidi Gaber, El Horreya (El Wezara), and El Horreya (Janaklees), and various solutions have been analysed, including:

- At-grade
- Viaduct structure for tramway
- Underpass for cars
- Underground section for the tram (considered for the Janaklees junction)

While selecting a preferred solution for each junction, the following must be taken into consideration:

- The impact on vehicles and tram on traffic overall
- The technical feasibility
- The impact on the surrounding buildings
- Environmental and social aspects

Assuming that an effective traffic signalling system will be enforced and in order to minimize cost and visual pollution imposed by viaduct structures, the tram network is expected to remain at-grade as much as possible. Chapter 3 indicates the grade structure of the entire tram network illustrating that viaduct structures are selected as the optimum option for the critical junctions, in addition to the Bakous to Shouts section. In addition to Various solutions for

junctions' management could be proposed through different types of infrastructure. All traffic issues will have to be coordinated closely with the Traffic Police and the Governorate.

5.2.3 Power

The current tram is operated by overhead power lines, via overhead catenary system and OCS. Although OCS is a source of visual intrusion, it proves to be technically more feasible and environmentally beneficial as the excavation of the overhead transmission line is much less in comparison to underground cables, which would require drilling and more land works. However, environmental hazards such as strong winds must be mitigated during the construction of the OCS system.

5.2.4 Alignment Options

5.2.4.1 Removal of Sidi Gaber Loop

It has been proposed to remove the northern branch of the Sidi Gaber loop, consequently eliminating the Cleopatra El Soghra, Cleopatra El Hamamat, and Sidi Gaber El Sheikh stations. Only the south branch of the Sidi Gaber loop will be kept for commercial operation, especially since it is next to the Sidi Gaber train station.



Figure 5-1 Northern loop and eliminated Stations

This decision is justified by the fact that those branches are only 300 m apart and that the area served only by the north branch stations was quite limited. This also allows increasing the legibility of the line and the transport capacity serving Sidi Gaber train station.

However, the removal of the northern loop will be a concern for passengers going and coming from the northern part of the city, especially the beach front which is an area of high economic and touristic activity.

Therefore, to reduce the additional walking distance imposed, the northern loop shall be preserved.

5.2.4.2 El Reyada El Kobra proposed traffic (Sporting Junction)

The current situation of the traffic at Sporting club junction is congested and messy. This junction is not proposed to be viaduct. The figure below shows the current traffic at the sporting club. The arrows indicated the ways which the vehicles can take.

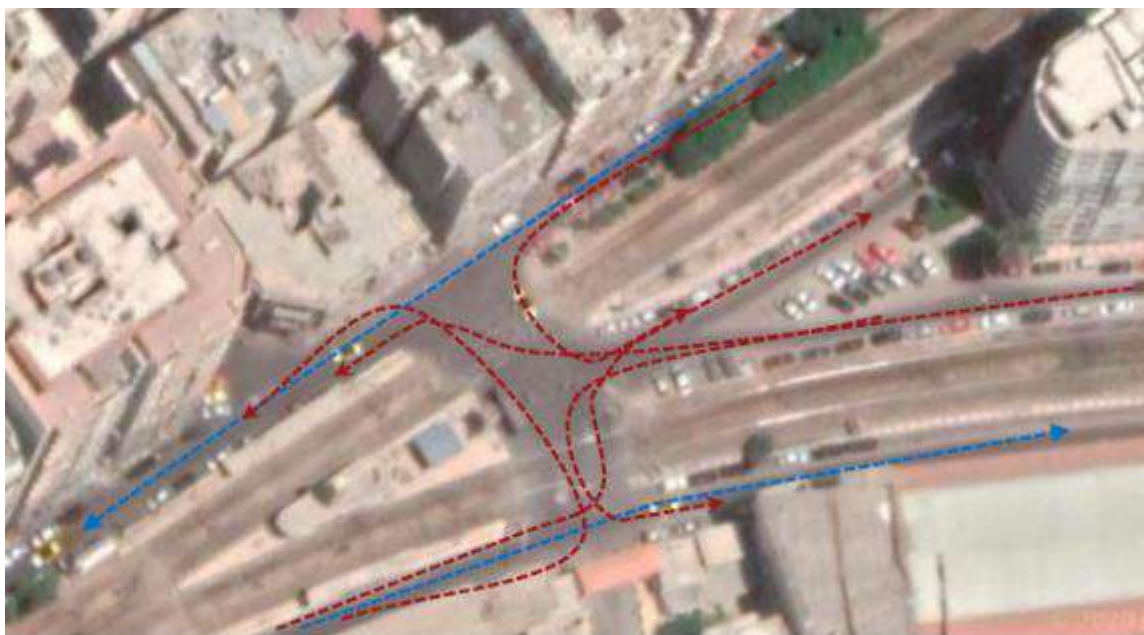


Figure 5-2 Current traffic at Sporting club junction



Figure 5-3 Current traffic at Sporting club junction

The first approach(A) is to let the vehicles travel from west to east only so that no crossing of vehicles will occur. The second approach (B) is to let vehicles to travel from east to west but with more optional ways to take which facilitate the movements of cars. Approach B is better than A.

5.2.5 Depot

The rehabilitation of the existing depot at Mostafa Kamal will require to completely demolish the existing depot and rebuilt it in the same location. It is proposed to build it above the existing depot OR below the existing depot. The comparison of building the depot above or below the existing one is presented in the below table.

Table 5-1 Comparison of building the depot above or below the existing one

Above	Below
Need to protect the depot against external conditions (sun)	No need to protect the depot against external conditions (sun)
Ramps for tramway (safety device to be provided)	Ramps for tramway (safety device to be provided)
No flood risk	Flood risk and need Pumps and remote monitoring system against flooding

Need to reinforce the ceiling to tolerate the weight of the tracks and the rolling stocks ($\approx$ 2,600 T)	Geotechnical survey will carry out
Increase the height of the construction	Deep digging
No Archaeological risk	Archaeological risk

As shown in the above table, building the depot below the existing one has 2 risks (flood and archaeological). Therefore, it is recommended to build the depot above the existing one in order to avoid the risk of flooding.

6. ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS

The environmental and social impact assessment (ESIA) is a process used to identify and evaluate the significance of potential impacts (positive and negative) on various environmental and social receptors as a result of the Project planned activities during pre-construction (includes demolition and clearing the site), construction and operational phases. **This assessment is preliminary and it focuses on identifying the environmental and social issues raised from the proposed alignment as described in chapter 3 and is subject to change as any changes or updates are made to the preferred alignment as applicable. This section is subject to updates once finalizing the geotechnical, hydrogeology and topographical studies which SYSTRA is currently conducting and collecting the data about natural hazards forecast requested from local research institutes.**

Environmental and Social Assessment of the Project has been carried out in three main steps as follows:

- Identification of potential impacts.
- Evaluation and assessment of the impacts in terms of their significance
- Identification/proposition of mitigation measures for minimizing the effects of significant impacts.
- Residual Impacts significance that remains after implementation of mitigation measures. The impact significance will decrease from one level to another depending on the effectiveness of the mitigation measure, e.g. A Major impact may become Moderate or even Minor. A minor impact will become Negligible after application of mitigation measures

The environmental and social impacts assessment is based on qualitative data available.

6.1 Identification of potential impacts

The identification of the potential impacts took into consideration the potential impacts from the proposed Project on the surrounding environment; and the potential impacts from the environmental setting on the Project itself (e.g., natural hazards and risks).

Impact identification was based on some baseline studies developed by the consortium as well as baseline collected data during the site visits about the characteristics of the existing environment and community surrounding the area of the Raml Tram Project. The identified impacts through the Project phases and the applicability are presented in the below table:

Table 6-1 Identified Impacts and Applicability

Receptors/Aspects	Demolition/Pre-Construction	Construction	Operation
Ambient air quality	A	A	A
Noise and Vibration propagation	A	A	A
Water resources (Groundwater)	A	A	A
Water Resources (Surface water)	NA	NA	NA
Soil	A	A	A
Aquatic environment	NA	NA	NA
Existing Services (Water Consumption and Wastewater)	A	A	NA
Impacts from Generated Waste	A	A	A
Terrestrial Ecology	NA	NA	NA
Natural risks	A	A	A
Occupational Health and Safety	A	A	A
Community Health, Safety, and Security	A	A	A

Receptors/Aspects	Demolition/Pre-Construction	Construction	Operation
Job creation and local content	A	A	A
Cultural heritage	A	A	A
Visual-landscape changes	A	A	A
Utilities(infrastructure)	A	A	NA
Temporary Labour influx	A	A	NA
Risk of Gender-Based Violence (GBV)	A	A	A
Risk of child labour	A	A	NA
Impacts on homeless (children and old people)	A	A	NA
Traffic and transportation	A	A	A
Economic displacement impacts	A	A	A
Working conditions	A	A	A

A: Applicable

NA: Not Applicable

6.2 Evaluation and Impact Assessment Methodology

The identified potential environmental impacts on the physical environment are evaluated against baseline conditions at the proposed location, and the reasonable performance standards which are assumed to be set during the Project pre-construction (includes demolition and clearing the site from the resulting debris), construction and operational phases of the Project.

Each potential impact resulting directly or indirectly from the Project is categorized based on the **Basic Impact Index** and the **Receptor Sensitivity**. Based on these two parameters, the **Impact Significance** is evaluated. The significance of each potential impact will depend on

the Project activities and the potential impacts on the environmental receptor. **Basic Impact Index:** The criteria for defining the basic impact index includes assessing the following parameters, see Figure 6-1.

- Magnitude: describes the quantity of the resource (or receptor) potentially affected by the activity.
- Spatial extent: the geographical area over which the impact is experienced.
- Duration: the length of time over which the impact will be experienced. An impact may be present only while an activity is active, or it could persist long after the activity has ceased, in which case the duration may be regarded as the time the receptor needs to recover from the effect.

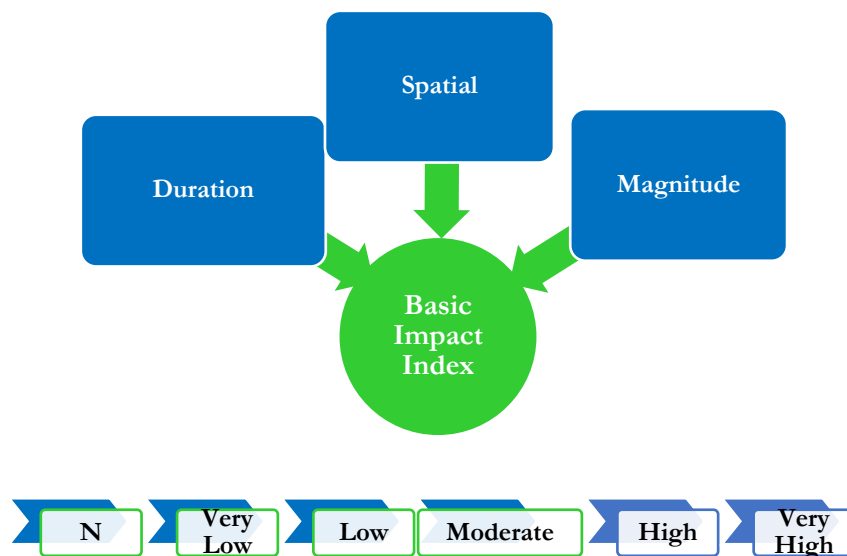


Figure 6-1: Basic Impact Index Assessment

Each potential impact should be evaluated by applying descriptors to each of the above criteria, based on qualitative or, to the extent possible, quantitative evaluation, as follows.

The magnitude of impact is allocated one of the following categories:

- Very Low (1): A very small proportion of the receptor is affected.
- Low (2): A small proportion of the receptor is affected.
- Moderate (3): A moderate proportion of the receptor is affected.
- High (4): A large proportion of the receptor is affected.

- Very High (5): A very large proportion or all of the receptor is affected.

The spatial extent of impact is allocated one of the following categories:

- N (0): No effect.
- Very Low (1): Local scale impact in the immediate area of the activity.
- Low (2): Local impact in the study area.
- Moderate (3): Regional scale impact.
- High (4): National scale impact.
- Very High (5): Global scale impact.

Duration of impact is described by one of the following categories:

- N (0): No effect.
- Very Low (1): Less than one month.
- Low (2): One to three months.
- Moderate (3): Three to six months.
- High (4): Greater than six months.
- Very High (5): Irreversible.

The relative importance of each criterion, as illustrated in Table 6-2, will be evaluated on a scale from zero to five, and expressed as follows: Nil (N), Very Low (VL), Low (L), Moderate (M), High (H), and Very High (VH). The highest figure is assigned to an impact when there is uncertainty about the criteria, so as to reduce the chance of underestimating an impact; thereby minimizing risk. The Basic Impact Index is obtained by the weighted average of these three values, to obtain a whole number between 0 and 5. The magnitude's weight is twice that for spatial extent and duration. (Crowfoot, J. E. and Wondolleck, J. M. (1990) *Environmental dispute settlement Washington, DC; Island Press p 19.*)

Table 6-2: Basic Impact Index

Basic Impact Index	N	VL	L	M	H	VH
Magnitude	0	1	2	3	4	5
Spatial Extent	0	1	2	3	4	5
Duration	0	1	2	3	4	5

Receptor Categorization: is based on the relationship between the respective Project activities and the present baseline environment (the receptor). It is assessed based on the vulnerability of the receptor, including the surrounding population and environment. To illustrate, if the effect of an impact on a receptor is more readily absorbed and easily mitigated, it is less sensitive. On the other hand, as an impact is more challenging to mitigate and cannot be absorbed by the population and/or environment it becomes more sensitive and requires an extensive management plan.

The sensitivity of the receptor is assessed as:

- **Low:** High capacity to absorb/mitigate impact
- **Medium:** Limited capacity to absorb/mitigate impact
- **High:** No capacity to absorb/mitigate impact

Impact Significance: The final impact significance is the result of the combination of the Basic Impact Index and the Receptor Categorization, as shown in Table 6-3: where impact significance may result in one of the following classes: Insignificant (IN), Minor (MI), Moderate (MO) or Major (MA).

Table 6-3: Impact Significance

Receptor Categorization	Basic Impact Index					
	Negative /Adverse					
	N	VL	L	M	H	VH
L	IN	IN	IN	MI	MO	MA
M	IN	IN	MI	MO	MA	MA
H	IN	MI	MO	MA	MA	MA

Environmental impacts are caused by environmental aspects and can have a direct impact on the environment, contribute indirectly to a larger environmental change, or be cumulative. Those impacts rated as Minor, Moderate or Major are considered to require mitigation measures in order to eliminate the impact or, where this is not possible, to reduce their

significance ranking to Minor or Insignificant.

6.3 Potential Impacts during Pre-Construction and Construction Phases

6.3.1 Potential Positive Impacts during Demolition, Pre-Construction and Construction Phases

6.3.1.1 Provision of Job and supplies Opportunities

Provision of job and supplies' opportunities tends to be by nature a positive socioeconomic impact. However, if it is poorly managed, there will be a high probability of raising disputes with the community people residing in Alexandria City. Accordingly, a Recruitment and Employment plan must be developed.

With regards to the direct benefit of the project on the community members is the likelihood of the Project to provide a number of job opportunities. The Raml Tram Rehabilitation Project is expected to provide a large number of job opportunities during the decommissioning, preconstruction and construction phases. According to preliminary estimates, about 500 direct job opportunities will be allocated for skilled, semi-skilled and unskilled labourers. In addition, job opportunities will be provided to sub-contractor's workers. A majority of the job opportunities that will become available during the pre-construction and construction phases will be Project based or temporary.

During the decommissioning phase, scrap traders will be provided with opportunities during the demolition of the old tram.

It is highly preferable that the temporary labour force is supplied from the local community of Alexandria Governorate and selected based on the skills required by the contractor and subcontractors. To maximize employment opportunities in the local communities, training will be required for unskilled workers. There are many vocational training centres that might benefit from capacity building of their graduates to be fit for jobs. Additionally, on-the-job training will be provided for the local workforce expected to pursue temporary construction roles;

The following procurement opportunities expected for local businesses include:

- Provision of supplies related to construction, and auxiliary facilities;
- Provision of transportation, goods and storage services to the Project;

- Provision of food supplies, catering, and cleaning services;
- Provision of building and auxiliary materials and accessories, engineering, installation and maintenance;
- Provision of, electronic appliances, communications and measurement equipment;
- Security personnel;
- Accommodation, laundry and clothing;
- Provision of electricity and water supplies;
- Retail services; and
- Provision of fuel.

Implementation of the Project and providing job opportunities will accordingly increase the State's tax revenue. A coordinated approach to small business development will be required to ensure equitable distribution of Project benefits. Migration into the Project area of influence will result in local businesses benefiting from the growing demand for resources, goods and services. Small and medium-sized enterprises are likely to benefit from the migration of people into the area, particularly businesses engaged in the accommodation sector, food services, and other domestic supply sectors. Accordingly, other businesses in surrounding regions are likely to benefit as well.

Given the availability of all required supplies in the area of influence, it is not anticipated to find any "followers" invading or encroaching the area of influence.

The management of job opportunities should fairly implement a recruitment process with no discrimination and transparently to avoid potential negative impacts associated with job creation. A Recruitment and Employment plan must be developed. including the following basic contents:

- Forecasting Hiring and Procurement Needs
- Points of Contact and Data Management
- Optimizing Employment/Procurement
- Communication and information sharing

6.3.1.2 Urban Planning, Architecture and Landscaping

The façade-to-façade design principle is to be implemented during the construction of the LRT network in which the area adjacent to the network is to be enhanced. The existing land adjacent to the tram network is a city environment with both commercial and residential use. By assessing the characteristics of each street within a 200 m-wide strip around the LRT alignment the different urban environments present are studied. The existing accessibility requirements in the vicinity of the proposed route will determine the requirements to deduce whether the current configuration can be maintained, modified to or, in the worst-case scenario, removed.

Pedestrian movement in the vicinity of the existing network and passenger movement between existing transport modes has been investigated and integrated into the proposed development to enhance the pedestrian safety experience. The existing track alignment is relatively straight with only two areas with radii of less than 100m, those being 65 and 80m in the vicinity of the existing depot. The slope profile is relatively flat with a maximum of 2%. The profile has been created flat by the construction of embankments and cuttings for the existing tram network. Therefore, the existing alignment and profile is compatible with modern tram rolling stock and also integrating the rehabilitated tram network into the urban environment.

6.3.2 Potential Negative Impacts during Demolition / Pre-Construction and Construction Phases

Pre-construction/Demolition and construction phases will include several activities such as the following:

- Excavation, land clearing, concrete foundations,
- Transportation of construction material and equipment,
- Burial of cables and pipes,
- Utilities diversions,
- Demolishing of the depot, stations and old track, etc.
- Generated waste (solid and liquid wastes from construction activities, domestic wastes from worker's caravans)

The above activities will require the employment of the following equipment:

- Excavator

- Diesel generators
- Trucks and loaders
- Bulldozers
- Air compressor with jackhammer
- Portable generators
- Directional boring machine
- Trench drilling machine
- Control box welding machine
- Manual excavation tools like shovel

Consequently, the above-mentioned activities and equipment are expected to cause environmental and social negative impacts. The following section will present the negative impacts on each receptors/aspect during the Pre-construction/Demolition and construction phases with recommended mitigation measures.

6.3.2.1 Ambient Air Quality

The following air pollutants are foreseeable for most of the above-mentioned activities and equipment:

- Dust and particulate matters could arise from accumulated piles of stored waste at or near the site prior to removal for disposal of stockpiles, ground asphalt, rubble, gravel, and sand that may result from rehabilitation activities.
- The predominant subsurface soil in the Project area according to geotechnical survey conducted in 2015, is silty sandy soil layer in the Project area which could generally generate large amounts of dust during the excavation work.
- Exhaust from heavy machinery such as excavators, loaders, trucks, vehicles, boring machine, and materials typically associated with the combustion of fossil fuels includes nitrogen oxides (NOx), sulphur dioxide (SO₂), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOCs).
- Evaporation and emissions from contaminated soil may result in local air pollution.

Since the sensitive receptors (residential houses, shops, business building, schools, medical centres) are located along the tramway, impact of emissions into the air will be significant.

Ambient air baseline measurements result for NO_x, SO₂, CO, PM₁₀ and TSP showed that air quality in the Project area is complying with national guidelines allowable limits except for PM₁₀ elevated regarding international but compliant with National guidelines.

Impacts of air emissions on ambient air quality is considered short term, local, direct effect on neighboring sensitive receptors such as schools and hospital and reversible.

Impact significance: **Major**

Mitigation Measures

Gaseous Emissions mitigation measures

- All machinery and vehicles need to be regularly maintained and in good working conditions such that fugitive/gaseous emissions are avoided/minimized.
- During the tender phase and construction works, the Contractor must review documentations about construction machinery exhaust emissions.
- Turning off engines when they are not used or working on minimum rpm.
- All construction equipment will be frequently inspected to ensure that the generated fugitive emissions are within acceptable limits.
- The contractor is obliged to use at all times the latest technology to reduce exhaust emissions.

Dust

- A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected where practical and feasible as dust barrier.
- Minimize movement of construction traffic around site and maintain appropriate speed limits. Vehicle speed will be minimized to control dust generation (for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr);
- Erect effective barriers such as fencing around dusty activities or at the site boundary
- Truck hauling fill or other dusty materials will be covered, and loads will be kept 0.3 meters below the upper edge of the truck boundaries, covered with a sheet or tarpaulin to control dust;

- Diesel, oil, paint, thinners and other chemicals used on the site will be kept in minimum quantities and stored in sealed containers in order to limit vapors;
- Dry cement powder will be kept in sealed bags or containers to prevent dust generation.
- Street restoration should be done as soon as possible – this should be considered in the design and planning
- Use water as dust suppressant where applicable, including periodic spraying of water during transfer of excavated materials
- Keep stockpiles for the shortest possible time and cover it or fence if possible
- Regular street sweeping/cleaning of access roads to site
- Preparation of Dust Management Plan for each specific site as part of the Contractor ESMP, including site map indicating location of physical barriers such as fencing, location of stockpiles and storage areas, traffic routes and stabilized site access/exit points, presentation of dust control measures to be used on site, and dust management checklist.

Residual Impacts

Moderate, if mitigation measures are implemented

6.3.2.2 Noise and Vibration propagation

The pre-construction and construction activities and equipment may generate high noise and vibration levels, and adversely affect sensitive receptors. The significance of the impact depends on the noise level produced and the distance of sensitive receptor from the source of impact. Since the sensitive receptors (residential houses, shops, business building, schools, medical centres) are located along the tramway, impact of noise will be significant.

Main identified groups expected to be affected by construction noise and vibration are:

- Construction Workers who are the exposed to the highest levels of noise due to their direct presence within the noise sources proximity.
- Close communities along the tramway.

The impact will vary greatly with the type of construction activities taking place and the powering mechanism of the equipment, i.e. Diesel-powered equipment and pneumatic impact tools generally generate noise that is higher than electric and hydraulic tools.

Various mechanical/electrical equipment will be required during the construction activities, including bulldozers, trucks, pavers, and other equipment. The expected levels of noise produced by different operating machinery are shown in the following table.

Table 6-4: Noise Emission Levels dB (A) of Typical Construction Equipment⁵⁸

Equipment	Expected Noise Emission Levels (15 m from Source)	Equipment	Expected Noise Emission Levels (15 m from Source)
Air Compressor	81	Impact Wrench	85
Backhoe	80	Jack Hammer	88
Ballast Equalizer	82	Loader	85
Ballast Tamper	83	Pile Driver (Impact)	101
Compactor	82	---	(Sonic)
Concrete Mixer	85	Pneumatic Tool	85
Crane, Mobile	83	Pump	76
Dozer	85	Rail Saw	90
Generator	81	Roller	74
Grader	85	Truck	88

According to baseline measurements, the ambient noise levels in the Project area is exceeding the national and international limits as along the main corridors due to traffic. Therefore, given the high background levels it is considered possible to carry out the construction without significantly increasing ambient noise. Noise impacts are short term, local, direct, reversible.

Impact significance: **Major**

Vibrations can cause soil settlement and hence can affect buildings that are in poor structural conditions. Vibrations can be expected all through the pre-construction phase as a result of heavy equipment. While a building's response to ground borne vibration is affected by

⁵⁸ USA, Environmental Protection Agency, 1995

numerous factors including the type of foundation, underlying ground conditions, the building construction and the state of the building, the damage threshold criteria should not exceed 15mm/sec in the low frequency range and this rises to 20mm/sec at frequencies of 15Hz and to 50mm/sec at 40Hz and above to avoid cosmetic damage to buildings.

Impacts from vibrations are short term, local and direct but may result in irreversible damage.

Impact significance: **Major**

Mitigation Measures

- A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected where practical and feasible as noise barrier.
- Localized noise barriers will be erected as necessary around items such as generators or high duty compressors.
- Machineries used during construction such, as excavator, generators, boring machine, etc are certified and maintained
- Regular maintenance for all equipment and vehicles used in the construction activities to maintain the levels of noise and vibration within the allowable levels.
- Turning off engines when they are not used.
- The contractor is obliged to use at all times the latest technology in terms of noise reduction
- Construction and demolition activities should be restricted to daytime periods. All works should take place during the day/evening, and only by exception at night. If works need to take place at night, the contractor shall ask written permission from promoter and shall inform residents at least 2 weeks in advance, with a clear start and end date.
- If possible, use exhaust mufflers in order to reduce noise impacts on the surrounding areas. Mufflers are part of equipment exhaust system and aid in dampening equipment emissions and engine noise.
- The awarded contractor will be responsible for assessing the exact vibration risk on the close residential and cultural buildings and assessment of all possible damage that could result during construction.
- The awarded contractor will be required to prepare a Construction Management Plan (CMP) in agreement with Alexandria Governorate and NAT, in line with lenders' E&S

Standards (i.e. EIB ESS, World Bank ESS). The plan will comprise a Noise and Vibration Management Plan detailing the measures the contractor will adhere to in order to comply with the noise and vibration criteria set out in this ESIA. The plan will precisely state and assess the specific construction activities and provide appropriate specific mitigation measures to reduce significant noise and vibration impacts associated with the works along the viaduct.

Residual Impacts

Moderate, if mitigation measures are implemented

6.3.2.3 Water resources (Surface and Groundwater)

The potential impacts during pre-construction and construction phases on the water resources can induce physical characteristics changes (temperature, odor, color and taste) or chemical characteristics changes (composition of water) to the water. The potential impacts can occur due to the following:

- Spill or discharge of hazards chemicals including oil and fuel from construction equipment
- Reaching groundwater piezometric level during construction of depot and viaducts
- Contamination of the groundwater due to uncontrolled discharge of wastewater and oil
- Poor Waste management

Surface water

Surface water is any body of water including both the saltwater and the freshwater in rivers, streams, and lakes surrounded the Project area. The nearest freshwater to Tramway is Lake Maryout located 3.65 kilometers far and the shoreline of Mediterranean Sea is ranged from 120 meters to 1.2 kilometer far depends on the route curves.

Impact significance: **insignificant.**

Groundwater

As a general case, groundwater vulnerability is high in areas where the aquifer is shallow or in areas where it is confined by a thin layer of porous or permeable sediments. The significance of the impact is generally however determined by whether or not the groundwater is used for potable and irrigation purposes, i.e. sensitivity of the receptor.

Depth of the groundwater in the Project area is ranged from 1.2 meter to 8.5 meters which could be impacted during the construction of the depot and viaducts as the construction will involve the removal of the geologic formation which could be saturated. Due to the removal of the saturated aquifer material, the concrete structure would reduce the saturated thickness of the aquifer. As a result, the water levels and the flow direction of the ambient groundwater would change in the vicinity of the underground structures. Therefore, it is expected to have a lowering in the levels of the groundwater piezometric surface in the vicinity of the viaducts and depot infrastructure, which might affect the existing and near- by foundations, and the depth to groundwater piezometric surface will increase.

Since groundwater is not used for any human or irrigation purposes, deterioration in groundwater quality described above is not expected to lead to secondary impacts associated with any necessity find replacements to water sources or limited access to existing sources (such as increased cost, with impacts on livelihoods).

Abstraction

Since excavations are expected to intercept the water table during utility diversion, it may be necessary to install a dewatering system to lower the water table and accordingly facilitate the construction work environment. Dewatering systems usually encompass a group of well-points (perforated tubes) that are inserted into the ground around the work area and connected to a vacuum pump. The pumps draw the water out of the ground and thereby lead to:

- A temporary lowering of water table. This effect is restricted to a localized area and the water table returns to its normal level once the pumps are switched off (Reversible).
- Possible ground settlement leading to dewatering-induced building settlement, depending on the drawdown. Impact of pre-construction and construction on soil is local, short term, direct, temporary but could be irreversible.

Impact on groundwater is therefore considered a Minor.

This change is short term, direct, temporary and reversible as the hydrologic system will tend to retain equilibrium, and will be of local extent.

Impact significance: **Minor**

The improper waste handling, effluent discharge or some oil/hazardous effluents spills can negatively impact the groundwater quality. This impact is short term, direct, temporary and irreversible.

Impact significance: **Moderate**

Mitigation measures

- Prior to construction activities, the Contractor must review the detailed hydrogeological study (to be developed by Systra before demolition and construction) and review the numerical models that represent groundwater presence, the expected scenarios of rising groundwater water levels, and the extent of the negative impacts on facilities and residential buildings.
- Implement the measures related to the protection of soil and waste mentioned in section 6.3.2.4 and 6.3.2.5 respectively.
- Ensure proper maintenance equipment used for construction equipment are in good condition to minimize spills.
- Systematic control over implementation of measures considered by the waste management plan;
- Sewage holding tanks should be evacuated as frequently as-required, to prevent over flow. A schedule for regular sewage tanker evacuation of sewage holding tanks should be established;
- Conduct regular maintenance and inspection on the sewage holding tanks, plumbing and associated wastewater facilities to ensure good sanitary conditions; and
- All tanks, drums, pipes and sewage holding tanks should be decommissioned and removed upon demobilization from the site.
- Instruction of personnel on environmental and safety issues.

- Install a dewatering system if it is likely that a water table may be intercepted to ensure dry and stable soils for site preparation and foundation excavation and protect equipment and materials on-site from getting damaged by water.

Residual Impact

Moderate, if mitigation measures are implemented.

6.3.2.4 Soil

Soils may be affected by the rehabilitation activities. The following components of the proposed Project may impact the soil:

- The excavated soil could come into contact with unmanaged waste effluents or oil spills or other types of hazardous waste which could be generated on site.
- Utility diversion and removal of previous tracks in the pre-construction phase;
- Dewatering
- Stations excavation and piling works for viaduct during the construction phase.
- Run-off water which may have been subject to contamination. This will lead to other indirect impacts when the soil is handled, stored, dumped or reused.
- Vibration during the different construction activities. However, the construction of slurry walls and other structural mitigation measures which will be implemented during the construction phase to protect the surrounding structures will minimize the impact on the soil due to vibration.
- The soil could be subjected to increased levels of compaction due to the load of heavy construction equipment and machinery. The increased pressure due to heavy construction equipment is inevitable, but the entire Project areas fall within purely urban areas, even depot which affect the impact on soil to be local, temporary and partially reversible. The impact is likely to happen, temporary, local and reversible.

Impact significance: **Moderate**

Mitigation Measures

- A waste management plan will be developed in accordance with the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects as part of the construction environmental management plan.
- Assign area for proper storage of generated waste
- Ensure that all construction and maintenance waste are stored, managed, transported, reused or disposed of in an appropriate manner by licensed contractors in accordance with relevant waste legislation
- Transport and dispose of the construction waste in designated licensed sanitary landfill (ex. El Nasriya hazardous landfill).
- In addition, in order to understand the vibration impacts on the soil, a monitoring programme should be put in place to monitor vibrations during construction.
- Ensure that spoil and any potential contamination is dealt with in an appropriate manner in accordance with all relevant legislation.
- The geotechnical surveys must be developed by ACE pre-construction and provided to NAT and the Contractor to provide more information about the local conditions of the soil characteristics along the route of the tram way and location of depot and to identify the geological features of the sub areas to predict the impact that may occur. The Contractor will review the survey to identify features specific to each construction site and identify any potential impacts and how to prevent/reduce them.

Residual Impact

Minor, if mitigation measures are implemented

6.3.2.5 Impacts from Generated Waste

Non-Hazardous Solid Wastes

The following non-hazardous solid wastes are expected from the rehabilitation activities:

- Old track sleepers, fastenings, turnouts and old un-contaminated ballast.
- Demolishing waste from depot (concrete, debris, bricks, sand and gravel)
- Steel, metals, wood, empty cement sacks, wires, cables

- Domestic waste that will be generated from construction workers.

Non-hazardous wastes generated on-site during the construction phase normally have a high recycling potential. If not recycled, it should be directed to the nearest solid waste disposal site.

Solid Hazardous Wastes

The expected hazardous wastes include contaminated ballast, sleepers, spent welding materials, and other hazardous wastes resulting from the maintenance of the equipment and vehicles, i.e. spent oils, spent lube, waste oil filters, batteries, etc. Among the hazardous wastes also are the wasted or faulted materials. Hazardous waste can result in major, irreversible effects if not properly handled, stored and safely disposed of, as follows:

- Mishandling and uncontrolled disposal of hazardous liquids and solid waste would have major health impacts for on-site workers, inhabitants in the Project's area of influence, people who get in contact with waste during transportation and disposal, as well as flora and fauna exposed to such hazardous waste.
- Air quality could also be affected, since uncontrolled dumping of hazardous materials would result in most cases to open burning and potential release of toxic emissions.
- Uncontrolled disposal of hazardous liquid waste can cause soil contamination through direct contact or leaching.
- There is potential of the presence of asbestos at the Mostafa Kamel Depot and also in the old stations across the line.
- There is the potential of creosote-treated wooden railway sleepers which may pose hazardous waste during the decommissioning phase.

The hazardous waste has to be collected via licensed contractor and transferred to a landfill site (El Nasiriya landfill)

Liquid Waste

Domestic Wastewater will generate from that will be generated from the on-site caravans. The wastewater will be collected in temporary holding tanks and regularly evacuated by the local authority to the centralized wastewater treatment plant.

Dewatered Water Due to the shallow groundwater table in the Project area, dewatering is expected to be required in the pre-construction and construction phases. The resulting dewatered water may be polluted and spread contamination if improperly managed. The exact quality of the groundwater in the Project area has not recently been investigated however, will be confirmed when the updated geotechnical survey is conducted. The impacts of dewatered water can be described as being direct, short-term, local and reversible.

Impacts from waste generated is short term, local and direct but may result in irreversible damage.

Impact significance: **Moderate**

Mitigation Measures

Prior to pre- construction and construction phase, the contractor will prepare, submit to NAT's approval, and implement a waste management plan. The plan will, as a priority include the removal of all identified polluted wastes described in the ESIA. NAT in cooperation with the responsible District authority has to guarantee the safe disposal and treatment of the generated waste. The recommended mitigation measures are as follow:

- All types of hazardous waste will only be transported by licensed hazardous waste service providers and disposed of in licensed landfill. Both, the service providers and disposal sites have to be identified at the beginning of construction work
- Ensure that the controlled dumpsites or landfill could accommodate the amount of wastes generate from the rehabilitation activities
- Arrange all administrative procedures for licensing the transport and disposal of waste;

Waste Minimization

- Dampening waste or excavated soils before front-end loading into trucks.
- Materials will be purchased in the exact quantity required for the contract, to minimize unused left-overs.
- As much as practically feasible, pre-welded track sections should be used to minimize on-site generation of hazardous waste as well as control gaseous emissions in the doubling area.

Waste Re-use and Recycling

- Maximize re-use of excavation waste as backfill and recycle viable materials;
- Implement a segregation system based on compatibility of different waste streams during each phase of Project implementation.
- Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at designated sites.
- Spent oils shall be collected, stored in sealed containers and recycled using a licensed company which also has to be identified by the contractor.
- Prevent open burning of non-hazardous waste to avoid release of toxic pollutants into the ambient air through closing the informal openings that are used by people living in the surrounding to throw out their garbage.

Waste Storage and Handling

- Assigning certain areas, for stockpiling soil and construction waste, these areas should be secured and protected to avoid any possible theft;
- Waste will be stored in containers or skip bins. It will not be stockpiled directly on unsealed ground;
- Collection tanks receiving wastewater from offices/camps, needs to be made of waterproof material to avoid leaks and have to be evacuated frequently to operating WWTPs.
- Sewage/septage generated during construction should be removed by tankers and disposed of in a WWTP or city sewer. Contractors should allocate certain areas within the construction site for the offices/camps of the construction staff. An agreement will be made with Alexandria Sewerage Company at the beginning of the preconstruction phase. According to the estimated amount of wastewater, an arrangement will be made with several wastewater treatment plants in Alexandria, depending on its individual capacity.
- Recycling waste will be stored in separated areas or containers, and not mixed with other waste types;
- Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable.

- All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as “hazardous”;
- Waste removal from the site will be scheduled, to always have a waste skip available for use on site, and to ensure that waste skips/containers are not overfilled;
- Any temporary waste storage areas (not contained in bins or containers) will be covered and/or surrounded by a screen mesh fence to prevent it being wind-blown across the site;
- Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage.
- Temporary storage is to take place in areas with impervious flooring.

In case of spillage:

- Avoid inhalation and sources of ignition.
- Cover and mix with sufficient amounts of sand using PPE.
- Collect contaminated sand in clearly marked secure containers/bags.

Waste Disposal

- The disposal of all the solid wastes generated during the pre-construction and construction phase is the responsibility of the contractor and should be disposed of through licensed contractor and transferred to controlled dumpsites or landfills. Hazardous waste will be sent to Nasiriya Landfill. Other solid wastes will be sent to Burj al Arab or El Hammam landfills
- For the disposal of the old track components (rails, fastenings, etc.), it will undergo quality control check and it could be either reused in other railway lines or to be sold as scrap in auction. While the disposal of the wooden sleepers, if contaminated, it should be disposed of sent to El Nasiriya landfill.
- The old ballast will be sieved and screened and if contaminated, it will be disposed of in a hazardous landfill and if not, it will be reused onsite.

- Sewage holding tanks should be evacuated as frequently as-required, to prevent over flow. A schedule for regular sewage tanker evacuation of sewage holding tanks should be established;
- Conduct regular maintenance and inspection on the sewage holding tanks, plumbing and associated wastewater facilities to ensure good sanitary conditions; and
- All tanks, drums, pipes and sewage holding tanks should be decommissioned and removed upon demobilization from the site.
- Asbestos survey should be developed to indicate the existence of Asbestos. If it exists, an asbestos management plan should be developed that clearly identifies the locations where the Asbestos Containing Material (ACM) is present, its condition, procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. Repair or removal and disposal of existing ACM in buildings should be performed only by specially trained personnel.

Residual Impact

Minor, if mitigation measures are implemented.

6.3.2.6 Aquatic environment

The nearest waterbodies to Tramway are Lake Maryout located 3.65 kilometres far and the shoreline of Mediterranean Sea is ranged from 120 meters to 1.2 kilometre far depends on the route curves.

Impact significance: **Insignificant**

Mitigation measures

- Trees removed during the construction phase should be transplanted, to avoid creating waste and to compensate for the removal of vegetation, near the new stations where the existing trees would be damaged due to the construction works.

No mitigation measures are required

6.3.2.7 Existing Services (Water Consumption and Wastewater)

The water used for construction activities will be sourced from trucks. The contractor will be responsible for providing drinking water to the labour force.

The Alexandria Electricity Distribution Company serves the governorate of Alexandria thus electricity is already available at the Project location. Generators will only be used in the case of power cuts.

Diesel fuel will be mainly used for diesel generators that supplies electricity to construction activities including welding. In addition, diesel will be the fuel used by the trucks and excavators. The impact on the existing services is short term, localized and reversible.

Impact significance: **Insignificant**

Mitigation measures

No mitigation measures are required

6.3.2.8 Terrestrial Ecology

Pre-construction and construction activities will directly impact the flora and fauna of the study area and roadside trees might have to be cut down for the construction of some the at-grade and viaduct sections. However, according to baseline chapter section 4, the Project is located in a populated residential area and there are no recorded threatened animals or plants presence in the Project area. Only native grass growing on the tracks, ornamental trees within the track boundaries. The only existing fauna are birds, feral cats and dogs. In addition, even biodiversity species recorded within the wider Project area are common and unthreatened according to the IUCN Red List of threatened species (2020-3). In addition, the area is not located within any Important Bird Area (IBA) or main bird migration routes.

Impact significance: **Moderate**

Mitigation Measures

- Restrict areas for dredging and soil moving activities or vegetation clearing as much as possible (minimal clearance);
- Where possible, re-vegetate cleared areas by planting trees, shrubs and native grass;

- Systra will designate the area under the viaduct stations to either parking spaces or recreational green areas. The green areas may be fenced with sufficient waste bins and Nahdet Misr should be contracted with to ensure that the area is well-maintained and remains free of uncontrolled solid-waste dumping.
- Trees can be replanted at the cancelled North Sidi Gaber Loop in addition to shrubs and grass.

Residual Impact

Minor, if mitigation measures are implemented.

6.3.2.9 Impacts on Structural Integrity of buildings

The structural integrity of neighbouring buildings in direct vicinity of the ROW of the corridor in the viaduct areas and stations can be put to risk during the construction phase due to:

- Soil settlement as a result of dewatering activities
- Vibration as a result of Piling and use of heavy machinery

The impacts of Structural Integrity of buildings can be described as being direct, short-term, local, temporary and irreversible.

Impact significance: **Moderate**

Mitigation Measures

The structural integrity of all structures along the 5 viaducts sections as mentioned earlier, will be assessed by the construction contractor prior to start of construction activities.

The contractor will commit to carry out a survey before the start of construction along the whole Tram route to assess the potential risk of damage, and indicate the dilapidation of buildings/structures. The Contractor will carry out all necessary models to evaluate potential degree of damage in sensitive receptors.

Residual Impacts

Minor, if mitigation measures are implemented.

6.3.2.10 Natural Risks

Seismic Hazards (Earthquakes) – Earthquake risk profiles indicate that Al-Montazah, Al-Amriya, and Sharq districts lie in high-seismic areas and are threatened by more than 90% of estimated earthquake risks. Moreover, moderate seismic risk level areas are Gharb and Wasat districts.

Raml Tram is passing by Wasat district from Raml station to Sporting el Soghra station and Sharq & Montazah districts from Sporting el Kobra station to Victoria.

This has the potential to negatively impact the time schedule of the construction activities and may cause injuries or fatalities to the workers. This impact is long term, localized and reversible.

Impact significance: **Moderate**

Mitigation measure

Seismic Risk factors should be considered in the construction of the Raml Tram stations, viaducts and depot. For example, Integration of a safety engineering criteria in the design structures of the stations and electrical overhead contact system to prevent failures due to earthquakes. It is necessary that responsible employees and workers are trained to deal with such events and that such risks are incorporated in the contractor's emergency response plan.

Residual Impact

Minor, if mitigation measures are implemented.

Flood – A major concern for the city of Alexandria is its exposure to occasional flooding. Although the city normally does not experience annual rainfall greater than 200mm, harmful flooding threatens the city due to climate change and the rising wave levels. In 2015, Alexandria suffered from a disastrous flood impairing the entire city. In particular, the overhead power supply line of the tram line in Moharram Bey snapped and collapsed into the flooding roads killing seven people due to electric shock. This impact is short term, temporary, reversible.

Impact significant: **Moderate**

Mitigation measure

- Contractor will plan activities taking seasonal conditions into consideration, keeping all activities that could be affected outside the rainy season.
- During Construction, the Contractor will build a site drainage system equipped to protect the site against potential flooding. This system will be built such that flood waters are rerouted away from the project area to the city's sewer network.
- Avoid low lying areas on the work site which can become flooded
- Ensure that material storage places are adequately drained
- Adequate plastic sheeting to cover recently completed work and unfinished work that can be damaged by rain.
- Have adequate water pumps for dewatering on site and have a system in place to dispose of storm water and discharge the water to the sewer drainage network.

Residual Impact

Minor, if mitigation measures are implemented.

6.3.2.11 Occupational Health and Safety

During the course of the construction phase there will be many occupational health and safety risks to workers on site. They are generic risks associated with construction sites and include:

- **Excavation and Trenching:** Drilling and trenching are the most dangerous work on the construction site.
- **Fall:** falling from heights or off ladders is considered a major hazard on construction sites, and usually happen as a result of slipping or foot stumbling or using a loose ladder.
- **Exposure to high level of Noise and Vibration:** Workers may be exposed to high levels of noise that could consequently affect their hearing.
- **Construction equipment and vehicles/trucks:** Injuries may result due to the malfunctioning of equipment (brakes are not working properly, unexpected starting of the equipment, nonobvious movement during operations, etc.)
- **Weather conditions:** heavy rains, wind, high temperatures and fog.
- **Unstable surfaces:** It can be difficult to assess the level of loading a surface can withstand; particularly under certain environmental conditions.

- **Falling objects:** falling objects; equipment, debris, and dislodged unstable materials affected by certain environmental and weather conditions all pose significant risks.
- **Manual handling:** the improper handling of equipment can result in a variety of injuries or fatalities.
- **Musculoskeletal injuries:** body positioning, force of movement, etc.
- **Transmission of diseases:** Workers might be affected by transmission of diseases, especially COVID-19, Hepatitis A, B & C and HIV Aids. Additionally, other communicable diseases might affect workers.
- The presence of workers in the Project sites might evoke **gender-based violence activities**. Section 6.3.2.17 provides detailed information about GBV impacts.
The impact of OHS is of long term, localized and of reversible nature.

Impact significance: **Major**

Mitigation Measures

- The Contractor and NAT must prepare and adopt a Construction Environmental and Social Management Plan (CESMP) during the construction phase that consists of subplans including:
 - An Occupational Health and Safety Management Plan (OHSP);
 - An Environmental, Health, and Safety (EHS) plan;
 - A health surveillance program;
 - A working conditions management plan; and
 - An emergency response plan.
- NAT and the contractor will assign a competent officer to implement the CESMP. Given that a large number of unskilled workers will be employed, a simple occupational health and safety management system must be implemented.
- The developed CESMP should be prepared in full compliance with World Bank Group Environmental, Health & Safety Guidelines and EIB E&S Standards.
- The contractual agreement with the contractor should include rigid commitments to apply the CESMP that should be prepared in full compliance with the WB EHS requirements.
- The minimum elements to be included in the EHS plan are as follows:
 - General Facility Design and Operation
 - Communication and Training

- Physical Hazards
 - Chemical Hazards
 - Biological Hazards
 - Radiological Hazards
 - Personal Protective Equipment (PPE)
 - Special Hazard Environments
 - Monitoring
- There must be specific contractual terms that prohibit discrimination activities and emphasize on provision of fair treatment to all workers. As well as provision of decent working conditions in terms of provision of facility, proper lighting, PPE, etc.
 - Noise and vibration exposure periods should be minimized for workers so as not to exceed the safe limits as described by Labour Law No.12/2003, in addition to the occupational health and safety standards.

Residual Impact

Moderate, if mitigation measures are implemented.

6.3.2.12 Community Health, Safety, and Security

Community Health, Safety and Security impacts arising from the construction are likely to be as follows:

- Increased risk of traffic hazards and incidents associated with the use of the highway for freight and local roads for communities and workers;
- Site trespass and injury;
- Pedestrian road safety during construction and operation;
- Increased transmission of Sexually Transmitted Diseases (STDs);
- Spread of communicable diseases other than COVID 19, TBC, Hepatitis C;
- Increased incidence of communicable disease e.g. COVID-19 and Hepatitis;
- Risks associated with the presence of security personnel on site (within the Project area) and at offsite operations and activities (within the community); and
- Personal safety and well-being impacts associated with worker influx.

Throughout demolishing, preconstruction and construction phases, there will be many potential health and safety risks to the communities in the area. These include risks associated with increased traffic and the influx of workers.

It is recognized that there will be population influx to the Project AOI from different sources including domestic and international sources whether seeking formal or informal; direct or supply chain related jobs. The interactions between the various stakeholders will determine the level of impact.

The following areas have been identified as sources for potential impact on community health, safety and security during constructions:

- Noise and vibration
- Hazardous materials and waste
- Dust and air emissions
- Air quality
- Traffic accidents
- Security personnel
- Uncontrolled dumping, and potential burning of construction waste,
- Accidental falls in temporary excavated trenches, and accidental contact with equipment, etc.
- The presence of workers in the Project sites might evoke gender-based violence activities.
- Site trespass and injury
- Pedestrian road safety during construction and operation.
- Increased transmission of Sexually Transmitted Diseases (STDs);
- Spread of communicable diseases other than COVID e.g. Tuberculosis

The community impacts of dust and air quality were discussed and presented in the environmental impacts' assessment section.

For the community impacts of noise, the situation is similar. These impacts will be felt by communities around all construction sites; especially in the community along Ibrahimiya station, where there is limited space around the alignment. The duration of CHS impact is of long term, localized and of reversible nature.

Impact significance: **Major**

Mitigation measures

The mitigation measures identified under the sections on noise, air quality, waste management and traffic deviation, will all minimize potential negative impacts on communities. The contractor must abide to developing the following plans:

- Community Health, Safety and Security Plan
- Traffic and Transportation Management Plan
- Emergency preparedness and Response Plan
- Stakeholder Engagement Plan
- Severance Management Plan

Additionally, the following mitigation measures addressing community health, safety and security are suggested during the construction phase:

- A health surveillance programme can be established to monitor the health conditions of communities within the area of influence with a significant exposure risk.
- Data collected from the health surveillance programme is used to make appropriate management decisions through the application of evidence-based effective control measures.
- Medical examinations for all workers are to be conducted by a registered medical officer (physician). Any necessary additional medical testing shall be conducted by medical specialists.
- The frequency of the health surveillance will be determined by NAT. For any specific concerns identified by its workforce, NAT can request workers to undertake any additional medical examinations. These are authorized by the Project Manager in coordination with the site managers as relevant. These events are triggered based on consideration of the exposure monitoring results, the level of health risk, the speed of development of any potential illness e.g. COVID- 19 and the requirements of regulatory and other obligations. Notwithstanding this and unless otherwise specified, required health surveillance will be conducted at least once annually

- It is crucial to establish and sustain an open and transparent dialogue between NAT/contractor and the affected communities in full compliance with the WB and EIB standards related to stakeholder engagement activities. This can be achieved by availing a grievance mechanism
- To invite, listen and respond properly to community concerns
- Timely and appropriate dissemination of information on the planned design, alignment and construction in affected communities along the alignment
- Timely and appropriate information on traffic deviation plans to affected communities
- Timely and appropriate information on the grievance mechanism established in NAT for this Project to affected communities
- Satisfactory resolutions for each legitimate complaint and grievance
- Timely and appropriate information disclosure, including stakeholder information on the NAT website
- Implementation of Community Traffic Safety Awareness Campaign during the construction period, particularly in those communities where construction vehicles will be most active.
- Prevention and control of construction traffic related injuries and fatalities by adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents, as required by the IFC General EHS Guidelines: Community health, safety and security .

Residual Impacts

Moderate, if mitigation measures are implemented.

6.3.2.13 Cultural Heritage Sites

As it was presented in the baseline section of this report, Alexandria Governorate is one of the richest governorates in terms of cultural heritage. Potential key impacts on archaeological and cultural heritage are mainly expected during the construction phase, and can be identified as follows:

- Potential impact on historic and/or sites of architectural significance
- Risk of damaging chance-find buried artefacts

- The visitors of the shrines and mosques might be disturbed by limiting their access to these valuable structures
- During the preconstruction phases of the Tram, extensive excavation works will be carried out by the Ministry of Antiquities in full compliance with Antiquities Law No 117 of year 1983 and its amendments by Law 3 of 2010 and Law 61 of year 2010 and Law 91 of year 2018. This could lead to chance finds of antiquities or buried artefacts. The possibilities for such chance-finds may be high in some locations all over the Project alignment.

The duration of culture heritage impact is of long term, localized and reversible nature.

Impact significance: **Major**

Mitigation of Impacts

- According to above mentioned antiquities laws, approvals must be obtained during the pre-construction phase of the Project from both Antiquates Directorate. These ensure that the Project will not negatively affect objects of cultural heritage value.
- An SCA inspector shall then supervise any excavation on the site following any evident artefacts or antiquities traces. Referring to cultural heritage standards of the WB ESS8, EIB standard 5 and the Egyptian Law 17/1983, NAT should include the chance find procedures in its contracts for the various lots within the Tram Project.
- A Cultural heritage Management Plan following standard mitigation for projects that are aligned with international standards. The Cultural heritage Management Plan should be in place before construction begins.
- A chance find procedure should be drawn-up prior to construction that addresses and protects cultural heritage finds made during the construction phase. (please see Appendix V).
- The chance find procedure should outline the chain of events put in motion if previously unknown heritage resources, particularly archaeological resources, are encountered during the Project's construction phase. The procedure should include provisions for:
 - Record keeping
 - Expert verification procedures
 - Chain of custody instructions for movable finds
 - Clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds.

- outline the roles and responsibilities and the response times required on the part of both Project staff and any relevant heritage authority, as well as any agreed consultation procedures.

Residual Impacts

Minor, if mitigation measures are implemented.

6.3.2.14 Visual-landscape

During the construction phase of the alleviated sections of the Project, visual impacts cannot be avoided but can only be minimized by fencing of the construction sites. Given the nature and structures located in the vicinity of the Tramway, which can be described as beautiful structures with some of them dated more than 100 years ago, the visual impacts tend to be of importance. This impact of visual landscape is of long term, localized and reversible.

Impact significance: **Moderate**.

Mitigation measures

- Prior to pre-construction and construction, the contractor will have to provide fences, steel sheet piles hoarding and covers around the construction site in order to enable a safe construction site and to minimize noise, dust, storage of wastes and airborne particulates. The fences and steel piles appearance will create a significant visual intrusion for the population during the construction period, which could last for 2 years.
- The immediate removal of all construction material and the restoration of the construction area is part of the contractor's duty laid down in the Environmental and Social Management Plan.
- Illegal dumping around the construction will be prohibited

Residual Impacts

Minor, if mitigation measures are implemented.

6.3.2.15 Utilities(infrastructure)

Public services and infrastructure related impacts represent one of the important impacts that may be affected by the Project. Impacts on public utility diversions (electricity cables, water and wastewater networks, telecommunication networks) during the pre-construction and construction of the Tram might disturb the surrounding communities in case of any interruption of electricity current, water supply, and telecommunications network. Therefore, it is essential to implement utility diversions throughout the pre-construction phase and can be complemented during construction phase.

Additionally, the construction and utility diversion activities might put limitation to the accessibility to some community services might be disturbed. This includes emergency services and public safety, education, health care, and shopping which can all be indirectly influenced by the Project activities.

The impacts pertaining to public services and utilities tend to be of negative nature. However, utilities companies might benefit from the provision of services to the Project. They will also benefit from the opportunity to divert the utilities. NAT will be responsible for paying the cost of any utility diversions to the implemented company.

This impact on utilities is of short term, localized and reversible nature.

Impact significance: **Moderate**.

Mitigation Measures

- Project should develop a Public Utilities Enhancement and Management Plan in which infrastructure relocated by the Project (electric and telecommunication lines, water supply etc.) will be developed in a way that allows neighboring communities to benefit from them after construction is over.
- The Plan will also consider the management of disruption to utilities through definition of clear procedures in close coordination with local utility companies.
- In case of any damage the community people can bring forward a complaint on the Project GM channels. Additionally, sufficient information about damaging any utilities should be shared with the community people as reported in the Stakeholder Engagement Plan.

- Utility diversion plans are important instruments for NAT to inform the population in time about possible disturbances which will emerge from construction and are important plans for the utility companies for implementation of utility diversions in the pre-construction phase but also during the construction phase. In addition, the diversion plans inform the contractor about the type and dimension of the connecting utility to the construction sites. .
- A grievance mechanism will be implemented to manage any complaints related to utilities impacts.

Residual Impacts

Minor, if mitigation measures are implemented.

6.3.2.16 Temporary Labour influx

The implementing contractors will rely on using a number of workers and technicians during the pre-construction and construction phases. It is estimated by the NAT that about 500 workers will be employed on the Project site during construction phase. They might be recruited from the area of influence or from other provinces.

The number of workers varies according to the phase of the Project, construction plan, and type of activities at each station. For the time being and given the absence of the contractor, there is no sufficient information about the total number of workers per each station. In addition to the number of recruited people for the construction work, other workers may follow to provide services to the construction workforce. The temporary workers may affect the Project areas in terms of:

- **Risk of social conflict:** There are no potential effects of temporary labour influx on the culture of the society in the Project areas as Alexandria Governorate is an attracting place that accommodate multi-cultural people with no distinction; on the other hand, the contractor recruiting labourers from areas adjacent to the Project site.
- **Increased risk of illicit behaviour and crime:** workers may have a criminal history and attitude. The workers might jeopardize the safety of the surrounding communities, particularly, shops.

- **Increased risk of communicable diseases and burden on local health services:**
There is a probability to face spread of communicable diseases, with special attention to COVID-19.
- **Accommodation of workers impacts:** there will be an increased demand on renting dwellings in the Project area of influence.
- **Local inflation of prices:** The prices of some food and services may rise due to the increase of demand.
- **Gender based violence:** This is one of the impacts originated due to labour influx. More details will be presented in the preceding sub-section
- **Overconsumption of community resources:** The temporary labour influx may affect the public facilities available in the Project areas, such as places of worship, cafes and restaurants.

The contractor will recruit most of the unskilled labourers from the area of influence. Therefore, the influx related impacts will be minimized

The impacts related to labour influx will be of short-term, localized, temporary and reversible.

Impact significance: **Moderate**.

Mitigation measures

- Develop a comprehensive code of conduct that all workers should be trained on
- Develop and implement a recruitment and employment plan
- Reduce labour influx by relying on the local workforce
- Assess and manage labour influx risk based on appropriate instruments e.g. the ESIA
- Prepare a Labour Influx Management Plan (if the number of workers is more than 400)
- Incorporate social and environment mitigation measures into the civil works contract
- Apply the grievance mechanism and the stakeholder engagement plan.

Residual impacts

Minor, if mitigation measures are implemented.

6.3.2.17 Gender-Based Violence (GBV)

The presence of workers in the Project sites might evoke gender-based violence activities. They are as follows:

- Harassment of women and young girls by workers, such as honour crimes in extreme cases.
- Disturbance of women and young girls' mobility around the Project area.
- Discrimination against women in terms of employment.

Impacts resulting from GBV on community members is of short-term, localized, temporary and reversible nature.

Impact significance: **Moderate**.

Mitigation measures

- Prepare a Code of Conduct and insert it in the induction training to be provided to all workers
- Engagement of community people:
 - Transparent engagement and participation of the local community
 - Provide accurate and timely information
 - Enhance local knowledge of potential risks and problems
 - There should be an accessible and Project-level grievance mechanism

Residual impacts

Minor, if mitigation measures are implemented.

6.3.2.18 Child Labour

Child labour is defined as " work that places heavy burdens on the child, and that threatens his safety, health and well-being, work that benefits from the child's weakness and his inability to defend his rights, work that exploits children as a cheap labour alternative to adults, work that uses the presence of children and does not contribute in their development, work that hinders a child's education and training and changes his life and future. "

Based on the data collected in the social baseline, child labour is a common practise in Egypt. Despite all restrictions of child labour, children (below the age of 18 years) work almost in all Projects as they receive low salaries and are less demanding. Therefore, there is a high probability of child labour. The impact related to child labour is of long term, localized and reversible nature.

Impact significance: **Moderate.**

Mitigation measures

- NAT and its contractors will oversee if suppliers, contractors and subcontractors comply with all applicable child labour laws and only employ workers who meet the applicable minimum legal age requirement in accordance with international standards;
- Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers; and
- In all contractor contracts the Project will make explicit reference to the need to abide by Egyptian law and international standards in relation to child labour and forced labour
- Contractors and subcontractors will need to monitor closely the potential existence of irregular forms of child and forced labour in the supply chain. Action measures and notice to NAT will be carried out immediately if this is found.

Residual impacts

Minor, if mitigation measures are implemented.

6.3.2.19 Homeless (children and old people)

As reported in the baseline section, few numbers of homeless street children and old people reside in the stations of the tram. Therefore, it is essential to recommend how to manage this

category which can be classified as vulnerable groups. The homeless will be moved from the stations during preconstruction and construction phases. The RPF provides detailed information about how to support street children and homeless people.

The impacts on homeless is of short term, localized and reversible nature

Impact significance: **Moderate**

Mitigation measures

According to the Ministry of Social Solidarity, the NGOs working with homeless people (e.g. Caritas-Egypt) should be reached out in order to find proper and acceptable measures to accommodate the homeless with full respect to their human rights. Based on discussions with Caritas-Egypt NGO and the social solidarity directorate the measures below were recommended:

Table 6-5: Entitlement of the Street Children and Homeless Old People

Primary category	Secondary category	Entitlements in Accordance with Egyptian Requirements	Additional Entitlements to meet International Standards and Requirements
IV. Street children	IV 1: Street children with no alternative accommodation arrangement	No specific entitlement according to the Egyptian law. However, they are classified as orphans that need shelters.	Cash compensation (to be paid as support through institution) - No cash compensation to be provided In kind support - NAT will sign a protocol with the security department, the governorate authority, NGOs , Social Solidarity directorate and Health directorate. This protocol aims to provide proper accommodation for street children. - Street children will be engaged with by the social solidarity directorate staff who work in “ Children and Homeless Without Shelter Program”. As the social solidarity team has wide experience in dealing with street children. They will be the responsible entity in cooperation with NAT. - Street children will be accommodated in governmental shelters that are affiliated to the Ministry of Social Solidarity upon their free will (if they are above 12 years and can choose for themselves). The young street children below 12 years old will be sent to a shelter. Alternatively, they might be accommodated in the NGOs shelters. - Provide them with capacity building programs or sending them back to schools, upon their free will, the capacity building will be on carpentry, how to start small business and food production. - The health directorate will secure any medical check-up required in order to accommodate children in the shelters. Engagement activities - For those who are unwilling to get into shelters, they will be informed about the project and the necessity to stay outside the tram route by the social solidarity team . - They should also be informed of a CLO/contact person and the GRM established for the project so that they can come forward for needs and requests.

Primary category	Secondary category	Entitlements in Accordance with Egyptian Requirements	Additional Entitlements to meet International Standards and Requirements
	IV 2: Street children who have shelters or families	No specific entitlement according to the Egyptian law. However, they are considered fugitives that need to be taken back to their families.	Social solidarity directorate will work with street children in order to convince them to reunite with their families. Alternatively, all above mentioned procedures including engagement activities (mentioned in group IV (1) will be applied.
	IV 3: Street children engaged in illegal business (e.g. drug dealing)	They are entitled to be supported and accommodated in Juvenile Justice as they are of delinquency behaviour.	In kind support - In full cooperation with the security staff, Juvenile unit, Social Solidarity directorate and NAT Community liaison officer they will be engaged with prior to the project. They can be sent to Juvenile shelters. - In full cooperation with Social Solidarity directorate and Health directorate, the drug addicts might be sent to rehabilitation centres. Engagement activities - They will be informed about the project and the necessity to stay outside the tram route by the social solidarity team . - They should also be informed of a CLO/contact person and the GRM established for the project so that they can come forward for needs and requests.
	V 1: Homeless people with mental	No entitlement according to law	In kind support

Primary category	Secondary category	Entitlements in Accordance with Egyptian Requirements	Additional Entitlements to meet International Standards and Requirements
V. Homeless and street beggars	disability (this category was reported by the social solidarity team)		- In full cooperation with Health Directorate, they will be directed to hospital. They will be tested by Health Directorate and based on the medical check-up report they will be sent to the psychiatric hospital in Cairo. Alternatively, - They will be supported by Social Solidarity directorate “ Children and Homeless People Without Shelter Initiative”. They will be provided with blankets, food, water and medication by the initiative. Engagement activities - They will be informed about the project impacts and the necessity to evacuate the construction site.
	V 2: Homeless people who have no accommodation	No entitlement according to law	In kind support - They will be supported by Social Solidarity directorate “ Children and Homeless People Without Shelter Initiative”. They will be provided with blankets, food, water and medication by the initiative. - A protocol will be signed with NAT, Health Directorate and Security department to provide the homeless with required support. Engagement activities - They will be informed about the project impacts and the necessity to evacuate the construction site. - Robust stakeholder engagement programme with them to explain construction activities, schedules and grievance mechanism will be implemented. Vulnerability assistance - Additional vulnerability assistance can be provided in form of food, medication, etc by the project or by the NGOs e.g. Resala, Caritas, Misr El Kheir.

Primary category	Secondary category	Entitlements in Accordance with Egyptian Requirements	Additional Entitlements to meet International Standards and Requirements
	V 3: Homeless people who work as beggars and have alternative accommodation	No entitlement according to law. However, they violate the law by committing begging activities.	In kind support - They will be enabled to stay outside the corridor of the Tram. Engagement activities - In order to enable the street beggars to restore their income, a robust stakeholder engagement programme with informal street beggars to explain construction activities, schedules and grievance mechanism.

Residual impacts

Minor, if mitigation measures are implemented.

6.3.2.20 Traffic and Transportation

Traffic impacts of the Project are expected to occur during the construction phase of the Project due to roads diversion. Construction will disturb and delay traffic flow that is likely to affect the local communities and environmental conditions at the construction sites and may also directly or indirectly affect the surrounding areas. It will also affect the accessibility to public buildings and public services.

An increased number of trucks and heavy equipment will be necessary to transport the construction materials and equipment to the Project site during the pre-construction and construction phase. In addition, the construction activities may lead to rerouting the roads due to closing of crossings. This will lead to reduction in the average speed of the vehicles on the road and the number of operating lanes, and may affect the areas devoted for parking.

Additional impact pertaining to traffic is the transportation of passengers who will be deprived of their low cost means of transportation, the Tram. APTA will face a challenge in compensating a large number of passengers with an alternative mode of transportation.

Using and relying on the alternative roads that will be used to substitute the absence of the tram may impact the quality of these roads. It is strongly recommended to carry out coordination meetings with NAT, consulting Consortium, Traffic Department, Road Authority, and APTA in order to develop proper Traffic Management Plan.

Impact of Raml Line Stoppage on Operation of the City Tram Line (Ras El-Tin – San Stefano Section).

The impacted section of the City Tram Line is from Ras El-Tin to San Stefano Station (located at the Eastern point where the San Stefano North and South Loops join).

The trams operating on this section of the City Tram Line are the 'Ukrainian Trams', with a single, drivers cab and doors on one side only. Therefore, the turnback at San Stefano comprises a loop (approx. 20m radius), permitting the 'Ukrainian' City Trams to return to Ras El-Tin.

Therefore, the de-commissioning of the Raml Tram Line from Raml Station Eastwards will impact this section of the City Tram line in the following way:

- The 'Ukrainian Trams' require a turnback loop and as there would be no loop available, therefore no City Tram can operate East of Ras El-Tin, resulting in a loss of service to a densely populated part of Alexandria.

Impact Significance: **Major**.

Mitigation measures

- The contractor shall provide transport safety assessments and audits around the work sites, and the engineer shall approve these.
- A Traffic Management Plan should be developed to provide the maximum safety to the population and Project personnel. Additionally, to propose alternative solutions for transporting community people;
- Target signage and outreach activities to improve public awareness of traffic changes and potential hazards;
- Provide and identify alternative access routes to cars and pedestrians (special attention should be paid to old people and people with disability) , if necessary, with coordination between the local authorities (traffic authority) and community leaders in the Project area and inform the residents about the alternative routes before construction begins;
- Ensure vehicle safety and regular maintenance;
- Review any complaints related to traffic and accident; and
- Agree on the routes that will be utilized by the Project vehicles.

Mitigation Measures specific for City Tram Impacts from Ras El-Tin to San Stefano:

APTA have stated their desire to form a 900m connection (see below) for the City Tram line from Mansheya to St. Catherine Square. APTA are willing to carry out the associated works themselves.

Possible options to ensure that the City tram passenger service could continue between Ras El- Tin and Mansheya are presented below.

It should be noted that APTA would be required to implement a bus service to be able to accommodate passengers throughout the construction phase. In either option, the works should ideally be completed before the Raml Tram line is de-commissioned, to allow the City Tram to continue operation East of Ras El-Tin.

Residual Impact

Moderate, if mitigation measures are implemented

6.3.2.21 Working Condition

Inconvenient working environment might affect the health and the productivity of workers. Therefore, it is essential to shed light on working conditions that describe all impacts on workers. Additionally, their welfare and the onsite facilities to be made available for workers. In light of creating job opportunities and generating income to overcome poverty and reinforce collective economic growth, NAT can foster a healthy management strategy for workers and increase developmental benefits for the Project. The strategy should adopt an intact management approach to labour conditions, treating workers fairly, and providing a safe and healthy working environment. The main objectives of working conditions management are as follows:

- Reinforcing occupational health and safety;
- Providing a foundation for non-discriminatory and fair treatment, as well as congruence of opportunities to all workers;
- Protecting Project's workers, including those who are regarded vulnerable such as women and people with disability;
- Prohibiting any type of forced work and child labour;
- Avoid any discriminatory actions related to religion, skin colour, and gender;
- Supporting principles related to freedom of syndicate and collective negotiation of the Project's workers in line with the national law Number 12 of year 2003;

- Providing a mechanism for questions, concerns, suggestions, and grievances for workers

The impact related to working condition is of long term, localized and reversible nature.

Impact significance: **Major**

Mitigation measures:

Development of a Working Conditions Management Plan. The main contents are:

- Providing protection and safety to workers
- Facilities and Utilities in the site
- Security & workers right
- Enhancing Workers' Efficiency

Residual Impact

Minor, If the Working Conditions Plan is properly implemented.

6.3.2.22 Impacts related to Involuntary Resettlement and Economic Displacement

Given the presence of Tram Raml route and depot that are being used by the tram now, the land acquisition tends to be limited to land transfer of ownership from APTA and Alexandria Governorate to NAT. Such transfer of ownership always takes place between governmental entities. However, the project will result in economic and physical displacement as follows.

Table 6-6: Project Affected Assets, lands and people

Affected land	Total area of affected land	Duration	Owners of land	Current use of land
Lands				
1. A plot of land to be used to construct an electricity station	One plot of land 205-meter square	Permanent	Alexandria Governorate Authority	The land is used as a small garden cultivated with trees.

Affected land	Total area of affected land	Duration	Owners of land	Current use of land
				The garden is not used by anyone as it surrounded by fence. No one will be affected due to the land acquisition there.
2. The land allocated for the Raml Tram route from Raml to Victoria station and the depot	208,210 meter square	Permanent	Alexandria Governorate Authority and APTA	The land is used by the current Tram and the depot. Many commercial and two service facilities are reported on the route (91 shops/mosque/toilet)
3. Right of Way	No land required	*NA	NA	NA
4. Construction camp	No land required to date. Decision of land that will be used is mainly the contractors decision.	NA	NA	NA
5. Infrastructure (electrical lines and telecommunication)	No land required	NA	NA	NA

* NA = Not applicable

Affected assets	Total number of affected assets	Duration	Owners of assets	Current use of assets
Assets				

Shops/kiosks/ shop used as open garden/toilet used by men/ mosque established instead of shops	117 (only 91 of them are operating)	Permanent	APTA (owner of the shops)	The affected shops are used for commercial activities. The mosque is used for praying purposes.
An informal small mosque established at the station	1	Permanent	Private illegal structure that is not owned by anyone . The mosque was constructed by collecting donations from the community people. No one claimed the ownership of the mosque.	The mosque is used for praying.

Num	Affected group	Total number of affected groups	Comments
Project affected people			
I. Tenants	I1- Tenants of shop/Kiosk with contract ending before June 2022 ⁵⁹	12	The owners of assets and lands are APTA and Alexandria Governorate.
	I2- Tenants of Shops/ kiosks with valid contract after June 2022	43	
	I.3: Tenants of APTA shop/Kiosk with contracts that ended before 2014 but continued to pay low rents	20	
	I.4: Tenants with contracts ended from 2015 to 2021	16	
	I.5 : Sub-tenants	2	

⁵⁹ NAT has confirmed that construction is to start in June 2022. These two categories have been defined because NAT suggested that those whose contract would expire before start of construction should not be entitled to compensation. Since the standard practice is for tenants whose contracts expire to continue paying rent until the new tenant is identified it was considered appropriate to include these tenants as eligible for compensation regardless of contract expire date.

Num	Affected group	Total number of affected groups	Comments
Project affected people			
	Sub-Total	91 tenants / 2 sub-tenants	
II. Individuals engaged in labour	II.1: Individuals with formal permanent contract with public firms (e.g. United Republic Newspaper Distribution Company, El Akhbar Foundation Dar Al Hilal Foundation)	TBD after the census	The casual workers are those who work on daily basis at cafés and restaurants.
	II.2: Individuals with formal permanent contract with the shops' tenants	TBD after the census	
	II.3: Individuals with informal contracts	TBD after the census	
	II.4 Individuals engaged in casual work (work in restaurants and cafés)	TBD after the census	
	II.5 Workers of the tram who are working in the Raml Tram now and are permanently recruited by APTA (governmental entity) ⁶⁰	200	
	II.6 Workers of the mosque	4 full time + 1 part time were recruited by the NGO ⁶¹ and one Imam was recruited by the Ministry of Endowment	
	Sub-Total	Estimated 148 / APTA 500	Labourers (tentative number to be updated 3 months before displacement)
III. Informal	III 1: Semi-mobile Vendors who have a stable hand cart/ table/ stalls	10 persons	During various site visits, the number of vendors

⁶⁰ These are governmental staff recruited by APTA on permanent based contract.

⁶¹ The NGO is not operating inside the mosque as the headquarter of the NGO is located in Bakous neighbourhood

Num	Affected group	Total number of affected groups	Comments
Project affected people			
street vendors			was not the same as the vendors did not have fixed site.
	III 2: Mobile Vendors who have no fixed workplace	Estimated 20-30	
	III 3: Mobile Vendors who work inside the tram wagons	Estimated 15-25	
	Total	Estimated 45-65	Tentative number to be modified during the final census
IV. Street Children	IV 1: Street children with no alternative accommodation	To be defined during the census	Number of street children was not the same in each site visit.
	IV 2: Street children who have shelters or families	To be defined during the census	
	IV 3: Street children engaged in illegal business (e.g. drug dealing)	To be defined during the census	
	Sub-Total	10 children (estimated based on field observation)	
V. Homeless and beggars	V 1: Homeless people with mental disability	To be defined during the census	Homeless number changed 4 times based on the date of site visit.
	V 2: Homeless people who have no accommodation	To be defined during the census	
	V 3: Homeless people who work as beggars and have alternative accommodation	To be defined during the census	
	Sub-Total	8 people (estimated based on field observation)	

Num	Affected group	Total number of affected groups	Comments
Project affected people			
VI. Garden 62	VI.1 Garden Shop tenant who planted decoration trees (in the garden or in the vicinity of shop)	1 ⁶³	One shop tenant leased a shop and used it to plant trees and make it an open area
VII. Religious buildings	VII.1 Mosque	2	One big mosque is being operated by an NGO. Another very small mosque was built on the station by community people.
	Sub-total	3	
VIII. Local community	VIII.1 Users of the mosques will be slightly affected by the absence of the mosque as there are many alternative mosques within the area of influence.	No estimates available	
	VIII.2 Buyers and clients of the shops they will be slightly affected as the area of influence has thousands of shops of the same nature.	No estimates available	
	VIII.3 Users of public transportation (e.g. tram, metro, minibuses, buses, taxis) They will be slightly affected as alternative transportation means are available within the area of influence.	No estimates available	

* The total number of shops/ garden/ kiosks/offices and mosque is 129 as per the lists provided by APTA in August 2021. 12 assets were located out of the Right of Way. Accordingly, the 12

⁶² It has been decided to present the loss of the garden as a separate category of losses but these are tenants that have been recorded under Category I above.

⁶³ Already accounted for under Category I.

assets were excluded. The 117 assets include 24 closed shops and 2 assets used by APTA as supermarket and rest area for cleaning workers

Additionally, about 10 street children and 8 homeless people might not be able to stay overnight at the stations during the construction phase. Accordingly, alternative shelter will be secured in full cooperation with the social solidarity directorate.

Street vendors were noticed in the vicinity of the project sites and inside the Raml Tram. Their number changed continuously as the majority of them are mobile street vendors. The average number of street vendors is 25-30 people.



Figure 6-2: Samples of the anticipated Project Affected Shops

Impact significance: **Major**

Mitigation measures:

- A Resettlement Action Plan (RAP) will be prepared in line with IFC Performance Standards and EIB Standards as well as Egyptian legislation. The RAP will address issues associated with physical and economic displacement, loss of community infrastructure and other assets.
- A Grievance Mechanism will be developed, whereby affected people can raise issues and concerns associated with displacement and the RAP processes. Establish KPIs for grievance resolution.
- RAP implementation will be monitored until a point whereby it can be demonstrated that the standard of living and livelihoods of displaced households have been at least restored if not improved. As necessary corrective action will be put in place through implementation to achieve this outcome.

Residual Impact

Minor, If the RAP is properly implemented.

6.3.2.23 Impacts on Other Means of Transportation Operators

The Raml tram project is not anticipated to adversely affect the operators and owners of other means of transportation e.g. tuk tuk, minibuses and buses. The discussion of impacts on the operators of means of transportations reflected the following:

- **During construction phase:**

Public transportation will continue working and additional buses might come to service as to substitute the absence of the Tram.

All means of transportation will benefit from tram closure during the construction phase in terms of transporting those who got accustomed to using the tram. Despite, the traffic impacts related to the construction activities, other means of transportation will be able to transport Tram Raml beneficiaries, particularly as the traffic impacts will be managed through proper traffic management plan. The consulted drivers of tuk tuks and minibuses reported that they will not be affected by the project construction in case that the crossings remained open. In case of closing of streets, they should be informed prior to any closure of streets.

- **During operation phase:**

Raml Tram have specific route that does not serve all passengers of Alexandria. Accordingly, the customers of buses, minibuses and tuk tuk are not anticipated to rely on Raml Tram. Additionally, the coverage areas of tuk tuks, minibuses and buses are much wider than the Tram. As a matter of fact, the tuk tuk and minibuses might also benefit from transporting people to the Tram, particularly, if the Tram service is enhanced.

Impact significance: **Insignificant**

Mitigation measures:

Not applicable

6.3.2.24 Impacts on Itinerant Vendors

Based on meetings and site visits to study area of influence, the itinerant vendors can be classified into three categories .

- 1- Those who have fixed area to stay in and they are mainly close to the fence of the tram.
- 2- Those who work inside the station (polishing shoes – selling stationary and sweets).
- 3- Those who work inside the tram wagons.

Based on similar projects carried out by NAT recently, itinerant vendors use the fence of the construction site to present and trade in their goods. Additionally, they sell their goods to construction workers. Accordingly, the impacts tend to be of positive nature on the itinerant vendors during the construction phase. The photos below shed light on the street vendors in Raml Tram. Additionally, the photos illustrate where the vendors stood in similar project implemented by NAT.

Figure 6-3: Shoes polisher in Bolkly station

Figure 6-4: Fixed street vendor

Figure 6-5: Street vendors standing by the fence of Metro line three phase three in Cairo

Impact significance: **Insignificant**

Mitigation measures:

Not applicable

6.4 Potential Impacts during Operation

6.4.1 Potential Positive Impacts during Operation Phase

Operational and maintenance activities associated with tram infrastructure include the maintenance and clearance of tracks and track right-of-way maintenance, signalling and switching systems. Maintenance Activities may consist of lubricating oil changes and mechanical safety inspections, exterior washing of rolling stocks. Heavy mechanical maintenance may include replacement of rolling and engine components, engine overhauls, mechanical tests and adjustments, among others. Heavy mechanical maintenance may also include parts machining, welding, cleaning (including degreasing), passenger and cargo wagons may also be cleaned and painted, including touch up painting.

6.4.1.1 Provision of direct Job Opportunities for NAT and Operating Staff

The Raml Tram Rehabilitation Project is expected to generate a number of job opportunities during the operation phase. Some of the employment opportunities will be provided by NAT while a majority of the opportunities will be provided by the operator. Given the absence of any information about the potential operator, no figures can be provided about the estimate job opportunities. In fact, it will be difficult to predict the job opportunities based on the current workers of the Tram lines since the Tram is less demanding in terms of operators. The ESIA consultant anticipates that there will be various job opportunities; including, drivers, conductors, maintenance workers, engineers, etc. Given that these jobs are during the operation phase, they will be of permanent nature.

The local community of Alexandria Governorate can provide almost all of the labour force depending on the skills needed and the operator in sourcing their workforce. To maximize employment opportunities in the local communities it is anticipated that training will be required for currently unskilled workers.

Additionally, the Project is expected to result in a number of procurement opportunities for local business including:

- Provision of transportation, goods and storage services to the Project;
- Provision of food supplies, catering, and cleaning services;

- Provision of, electronic appliances, communications and measurement equipment;
- Security personnel;
- Accommodation, laundry and clothing;
- Provision of electricity and water supplies;
- Retail services; and
- Provision of fuel.

6.4.1.2 Provision of indirect Job Opportunities for NAT and Operating Staff

In addition, small business will benefit from the operation of the Tram as they may be demanded by passengers of the Tram. It is predicted that the Tram might attract retailers and street vendors to trade in their goods close to the tramway.

6.4.2 Potential Negative Impacts during Operation Phase

6.4.2.1 Ambient Air Quality

Since the tram operates entirely by electricity from the grid, it is not expected that it will introduce any direct air emissions during the operational phase but the air quality at the depot may be jeopardized due to operation of equipment associated with maintenance activities.

Some secondary sources of air quality degradation can also arise during the tram operational phase including:

- Increases in air pollution levels as a result of crowding of vehicles such as cars and buses around the stations.
- Indirect emissions as a result of electricity generation. However, the reduction in vehicle emissions that occurs as a result of rail line operation replacing fossil fuel operated vehicles currently used along the route will readily offset the emissions associated with generation of the system's electrical power supply.

This impact is long term, direct, local and reversible.

Impact significance: **Minor**

Mitigation measures

- Proper housekeeping measures and maintenance of equipment at the depot.
- All equipment in the depot areas need to be properly and regularly maintained

- Adequate ventilation system in depot.
- Vehicles around the stations are properly managed.

Residual Impact

Insignificant, if mitigation measures are implemented.

6.4.2.2 Noise and Vibration propagation

Noise during operation of tram is generated from a variety of sources as follow:

- The most significant source of noise is rolling noise from contact between wheel and rail during normal movement and braking (including noise from contact between the brake pad and wheel),
- Presence of wheel flat spots and engine noise.
- Elevated noise emitted when tram runs over a viaduct.
- Noise in depot during maintenance operations
- Other sources of noise expected can occur as a result of horns, maintenance and noise generated from passing tram
- The Project is also expected to cause crowding of vehicles such as cars and buses around the stations

Noise and vibration impact is short term (during the tram pass and working and working hours of tram from 5am to 12 am), localized and reversible.

Impact significance: **Moderate.**

Mitigation measures

Measures that will be developed as part of the design process include (as much as feasible):

- Fencing with concrete walls along the tram way as a wave barrier to reduce noise and vibration.

- Under special circumstances, it can be practical to modify an affected building to reduce the vibration levels. Vibration isolation of buildings consists of supporting the building foundation on elastomer pads similar to bridge bearing pads⁶⁴.
- Use of modern non-metallic disc brakes, which can reduce rolling noise by 8-10 decibels (dB) compared to cast-iron block tread brakes utilized on older vehicles (non-metallic disc brakes also reduce wearing of wheels and rails)
- Reducing the roughness of running surfaces through regular maintenance of wheels and tracks, and install jointed track with continuously welded rail
- Use adequate friction modifiers (oil based or water based) is a suitable approach to the reduction of noise and vibrations.
- Floating slabs, resiliently supported ties, high resilience, fasteners, and ballast mats have been used to reduce the levels of vibration.
- Ballast mat consists of a rubber or other type of elastomer pads, that is placed under the ballast. The mat generally must be placed on a thick concrete or asphalt pad to be effective. It will not be as effective if placed directly on the soil or the sub-ballast.
- Modify the foundation conditions of the embankment stiffness by compaction of the embankment material. This method is usually only applicable when new embankments are constructed. Another alternative is to install a stiffening element (e.g. concrete beam or box structure) horizontally along the alignment of the embankment. Installation of stiffening beams, consisting of concrete elements, can be effective.

Measures that will be carried out during operational phase:

- Regular maintenance of wheels to reduce the friction between wheels and tracks
- Periodic monitoring needs to be carried out to ensure compliance to standards at the sensitive receptor locations.
- The operator will ensure that close coordination is maintained with responsible agencies like traffic authorities to reduce the noise impact from clustering of vehicles at station locations

⁶⁴ Federal Railroad Administration U. S., Department of Transportation. 1998. "High-Speed Ground Transportation. Noise and vibration impact assessment. Final Draft. Office of Railroad Development. 220 p

Residual Impact

Minor, if mitigation measures are implemented

6.4.2.3 Water resources (Surface and Groundwater)

Water resources contamination risks during the operation phase is the wastes generated from maintenance activities in the depot. The source of pollution in the first place can be a transformer oils, other petroleum products stored in the area, uncontrolled discharge of wastewater and oil from the and poor waste management practice.

Surface water

The nearest freshwater to Tramway is Lake Maryout located 3.65 kilometres far and the shoreline of Mediterranean Sea is ranged from 120 meters to 1.2 kilometre far depends on the route curves.

Impact significance: **Insignificant.**

Groundwater

Groundwater contamination risks during the operation phase will be lower compared with the construction phase. There may be a risk of leakage of oily wastewater discharged from the depot which may pollute the soil and groundwater. This impact is a local impact, short term but the consequences to the groundwater quality are irreversible assuming water is a finite resource.

Since groundwater is not used for any human or irrigation purposes, deterioration in groundwater quality described above is not expected to lead to secondary impacts associated with any necessity find replacements to water sources or limited access to existing sources (such as increased cost, with impacts on livelihoods).

Impact significance: **Minor**

Mitigation measures

- An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater.
- Install adequate drainage system connected to the public sewer network.
- Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.

Residual Impacts

Insignificant, if mitigation measures are implemented.

6.4.2.4 Soil

During the operation phase, impacts on soil could be as follows:

- Maintenance works of rolling stocks at the depot.
- Disturbance due to induced vibration resulting from normal tram operation and maintenance works.
- Leakage of wastewater effluents during maintenance activities or oil/water mix from activities at the depot. This could be a source of pollution to the soil and groundwater.
- Track maintenance

The potential toxicity nature of such effluent, and the expected low amount and non-toxicity nature of such effluents, short term, localized, and low magnitude.

Impact significance: **Minor**

Mitigation Measures

- Install adequate drainage system connected to the public sewer network.
- An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater.
- Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.

Residual impact

Insignificant, if mitigation measures are implemented.

6.4.2.5 Impacts from Generated Waste

Solid (Non-Hazardous) waste including steel scrap, wood scrap and domestic waste around stations.

The non-hazardous wastes generated during the operation phase normally have a high recycling potential. If not recycled, they should be sent to a specialized contractor or a controlled dumping site.

Liquid Waste including the oily wastewater discharged from the depot

Hazardous waste including empty containers of chemicals, spent lubricating oils, and paint used for maintenance works, ballast and sleepers if contaminated with oil. Improper handling and storage of hazardous substances and/or waste, would result in environmental contamination.

All considered hazardous waste should be collected via licensed contractor and sent to controlled dump site or landfill site (ex. El Nasiriya).

The storage and disposal of hazardous waste streams have to be carefully performed to comply with the regulatory framework. Such hazardous waste can have major, irreversible effects if not properly handled, stored, and safely disposed of, as follows:

- Mishandling and uncontrolled disposal of hazardous liquid and solid waste can have major health impacts for inhabitants in the Project's area of influence; i.e., people who get in contact with waste during transport and disposal;
- Uncontrolled disposal of hazardous liquid waste can cause soil contamination through direct contact or leaching.

Given the expected low amount and non-toxicity nature of such effluents, this impact is long term, localized and reversible.

Impact significance: **Minor**

Mitigation measures

- Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable.
- Provide adequate waste bins within the stations' locations.
- The disposal of solid waste generated from the depot will be carried out by NAT.
- The EPC contractor will design the depot with plumbing connection in maintenance areas to an oil pit where the oil (oil/water separator) is separated and the water is discharged to the sewer network.

- Spent mineral oils shall be collected, stored in sealed containers, and recycled using a licensed company.
- All types of hazardous waste can only be transported by licensed hazardous waste service providers and disposed of in a licensed landfill.
- Temporary storage is to take place in areas with impervious flooring.
- In case of spillage:
 - Avoid inhalation and sources of ignition.
 - Cover and mix with sufficient amounts of sand using PPE.
 - Collect contaminated sand in clearly marked secure containers/bags.

Residual Impact

Insignificant, if mitigation measures are implemented

6.4.2.6 Aquatic environment

The nearest waterbodies to Tramway are Lake Maryout located 3.65 kilometres far and the shoreline of Mediterranean Sea is ranged from 120 meters to 1.2 kilometre far depends on the route curves.

Impact significance: insignificant

Mitigation Measures

No mitigation measures are required

6.4.2.7 Existing Services (Water Consumption and Wastewater)

The three current substation locations are expected to be sufficient for the regular operation of the rehabilitated Raml Tram, there is the potential of power shortage in Mansheya, in the case of a failure from the Shatbi substation. Accordingly, a 2.2 MW substation located near Orabi Square could be allocated and connected to the Raml Tram in order to provide sufficient power in case of a failure of one of the three main substations.

Impact significance: insignificant

Mitigation Measures

No mitigation measures are required

6.4.2.8 Terrestrial Ecology

No significant impacts to biodiversity will result from activities during the operations phase. The mitigation measures related to replanting and reestablishment of green areas to be undertaken in relation to the impacts of the construction phase will continue into the operations phase.

Impact significance: insignificant

Mitigation Measures

No mitigation measures are required

6.4.2.9 Natural Risks

Seismic Hazards (Earthquakes) – Earthquake risk profiles indicate that Al-Montazah, Al-Amriya, and Sharq districts lie in high-seismic areas and are threatened by more than 90% of estimated earthquake risks. Moreover, moderate seismic risk level areas are Gharb and Wasat districts.

Raml Tram is passing by Wasat district from Raml station to Sporting el Soghra station and Sharq & Montazah districts from Sporting el Kobra station to Victoria.

Impact significance: **Moderate.**

Mitigation measure

Seismic Risk factors should be considered in the construction of the Raml Tram stations, viaducts and depot. For example, Integration of a safety engineering criteria in the design structures of the stations and electrical overhead contact system to prevent failures due to earthquakes.

Residual Impact

Minor, if mitigation measures are implemented

Groundwater Salinity– Climate change on Alexandria region, has impacted the Nile Delta aquifer which is considered as the main aquifer to Alexandria in which seawater from the Mediterranean Sea has moved towards the aquifer through seawater intrusion leading to increasing in groundwater salinity. The increasing in groundwater salinity could have impact on the foundations of stations, viaducts and depot. Groundwater level in the Project area is 2-5 meters.

Mitigation Measures

Resistible construction materials to salinity should be used for foundations of stations, viaducts and depot.

Residual Impact

Minor, if mitigation measures are implemented

Flood

Infrastructure –Considering the infrastructure, the risks are the following:

- Submersion of stations platforms: some stations cannot be served and/or accessed by passengers; the line may not work on its entire itinerary.
- Flooding of man holes for accessing cable ducts: cables will resist a couple of days but can be damaged if they are in water for more than a week.
- Water seepage into the trackway structure: during flooding the natural water drainage is hampered, there is a risk of structural deformation for the infrastructure.

Mitigation measures

- Consider the flooding risk in the sizing of the drainage system: a tram infrastructure usually includes a drainage system for rain water (transversal and longitudinal ducts are installed all-along the tram infrastructure); this system should be reinforced if recurrent flooding events are foreseen.
- Increase the height of the platform. The implementation of such a measure should only be envisaged when there is a high risk in a given section as it will impact the accessibility and the quality of the urban integration of the infrastructure.
- An adequate drainage system should be considered on the entire infrastructure.

Tracks and switches – Considering tracks and switches, the risks are the following:

- The trackway covering, depending on its type, can be damaged by flooding. The rails themselves will resist to water for a couple of days, only cleaning will be required before restarting operations.
- Devices for maneuvering switches (motors and command devices) are particularly vulnerable to water, if they are out of order, the whole line might have to be stopped or operate with higher headways.

Mitigation measures

- Implement concrete track structure rather than ballast. Concrete is resistant to water, where ballast will require refurbishing if exposed to heavy flooding with mud. Concrete tracks are however more expensive to implement.
- Implement asphalt or concrete trackway coverings which are easier to clean.
- In modern tram systems, track equipment is designed to be submersed and the motors are made waterproof. However, these equipment require careful cleaning before restarting operations.

Energy and systems – Considering energy and systems, the risks are the following:

- Signaling and train control are vulnerable to flooding, if they are out of order, the whole line might have to be stopped or operate with higher headways.
- The flooding of technical rooms (especially substations and signaling equipment rooms) will impact the tram operation.
- The overhead wire support masts can be impacted by heavy rain or wind.

Mitigation measures

- Proper drainage should be implemented on the infrastructure to protect signaling equipment.
- Technical rooms for signaling should be positioned at locations where the flooding risk is limited or their height should be increased.

- The Operating Control Center should be able to switch off power on the whole line rapidly.
- The operator can switch off power on one specific section of the line. In that case the operation can be maintained on the remaining part of the line.
- Overhead wire support masts, along with their foundations, should be sized according to the weather conditions foreseen during flooding.

Rolling stock –Considering the rolling stock, the risks are the following:

- The rolling stock can operate with a water level up to 10 cm; above this the rolling stock should be withdrawn from operation.
- If the rolling stock is flooded, its structure can be altered if infiltrated by polluted water.

Mitigation Measures

Specific measures can be included in the specifications of the rolling stock such as waterproofing devices for sensitive equipment (motors, antennas, electronic equipment...).

Depot –Considering the depot, the risks are the following:

- The depot access can be flooded, preventing rolling stock to be withdrawn from the main line.
- Maintenance facilities can be impacted by flood.

Mitigation Measures

- The flooding risk should be taken into account in the depot design. If the flooding risk is high, the height of maintenance and storage area floors can be slightly increased. Proper drainage should be implemented.
- Equipment that are located under the maintenance tracks can be equipped with pumps to prevent them from being submersed in case of flooding.

Currently, NAT is studying the status of all drainage flood network exist around the tramway. If there is damages or inadequate network, NAT is responsible to repair it in order to avoid negative impacts of this poor network on the tram performance.

Residual Impact

Minor, if mitigation measures are implemented

6.4.2.10 Electromagnetic field (EMF)

The Tram will be electrified either by overhead wires or a conductor rail (e.g. third rail) that will transmit electrical power to the rolling stock.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has set a guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively

Table 6-7. ICNIRP guidelines for EMF public and occupational exposure

Frequency	Public Exposure		Occupational Exposure	
	Electric Field (V/m)	Magnetic Field (mG)	Electric Field (V/m)	Magnetic Field (mG)
50 Hz	5,000	1,000	10,000	5,000
60 Hz	4,150	830	8,300	4,150

Considering that the rolling stock will be powered by the 1 500 VDC which has less electrical losses and less sub-stations notably. Impact from electromagnetic field long term, localized, direct, and low magnitude.

Impact significance: **Insignificant.**

Mitigation measures

No mitigation measures are required

6.4.2.11 Occupational Health and Safety

Occupational Health and Safety is one of the most important impacts related to the operation of the Tram. It is fundamental to shed light on the nature of tram workers who are not a homogenous group; they represent many different occupations with specific sets of working conditions and risks, and diversified demands. Recent changes in the transport sector have contributed to a change in risks and exposures. However, there are also some common issues. These risks are applicable to all workers who operate and maintain the Tram in the stations and in the depot.

The main OSH issues and risks related to the Tram Project can be summarized as follows:

- The risk of accidents with material loss and damage, particularly, in the depot.
- Other safety risks (i.e., prolonged sitting in ticket booth, heavy lifting, handling dangerous substances, and psychosocial risks, etc.).
- Drivers' exposure to vibrations and noise for long time.
- Long working hours that might exceed eight hours per day
- Third-party violence is an occupational risk in the transport sector that has attracted increasing attention over recent years. Violence at work can be defined as incidents where employees are abused, threatened, assaulted or subject to other offensive behaviour in circumstances related to their work. Violence includes both physical and non-physical violence.
- High number of musculoskeletal disorders. Additionally, other common diseases associated with transportation sector is stress-related health disorders, and noise-induced hearing loss.
- Overall fatigue is the most frequently mentioned work-related problem.
- Harassment of female labourers by other workers or tram users might result in psychological disturbance.

The impact related to OHS is of long term, localized and reversible nature.

Impact significance: **Major**

Mitigation measures

- An Operations Environmental and Social Management Plan (OESMP) and procedures should be prepared, implemented, and monitored during the operation phase that consists of subplans including:

- An Occupational Health and Safety Management Plan (OHSP);
 - An Environmental, Health, and Safety (EHS) plan;
 - A health surveillance program;
 - A working conditions management plan; and
 - An emergency response plan.
- The developed OESMP should be prepared in full compliance with World Bank Environmental, Health & Safety Guidelines and EIB E&S Standards
 - Address emerging risks such as violence and fatigue, and cognitive injuries with specific monitoring, reporting and prevention measures.
 - It is essential to monitor fatigue. Step-wise alarm levels and routines to prevent fatigue-related incidents in case of unforeseen events would also be needed.
 - More efforts are needed to prevent and monitor violence in the transport sector. Transport workers need to be trained adequately and encouraged to report violence, and effective reporting procedures need to be put in place.
 - Share information with the employment agencies on the specific OSH risks that might affect Tram workers.
 - Train employers and workers on how to better protect their health and safety.
 - Raise awareness of OSH issues in policy areas that may impact on the health and safety of transport workers.
 - Installation of active noise reduction systems;
 - Installing silencers for fans in the new depot.
 - Use of personal protective equipment (PPE) if engineering controls are not feasible or adequate to reduce noise level
 - Use of dampers at the seat post to reduce the vibration experienced by the operator.
 - OHS plan should propose specific procedures that might minimize the impacts related to the electromagnetic field;
 - The Emergency Response Plan should be prepared or at least updated.

Residual Impact

Moderate, if mitigation measures are implemented

6.4.2.12 Community Health, Safety, and Security

The Tram Rehabilitation Project will result in various impacts related to the community health, safety and security . They are as follows:

- Accidents along the tramway line, particularly the older groups and children;
- The risk of being hit by the tram causing injuries or fatal accidents;
- Transmission of communicable diseases e.g. COVID-19;
- Emergency accidents and fires that might affect community members and the Tram users
- Site trespass and injury
- Pedestrian road safety during construction and operation.
- Increased transmission of Sexually Transmitted Diseases (STDs);
- Spread of communicable diseases other than COVID 19, TBC, Hepatitis C

The impact related to CHS is of long term, localized and reversible nature.

Impact significance: **Major**

Mitigation measures

- The Emergency Response Plan should be prepared for the operations phase.
- Availability of secure functional pedestrian accesses and paths
- Establishment of a fence might put limitation to the community safety
- Full engagement of the surrounding communities, especially, their grievances related to transmission of diseases.

Residual Impact

Moderate, if mitigation measures are implemented

6.4.2.13 Cultural Heritage Sites

There is no anticipated further cultural heritage impact during the operation phase

Mitigation measures

No mitigation measures are required

6.4.2.14 Visual-Landscape

Visual intrusion and landscape impacts are by nature of negative impact. However, in the Tram Project and considering the current deteriorated and unfavorable situation of fences, stations, shops and the used tram, visual intrusions is expected to result in positive impacts during the operation phase.

The constructed viaducts might result in visual intrusion as they might affect the scenery of the beautiful areas.

The photos below shed light on the visual disturbance that is being faced recently in the stations.



Figure 6-6: Advertisements written on the fences



Figure 6-7: Bad writing affecting the fence



Figure 6-8: Murals painted by young students



Figure 6-9: wastes accumulated beside
the fence

Figure 6-10: Deteriorated station

Impacts related to visual intrusion tend to be of positive nature as the deteriorated fences, benches, stations, shops, ... etc. will be enhanced. The impact related to visual landscape is of long term, localized to the viaduct and irreversible.

Impacts related to viaducts is **Minor**

Mitigation measures

- An expert in Fine Arts should be recruited in order to design the fences, stations, viaducts and green areas. The design should be shared with SYSTRA consortium, NAT, and other stakeholders for approval.

- Replanting of the green space combined with public places for recreation and shops
- Availability of parking facilities with trees to provide shade; and
- Improved market space accessibility and local commercial development.

Residual Impact

Minor, if mitigation measures are implemented

6.4.2.15 Utilities(infrastructure)

The Project operation will not affect the existing utilities (infrastructure) and no significant impact concerning the existing infrastructure.

Impact significant: **Insignificant.**

Mitigation measures

No mitigation measures are required

6.4.2.16 Temporary Labour influx

As the total number of workers during operation is limited and the majority of job opportunities will be locally recruited, the impacts related to temporary labour influx is **insignificant**

Mitigation measures

No mitigation measures are required

6.4.2.17 Risk of Gender-Based Violence (GBV)

As the total number of workers during operation is limited and the majority of job opportunities will be locally occupied, the impacts related to temporary GBV is **insignificant**

Mitigation measures

No mitigation measures are required

6.4.2.18 Risk of Child Labour

Given the fact that the operator will recruit the taskforce in full compliance with national and international laws.

Impacts significance: **insignificant**

Mitigation measures

No mitigation measures are required

6.4.2.19 Traffic and Transportation

There are significant positive impacts on traffic and transportation in the local community:

- Fast, reliable means of transportation with limited cost.
- People will resort to the tram rather than using private cars to avoid congestion and the challenges of parking in Alexandria, this will significantly reduce the volume of traffic and the load on roads.
- Residents of the Tram AoI will be encouraged to solely rely upon the tram and use it for their all errands
- Greedy microbus and Tuk Tuk (rickshaw) drivers will be obliged to adjust their tariff in order to be able to compete with the Tram.

Mitigation measures

No mitigation measures are required as the impact is positive

6.4.2.20 Economic Impact

At each station, economic activities will provide sources of income and job opportunities for activities owners and those who will work in these shops. The economic activities will result in the following impacts:

- This economic model will generate income to NAT or the operator;
- Increase the taxes to be given to the Government of Egypt;
- Encourage young people to lease shops and start their own business

Mitigation measures

No mitigation measures are required

6.4.2.21 Working Condition

Working conditions might affect the productivity of workers during operation phase. The operator in full cooperation with NAT can adopt an occupational health and safety and increase

developmental benefits for the Project through adopting an intact management approach to labour condition, treating workers fairly, and providing a safe and healthy work conditions. The main objectives of working conditions are as follows:

- Reinforcing occupational health and safety;
- Providing a foundation for non-discriminatory and fair treatment, as well as congruence of opportunities to all workers;
- Protecting Project's workers, including those who are regarded vulnerable such as women and people with disability;
- Prohibiting any type of forced work and child labour, particularly, among sub-contractors;
- Supporting principles related to freedom of syndicate and collective negotiation of the Project's workers in line with the national law Number 12 of year 2003;
- Providing a mechanism for questions, concerns, suggestions, and grievances for workers;

The impact related to working condition is of long term, localized and reversible nature.

Impact significance: **Moderate**

Mitigation measures:

Development of a Working Conditions Management Plan. The main contents are:

- Providing protection and safety to workers
- Facilities and Utilities in the site
- Security & workers right
- Enhancing Workers' Efficiency

Residual Impact

Minor, if mitigation measures are implemented

6.5 Assessment of Cumulative Impacts

The identified foreseen Projects in the area of the Project (Tram Corridor), which may give rise potentially to cumulative impacts are as follows:

- Existing roads intersected by the track (operational)
- Planned construction of Metro Abu Qir (Construction phase)
- Planned Eslah Bridge
- Madinah Tram
- Borg Al Arab Train
- Other means of transportations (e.g. Taxi- Buses- Minibuses- Tuk Tuks)



Figure 6-11 Current Public Transport in Alexandria

6.5.1 Air Quality

Cumulative effects on air quality will be created from the combination of the Raml Tram Project and the Other Projects, mainly the Metro Abu Qir trains and crossings traffic at areas where the construction intersect crossings. Other Projects are considered to be out of the area of influence of the air quality impacts and are therefore not expected to result in cumulative

impacts. Dust emissions and gaseous emissions added to traffic exhaust emissions from crossings could create cumulative negative air quality impacts. These however are considered temporary and can be mitigated with proper measures.

6.5.2 Noise

Cumulative impacts on ambient noise are expected to occur as a result of the combination of the raml tram, Metro Abu Qir and Al Madina Tram and when construction works intersect with crossings. Other Projects are out of the area of influence in which noise is expected and therefore the cumulative impacts are minor. Even where cumulative impacts occur however, these are considered short-term and minor.

With regards to vibration, the other Projects will only produce minor vibration impacts during the operational phase. Vibration cumulative impacts are therefore unlikely to occur.

6.5.3 Cumulative impacts on Employment

During the both the construction and operational phases of tram and metro, there will be an increase in employment, thus a cumulative positive employment impact. In addition to the direct employment opportunities, there will also be indirect positive impacts on close by shops and restaurants.

6.5.4 Cumulative impacts on Quality of Life

The operation of all Projects will collectively contribute to the improvement of quality of life by increasing accessibility to transportation and relieving traffic volumes on the neighboring road networks.

6.5.5 Cumulative impacts on Occupational Health and Safety

Raml Tram Project is anticipated to result in many adverse impacts related to occupational health and safety, particularly, the transmission of diseases e.g. COVID 19. The other transportation Projects might increase the number of affected workers causing significant OHS impact. Additionally, the transportation employed persons might result in Major cumulative impact.

After applying the procedures of national and international organizations, the impacts related to OHS will be minimized to Moderate.

6.5.6 Cumulative impacts on Traffic

The cumulative traffic impacts will be a resultant of the net negative impacts of construction phases of both the tram and the metro, negative impacts of traffic on level crossings and positive impacts from the other supporting Projects. The exact magnitude and direction of cumulative impacts of traffic however, can only be determined by a traffic model.

6.5.7 Mitigation Measures for Cumulative Impacts

The main mitigation measure that needs to be implemented to manage cumulative impacts during the rehabilitation of the tramway and the regional metro is to maintain communication between Contractor's Project Management teams of both projects to ensure coordinated construction and field works logistics and schedules, eg. Labor camps locations to minimize disturbances to close sensitive receptors and maximize common benefit.

Since both the tram and the regional metro are under the ultimate responsibility of NAT, coordination activities between the two projects is expected to be a smooth process.

6.6 Greenhouse Gas Emissions

6.6.1 Overview

Assessment of greenhouse gas (GHG) emissions arising from a Project nominated for financing, is a lender requirement and is one of the fundamentals of responsible financing initiatives. The results of the GHG assessment is used to determine climate risks and determine possible adaption measures. Also, the results of the assessment determine whether annual reporting of GHG emissions will be required during the operational phase of the Project.

Greenhouse gases (GHG) are a range of gases that have the ability to trap radiation in the upper atmosphere, contributing to global warming. Accounting for the likely GHG emissions associated Projects has recently been a fundamental requirement by many donors. GHG include the following:

- Carbon dioxide (CO₂) – by far the most abundant, primarily released during fuel combustion;
- Methane (CH₄)- released through biomass decomposition, oil/gas production & processing, coal mining, municipal solid waste landfills, and municipal waste water treatment;
- Nitrous Oxide (N₂O) – from industrial activity, fertiliser use and production;
- Hydrofluorocarbons (HFCs) – commonly used as refrigerant gases in cooling systems;
- Perfluorocarbons (PFCs) – used in a range of applications including solvents, medical treatments and insulators; and
- Sulphur hexafluoride (SF₆) – used as a cover gas in magnesium smelting and as an insulator in heavy duty switch gear.
- Nitrogen trifluoride (NF₃)

Each of the above gases has a global warming potential (GWP), which is a measure of the degree to which a greenhouse gas mass can contribute to global warming as compared with the same mass of CO₂. The Global Greenhouse gases are usually expressed as carbon equivalents (Ce) or carbon dioxide equivalents (CO₂e).

Table 6-8 Global Warming Potential

Name	Chemical Formula	Global Warming Potential for Given Time Horizon (100 years)
Carbon Dioxide	CO ₂	1
Methane	CH ₄	25
Nitrous Oxide	N ₂ O	298

Greenhouse gas emissions are expected to increase as a result of the construction and operational phase activities of the Raml Tram. During the construction phase, greenhouse gas emissions resulting from the “raw materials” from the different elements and the transportation of these materials onsite are considered. On the other hand, during the operation phase, the modal shift of passengers to tram versus other modes of commute and decongestion are taken into consideration to compute the overall carbon footprint of the project and a carbon payback time comparing global emissions related with the construction to emission saved over the operation period.

The Consultant was made aware of a document (received by email in May 2021 from NAT), complimentary or part of the 2016 EGIS Feasibility Study, entitled, ‘Economic and Financial

Viability' (EFV)⁶⁵. Section 6 of this document contains a Carbon Footprint Assessment based on the passenger demand forecasts to 2040 and 2050 and additional road traffic information. The Carbon Footprint assessment was developed based upon a Predicoucarbhone tool suited to infrastructure projects such as the tramway operation. Principles of operation of the tool are shown in the following figure.

⁶⁵ Annex VII: EGIS 'Economic and Financial Viability' Report 2016

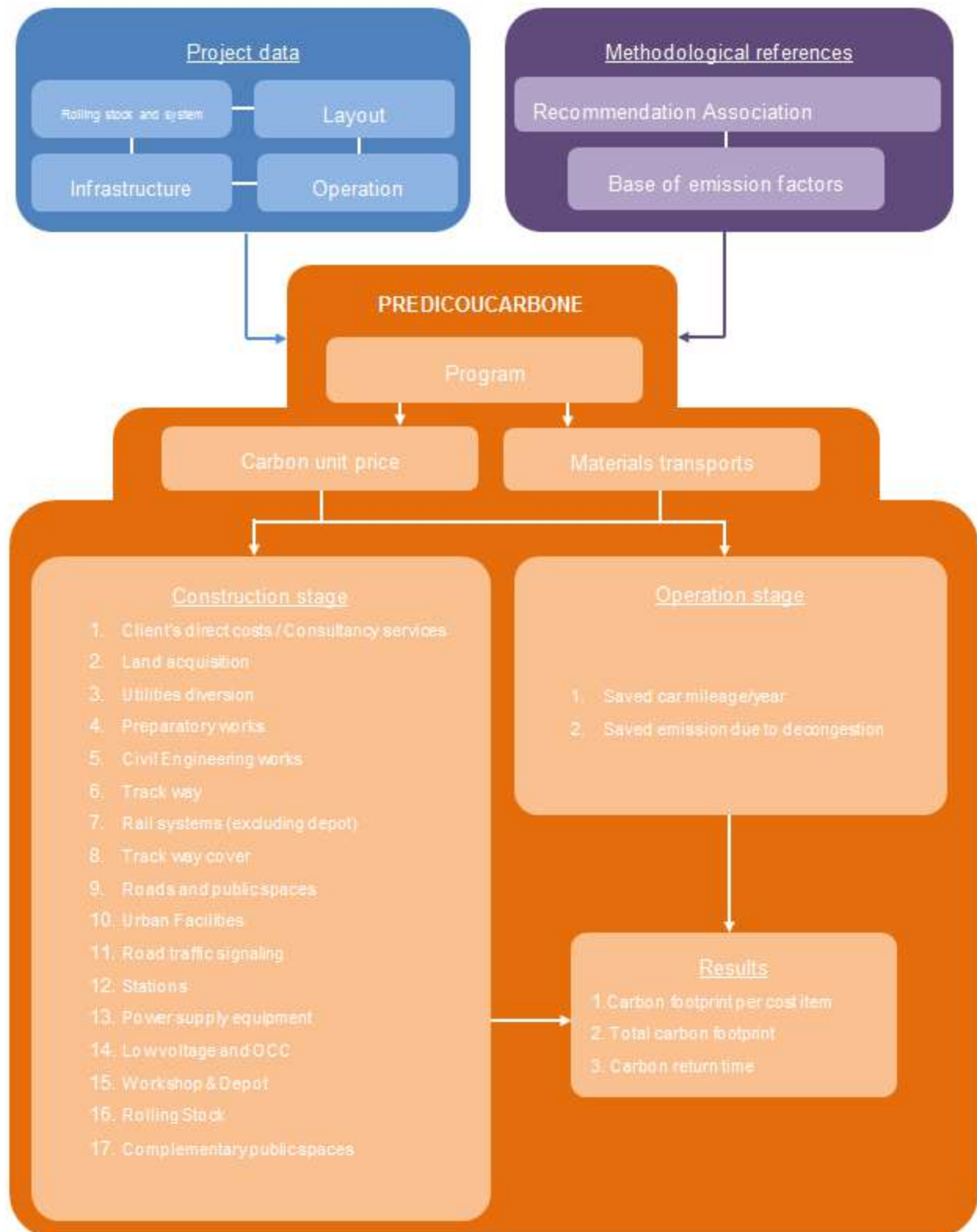


Figure 6-12 Principle of operation of the Predicoucarbhone tool (Source: Annex VII EGIS, 2016)

6.6.2 GHG Emissions During the Construction Phase

The total carbon footprint of the construction stage of the Raml Tram is estimated at 44 410 TeqC which is equivalent to 162 820 TeqCO₂. The four main cost items are: civil engineering, workshop and depot, stations and rail systems. They account for 71% of the emission with 31 450 TeqC. The main materials responsible for greenhouse gas emissions are metals and concrete, which are major constituent of the four items indicated above.

Table 6-9 Greenhouse gas emissions during the Construction Phase

Item	Carbon Footprint (TeqC)	Carbon Footprint (TeqCO ₂)
Client's direct costs/ Consultancy	1 010	3 690
Land Acquisition	0	0
Utilities Diversion	220	810
Preparatory Works	500	1 840
Civil Engineering Works	11 570	42 420
Track way	3 860	14 160
Rail Systems (excluding depot)	6 520	23 920
Track way cover	320	1 170
Roads and Public Spaces	2 970	10 890
Urban Facilities	10	30
Road Traffic Signaling	20	70
Stations	7 430	27 260
Power Supply Equipment	810	2 970
Low voltage and OCC	250	910
Workshop & Depot	5 930	21 750
Rolling Stock	2 990	10 950

Total	44 410	162 820

6.6.3 GHG Emissions During the Operation Phase

During the operation stage two kind of avoided emissions are taken into account:

- Emissions savings linked to the modal shift from cars and collective taxis to public transport
- Reduced emissions related to congestion reduction for the car traffic in Alexandria

These emissions are avoided if the project is implemented in comparison with the reference scenario where no public transport project is implemented.

A total of 3 430 TeqC , i.e. 12 577 TeqCO₂, emissions are saved every year thanks to the project (in comparison with a situation where the project would not be implemented). Over this amount 3 350 TeqC, 12 283 TeqCO₂, is due to the modal shift from car and collective taxi, and 80 are due to traffic decongestion in the city.

Table 6-10 Greenhouse gases emission savings in the operation stage

Item	Yearly Carbon Impact (TeqC)	Yearly Carbon Impact (TeqCO ₂)
Car Modal Shift	-910	-3 337
Collective Taxi Modal Shift	-2 440	-8 947
Traffic Decongestion	-80	-293
Total	-3 430	-12 577

During the operation stage, different types of emissions are taken into account: consumption of the rolling stock, the systems, and the depot. Given that the Project is a rehabilitation project of the existing Raml tram and the project will not be built from scratch, the current emissions are considered in the footprint assessment. Due to its age, the use of the current rolling stock implies a high energy consumption per passenger. In addition, the current voltage of the substations (600V) leads to higher power losses than modern systems which operate with 750V. The new Raml Tram rolling stock will benefit from the latest improvements in terms of energy savings (optimized energy consumption, regenerative braking system,

etc.). However, it has to be taken into account that there will be more rolling stock operating on the line and more systems (passenger information system, ticketing, etc.) which will involve extra power consumption. Accordingly, the carbon footprint assessment conducted by Egis has considered 15% of the emissions of the project at operation stage to account for the extra greenhouse gases emission compared to the reference scenario.

Table 6-11 Greenhouse gases emissions in operation stage

Item	Yearly Carbon Impact (TeqC)	Yearly Carbon Impact (TeqCO ₂)
Raw emissions at the operation stage	2 440	8 947
Adjusted emissions at the operation stage	360 (15% of the above item)	1 320

Table 6-12 Total greenhouse gases impact of the operation stage

Item	Yearly Carbon Impact (TeqC)	Yearly Carbon Impact (TeqCO ₂)
Emissions savings	-3 430	-12 577
Emissions due to operation stage	360	1 320
Emission balance of operation stage	-3 070	-11 257

Therefore, during the operation phase, a total of 3 070 TeqC/year (11 257 TeqCO₂/year) will not be emitted as a result of the rehabilitation of the tram in comparison to the existing situation.

6.6.4 Carbon Payback Time

As per Egis Economic and Financial Viability, 2016, the time it will take for the operational phase to compensate the carbon emissions that resulted during the construction phase will take approximately 14 years. This duration is slightly higher than most tramway projects, due to a moderate modal shift and to the high carbon cost of the viaduct sections.

6.6.5 Carbon Footprint of the Project

The total carbon footprint of the project was calculated for the construction stage and 30 years of operation stage as summarized in the following table.

Table 6-13 Summary of Carbon Footprint Assessment Results

Carbon Footprint Assessment Item	Value
Construction	44 410 TeqC (162 820 TeqCO ₂)
Operation	-3 070 TeqC / year (-11 257 TeqCO ₂)
Carbon Payback Time	14 years
30 years of operation	-92 100 TeqC (337 700 TeqCO ₂)
Carbon footprint over 30 years	-47 690 TeqC (-174 863 TeqCO ₂)

All in all, the carbon footprint assessment shows that over a duration of 30 years of operation, the **Project will avoid the emission of 47 690 TeqC (174 863 TeqCO₂)**. Therefore, the Project will result in an overall positive impact with regards to Greenhouse gas emissions.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) AND MONITORING PLAN

7.1 Introduction

This chapter presents the Environmental and Social Management Plan (ESMP), including management and monitoring activities and plans, developed for Raml Tram Rehabilitation Project. This chapter consists of the following sections:

- Objectives of ESMP
- ESMP
- Roles and responsibilities in the implementation of the ESMP and institutional arrangement
- Cost Estimation and budget

7.2 Objectives of ESMP and Monitoring Plan

The Environmental and Social Management Plan (ESMP) consists of a set of mitigation, management and monitoring measures to be undertaken during construction and operation of the Project so as to avoid, reduce, mitigate, or compensate or offset any adverse social and environmental impacts. In addition, the ESMP defines procedures to ensure that the management of environmental and social issues during the different Project phases are undertaken in accordance with national legislation and best practice procedures.

The successful implementation of the ESMP will depend on a range of different elements. To ensure a management plan that incorporates and successfully integrates with interface documents, the following elements must be considered and acted upon:

- The Environmental and Social Management Unit under NAT, the Contractor and the operator should be adequately staffed to ensure the proper implementation and monitoring of the ESMP. The organizational structure of the environmental and social PMU should also reflect the range of complete competencies to perform the tasks.
- The development and management of registers for the proper documentation and tracking of environmental and social training, environmental and social incidents and environmental and social related grievances.

7.3 Environmental and Social Management Plan (ESMP) and Monitoring Plan

The Environmental and Social Management Plan (ESMP) presented in this chapter reflects the implementation procedures and mechanisms for the mitigation measures and monitoring activities of the expected impacts previously discussed in Chapter 6. The ESMP assigns certain tasks for different stakeholders according to their roles and responsibilities in the Project.

7.3.1 Tasks and responsibilities

Based on the Institutional Capacity Assessment for NAT, the proposed institutional set up for Project management is comprised of the following main key players:

- Technical Assistance Consultant
- Technical Assistance Team (TAT)
- NAT E&S Management team
- Contractor Environmental, Social and Health & Safety Unit (CESHSU)
- Operator Environmental, Social and Health & Safety Unit (OESHSU)

7.3.1.1 Responsibility of Technical Assistance Consultant:

- Appoint an E&S officer within the team, who will interface between NAT and the contractors;
- Assist NAT in implementing the communication plan;
- Ensure awareness among the teams on local and international E&S system issues;
- Promote E&S system issues to local stakeholders;
- Lead monitoring from the site preparation phase, including e.g. updating of E&S management system master plan for the implementation phase; validating E&S management system documents issued by contractors; and
- During the construction phase: site visits and audits to verify compliance of the implementation with the all specifications, issue of command to contractors in case of non-compliance, organise meetings and trainings with contractors' managers.

7.3.1.2 Technical Assistance Team (TAT)

- Upgrade the Capacity of NAT
- Support in the implementation of all activities related to lenders requirements
- More details will be obtained about their exact roles after signing the contract

7.3.1.3 Responsibilities of NAT-PMU:

- Establish ownership and responsibility of action in the E&S Unit Director set-up. This should act with the purpose of ensuring their knowledge on various topics related to local and international regulations;
- Ensure proper implementation and monitoring of the process through regular reporting on E&S performance
- Participate as required in the E&S Committee organised by Technical Assistance Consultant with the contractors' E&S representatives; and
- Carry out or commission audits and inspections of the E&S management system implemented by the contractors; and
- Build on E&S management system indicators provided by the contractors to communicate on E&S system performance.

Below is the organizational chart of NAT E&S:

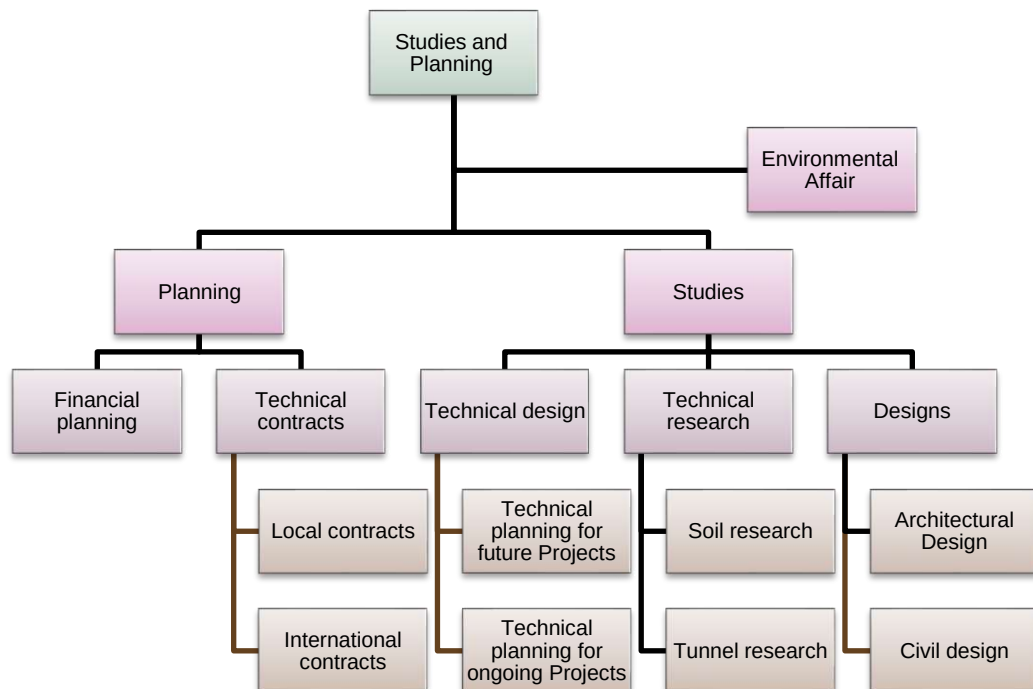


Figure 7-1: Organizational chart of NAT E&S related departments

7.3.1.4 Responsibility of the Contractor:

- Undertake to implement the E&S Management Policy of the Raml Tram;
- Set up the organisation, resources, tools and methods to meet requirements;
- Appoint an E&S officer within the team who will be responsible of implementing and monitoring compliance with the Project's E&S management system approach throughout the work, and accompanying Technical Assistance Consultant/Nat on site visits;
- Provide regular monitoring indicators for E&S management system site reporting;
- Training and awareness of employees, also ensuring the application of these provisions by suppliers and subcontractors; and
- Verifying the implementation of E&S management system requirements and analysing non-compliance and implementing and monitoring corrective actions;

- Develop detailed management plans as per requirements set in the ESMP. All the detailed management plans must be prepared before construction phase starts.

Contents of the Contractor's E&S Management Plan as specified by Technical Assistance Consultant:

- Staff Training Plan
- Health and Safety (HS) Management Plan
- Community Health , Safety and Security Plan
- Environmental Management Plan
- Waste Management Plan
- Water management plan
- Dust Management Plan
- Traffic Management Plan
- Labor and Working Conditions Management Plan including Workers Grievance Mechanism
- COVID 19 Prevention and Management Plan
- Recruitment and Employment Plan
- Develop a vegetation/greenery plan
- Update the Stakeholder Management Plan
- Monitoring of the E&S management system Construction Master Plan

The contractor is required to draft an Environmental and Social Management Plan for the Project and submit it to NAT for review and comment. From the bid phase onwards, all the requirements and measures agreed to by the contractor will be applicable to its subcontractors and suppliers. The contractor shall be responsible for ensuring these measures are implemented effectively. Additionally, the contractor must develop a vegetation/greenery plan, to be approved by NAT and local authorities, which aims at providing a green corridor through the city.

7.3.2 Required Human Resources and Training for NAT

NAT has a long experience with EIB and AFD funded Projects. They gained lots of information and knowledge about various aspects related to ESHS. In order to be able to fulfil their monitoring and follow up activities, NAT will be in need to upgrade their capacity in terms of:

- Environmental & Social Impacts Assessment (ESIA)
- Environmental/Occupational Health & Safety
- Environmental Monitoring and Audit
- Environmental planning and policy
- Urban Environmental Management
- Solid waste management and recycling
- Industrial waste management
- Wastewater treatment technology and reuse
- Air & soil pollution measurement & control
- Socio-economic surveys (Data collection, survey methods, and data analysis)
- Labour Influx management
- Grievance Redress Management (GRM) system
- Effective communication
- Conflict management

7.4 Environmental and Social Management and Monitoring Plan (ESMP)

7.4.1 Environmental and Social Management Plan during Pre-construction and Construction phases

Table 7-1: Environmental and Social Management Plan during Pre-construction/Demolishing and Construction phases

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Pre-construction and during construction phases							
Job creation and local content	Provision of job and supplies' opportunities tends to be by nature a positive socioeconomic impact. However, if it is poorly managed, there will be a high probability of raising disputes with the community people residing in Alexandria City. Accordingly, a	- A Recruitment and Employment Plan will be developed which will define the process to be followed for the recruitment, training and development of local personnel, concretely.⁶⁶ - NAT and project contractors will work with local authorities and employment organisations to	Not applicable	- Disclosed job opportunities - Review Minutes of Meetings - Monitor the GRM	Contractor and sub-contractors	NAT PMU/ TAC	No cost except for the cost of developing the Local Content & Procurement Plan (Approx.

⁶⁶ For more information please see the A guide to getting started in local procurement https://www.ifc.org/wps/wcm/connect/65550eb7-2bec-47db-95a1-8001f4b90706/IFC_LPPGuide_PDF20110708.pdf?MOD=AJPERES&CVID=nzmlKX1

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	Recruitment and Employment plan must be developed.	ensure that all positions are advertised in a manner that is accessible to the communities - Nat and contractors will ensure that the recruitment process is fair and transparent, public and open to all regardless of ethnicity, religion or gender; - NAT and contractors will develop specific measures to facilitate access to employment of women and youth. - Additionally, a Stakeholder Engagement Plan will be implemented to outline how NAT will ensure regular, open and transparent communication with all stakeholders, concretely:					2,000 USD)

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- To provide clear information on the number and limited timescales of employment opportunities. - To ensure information on the employment and the procurement strategies is disclosed at all local communities . - To plan an engagement with stakeholders through early, inclusive dialogue to build a shared understanding of the potential positive and negative impacts of workers influx, and the associated risks and opportunities. - The creation of jobs should be properly managed in order to					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		fairly implement recruitment process with no discrimination and transparently.					
Ambient Air Quality	Increase dust emission	- A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected where practical and feasible as dust barrier. - Minimize movement of construction traffic around site and maintain appropriate speed limits. Vehicle speed will be minimized to control dust generation (for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr); - Preparation of Dust Management Plan for each	Moderate	- Site investigation - Review the equipment maintenance log - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		specific site as part of the Contractor ESMP, including site map indicating location of physical barriers such as fencing, location of stockpiles and storage areas, traffic routes and stabilized site access/exit points, presentation of dust control measures to be used on site, and dust management checklist.					
	Gaseous Emissions	- All machinery and vehicles need to be regularly maintained and in good working conditions such that fugitive/gaseous emissions are avoided/minimized. During the tender phase and construction works, the Contractor must review	Moderate	- Site investigation - Review the equipment maintenance log - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		documentations about construction machinery exhaust emissions. - Turning off engines when they are not used or working on minimum rpm. - The contractor is obliged to use at all times the latest technology to reduce exhaust emissions.					
Noise and Vibration propagation	Increase of allowable noise and vibration levels	- Prepare a Construction Management Plan (CMP) in agreement with Alexandria Governorate and NAT, in line with lenders' E&S Standards (i.e. EIB ESS, World Bank ESS) - A 2m high steel sheet piles hoarding or slurry wall along the site boundaries will be erected	Moderate	- Site investigation - Review the equipment maintenance log - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		where practical and feasible as noise barrier. - Localized noise barriers will be erected as necessary to ensure noise levels remain below legal limits at all times around items such as generators or high duty compressors. - Machineries used during construction such, as excavator, generators, boring machine, etc are certified and maintained - The contractor is obliged to use at all times the latest technology in terms of noise reduction. - Regular maintenance for all equipment and vehicles used in the construction activities to					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		maintain the levels of noise and vibration within the allowable levels. - All works should take place during the day/evening, and only by exception at night. If works need to take place at night, the contractor shall ask written permission from promoter and shall inform residents at least 2 weeks in advance, with a clear start and end date.					
Groundwater	Interrupt nature and quality of groundwater due to improper waste handling and diversion activities	- Prior to construction activities, the Contractor must review the detailed hydrogeological study (to be developed by Systra before demolition and construction) and review the numerical models that represent	Moderate	- Site investigation - Review the equipment maintenance log	Contractor	NAT PMU/ TAC	Within contractor cost
	Intercept the water table during utility diversion.		Minor		Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		groundwater presence, the expected scenarios of rising groundwater water levels, and the extent of the negative impacts on facilities and residential buildings. - Ensure proper maintenance equipment used for construction equipment are in good condition to minimize spills. - Systematic control over implementation of measures considered by the waste management plan; - Sewage holding tanks should be evacuated as frequently as required, to prevent over flow. A schedule for regular sewage tanker evacuation of sewage		- Review complaint log			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		holding tanks should be established - Install a dewatering system if it is likely that a water table may be intercepted to ensure dry and stable soils for site preparation and foundation excavation and protect equipment and materials on-site from getting damaged by water.					
Soil	Degradation of soil quality	- The geotechnical surveys must be developed by the ACE pre-construction and provided to NAT and the Contractor to provide more information about the local conditions of the soil characteristics along the route of the tram way and location of depot and to identify the geological	Minor	- Site investigation - Review the equipment maintenance log - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		features of the sub areas to predict the impact that may occur. The Contractor will review the survey to identify features specific to each construction site and identify any potential impacts and how to prevent/reduce them. - Implement the site construction management plan regarding segregation and reuse options of excavated soil to avoid its contamination. - Implement proper waste management measures as described below. - Implement vibration mitigation measures as described above					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Generate d Waste	○ Solid hazardous and non-hazardous waste generated from construction activities ○ Liquid waste includes dewatering water	- The contractor will prepare, submit to NAT's approval, and implement a waste management plan. The plan will, as a priority include the removal of all identified polluted wastes described in the ESIA. - NAT in cooperation with the responsible District authority has to guarantee the safe disposal and treatment of the generated waste. The recommended mitigation measures are as follow: - All types of hazardous waste will only be transported by licensed hazardous waste service providers and disposed of in licensed landfill. Both, the	Minor	- Site investigation - Review wastes receipt - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost – It will cost approx. 90,000 USD to collect, transport, and dispose of the waste.

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		service providers and disposal sites have to be identified at the beginning of construction work – Ensure that the controlled dumpsites or landfill could accommodate the amount of wastes generate from the rehabilitation activities – Arrange all administrative procedures for licensing the transport and disposal of waste; <u>The Waste Management Plan</u> <u>Will:</u> – Identify waste types and quantities – Allocate a separate bin for each type of waste					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Contract a licensed solid waste contractor/scrap dealer to collect non hazardous solid waste and scrap on a regular basis and dispose in legally permitted facilities. - Contractors in charge of building concrete elements will manage the washing and maintenance of concrete mixer trucks to avoid unmanaged spills of concrete residue at various locations. - Construction waste in Project sites should be collected in designated areas inside the construction site and hauled to properly managed sites.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Keep a register of the quantities that have been disposed of. - During Construction, the contractor should establish a direct line of contact with the local authority and Nahdet Misr to regularly dispose the waste in the case of illegal dumping and minimize any risks that can affect the workers. - The waste management areas will be allocated within the tram corridor. General - Recycling and reuse will be prioritized over disposal by implementing the following:					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Sell decommissioned rails as high value scrap instead of sending them for disposal. - The contractor is encouraged to setup contact with any construction and demolition waste recycling facilities and send their waste for recycling rather than disposal. - Implement a waste segregation plan onsite, utilizing different containers were possible for recyclable construction waste and non-recyclable (the same applies to domestic waste). - Maximize re-use of excavation waste as backfill and recycle viable materials;					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Implement a segregation system based on compatibility of different waste streams during each phase of Project implementation. - Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at designated sites. - Spent oils shall be collected, stored in sealed containers and recycled using a licensed company which also has to be identified by the contractor. - Prevent open burning of non-hazardous waste to avoid release of toxic pollutants into the ambient air through closing					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		the informal openings that are used by people living in the surrounding to throw out their garbage. <u>Hazardous waste and substances:</u> – Store hazardous waste, such as paint cans and epoxy containers, in separate bins. – Contract a hazardous waste contractor to regularly collect the hazardous waste and transport to legally permitted facilities such as Al Nassiriya landfill. – Enforce the use of proper PPEs and safety precautions when dealing with hazardous material.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Keep a register of the quantities that have been disposed of. <u>Liquid Waste</u> - Contractors should allocate certain areas within the construction site for the offices/camps of the construction staff - Collection tanks receiving domestic wastewater from offices/camps, needs to be made of waterproof material to avoid leaks and has to be evacuated frequently to operating WWTPs by tankers and disposed of in a WWTP with suitable capacity as					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		determined by Alexandria Sewerage Company. - An agreement will be made with Alexandria Sewerage Company prior to preconstruction and construction to arrange for disposal. <u>Construction Dewatering Liquid</u> - The contractor will carry out site-specific assessments to determine the hydrogeological characterization of the site including all necessary information to determine the volume, quality and duration of the dewatering discharge during construction.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Prioritize the use of dewatering liquid in construction activities such as dust suppression rather than using potable water - Once the findings of the hydrogeological survey are ready, the Contractor will arrange for its disposal in a rain drainage network <u>Waste Storage & Handling</u> - Assigning certain areas, for stockpiling soil and construction waste, these areas should be secured and protected to avoid any possible theft; - Waste will be stored in containers or skip bins. It will not					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		be stockpiled directly on unsealed ground; - Collection tanks receiving wastewater from offices/camps, needs to be made of waterproof material to avoid leaks and have to be evacuated frequently to operating WWTPs. - Sewage/septage generated during construction should be removed by tankers and disposed of in a WWTP or city sewer. Contractors should allocate certain areas within the construction site for the offices/camps of the construction staff. An agreement will be made with Alexandria Sewerage Company					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		at the beginning of the preconstruction phase. According to the estimated amount of wastewater, an arrangement will be made with several wastewater treatment plants in Alexandria, depending on its individual capacity. - Recycling waste will be stored in separated areas or containers, and not mixed with other waste types; - Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable. - All hazardous wastes must be appropriately stored in bounded					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		areas and should be clearly identified as “hazardous”; – Waste removal from the site will be scheduled, to always have a waste skip available for use on site, and to ensure that waste skips/containers are not overfilled; – Any temporary waste storage areas (not contained in bins or containers) will be covered and/or surrounded by a screen mesh fence to prevent it being wind-blown across the site; – Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		sunlight during transportation and storage. - Temporary storage is to take place in areas with impervious flooring. In case of spillage: - Avoid inhalation and sources of ignition. - Cover and mix with sufficient amounts of sand using PPE. - Collect contaminated sand in clearly marked secure containers/bags. Waste Disposal - The disposal of all the solid wastes generated during the pre-construction and construction					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		phase is the responsibility of the contractor and should be disposed of through licensed contractor and transferred to controlled dumpsites or landfills. Hazardous waste will be sent to Nasiriya Landfill. Other solid wastes will be sent to Burj al Arab or El Hammam landfills - For the disposal of the old track components (rails, fastenings, etc.), it will undergo quality control check and it could be either reused in other railway lines or to be sold as scrap in auction. While the disposal of the wooden sleepers, if contaminated, it should be disposed of sent to El Nasiriya landfill.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- The old ballast will be sieved and screened and if contaminated, it will be disposed of in a hazardous landfill and if not, it will be reused onsite. - Sewage holding tanks should be evacuated as frequently as required, to prevent over flow. A schedule for regular sewage tanker evacuation of sewage holding tanks should be established; - Conduct regular maintenance and inspection on the sewage holding tanks, plumbing and associated wastewater facilities to ensure good sanitary conditions; and - All tanks, drums, pipes and sewage holding tanks should be					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		decommissioned and removed upon demobilization from the site. Asbestos survey should be developed to indicate the existence of Asbestos. If it exists, an asbestos management plan should be developed that clearly identifies the locations where the Asbestos Containing Material (ACM) is present, its condition, procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. Repair or removal and disposal of existing					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		ACM in buildings should be performed only by specially trained personnel.					
Terrestria I Ecology	Impact the flora and fauna of the study area and roadside trees might have to be cut down for the construction of some the at-grade and viaduct sections.	- Restrict areas for dredging and soil moving activities or vegetation clearing as much as possible (minimal clearance); - Where possible, re-vegetate cleared areas by planting trees, shrubs and native grass; - During the design phase, the Contractor must identify the number of trees that will be cut down/ vegetated areas that will be excavated and compensate by designing revegetated areas along the route, surrounding passenger loading area, underneath viaducts, etc	Minor	- Site investigation - Review complaint log	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Trees removed during the construction phase should be transplanted, to avoid creating waste and to compensate for the removal of vegetation, near the new stations where the existing trees would be damaged due to the construction works. - Systra will designate the area under the viaduct stations to either parking spaces or recreational green areas. The green areas may be fenced with sufficient waste bins and Nahdet Misr should be contracted with to ensure that the area is well-maintained and remains free					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		of uncontrolled solid-waste dumping. - Trees can be replanted at the cancelled North Sidi Gaber Loop in addition to shrubs and grass.					
Impacts on Structural Integrity of buildings	- The structural integrity of neighbouring buildings in direct vicinity of the ROW of the corridor in the viaduct areas and stations can be put to risk during the construction phase due to: - Soil settlement as a result of dewatering activities - Vibration as a result of Piling and use of heavy machinery	- Carry out a survey before the start of construction along the whole tram route to assess the potential risk of damage, and indicate the dilapidation of buildings/structures. The Contractor will carry out all necessary models to evaluate potential degree of damage on sensitive receptors.	Minor	- Site investigation - Review complaint log - Review accident report	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Natural Risks – Seismic	Seismic activity can pose potentially negative impacts on the time schedule of the construction activities in addition to possible injuries or fatalities to the workers.	- It is necessary that responsible employees and workers are trained to deal with such events and that such risks are incorporated in the contractor's emergency response plan. - It is necessary that Seismic Risk factors are taken into consideration and appropriate factor of safety/safety engineering criteria are incorporated in the design of the various components, including viaducts, stations, depot and tram catenary system to prevent failures due to earthquakes.	Minor		Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Natural Risks – Flood	Flood events can damage the overhead power supply lines causing secondary impacts on humans and biodiversity and posing serious life-threatening situations of electric shocks.	- Contractor will plan activities taking seasonal conditions into consideration, keeping all activities that could be affected outside the rainy season. - During Construction, the Contractor will build a site drainage system equipped to protect the site against potential flooding. This system will be built such that flood waters are rerouted away from the project area to the city's sewer network. - Avoid low lying areas on the work site which can become flooded - Ensure that material storage places are adequately drained	Minor	- Review flood forecast	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Adequate plastic sheeting to cover recently completed work and unfinished work that can be damaged by rain. - Have adequate water pumps for dewatering on site and have a system in place to dispose of storm water and discharge the water to the sewer drainage network.					
Occupational Health and Safety	- Generic occupational risks associated with construction sites include: - Excavation and Trenching - Fall - Exposure to Noise - Construction equipment and vehicles/trucks - Weather conditions	- The Contractor and NAT must prepare and adopt a Construction Environmental and Social Management Plan (CESMP) during the construction phase that consists of subplans including:	Moderate	- Review the OHS plan - Review of the contractual agreement - Monitor the GRM	Contractor	NAT PMU/ TAC	Within contractor cost – The cost of developing a CESMP is approx.. 25,000 USD

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	- Unstable surfaces - Falling objects - Manual handling - Musculoskeletal injuries - Transmission of diseases: Workers might be affected by transmission of diseases, especially COVID 19, Hepatitis A, B & C and HIV Aids. Additionally, other communicable diseases might affect workers.	• An Occupational Health and Safety Management Plan (OHSP); • An Environmental, Health, and Safety (EHS) plan; • A health surveillance program; • A working conditions management plan; • A Workers' Grievance Mechanism; • COVID-19 Prevention and Management Plan; and • An emergency response plan. - The developed CESMP should be prepared in full compliance with World Bank Group Environmental, Health & Safety					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		Guidelines and EIB E&S Standards - The contractual agreement with the contractor should include rigid commitments to apply the CESMP that should be prepared in full compliance with the WB EHS requirements and EIB E&S Standards.					
Community Health, Safety, and Security	- Increased risk of traffic hazards and incidents associated with the use of the highway for freight and local roads for communities and workers; - Increased incidence of communicable disease e.g. COVID 19 and Hepatitis;	- Implementation of Community Traffic Safety Awareness Campaign during the construction period, particularly in those communities where construction vehicles will be most active. - Prevention and control of construction traffic related injuries	Moderate	- Review the health surveillance program - Review the collected data - Review reports	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	- Risks associated with the presence of private security personnel on site (within the Project area) and at offsite operations and activities (within the community); and - Personal safety and well-being impacts associated with worker influx. Site trespass and injury Pedestrian road safety during construction and operation. Increased transmission of Sexually Transmitted Diseases (STDs); Spread of communicable diseases other than COVID e.g Tuberculosis	and fatalities by adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents, as required by the IFC General EHS Guidelines: Community Health, safety and Security. A health surveillance programme can be established within the CESMP to monitor the health condition of communities within the AoI with a significant exposure risk. Medical examinations for all workers to be conducted by a registered medical officer (physician). Monitor the spread of potential illness e.g. COVID 19.		related to health - Data related to COVID 19 - Monitoring labour influx impacts - Monitor the GRM			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		The following plans should be developed and implemented by the Contractor: - Community Health, Safety and Security Plan - Traffic and Transportation Management Plan - Emergency preparedness and Response Plan - Stakeholder Engagement Plan - Severance Management Plan - Security Arrangements will be based on the Voluntary Principles for Security and Human Rights which are international best practice. This involves e.g. the selection based on a careful background screening of security forces, their					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		training with regards to Human Rights and a careful monitoring of their services. NAT and contractors will make security arrangement transparent to the local communities and consult regularly with them about the impact of arrangements on communities - A Security Management training will be provided to security personnel. - Violation of the required standards will result in corrective actions, including termination of subcontracts with security firms. - Sufficient training including clear instructions on the objectives and the permissible actions will					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		be provided to the security personnel. The instructions will be based on the relevant Egyptian law and will be communicated as terms of employment and reinforced through periodic professional training. Given regular contact with the local populations, training on Grievance Mechanism, such as handling of community grievance will also be provided to the security staff as part of their periodic professional training. - Complaints by the public (or other workers) with respect to behavior of Security Personnel					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		can be made via the Grievance Mechanism. - As part of the Stakeholder Engagement Plan, NAT and contractors will have an engagement meeting with local community representatives and municipal officials informing about the safety management plan and the procedures adopted.					
Cultural heritage	Alexandria Governorate is one of the richest governorates in terms of cultural heritage aspects. Potential key impacts on archaeological and	Referring to the WB ESS 8 ⁶⁷ related to cultural heritage, EIB standard 5 pertaining to cultural heritage ⁶⁸ and the Egyptian Law 17/1983 stipulates that, in situations where any	Minor	- Review the reports of Antiquities Directorate	Contractor	NAT PMU/ TAC	Cost to be evaluated by the Antiquities Directorate

⁶⁷ Source: <https://documents1.worldbank.org/curated/en/743151530217186766/ESF-Guidance-Note-8-Cultural-Heritage-English.pdf>

⁶⁸ Source: https://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	cultural heritage can be identified as follows: 1) Potential impact on historic and/or sites of architectural significance, 2) Risk of Damaging Chance-Find Buried Artefacts	culturally valuable object/monument is discovered during excavation works, the works should be stopped by the contractor and the nearest administrative authority must be informed within 48 hours. An SCA inspector shall then supervise any excavation on the site following any evident of artefacts or antiquities traces. NAT includes in its contracts for the various lots within the Tram Project a term referring to the national law. According to above mentioned antiquities laws, approvals must be obtained during the pre-construction phase of the Project from both Antiquates Directorate. These ensure that the Project will not		- Review the chance find incidences - Monitor the GRM			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		negatively affect objects of cultural heritage value. A Cultural heritage Management Plan following standard mitigation for projects that are aligned with international standards: A Chance Finds Procedure will be designed and implemented to manage any unexpected discovery of archaeological material in-line with national and international requirements and guidelines. The Cultural heritage Management Plan should be in place before construction begins.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Visual- landscap e changes	During construction of alleviated sections, visual impacts cannot be avoided but can only be minimized by fencing of the construction sites. Given the nature of structures located in the vicinity of the Tramway, which can be described as beautiful structures with some of them dated more than 100 years ago, the visual impacts tend to be of importance.	- Prior to pre-construction and construction activities, the contractor will have to provide fences, steel sheet piles hoarding and covers around the construction site in order to enable a safe construction site and to minimize noise, dust, storage of wastes and airborne particulates. The fences and steel piles appearance of will create a significant visual intrusion for the population during the construction period, which could last for 2 years.	Minor	- Site visit to make sure that the fence is installed - Inspect the management and removal of wastes - Monitor the GRM	Contractor	NAT PMU/ TAC	Within contractor cost
Utilities(i nfrastruct ure)	Impacts on public utility diversions (electricity cables, water and wastewater networks, telecommunication networks) may	Project should develop a Public Utilities Enhancement and Management Plan in which	Minor	- Review utility diversions - Review the Minutes of	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	disturb the surrounding communities.	infrastructure relocated by the Project (electric and telecommunication lines, water supply etc.) will be developed in a way that allows neighbouring communities to benefit from them after construction is over. The Plan will also consider the management of disruption to utilities through definition of clear procedures in close coordination with local utility companies. In case of any damage the community people can bring forward a complaint on the Project GM channels. Additionally, sufficient information about damaging any utilities		meetings carried out with water, waste water, electricity and telecommuni cation companies - Monitor the GRM			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		should be shared with the community people as reported in the Stakeholder Engagement Plan. Utility diversion plans are important instruments for NAT to inform the population in time about possible disturbances which will emerge from construction and are important plans for the utility companies for implementation of utility diversions in the pre-construction phase but also during the construction phase. In addition, the diversion plans inform the contractor about the type and dimension of the connecting utility to the construction sites.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Temporary Labour influx	The temporary workers may affect the Project areas in terms of: - Risk of social conflict - Increased risk of illicit behavior and crime - Increased risk of communicable diseases and burden on local health services - Accommodation of workers impacts - Local inflation of prices - Gender based violence - Overconsumption of community resources	- Develop a comprehensive code of conduct that all workers should be trained on - Develop and implement a recruitment and employment plan - Apply the grievance mechanism and the stakeholder engagement plan - Reduce labour influx by tapping into the local workforce - Assess and manage labour influx risk based on appropriate instruments e.g. the ESIA - Prepare a Labour Influx Management Plan (if the number of workers is more than 400)	Minor	- Monitor local recruitment - Monitor labour influx impacts - Review the contractual agreement - Review and monitor the developed CESMP - Monitor the GRM	Contractor	NAT PMU/ TAC	Within contractor cost – The cost of preparing a Labour Influx Management Plan is approx.. 5,000 USD

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Incorporate social and environment mitigation measures into the civil works contract - The safeguards instruments are reflected in the contractor's ESMP (CESMP) - The Project is implemented in accordance with the CESMP, safeguards instruments and other relevant contractual provision					
Risk of Gender-Based Violence (GBV)	There is a probability that the presence of workers in the Project sites might evoke gender-based violence activities, as follows: - Harassment of women and young girls by workers, this	- Prepare a Code of Conduct and insert it in the induction training to be provided to all workers - Apply the grievance mechanism and the stakeholder engagement plan	Minor	- Review the code of conduct - Review the Minutes of Meetings	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	might lead to honor crimes in extreme cases. - The probability of limitation of women and young girls' mobility around the Project area. - Discrimination against women in terms of employment.	- Engagement of community people: - Transparent engagement and participation of the local community - Provide accurate and timely information - Enhance local knowledge of potential risks and problems - There should be an accessible and Project-level grievance mechanism		- Monitor SEP implementation - Monitor the GRM			
Risk of child labour	Child labour is a common practise in Egypt. Despite all restrictions of child labour, children (below the age of 18 years) work almost in all Projects as they receive low salaries and are less demanding.	- NAT and its contractors will oversee if suppliers, contractors and subcontractors comply with all applicable child labour laws and only employ workers who meet the	Minor	- Revision of the contractual agreement - Monitoring of the workers IDs	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	Therefore, there is a high probability of child labour.	applicable minimum legal age requirement in accordance with international standards; - Contractor contracts will specify monitoring to be undertaken by the contractor, establish the right for the Project monitoring and auditing of all contractors and subcontractors and the consequences for the contractor if they are found to be breaching national legal requirements, international standards, policies or clauses in the contract regarding forced		- Monitor the GRM			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		child labour. Contractor contracts will specify that the same standards will be met by their sub-contractors and suppliers; and - In all contractor contracts the Project will make explicit reference to the need to abide by Egyptian law and international standards in relation to child labour and forced labour - Contractors and subcontractors will need to monitor closely the potential existence of irregular forms of child and					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		forced labour in the supply chain. Action measures and notice to NAT will be carried out immediately if this is found. - Monitor the IDs of workers on daily basis					
Impacts on homeless (children and old people)	Many homeless street children and old people residing in the stations of the tram might be expelled out of the stations. It was essential to recommend how to manage this category which can be classified as vulnerable groups.	A coordination agreement or a protocol should be signed with the social solidarity directorate in order to manage the resettlement of homeless and street children according to Children and homeless people without shelter NAT will make sure that this category were properly resettled as per the Resettlement Policy Framework	Minor	- Review the Minutes of meetings with the MoSS and the NGOs - Keep tracking for homeless	NAT	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
Traffic and transport ation	Construction will disturb and delay the traffic flow that may affect the local communities and environmental conditions at the construction sites and may also directly or indirectly affect the surrounding areas. Tram passengers will be deprived of their low cost means of public transportation, APTA is must provide an alternative means for the large number of passengers.	- The contractor shall provide transport safety assessments and audits around the work sites, and the engineer shall approve these. - A Traffic Management Plan should be developed to provide the maximum safety to the population and Project personnel. Additionally, to propose alternative solutions for transporting community people; - Target signage and outreach activities to improve public awareness of traffic changes and potential hazards;	Moderate	- Review the traffic Management Plan - Assess the efficiency of traffic diversions - Assess the quality of alternative roads - Monitor the GRM	Contractor	NAT PMU/ TAC	Within contractor cost – Development of Traffic Management Plan approx.. 5,000 USD

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		- Provide and identify alternative access routes for cars and pedestrians(special attention should be paid to old people and people with disability), if necessary, with coordination between the local authorities (traffic authority) and community leaders in the Project area and inform the residents about the alternative routes before construction begins; and - Review any complaints related to traffic and accident. - Mitigation Measures specific for City Tram Impacts from Ras El-Tin to San Stefano:					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		APTA is required to implement a bus service to be able to accommodate passengers throughout the construction phase. In either option, the works should ideally be completed before the Raml Tram line is de-commissioned, to allow the City Tram to continue operation East of Ras El-Tin.					
Economic displacement impacts	The Alexandria Raml Tram Rehabilitation Project will result in a permanent adverse impact on livelihood of the tenants and workers of shops, mosque, kiosk	A Resettlement Action Plan (RAP) will be prepared in line with IFC Performance Standards and EIB Standards as well as Egyptian legislation.	Minor	Apply monitoring indicators reported in the Livelihood	NAT	NAT PMU/ TAC	\$10,000 for preparation of the RAP The cost of implementing the RAP

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
	and restaurant within the Ram tramway and stations.	- The RAP will address issues associated with physical and economic displacement, loss of community infrastructure and other assets. - A Grievance Mechanism will be developed, whereby affected people can raise issues and concerns associated with displacement and the RAP processes. Establish KPIs for grievance resolution. - RAP implementation will be monitored until a point whereby it can be demonstrated that the standard of living and livelihoods of displaced households have been at least restored if not improved. As necessary		Restoration Plan			will be determined after finalizing the RAP

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		corrective action will be put in place through implementation to achieve this outcome.					
Working conditions	Working conditions describe all impacts on workers. Additionally, their welfare and the onsite facilities to be made available for workers. In light of creating job opportunities and generating income to overcome poverty and reinforce collective economic growth.	Development of a Working Conditions Management Plan in the CESMP. The main contents are: - Access to clear and understandable information regarding worker's labour and working conditions; - Provision of reasonable working conditions and terms of employment; - Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding	Minor	- Development of the WCAP - Review the working Condition Management Plan - Monitor the GRM	Contractor	NAT PMU/ TAC	Within contractor cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
		discrimination on any aspects; - Implementation of a grievance mechanism for the Project workers including subcontractor workforce; - Adoption of open attitude towards freedom of association and in conformance with Egyptian laws. Retrenchment preventive measures will be implemented to reduce adverse impacts as a result of termination of contacts which will consider benefits to boost workers employment opportunities post construction where possible. Notice of dismissals will be done in due time and will manage employment expectations of the construction workforce					

7.4.2 Environmental and Social Management Plan during Operation Phases

Table 7-2: Environmental and Social Management Plan during Operation Phase

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
Job creation and local content	The Raml Tram Rehabilitation Project might generate a large number of job opportunities during the operation phase. Some of the developed jobs will be under NAT. However, the majority of job opportunities will go to the operator.	All measures adopted during construction will be applicable during operation phase.	NA	- Disclosed job opportunities - Review Minutes of Meetings - Monitor the GRM	Operator	NAT PMU	No cost
Ambient Air Quality	- Increases in air pollution levels as a result of crowding of vehicles such as cars and buses around the stations.	- Proper housekeeping measures and maintenance of equipment at the depot.	Insignificant	- Site investigation - Review complains log	Operator	NAT PMU	No cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
	Indirect emissions as a result of electricity generation.	- All equipment in the depot areas need to be properly and regularly maintained - The contractor is obliged to use at all times the latest technology to reduce exhaust emissions. - Adequate ventilation system in depot. - Vehicles around the stations are properly managed.					
Noise and Vibration propagati on	Increase in noise and vibration levels due to Tram runs on the track and maintenance in depot area	Measures that will be developed as part of the design process include (as much as feasible): Fencing with concrete walls along the tram way as a wave	Minor	Ensure that the design consideration are properly implemented	Operator	NAT PMU	Included in design phase cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		barrier to reduce noise and vibration. - Use of modern non-metallic disc brakes, - Regular maintenance of wheels and tracks, and install jointed track with continuously welded rail - Use adequate friction modifiers (oil based or water based) is a suitable approach to the reduction of noise and vibrations. - Floating slabs, resiliently supported ties, high resilience, fasteners, and ballast mats have been used to reduce the levels of vibration.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		- Ballast mat consists of a rubber or other type of elastomer pads, that is placed under the ballast. - Modify the foundation conditions of the embankment stiffness by compaction of the embankment material. Measures that will be carried out during operational phase: ○ Regular maintenance of wheels to reduce the friction between wheels and tracks - Periodic monitoring needs to be carried out to ensure compliance to standards at					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		the sensitive receptor locations. - The operator will ensure that close coordination is maintained with responsible agencies like traffic authorities to reduce the noise impact from clustering of vehicles at station locations					
Groundwater	Leakage of oily wastewater discharged from the depot which may pollute the soil and groundwater	- An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater. - Install adequate drainage system connected to the public sewer network.	Insignificant	- Depot site investigation	Operator	NAT PMU	No Cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		- Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.					
Soil	Degradation of soil quality at depot area due to maintenance work	- Install adequate drainage system connected to the public sewer network. - An oil pit will be installed at the end of pipe discharging the wastewater from the workshop, to separate the oil from oily wastewater. - Oil is collected in barrels and send to licensed contractor for hazardous liquid waste for treatment.	Insignificant	- Depot site investigation	Operator	NAT PMU	No Cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
Generated waste	<u>Solid (Non-Hazardous)</u> waste including steel scrap, wood scrap and domestic waste around stations. The non-hazardous wastes generated during the operation phase normally have a high recycling potential. If not recycled, they should be sent to a specialized contractor or a controlled dumping site. <u>Liquid Waste</u> including the oily wastewater discharged from the depot	- Segregate waste streams to the maximum possible extent to facilitate re-use/recycling, if applicable. - Provide adequate waste bins within the stations' locations. - The disposal of solid waste generated from the depot will be carried out by NAT. - The EPC contractor will design the depot with plumbing connection in maintenance areas to an oil pit where the oil (oil/water separator) is separated and the water is discharged to the sewer network.	Insignificant	- Depot site investigation	Operator	NAT PMU	No Cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
	Hazardous waste including empty containers of chemicals, spent lubricating oils, and paint used for maintenance works, ballast and sleepers if contaminated with oil. Improper handling and storage of hazardous substances and/or waste, would result in environmental contamination.	- Spent mineral oils shall be collected, stored in sealed containers, and recycled using a licensed company. - All types of hazardous waste can only be transported by licensed hazardous waste service providers and disposed of in a licensed landfill. - Temporary storage is to take place in areas with impervious flooring. - In case of spillage: - Avoid inhalation and sources of ignition.					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		- Cover and mix with sufficient amounts of sand using PPE. - Collect contaminated sand in clearly marked secure containers/bags					
Natural Hazards	- Seismic Hazards (Earthquakes) - Groundwater Salinity - Flood	- Seismic Risk factors should be considered in the construction of the Raml Tram stations, viaducts and depot. For example, Integration of a safety engineering criteria in the design structures of the stations and electrical overhead contact system to prevent failures due to earthquakes. - Resistible construction materials to salinity should be used for	Minor	- Review weather forecast and Seismic forecast	Operator	NAT PMU	No Cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		foundations of stations, viaducts and depot. - Consider the flooding risk in the sizing of the drainage system - Increase the height of the platform.					
Occupational Health and Safety	Occupational Health and Safety is one of the most important impacts related to the operation of the Tram. It is fundamental to shed light on the nature of tram workers who represent many different occupations with specific sets of working conditions and risks, and diversified demands.	- The Contractor and NAT must prepare and adopt an Operations Environmental and Social Management Plan (OESMP) during the operation phase that consists of subplans including: - An Occupational Health and Safety Management Plan (OHSP); - An Environmental, Health, and Safety (EHS) plan;	Moderate	- Review the OHS plan - Review of the contractual agreement - Monitor the GRM	Operator	NAT PMU	Include in the Project budget – the cost of developing an OESMP is approx. 25,000 USD

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		• A health surveillance program; • A working conditions management plan; and • An emergency response plan. - The developed OESMP should be prepared in full compliance with World Bank Environmental, Health & Safety Guidelines and EIB E&S Standards - The OESMP/ Procedures should be prepared, implemented and monitored. - Address emerging risks such as violence and fatigue, and cognitive injuries with specific					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		monitoring, reporting and prevention measures. - It is essential to monitor fatigue. Step-wise alarm levels and routines to prevent fatigue-related incidents in case of unforeseen events would also be needed. - More efforts are needed to prevent and monitor violence in the transport sector. Transport workers need to be trained adequately and encouraged to report violence, and effective reporting procedures need to be put in place. - Share information with the employment agencies on the					

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
		specific OSH risks that might affect Tram workers. - Train employers and workers on how to better protect their health and safety. - Raise awareness of OSH issues in policy areas that may impact on the health and safety of transport workers. - Installation of active noise cancellation systems; - Enabling workers grievance mechanism					
Community Health, Safety,	The Tram Rehabilitation Project will result in various impacts related to the community health ,	- An Emergency Response Plan should be prepared for the operations phase under the OESMP.	Moderate	- Review the ERP - Site visit to pedestrian	Operator	NAT PMU	No cost

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
and Security	safety and security . They are as follows: 1- Accidents along the tramway line, particularly the older groups and children; 2- The risk of being hit by the tram causing injuries or fatal accidents; 3- Transmission of communicable diseases e.g. COVID-19; 4- Emergency accidents and fires that might affect community members and the Tram users	- A community health and safety and security to be developed - Availability of secure functional pedestrian accesses and paths - Full engagement of the surrounding communities, especially, their grievances related to transmission of diseases.		- access roads - Engage ment activities log review + Minutes of Meetings - Review the GRM			

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
Visual- landscape changes	Visual intrusion and landscape are by nature a negative impact. However, in the Tram Project and considering the current deteriorated and unfavourable situation of fences, stations, shops and the used tram, there is a visual landscape impacts will be considered positive after the rehabilitation. With regards to the viaducts, they might result in visual intrusion.	An expert in Fine Arts should be recruited in order to put a design for the fence, stations, viaducts and green areas design. The design should be shared with Technical Assistance Consultant, NAT and other stakeholders for approval and should consider: - Availability of secure functional pedestrian accesses and paths, - Replanting of the green space combined with public places for recreation and shops - Availability of parking facilities with trees to provide shade.	Minor	- Recruited expert contract - Engagement activities log review + Minutes of Meetings - Review the GRM - Site inspection	Operator	NAT PMU	Cost of fine arts expert to be defined

Receptor/ EHS Aspect	Impact description	Mitigation Measures	Residual impact	Means of Supervision	Implementation Responsibility	Supervision	Estimated Cost
During operation phase							
Working conditions	Working conditions describe all impacts on workers. Additionally, their welfare and on site facilities made available for them. In light of creating job opportunities and generating income to overcome poverty and reinforce collective economic growth, NAT can foster a healthy management strategy for workers and increase developmental benefits for the Project through adopting an intact management approach to labour condition, treating workers fairly, and providing a safe and healthy work conditions.	Development of a Working Conditions Management Plan under the OESMP. The main contents are: - Providing protection and safety to workers - Facilities and Utilities in the site - Security & workers right - Enhancing Workers' Efficiency - Enabling workers grievance mechanism	Minor	- Review of the developed plan - Review working conditions	Operator	NAT PMU	No cost rather than the cost of developing the WCMP

7.5 Environmental and Social Monitoring Plan

7.5.1 Environmental and Social Monitoring Plan during Pre-construction and Construction phase

Table 7-3: Environmental and Social Monitoring Plan during Pre-construction and Construction phases

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
Ambient Air Quality	- Number of complaints related to air quality. - Equipment performance and maintenance frequency. - Results of measurements and % not compliant with applicable legal standards including reasons for non-compliance.	Contractor and NAT	- On monthly basis	- Construction Sites at nearest sensitive receptor	- Visual inspection of exhaust gases from construction machinery and vehicles - Establish a documented maintenance programme for construction machinery used on sites. The maintenance programme should give particular attention to verification and adjustment of fuel feedstock, ignition and gas distribution	Included in the contractor cost The cost of conducting monthly air measurements at the 6 baseline points monthly is approx.. 92,000 USD

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
					systems of engines to ensure complete fuel combustion that will reduce fuel requirement and decrease exhaust of emissions. - An ambient air quality monitoring programme for the construction phase will monitor air quality parameters at the selected monitoring points where baseline measurements had been carried out and compare the results during construction to the results of baseline. The programme will monitor the total effect on the air quality with respect	

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
					to the parameters and the results will therefore not only be affected by the construction activities, but also by air pollution from other sources. - Complaints log	
Noise & Vibration	- Number of complaints related to noise level. - Equipment performance and maintenance frequency. - Results of noise ambient measurements including reasons for non-compliance.	Contractor and NAT	- On monthly basis	- Construction Sites at nearest sensitive receptor	- Building inspection surveys should also be carried out on the right-of-way in order to assess and control vibration impacts on buildings - Site inspection including photo documentation; - Measure ambient Noise (in case of use of mechanical/electrical digging equipment and machinery)	Included in the contractor cost The cost of conducting noise measurements is approx.. 350 USD

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
					- Inspecting maintenance records. - Complaints log	
Groundwater	- Signs of spillage of hazardous materials - Testing in case of accidental spills of hazardous	Contractor and NAT	- Weekly site inspection during rainy season - Bi-weekly site inspection during dry seasons	- Stations, viaducts and depot construction areas	- Supervision on fuel/oil storage and usage rules; - Continuous monitoring of the groundwater quality during construction would give an indicator of possible pollution that might have occurred due to changes in groundwater head. - Site inspection	Included in the contractor cost
Soil	- Observation of spillage and accumulated wastes - Signs of soil erosion - Observation of piling of hazardous materials - Evidence of fuel spills and lubricants	Contractor and NAT	- Daily	- Construction Sites	- Supervision on fuel/oil storage and usage rules - Site inspection with photo documentation	No additional costs
Solid & Hazardous	- Observation of accumulated waste piles - Storage conditions of hazardous materials; - Disposal at designated sites.	Contractor and NAT	- Daily	- Construction Sites	- Register the amounts of disposed wastes and keep waste	No additional costs

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
materials & Waste					disposal and transportation receipts/manifests; - All waste removal records will be maintained, and reported as required in the monthly environmental performance report; - The aforementioned records will be kept in a Waste Register, which records collection dates, type of waste, quantities, waste transport company, destination, and signature of an authorized person. - Site inspections -	
Job creation	- Availability of Local Content and Procurement Plan - Disclosure activities including points of sharing information is in place	NAT	- According to the developed	- As per the Local Content and	- As per the Local Content and Procurement Plan	No cost

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
and local content	- Availability of data related to labour forecasting - Develop Key Performance Indicators about the local content - Disclosed information through the Project information documents		d Local Content and Procurem ent Plan	Procurement Plan		
Occupatio nal Health and Safety	- Availability of the OHSP - Monitor all indicators mentioned in the OHSP - Review the contractual agreement	NAT	As per the developed Occupation al Health and Safety Plan	As per the developed Occupational Health and Safety Plan	As per the developed Occupational Health and Safety Plan	No Cost
Communit y Health, Safety, and Security	- Availability of the health surveillance program - Check the medical examination of all workers - Monitor the number of workers and community people who get infected by any diseases including COVID 19 - Availability of community grievance mechanism - Availability of community health, safety and security plan	NAT	Monthly	The site and desk work	- Site inspection checklist	No cost
Cultural heritage	- Full implementation of the chance finds procedures - Efficiency of implementation - Availability of community grievance mechanism	NAT	Monthly	Site inspection and desk work	- Revision of the developed chance find procedures - Revision of incidents of finding antiquities	No cost

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
Visual- landscape changes	- Commitment to establish the fence - Proper management of wastes and its full indicators according to the waste management plan	NAT	Monthly	Construction site	- Site visit to the fence - Apply all monitoring methods related to waste management	No cost
Utilities(inf rastructure)	- Availability of utility diversion plans - Full implementation of the required communication and the GM	NAT	Monthly	Construction site Desk Work	- Revision of the plans - Site inspections	No cost
Temporary Labour influx	- Labour influx plan is prepared - Apply the monitoring indicators of the Labour Influx Plan	NAT	Monthly	Construction site Desk Work	- Revision of influx management plan - Pay site visit and meet with various stakeholders - Review the raised complaints	No cost
Risk of Gender- Based Violence (GBV)	- Availability of the Code of Conduct - Implementation of the SEP and engagement activities	NAT	Monthly	Construction site Desk Work	- Review the code of conduct - Review of engagement minutes of meetings - Review the Stakeholder Engagement Log - Review the GRM	No cost

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
Pre-construction and during construction phases						
Risk of child labour	- Contractor commitments as per the contract in terms of avoiding child labour - No children inside the site	NAT	Monthly	Construction site Desk Work	- Revision of the contract - Inspection of the site - Review the GRM	No cost
Impacts on homeless (children and old people)	- No homeless in the site - Accommodation of homeless children and old people - Cooperation with Ministry of Social Solidarity and the NGOS	NAT	Quarterly	Construction site Desk Work	- Revision of the arrangement to accommodate homeless - Review the minutes of meetings with various stakeholders - Review the GRM	No cost
Traffic and transportat ion	- Availability of the Traffic Management Plan - Monitor all indicators mentioned in the traffic plan - Availability of alternative means of transportation - Availability and utilization of alternative routes	NAT	As per the developed Traffic Manageme nt Plan	Construction site Desk Work	As per the developed Traffic Management Plan	No Cost
Economic displaceme nt impacts	- Monitoring indicators are reported in the Resettlement Policy Framework.	NAT	As per the developed Livelihood Restoration Plan	As per the developed Livelihood Restoration Plan	As per the developed Livelihood Restoration Plan	No cost
Working conditions	- Availability of the Working Conditions Plans - Indicators and Key Performance Indicators to be included in the Working Condition Plan - Availability of working grievance mechanism	NAT	Based on the Working Conditions Plan	Based on the Working Conditions Plan	Based on the Working Conditions Plan	No cost

7.5.2 Environmental and Social Monitoring Plan during Operation phase

Table 7-4: Environmental and Social Monitoring Plan Operation phase

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
During operation phase						
Ambient Air Quality	- Number of complaints related to air quality inside depot. - Emissions or dust emit from depot	Environmental Affairs Department of NAT, Depot manager	- Annually	- Depot	- Regular periodic monitoring is carried out to ensure compliance to allowable limits	Included in operating cost for NAT
Noise & Vibration	- Number of complaints related to Noise and vibration	Environmental Affairs Department of NAT	- Annually	- Sensitive receptors	- Regular periodic monitoring is carried out to ensure compliance to allowable limits - Monitoring of vibrations should continue into the operations phase. Building inspections should also be carried out in order to follow-up on the surveys conducted during the pre-	Included in operating cost for NAT

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
During operation phase						
					construction and construction phases, and thereby assess and control vibration impacts on buildings	
EMF	- Number of raised compliant	Environmental Affairs Department of NAT	- Annually	- Conductors	- Regular measurements	Included in operating cost for NAT
Groundwater	- Observation of accumulated waste piles. - spillage/leakage from oils, chemicals, fuel ... etc	Environmental Affairs Department of NAT	- Annually	- Along route and depot	- Supervision on fuel/oil storage and usage rules; - Continuous monitoring of the groundwater quality during operation would give an indicator of possible pollution that might have occurred due to changes in groundwater head.	Included in operating cost for NAT
Soil	- Observation of accumulated waste piles.	Environmental Affairs	- Bi-annually (During maintenance)	- Depot	- Supervision on fuel/oil storage and usage rules;	Included in operating

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
During operation phase						
		Department of NAT	ce activities)		- Regular measurements and compared to baseline measurements	cost for NAT
Solid & Hazardous materials & Waste	- Spillage/leakage from oils, chemicals, fuel ... etc	Environmental Affairs Department of NAT	- On monthly basis	- Depot	- Supervision on fuel/oil storage and usage rules;	No additional cost
Job creation and local content	- Availability of Local Content and Procurement Plan - Disclosure activities including points of sharing information is in place - Availability of data related to labour forecasting - Develop Key Performance Indicators about the local content - Disclosed information through the Project information documents	NAT	- According to the developed Local Content and Procurement Plan	- As per the Local Content and Procurement Plan	- As per the Local Content and Procurement Plan	No cost
Occupational Health and Safety	- Availability of the OHSP - Monitor all indicators mentioned in the OHSP - Review the contractual agreement - Availability of workers grievance mechanism	NAT	As per the developed Occupational Health and Safety Plan	As per the developed Occupational Health and Safety Plan	As per the developed Occupational Health and Safety Plan	No cost

Receptor/E HS Aspect	Monitoring Indicators	Monitoring Responsibility	Monitoring Frequency	Location of Monitoring	Monitoring Methods	Estimated Cost
During operation phase						
Community Health, Safety, and Security	- Total number of fatal accidents - Total number of people fall down by gender and age - Total number of Tram workers infected by communicable diseases - Availability of community grievance mechanism	NAT	Monthly	The site and desk work	- Site inspection checklist	No cost
Visual-landscape changes	- Availability of proper and unified fence - Proper waste management - Plantation of trees	NAT	Monthly	Construction site	- Site visit to the fences - Apply all monitoring methods related to waste management	No cost
Working conditions	- Availability of the Working Conditions Plans - Indicators and Key Performance Indicators to be included in the Working Condition Plan - Availability of workers grievance mechanism	NAT	Based on the Working Conditions Plan	Based on the Working Conditions Plan	Based on the Working Conditions Plan	No cost

7.6 Summary of ESMP Budget Estimate

The following table provides an approximate cost estimate of the items in the E&S Management and Monitoring Plans. At this stage in the Project, the development of management plans and programs and the costs of measurements can be estimated.

Table 7-5 Summary of ESMP Budget Estimate

Item	Price (USD)
Local Content & Procurement Plan	2,000
Dust Management Plan	5,000
Waste Management	90,000
Construction Environmental and Social Management Plan (CESMP): 1. OHS Plan 2. EHS Plan 3. Health Surveillance Program 4. Working Conditions Management Plan 5. Emergency Response Plan 6. COVID-19 Prevention and Management Plan	30,000 (5,000 / subplan)
Total CESMP:	
Operations Environmental and Social Management Plan (OESMP): (Contains same as the above)	25,000
Labour Influx Management Plan	5,000
SEP Implementation (for 24 months)	17,000
Traffic Management Plan	5,000
Air measurements at 6 points monthly → 24 measurements	92,000
Noise measurements when using digging equipment and machinery	350/measurement
Capacity Building	To be determined
Implementation and Monitoring of the RAP	To be determined

7.7 Mitigation Measures for Cumulative Impacts

Table 7-6 Mitigation Measures for Cumulative Impacts

Aspect	Description of Impact	Impact Magnitude	Mitigation Measure
Ambient Air Quality	Degradation of Air Quality as a result of the combined construction activities of the tram and Metro.	Major	- Each of the individual projects will implement its prevention and mitigation measures as set out in construction management plans. - Coordinate and synchronize between activities occurring within common area of influence for maximum gains and minimal impacts.
Noise and Vibration	Elevated noise and vibration levels as a result of construction activities in overlapping area of influence of both projects.	Major	- Each of the individual projects will implement its prevention and mitigation measures as set out in construction management plans. - Coordinate and synchronize between activities occurring within common area of influence for maximum gains and minimal impacts.
Access Roads	- Increased traffic and consequent delays in construction work schedules. - Indirect potential impacts resulting from the increased construction durations including air quality and noise	Major	- Identify suitable construction schedule - Consolidate common activities - Coordinate between schedules and maintain communication between Contractor's Project Management teams of both projects - Specific mitigations to minimize traffic impacts include sharing traffic management plans between the projects, conducting regular internal

Aspect	Description of Impact	Impact Magnitude	Mitigation Measure
			coordination meetings and meetings with the traffic authority.
Increased waste and higher Soil and Groundwater Contamination potential	Increased pollution potential as a result of overlapping schedules within shared areas of influence.	Moderate	- Each of the individual projects will implement its prevention and mitigation measures as set out in construction management plans. - Coordinate and synchronize between activities occurring within common area of influence for maximum gains and minimal impacts.
Risk on Structural Integrity	Increased risk on structures as a result of vibrations resulting from combined projects activities such as: - Dewatering activities - Piling - Use of heavy machinery.	High	- NAT will oblige its contractors to coordinate in carrying out a shared survey before the start of construction along the common areas of influence to assess the combined project activities' potential risk of damage, and indicate the dilapidation of buildings/ structures. - The Contractors of both projects will coordinate in carrying out all necessary models to evaluate potential degree of damage in sensitive receptors.

8. PUBLIC CONSULTATION AND PARTICIPATION INCLUDING SECTION ABOUT GRM

8.1 Introduction

The Stakeholder Engagement chapter aims at highlighting the key consultation and community engagement activities and their outcomes, in addition to outlining the validity and reliability of the data collected. The stakeholder engagement activities were carried out with reference to ESS10: Stakeholder Engagement and Information Disclosure.⁶⁹

In summary, the main objectives of stakeholder engagement activities are as follows:

- The Project recognizes its responsibility to engage with stakeholders, particularly those living close to the Project site, and is committed to engaging stakeholders in a meaningful, accountable, effective, culturally appropriate, accessible, and transparent manner. The specific objectives of the SEP are to:
- Establish and maintain a constructive dialogue between the promoter, the affected communities and other interested parties throughout the Project life cycle;
- Ensure that all stakeholders are properly identified and engaged;
- Enable early and active engagement to include stakeholder feedback into Project design and establish a long-term relationship to last throughout the Project lifecycle;
- Engage stakeholders in the disclosure process, engagement and consultations in an appropriate and effective manner throughout the Project lifecycle, in line with the principles of public participation, non-discrimination and transparency;
- Ensure that the relevant stakeholders, including commonly marginalised groups on account of gender, poverty, educational profile and other elements of social vulnerability, are given equal opportunity and possibility to voice their opinions and concerns, and that these are accounted for in the Project decision-making;
- Duly verify and assess that the quality and process of engagement undertaken by third parties on the Project conforms to the provisions included in the present standard. Ensure compliance with national and international regulatory requirements;

⁶⁹ <http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf>

- Ensure timely and transparent information disclosure to make Project information accessible to interested and affected parties;
- Manage stakeholders' expectations and possible misconceptions;
- Allow communication in a locally appropriate and understandable manner about the Project and adapt the approach, as needed, based on feedback from stakeholders;
- Define, implement, and update a Stakeholder Engagement Action Plan which outlines timelines and activities for information disclosure and consultation;
- Generate a good understanding of the Project amongst stakeholders, in particular regarding environmental and social risks and impacts associated with the Project, along with proposed measures and actions to address them;
- Establish and maintain a Community Grievance Mechanism;
- Document the SEP implementation and management via SEP Data Management System (DMS);
- Identify roles and responsibilities for implementation of the SEP;
- Outline reporting to stakeholders and Project management.

8.2 Regulations and Requirements

8.2.1 National Regulations

The Environmental Law no. 4/1994 and its executive amendment no. 9/2009, modified with Ministerial Decrees no. 1095/2011 and no. 710/2012, require that Public Consultation should be held prior to the approval of Projects which need an ESIA Study. According to the above-mentioned requirements, two consultation sessions, namely a Scoping Phase Consultation (or Pre-Public Consultation) and a Public Consultation activity should be performed. The scoping consultation activities were carried out in 2016 and 2020. However, the Public Consultation is still in progress. The two required consultation phases are described below.

Phase One Scoping

The aim of this stage is to define the aspects and impacts that will be assessed during the impact assessment. Consultation during this phase can be through individual meetings or larger group meetings, as appropriate and is expected to provide:

- 1) Information about the Project components and activities, as well as the areas to be studied;
- 2) An opportunity for stakeholders to share their opinions and concerns related to the Project; and
- 3) A means of identifying any additional stakeholder groups to be consulted.

Phase Two: Public Consultation

During this phase, the ESIA report and findings are disclosed and discussed. A public meeting, called a 'hearing session', is held and all relevant stakeholder groups (at a minimum those involved in during scoping consultation) are invited.

The objective of the public consultation event is to present the potential impacts of the Project, proposed mitigation measures and capture the opinions of key stakeholders and identify any additional actions required to finalise the impact assessment.

8.2.2 International Requirements

8.2.2.1 The World Bank ESS 10 related to stakeholder engagement and information disclosure

This ESS emphasizes that the importance of applying meaningful stakeholder engagement depends on timely, accurate, accessible, and comprehensible information. Making available Project-related information as early as possible in the Project cycle and in a manner, format, and language appropriate for each stakeholder group is important. Formats to provide information may include presentation printouts, nontechnical summaries, Project leaflets, and pamphlets. Ideally, maps of the Project area and nontechnical drawings should be included in the materials. Documents used in stakeholder consultation should be made available to stakeholders.

Documentation should also be accessible for stakeholders with sensory disabilities, for instance, through providing documents in Braille or engaging a sign language interpreter at a consultation meeting, as appropriate.

In cases where literacy levels are low, additional formats like location sketches, physical models, and film presentations may be useful to communicate relevant information. The

Borrower should help the public to understand technical documents, for instance, through the publication of simplified summaries, nontechnical background explanations, or access to local experts.

Special efforts should be exerted to inform, engage with, and understand disadvantaged or vulnerable groups with regard to the impacts of the Project on them, the means of obtaining access to compensation and benefits where appropriate, and how and when to raise grievances.

It is important to remain responsive to requests for information from Project-affected parties and other interested parties throughout the Project cycle. It is helpful to set up appropriate systems to make Project information available on a continuous basis. For instance, a website or other media may be useful to provide, and regularly update, Project-related information.

8.2.2.2 European Investment Bank Environmental and Social Standards (Standard Number 10. Stakeholder Engagement)

Standard 10 requires promoters (Project implementers) to maintain an open, transparent, and accountable dialogue with all Project-affected persons, communities and other relevant stakeholders in an effective and appropriate manner. The value of public participation in the decision-making process is stressed throughout the preparation, implementation and monitoring phases of a Project. Stakeholder Engagement standard 10 emphasized on the following:

1. A meaningful engagement process allows for the efficient implementation of a financed operation and, in particular, the early and effective identification, assessment, and management of any environmental and social risks, impacts, and opportunities. The views, interests, and concerns of Project affected communities and other interested stakeholders are heard, understood, and taken into account throughout the Project lifecycle.
2. Standard 10 outlines a systematic approach to stakeholder engagement that the promoter is expected to build and maintain by way of a constructive relationship with relevant stakeholders. Stakeholder engagement is an inclusive and iterative process that involves, in varying degrees, stakeholder analysis and engagement planning, timely disclosure and dissemination of/access to information, public consultations and stakeholder participation, and a mechanism ensuring access to grievance and remedy.

8.2.2.3 Guidance note for EIB Standard on Stakeholder Engagement in the EIB Operations October 2020

The European Investment Bank (EIB) sustains the following rights: (i) public access to information; (ii) access to public consultation in decision-making; and (iii) access to justice. International law reflects similar, complementary, requirements. These rights, and how they apply in the context of EIB-financed Projects, are set out in Standard 10 of the EIB's Environmental and Social Standards.

The purpose of this Guidance note is to provide recommendations to promoters on how to meet the EIB's requirements regarding stakeholder engagement in EIB operations. It also summarises good practices for meaningful stakeholder engagement to help promoters maximise potential Project gains.

The Guidance note in itself is non-binding and is to be used in conjunction with Standard 10. If there is any inconsistency or conflict between the Guidance note and Standard 10 or any of the EIB's other Environmental and Social Standards, the provisions of the Standards prevail. The Guidance note may be updated occasionally in line with how policies and practice related to stakeholder engagement evolve.

The Guidance note follows the structure of Standard 10. The sections following this introduction cover key elements of the stakeholder engagement process. Each section starts with the relevant extract from Standard 10 (in green-shaded boxes) and the ensuing text describes both the required and recommended steps to conform to the Standard.

8.3 Stakeholder Identification

Stakeholder identification has gone through many stages. The first stage of stakeholder identification was implemented during the preparation of the initial ESIA in 2016. Thereafter, further engagement activities took place during 2019-2020 in the form of periodic meetings with various stakeholders. Finally, in 2020-2021 various engagement activities took place in order to assess the stakeholders affected, in terms of their concerns and feedback.

8.3.1 Stakeholder Identification- ESIA Phase 2016

Below is the list of Stakeholders identified while preparing the ESIA:

Table 8-1 Project Stakeholders – ESIA Phase 2016

Stakeholder	Connection to the Project
APTA, Head of Central Division for Tram Affair	APTA is the current owner of the Tram in Alexandria and is responsible for the operation of the Tram and own all 129 shops located along the line that are leased to tenants.
NGOs near the Tramway	Two NGOs were located in the vicinity of the tramway; one of them provides services to young Muslim groups and the second one serves the Christian community.
NAT	NAT is the Project owner and are responsible for the construction and operation of the rehabilitated Project
189 Community Members and Beneficiaries	They are the direct beneficiaries of the Tram Rehabilitation Project. They will be affected during the decommissioning and construction phase.
Alexandria Governorate Environmental Entities (Regional Government)	They are the main entity responsible for monitoring the environmental performance of various developmental Projects. They will be responsible for reviewing the ESIA and provide environmental permits.
Tram drivers and conductors	They are the operators of the Tram and they may be affected by the Rehabilitation Project.
Four Tenants of Shops	They benefit from leasing shops and therefore may be affected during the construction phase.
French Center for Alexandrian Studies – CEAlex	They shared information about the antiquities, cultural heritage, and maps of the areas of importance.

8.3.2 Stakeholder Verification and Update –Updating the ESIA Study, December 2020

8.3.2.1 Vulnerable Groups

Vulnerable groups are defined as those stakeholders that may experience impacts differently than the wider society and/or may experience restrictions during the community decision making process due to their socio-economic characteristics. Vulnerable groups may be affected by virtue of their physical disability, social or economic standing, limited education, lack of employment, or lack of access to land. The IFC requires that the Project engages vulnerable groups separately so as to ensure they receive Project information directly and that any issues, feedback, or grievances are captured by the Project. The Social Consultant managed to identify potential Vulnerable Groups.

Aiming at reaching an inclusive process, the engagement process ensures the identification and full engagement of individuals and groups who may find it more difficult to participate and those who may be directly and differentially or disproportionately affected by the Project. The identification of those whom do not benefit from development opportunities due to their vulnerable status are also considered. The Project will ensure specific steps are taken to access these groups and provide them with the opportunity to engage in discussions about the Project. The table below summarises the groups that were identified as potentially vulnerable.

Table 8-2 Vulnerable Groups

Vulnerable Group	Description and Relationship to the Project
People with disabilities or chronic diseases	People with disabilities or chronic diseases often have a lower ability to gain employment and generate income. The physically disabled are likely to be vulnerable members of the community as they tend to require more support and often rely on family care. Accordingly, they will have limited access to job opportunities in the Project during the construction and operation phase. Currently, they struggle to use the Tram as it is not fully equipped to support people with disabilities.
Women	Women have limited access to any job opportunities in the Project during the construction and operation phases. However, there are no limitation on attending all consultation activities.
Female-lead households, and low-income women	Female-lead households and women with limited access to income generation often suffer from receiving less education relative to their male counterparts; therefore, will not have the same opportunities for employment by the Project.
Homeless Street Children	They are deprived from their basic rights e.g. shelter, food, education, etc. At night time they sleep at the Tram stations on the benches. Some of them beg for food and money from tram passengers.
Elderly (men and women)	Elderly (men and women) are likely to have a more limited ability to work. They have difficulties with the current tram as they can hardly reach the stations and suffer from accidents due to the lack of safe pathways and railings.

8.3.2.2 Project Stakeholders - Construction and Operations Phases

Project stakeholders were identified during December 2020 and the updated list was prepared by the mid of January 2021. The table below presents the identified stakeholders to date:

Table 8-3 Description of Project Stakeholders

Primary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
Communities in the Area of Influence (AoI)	The residents of the Districts located in the Vicinity of the Tramway (Central, East and Al Montazah-First)	The residents and commuters to the three districts will be affected due to shutdown of the Project for at least two years. They will be affected by all Project impacts (dust, noise, etc.)	High	Med
	Members of the clubs, students of schools and university, employers and employees who use the tram	Residents of these communities are more likely to be adversely affected by environmental and social impacts; for example, noise and traffic during construction and other impacts related to health, safety, and security. Residents of local communities will also potentially benefit from job opportunities or other positive economic outcomes.	High	Low
	Vulnerable groups within	Vulnerable groups may be likely adversely affected by environmental and social	High	Low

Primary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
	the local communities	impacts, while also being least likely to benefit from the Project.		
	All commercial, health, tourism, and other economic activities	All those who work in the vicinity of the Tram will be either positively or negatively affected by the Project during the construction and operation phases.	High	Med
	Small business owners (e.g. restaurants and small shops)	Local businesses have the potential to benefit economically from the Project. However, as local residents, this group also has the potential to be impacted from any social and environmental impacts (positive and/or negative).	High	Low
Educational Sector	Educational facilities along the Tram way	During the construction phase students, educators, and all working the facilities will resort to alternative modes of transportation.	High	Low
Youth Sector	The Ministry of Sports,	The clubs and facilities within the AoI might be affected during construction due to congestion	High	Low

Primary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
	youth centers, clubs, and recreational areas	from traffic diversions and limited transportation services available in the area.		
Health Sector	Health facilities, Health directorate and those who benefit from health facilities located in the proximity of the tram	1- Employees will face difficulties due to congestion and traffic diversions. 2- Buildings will be affected due to vibration, noise, dust, etc. 3- Additional monitoring activities will be applied by the health sector in order to oversee COVID-19 4- Workers might rely on the surrounding facilities to receive their medical treatment	High	Med
NGOs and civil society	Community Development Associations along the route of the tram and CARITAS NGO	They will participate in the process of consultation and provide guidance to the Project. In addition to	Med	Low

Primary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
		accommodating homeless children and the elderly who reside in the Tram stations		
Transportation Sector	Ministry of Transport	The main ministry responsible for the Project	High	High
	NAT	The Project owners and are responsible for monitoring activities.	High	High
	APTA	Currently responsible for operating the tram. Responsible for providing passengers with alternative transportation during the construction phase.	High	High

Secondary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
Water Authority	Water and waste water company in Alexandria	The water company will secure potable water to the Project.	Low	Low
Local/ provincial Government Stakeholders	Alexandria Governorate Authority	The Governorate is fully engaged with the Project with respect to extension and use of utilities and services in the area, such as roads, connection to water, and gas pipelines. The Governorate represents the rights of citizens in its jurisdiction. The Governorate might receive the benefits of the Project, particularly, in terms of rehabilitating the tram. The Governor assembled a committee that facilitates all Project activities and oversee Project performance. Housing Survey Department will be responsible for identifying the Project Affected	Med	Med

Secondary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
		People and Propose Compensation value		
National government stakeholders	Egyptian Environmental sector - EEAA Headquarter Cairo - EEAA regional branch in Alexandria - Environmental department in Alexandria Governorate - Environmental manager in Districts (Central, East and El Montazah)	The EEAA has the overall responsibility for permitting during the ESIA process. They are also responsible for environmental monitoring during construction and operation phase. In case of any environmental issues raised they follow up and monitor the corrective measures adopted.	Low	High

Secondary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
	General Authority for Roads, Bridges and Land Transport	Responsible for any permits related to any road work for the Project (e.g. road cutting soil investigation). They will be responsible for rehabilitating the damaged roads in order to accommodate other means of transportation during construction phases.	Med	Med
	Ministry of Defence	This ministry may have responsibilities associated with the Project security and safety in full cooperation with NAT	Low	High
	The Egyptian General Authority for Land Survey (head quarter and Alexandria Directorate	They will be responsible for participating in any land acquisition or livelihood restoration activities	Low	High
	Ministry of Social Solidarity	They will participate in the process of the accommodation of homeless people and street children	Med	Med

Secondary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
	Ministry of Endowment (Awqaf)	They will be compensated for any affected mosques that might be affected by the Project	Low	Med
National Government stakeholders	Housing and Utilities Directorate	They will be essential in terms of providing permits and data about utilities and facilities	Low	High
	Natural Gas companies (Town Gas)	They will secure gas supplies to the Project	Low	Med
	EETC	They will secure the electricity required for the Project and may be required to upgrade some substations to meet the electricity requirements of the Project. They will be required to monitor underground cables for utility diversion.	Low	High
	Egyptian telecom	They will secure all communication required for the Project. They will also be required to monitor underground cables for utility diversion.	Low	High

Secondary Stakeholders				
Stakeholder Category	Stakeholder Group	Potential Implications for Stakeholder Groups	Impact (Low, Med, High)	Influence (Low, Med, High)
	Antiquities Directorate	Given the high importance of Alexandria City in terms of historical value, they will provide information, and guidance during the construction phase. The Antiquities directorate will investigate the areas where deep digging will be applied in order to investigate the availability of antiquities.	Low	High
Media	Alexandria TV	Public disclosure of Project information via TV	Low	High
	Local Newspapers (Electronic newspaper) El Youm Sabea...etc	Public disclosure of Project information via Newspapers	Low	High
Suppliers	The potential suppliers of construction materials and outsourcing	Important as a result of providing supplies from the local community in the Aol.	Low	High

8.4 Consultation Methodology and Activities

The Project adopted comprehensive stakeholder engagement activities since the beginning of Project activities. The previous engagement activities are segregated into two phases to date:

- 1- During the preparation of the ESIA Study 2016.
- 2- Discussions with governmental entities about the Project. (A majority of meetings with the governorate authority and affiliated departments were not documented)
- 3- While updating of the ESIA Study 2020-2021. *(To be completed after the final public consultation)*

Below is a brief description of implemented engagement activities to date.

8.4.1 Previous Stakeholder Engagement – ESIA Phase

Previous Stakeholder Engagement undertaken to date are mainly the activities carried out during the preparation of the ESIA in 2016. Thereafter, a long list of meetings was carried out with various governmental stakeholders and the Project steering committee during the course of 2019-2020. The final phase of Stakeholder Engagement was during the update of the ESIA 2020-2021.

Table 8-4 Previous Stakeholder Engagement – ESIA 2016 Phase

Participants	Number		Methods	Date
	Male	Female		
Alexandria Passenger Transportation Authority (APTA), Head of Central Division for Tram Affair	3		In-depth interview	28/07/2016
NGOs near the tramway	2		In-depth interview	28/07/2016

National Authority for Tunnels (NAT)	4		Meeting	1/08/2016
Community members and beneficiaries	16	8	Focus group discussion (FGD)	16/08/2016
	108	81	Structured questionnaire	
Tram drivers and conductors	4		In-depth interview	16/08/2016
Tenants of kiosks	4		In-depth interview	16/08/2016
French Center for Alexandrian Studies – CEAlex	1	1	In-depth interview	16/08/2016
Total	141	89		



Figure 8-1 FGD with females in an NGO



Figure 8-2 FGD with males in a coffee shop near the tram



Figure 8-3 Interview with members of Young Muslims NGO



Figure 8-4 Interview with members of Young Christians NGO



Figure 8-5 Individual meetings with tram beneficiaries



Figure 8-6 Individual meetings with tram beneficiaries

8.4.2 Stakeholder Engagement – Updated ESIA 2020-2021

The Project managed to carry various stakeholders' engagement activities with the stakeholders.

Table 8-5 Previous Stakeholder Engagement – Updating the ESIA 2020-2021 Phase

Consulted Groups	Number		Methods	Date
	Male	Female		
NGO	1	1	In-depth interview	20/11/2020
Vulnerable women/ Elderly/ Disabled persons	10	2	Interview	20/11/2020
APTA, Head of Central Division for Tram Affairs	6	1	FGD	29/12/2020
Central District (Wasat)	7	6	Group meetings	29/12/2020
East District (Sharq)	1	2	In-depth interview	29/12/2020
Sporting Club	4	2	FGD	29/12/2020
Shops tenants	78	8	Questionnaire	12/2020 and November 2021
Beneficiaries	14	14	Structured questionnaire	12/2020
Housing and Utilities Directorate	5	12	Group meeting	29/12/2020
Egyptian Electricity Transmission Co. (EETC)	3		In-depth interview	29/12/2020
Egyptian Telecom	6		FGD	30/12/2020
Health Directorate	3	1	Interview	30/12/2020
Antiquities Directorate	3	1	Interview	30/12/2020
Roads Directorate	3	1	Interview	30/12/2020

Consulted Groups	Number		Methods	Date
	Male	Female		
Traffic Authority	1		Interview	30/12/2020
NAT (Project engineer)	3		Interview	14/01/2021
Governorate Authority and governmental units	20	8	Group meeting	19/01/2020
NAT (Real estate Department and environmental manager)	3	1	Interview	24/01 /2021
Total	248	63		



Figure 8-7: Meeting with APTA



Figure 8-8: Meeting with Central (Wasat) District



Figure 8-9: Meeting with the head of East (Sharq) District



Figure 8-10: Meeting with EETC staff in Alexandria branch



Figure 8-11: Group meeting with the Housing Directorate



Figure 8-12: Meeting with the head of Security Department in Sporting Club



Figure 8-13: FGD with the members of Sporting Club



Figure 8-14: Meeting with Egyptian
Telecommunication



Figure 8-15: Meeting with Antiquities
Directorate

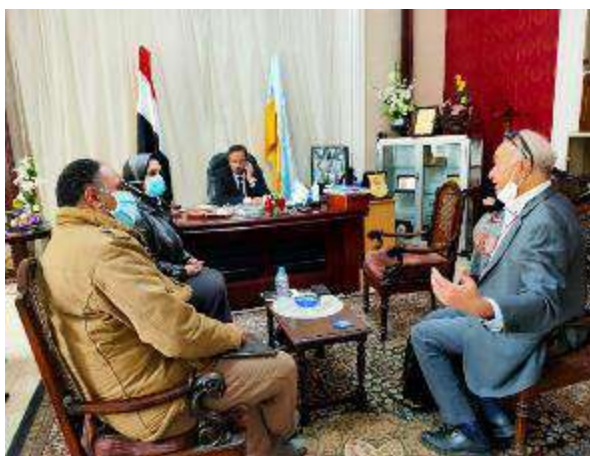


Figure 8-16: Meeting with the Health
Directorate



Figure 8-17: Discussion with women and a
man with disability



Figure 8-18: Meeting with Project
Affected People



Figure 8-19: Meeting with Tram female
user

The main findings of the abovementioned consultation activities can be summarized as follows:

Table 8-6 Main Outcomes of Consultation Activities to Date

Subject	Questions and Comments
Benefits of the Project	The Project will result in many benefits during the construction and operation phases. The following are the main advantages of the Rehabilitated Tram: - There will be plenty of job opportunities allocated for semi-skilled and unskilled workers. - The labourers will purchase food from the surrounding groceries. - The full trip duration will be minimized to 45 minutes instead of 70 minutes. - Improved safety as a result of fencing and appropriate signalling to minimize delays from crossings. - The tram will be a competitor to minibuses and other modes of transportation, which will reduce the issue of mistreatment from microbus drivers. - The transportation cost will be reduced as the tram ticket is of lower cost. - The tram will be an added value to touristic aspects as it will facilitate movement around the city.

Subject	Questions and Comments
	- The fence of the tram may be used by itinerant vendors to locate kiosks near it. Also, in some areas the fence may be used for a park-and-ride system. - The conductors will not be affected as they will work in the rehabilitated tram as ticket inspectors or in ticket booths.
Drawbacks of the Project	The Project will result in many drawbacks during the construction phase: - Crossings will be closed which will impair traffic and disturb economic activity in the construction areas. - Microbus drivers will take advantage of the shutdown of the tram service and raise their ticket value. - Students and employees will be severely affected as the tram service will be shut down and they will resort to transportation modes of higher cost. - The conductors and drivers will not be working. - Tram passengers will use alternative means of transportation and it will be difficult to retain passengers. Therefore, an excellent service should be provided in order to attract the community members. During the operation phase: - Passengers are concerned that the ticket machines will not work properly (referring to Cairo Metro Line)

Subject	Questions and Comments
	- A limited number of entrances will result in congestion at stations.
Role of the NGOs	○ The NGOs deal with a wide range of community members and shall provide them with information about the Project, e.g. work opportunities available, work plan, and Project activities. ○ NGOs can also work as an information bureau through disclosing posters and leaflets about the Project
Perception of the Current Tram	○ The tram is too slow as it passes through many crossings. ○ There are four tram lines each serving certain areas of the city and are identified according to colour; yellow, blue, green, and red. Colour classification is used most commonly and written labelling is not always present. Accordingly, passengers struggle to identify tram lines that are required for desired destinations. ○ The tram door is always open which is a safety concern. ○ There are no fines for damaging tram assets. ○ Smoking is currently permissible on the tram which adversely affects the health of all passengers. ○ There are no seats designated for the elderly and disable persons. ○ There is no ticket booth

Subject	Questions and Comments
	○ The ticket conductor mistreats passengers. ○ The cleanliness of the tram is not given attention. ○ Thieves and criminal activity take place without restriction on the tram as there is inadequate police and security enforcements on the tram. ○ The time span between tram rides might reach 30 minutes ○ Women use the female-designated wagon in order to avoid any harassment, however many theft-related crimes are reported. The drivers have reported that there are many female gangs inside these wagons. ○ The quantity of waste accumulated on the fence of tram is relatively large as there is no controlled waste management program implemented and residents have become accustomed to disposing their waste near the tram fences. ○ The tram performance is considered below average standards as it has been in operation since 1970 without adequate maintenance and electricity cables have deteriorated.
Recommendations to Enhance Tram Performance	○ A monitoring scheme should be developed and applied on all Project activities ○ Periodic inspection and maintenance of the Project activities

Subject	Questions and Comments
	○ The fence around the tram should be higher. ○ Surveillance cameras should be installed along the tram line and inside the wagons themselves. ○ Itinerant vendors should be prohibited from all tram vehicles and replaced by civilized kiosks at stations. ○ The driver and conductor should be well dressed and of good shape. ○ Cleanliness inside the tram and the stations is essential. ○ Coordinate with the police force to secure the tram vehicles and stations. ○ A prolonged construction period is not appealing to the community. ○ The total number of stations should be reduced as a high number of stations affects tram performance. ○ The tram should not be constructed close to buildings. ○ A specialized entity should operate the Project. It is recommended to recruit the same entity that operates Cairo Metro. ○ During construction at least 50 buses should be available to transport passengers along the tramway path ○ There should be a traffic plan that reduces congestion of roads particularly due to closing of the crossings.

Subject	Questions and Comments
	○ The kiosks should be designed in a manner that does not obstruct the narrow station platforms. ○ The total number of wagons should be increased to five. ○ The doors should be automated. ○ There should be a proper ventilation system including air-conditioning and fans. ○ Homeless, street children, thieves, and criminals gather and sleep at some stations, e.g. Sidi Gaber. It was recommended to coordinate with the Ministry of social Solidarity to provide shelter for these groups ○ A unified ticket system is convenient for conductors and drivers, however passengers are requesting a ticketing system based on the number of stations passed.
Poverty Dimension	○ The Project is more useful to the low-income class as other social classes do not use the tram frequently. Therefore, the Project should reflect needs of the low-income class. ○ The ticket should accommodate the incomes of the less fortunate, and not exceed 1EGP.
Community Safety Issues	○ The tram is unfenced in most areas, people crossing across any area of the line are prone to accidents and fatalities ○ Some passengers hang onto the exterior of the tram to avoid paying tickets, which is a major risk as they may fall and be injured.

Subject	Questions and Comments
	Street children play on, around, under the tramway and are sometimes under the influence of drugs. This may result in major accidents.
Low-Income Seniors	- Low-income seniors use the tram as it is the cheapest method of public transportation. However, due to their limited-mobility it is difficult for them to use stairs at elevated and low sections of the current route. - The lack of safe pathways results in injuries and accidents - It is difficult for seniors to get on the current tram as it is slightly higher than the station floor - Low-income seniors cannot afford the new Ukrainian tram line
Homeless People and Street Children	- The homeless use the tram as shelter at night time - Some NGOs, affiliated with the Ministry of Social Solidarity, proposed to accommodate the homeless.
Disabled Persons	- They have the full right by law to pay half ticket. However, the conductors do not allow them to pay half ticket. - The number of recruited people with disabilities in the tram is limited - The people with mobility disabilities do not benefit from the tram as it is not properly equipped to accommodate equipment such as wheelchairs

Subject	Questions and Comments
Availability of Restrooms at the Tram stations	○ There are no restroom/toilets facilities at the tram stations ○ People with specific health conditions (e.g. diabetics) cannot use the tram due to the absence of bathrooms

Detailed Minutes of Meetings are presented in Annex

8.4.3 Final Public Consultation

The study team will prepare for the final public consultation. A place suitable for about 75 persons will be booked in an accessible venue that should be approved by the Governor as his attendance is highly recommended. All participants should be informed about the meeting venue and date.

Given the restrictions and requirement of social distancing due to COVID-19, the Consultant will book a meeting room that can host up to 150 people. However, the total number of participants must not exceed 75 in order to properly maintain social distance. Additionally, face masks and sanitizers will be provided to all participants. All participants were informed about the meeting venue.

8.4.3.1 Target stakeholders:

All stakeholders will be invited:

- 1- Governmental entities (governorate- directorates ..etc)
- 2- Social solidarity directorate
- 3- NGOs
- 4- Educational sector
- 5- Media
- 6- Clubs
- 7- Other means of transportation drivers
- 8- Project affected tenants, workers and others
- 9- Residents within the AoI

8.4.3.2 Summary of consultation:

A detailed summary of consultation will be developed that will reflect the following:

- 1- Concerns, suggestions, required information and complaints raised by various stakeholders
- 2- Response to their concerns
- 3- Additional points to be considered

The final public consultation will be summarized in the report and a full description of discussion will be added as an Annex. The Annex will include the advertisement to be disclosed in National Press, the invitations shared with various stakeholders, a photolog and detailed questions and answers.

8.5 Engagement Strategy during COVID 19

Given the spread of COVID 19 Pandemic and the limitation of gatherings that has been declared by the Government of Egypt since last February 2020, it was essential to develop specific strategies of engagement during COVID 19. More details are made available through adopting specific procedures developed by the EBRD⁷⁰ and the AFD⁷¹. The AFD Prescriptions for inclusion in Construction/worksite ESMPS to Strengthen covid-19 health control report proposed the recommended actions below:

8.5.1 Recommendations by the AFD

The Project owner should assess the risk of transmitting COVID-19 during stakeholder engagement. If the risk cannot be mitigated effectively with the measures below the Project owner should consider postponing the activities. The measures to prevent transmission should include – but not be limited to – the following:

1. Identify and examine the activities planned by the Project requiring the engagement of stakeholders and public consultations.
2. Assess the level of direct engagement proposed with stakeholders, including the location and size of proposed meetings, the frequency of engagement, categories of stakeholders (international, national, local).
3. Assess the level of risk of virus transmission for these stakeholders' commitments and how the restrictions in force in the country / Project area would affect these commitments.
4. Identify the Project activities for which consultation / engagement is essential and cannot be postponed without having a significant impact on the Project schedule. e.g.

⁷⁰ <https://www.ebrd.com/sustainability-covid.html>

⁷¹ <https://www.afd.fr/en/ressources/prescriptions-inclusion-constructionworksite-esmps-strengthen-covid-19-health-control>

the selection of resettlement options by affected people during the implementation of the Project. Depending on the specific activity, consider viable ways to obtain the necessary participation from stakeholders.

5. Assess the level of use of technologies and internet among the main stakeholder groups, in order to identify the type of communication channels that can be used effectively.
6. Make a particular effort to understand and use the most appropriate way for women to have access to the information.
7. The Project Owner, assisted by the Owners' Engineer as appropriate, should consider the following when selecting communication channels for stakeholder engagement in the context of the COVID-19 pandemic:
 - a. Avoid public gatherings (taking into account national restrictions), including public hearings, workshops and community meetings.
 - b. If smaller meetings are allowed, conduct consultations in small groups, such as focus group meetings. If this is not allowed, make all reasonable efforts to conduct the meetings through online channels.
 - c. Diversify means of communication and rely more on social media and online channels. When possible and appropriate, create online platforms and specialized discussion groups tailored to the objective, depending on the type and category of stakeholders.
 - d. Use traditional communication channels (television, newspapers, radio, dedicated telephone lines and mail) when stakeholders do not have access to online channels or do not use them frequently. Traditional channels can also be very effective in conveying relevant information to stakeholders and allowing them to share their reactions and suggestions.
 - e. When direct engagement with affected people or beneficiaries of a Project is necessary, as would be the case for the preparation and implementation of resettlement action plans and awareness-raising actions, identify the channels of direct communication with each household affected by a specific combination of electronic messages, mail, online platforms, dedicated telephone lines with knowledgeable operators.
 - f. Each of the engagement channels proposed must clearly specify how the stakeholders, in particular the women, old peoples and illiterates, can provide feedback and suggestions.

8.5.2 Recommendations by the World Bank

According to the WB recommendations avoiding any group meetings, face-to-face meetings and public consultation events is strongly recommended.

Virtual engagement may include communication by phone, text, e-mail, phone or video conference calls and webinars. Any technology that resonates with the targeted stakeholders and allows for researcher/stakeholder interactions can be harnessed to assist with engagement. Examples of engagement modes and ways that might be utilized include:

- Phone (One-on-one calls between consultant and stakeholders),
- Group conference calls,
- Having discussions via a closed Facebook group,
- Videoconference platforms,
- Hosting online meetings with stakeholders.
 - It is strongly recommended to:
 - Ensure that new modes of engagement are feasible and acceptable to stakeholders,
 - Let stakeholders be the guide and to ask for their preferred way to engage remotely,
 - Be sensitive to barriers stakeholders may face in engagement using a particular method (e.g., lack of internet access),
 - A female social officer should be made available in order to consult with female stakeholders, as it is a bit sensitive for women to receive calls from male social officer,
 - Whenever possible, offer multiple ways to engage. For example, provide an option to call in to an online meeting via phone, and send materials out in advance via WhatsApp,
 - Ask for stakeholder feedback throughout the Project and work to address any issues hindering their engagement,
 - If using videoconferencing or other online platforms:
 - Provide participants with necessary technological tutorials or technical support in advance, including written instructions for utilizing the technology.
 - Understand that stakeholders' technological literacy will vary and be willing and available to answer questions.
 - Have a facilitator from the targeted community work with you to adjust stakeholders to the technology used.
 - When possible, have a lower-tech option for engaging, such as the option to call in to a videoconference via phone

8.6 Grievance Redressal Mechanism (GRM)

8.6.1 Introduction

The Community Grievance Mechanism (CGM) allows stakeholders to submit complaints and comments at no cost, without retribution. The CGM considers the gender dimension and proper presentation of women. The CGM also will be applicable throughout preconstruction, construction and operation phases. The grievance mechanism will be gender sensitive in terms of enabling female social officer (if needed) to communicate with the aggrieved females. All gender-based violence grievances should be carefully managed and taken seriously by the contractor, NAT and the operator.

8.6.2 NAT Current Community Grievance Mechanism

NAT has a great experience with EIB financed Projects. Therefore, NAT has an existing grievances committee for the Cairo Metro Line Project. The process of receiving and managing grievances is shown in the flowchart in the figure below. Grievances are received through various channels:

- Engineering representative on-site
- NAT Website
- Direct mail to the Chairman of NAT
- Telephone calls (Landline)
- Personal meetings
- Handovers to the grievances committee
- Legal Affairs Department
- The Government Complaints Portal www.shakwa.eg (16528).

The response to grievances normally takes 1 to 1.5 months. In some cases, grievances are channelled directly to the concerned department but in the majority of cases, the grievances committee is notified with the grievances. The following procedures are followed:

- The Grievances Committee or NAT Archive Unit receive the complaint
- The Grievances Committee directs the complaint to the concerned department or to the engineering department for investigation

- The complaint and the investigation report are routed back to the grievances committee, where a report is prepared and raised to the decision-making authority
- If the aggrieved person is eligible for compensation, compensation procedures are followed. Alternatively, the response will be shared with the aggrieved person.

Grievances related to interruption of economic activity require a lot of time to be resolved. This is mainly because they require determining a fair compensation, which is usually based on the PAPs tax records. Most of the PAPs might be obliged to wait until their financial year is closed in order to be able to get their tax record that is required by the compensation committee. Therefore, they prefer to submit updated tax records in to order to reflect their updated revenue.

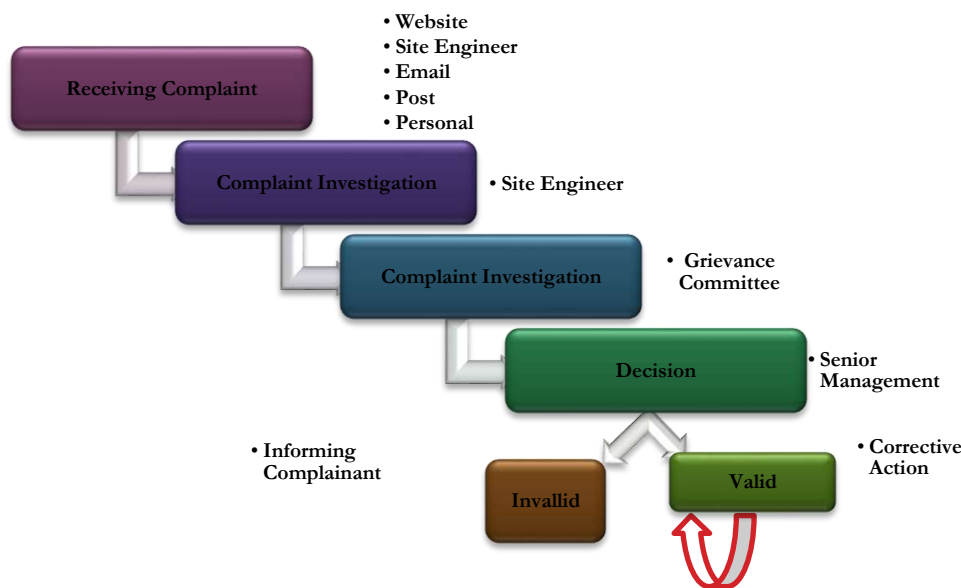


Figure 8-20: NAT Current Community Grievance Mechanism

Source: NAT 2021

The CGM applied by NAT sets focus on two types of grievances:

1. The grievances received from the Governmental Complaint Portal. There is an assigned staff member who follow up the complaints received from the portal. The aggrieved person is replied to within 72 hours in order to inform him/her about the

recipient of grievance and how it will be managed. The solution of complaint is mainly based on its severity and complexity.

2. The second types of grievances are the ones related to compensation and livelihood restoration impacts. These complaints might be sent to the: 1) contractor, 2) by phone, 3) on the website, 4) by hand in NAT, 5) the Ministry of Transport. The complaints are managed by a committee formulated particularly to manage and solve complaints related to compensations and involuntary resettlements. Such grievances are managed carefully as the aggrieved person should restore his/her living conditions. The same aggrieved person has the full right to submit his complaint more than once in order to reach the acceptable compensation. The aggrieved person has the full right also to raise his complaint to court.

However, there is additional CGM for the Cairo Metro Project which is applied by the contractors (refer to the CGM applied by the contractor of Cairo Metro Line Three Phase Three Project).

The contractor is committed to apply the GM based on the Best Practices. The CGM applied by the contractor covered the following aspects:

- Roles and responsibilities
- Disclosure of the CGM
- Mode of CGM
- Response to CGM
- Registration of CGM
- CGM channels
- Confidentiality
- Management of CGM
- Monitoring of CGM

Gender Sensitivity and Gender Based Violence

The GM should be developed in manner sensitive to gender.

Special attention must go to the Gender based Violence

Grievances related to GBV should be raised to the responsible entity immediately

The contractor social officer report to NAT on monthly basis all received complaints and how they were managed.

8.6.3 Proposed Community Grievance Mechanism

This mechanism is unified and will be applied during all Project phases.

1. During construction phase: the contractor will be responsible for the CGM
2. During operation phase: the operator will be responsible for the CGM
3. NAT will oversee and monitor the efficiency of the CGM

The key principles and overview of an effective CGM as adopted by the Project are:

- **Culturally appropriate** - tailored to local culture, language and literacy level
- **Gender sensitivity**: transparent and fit for men and women
- **Accessible** – accessible to all community members
- **Inclusive to vulnerable groups – available to those less likely to have the means to voice their** concerns or opinion within the local context
- **Reliable** - Project commitment to respond to grievances within agreed upon timeframe
- **Publicised** – all stakeholders are made aware of the CGM through stakeholder engagement activities
- **Logged** – all grievances are logged and tracked
- **Confidential** – grievances will remain confidential with an option of anonymity

The Social Liaison officer (SLO) will lead the implementation of the CGM. Therefore, he/she will refer the grievance to the interested entity to solve. He/she will be responsible for documentation and monthly reporting to NAT.

At the outset, the Project contractor will disclose/ communicate the CGM to the local communities via the following methods in accordance with the local context (to be confirmed in consultation with the community by the Social Consultant):

- Stakeholder Engagement Activities
- Project webpage
- Noticeboards at Local Governmental Unit, Youth Centres and NGOs
- Local Media
- Governmental Complaint Portal (<https://www.shakwa.eg/GCP/Default.aspx>)
- National Authority for Tunnels (complaint channels)
- Alexandria Governorate complaint channels

The GM will include the steps listed below and elaborated in subsequent sections:

1. Receiving Grievances

2. Registering Grievances
3. Acknowledgement of Grievances
4. Screening and Classification of Grievances
5. Addressing Grievances
6. Communication of Grievance Resolution Process
7. Implementation and Final Closure

8.6.3.1 Step 1 – Receiving Grievances (Day 0)

The following options will be available to stakeholders for submitting grievances to the Project:

- Face to face with SLO during stakeholder engagement activities
- Submit via dedicated email address
- Verbally to SLO via phone
- Grievance boxes at key community locations to be determined in full cooperation with the Steering Committee in consultation with NAT and the contractor.
- The Governmental Complaint Portal

Upon receipt of the grievance at the originating point the receiving party has a maximum of three days to forward the respective grievance to the SLO. All complaints whether received directly by the SLO Manager or via another route will be collated and handed centrally, actioned and closed out. The SLO will lead this process. Grievance boxes will be checked on a weekly basis by the SLO.

8.6.3.2 Step 2 – Registering Grievances (Day 3)

All grievance received will be formally registered by the SLO using the Project Grievance Form and summarised in the Community Grievance Register (included in the SEP DMS in Annex 1), ensuring that contact details are provided with the preferred method of communication. A clear description is also required to be provided of the grievance. Anonymous submissions will also be accepted.

8.6.3.3 Step 3 – Acknowledgement of Grievance (Day 5)

Within 48 hours from registering the grievance, the SLO will acknowledge to the complainant that the grievance has been received and registered as a legitimate complaint that can be handled by the Project. This is likely to be through a phone call, in person visit or in written

format as determined most appropriate. Where possible, information will be provided to the complainant on the next course of action as well as an indicative timeframe for resolution. The SLO will track progress of grievance investigation and resolution and keep the complainant informed as necessary.

If the grievance is not registered as a legitimate complaint, the complainant will be informed and the grievances closed out. If the complainant does not agree they can seek External Recourse.

8.6.3.4 Step 4 – Screening and Classification (Day 7)

All grievances will be screened to determine if they are a legitimate complaint. Non-legitimate complaints could include: complaints which obviously are not related to the Project, criminal activity not related to the Project, labour related grievances (refer to workers' grievance mechanism as mentioned in Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) Section), contractual disputes (use redress methods in contracts), issues related to government policy or procedures (the complainant should be directed to the relevant routes). If required, the SLO will identify the support of an internal investigation team with the correct skills to further investigate issue raised and to decide whether it is Project related or whether it is more appropriately addressed by a third party (e.g. relevant authority, other company).

Once determined a legitimate complaint, each grievance will be reviewed, assessed and classified into one of the following categories:

- **Minor Social Incident or Minimum Priority Complaint** – Level 1: a local, isolated and one-off complaint which could be addressed with limited effort. They are small in nature and do not threaten the prevailing situation the complaint is registered for. Usually, they are generated and motivated with individual interests.
- **Medium Social Incident or Medium Priority Complaint** – Level 2: widespread and/or ongoing complaints. It's widespread in nature, probably affecting more than one person or groups. It has the potential that, if not addressed, may escalate into a major social incident. (e.g. noise, vibration and dust during construction).
- **Major Social Incident or Critical Priority Complaint** – Level 3: potential for significant breach of the applicable legislation, international standard, company policies, and/ or

negative media attention, safety and security of the Project site, employees and stakeholder (e.g. abuse by security force).

The SLO will then assign a type to each grievance as per the following categories:

- Compensation
- Livelihood/income
- Environmental concern (to be defined)
- Injury
- Employment
- Property damage
- Security forces abuse
- Employee/Sub-contractor bad behaviour
- Non-fulfilment of Project commitments
- Cultural heritage

8.6.3.5 Step 5 – Addressing Grievance (Day 8)

The SLO with support from other relevant Project personnel will:

- Identify required action for resolution of the grievance as well as responsible person/party. If unable to deal with grievance directly, the SLO will assign it to the appropriate Project personnel for resolution (ideally to a head of a unit). The identified personnel will assist the SLO in the resolution of the grievance.
- If necessary to address the grievances, the SLO can perform a field visit and/or hold additional consultation meetings.
- Identify activities, procedures, equipment and training to address and prevent reoccurrence.
- SLO remains responsible for tracking the grievance through to closure

8.6.3.6 Step 6 – Communication of Grievance Resolution Process (Day 20)

The SLO will communicate the outcome of the grievance resolution process to the complainant and request feedback (if possible) on the resolution. They will make sure all grievances are responded within 15 days from being acknowledged. All grievances of a Level 3 – critical priority will be responded to within 72 hours. Responses shall be in writing and a verbal

response will also be provided where appropriate. If the complainant agrees, they should sign the grievance resolution form. If the complainant does not agree they can seek external recourse.

8.6.3.7 Step 7 – Implementation and Final Closure (Based on required corrective measures)

The SLO and the responsible personnel identified for resolution, shall ensure that the grievance resolution is effectively implemented in an efficient and timely manner. The SLO shall inform stakeholders on the progress of implemented corrective actions. When no further attention is required then the SLO will close the grievance and record close out date in the Grievances Register (included in the SEP DMS in Annex 1). For Level 3 Grievances, the SLO and the NAT E&S Manager will close out the grievance together. The Project will aim to close all grievances within 30 days of receiving the grievance. The Project will guarantee anonymity in all external reporting.

8.7 Disclosure activities

As soon as the ESIA gets clearance from the EIB and AFD, as well as, receive the approval from EEAA, the following disclosure procedures will be adapted:

- A final report, in English and Arabic, will be published on the NAT websites.
- A copy of the ESIA report in English and a summary in Arabic will be made available in the Governorate of Alexandria Authority.
- An A3 poster will be installed at the Project construction sites along the tramway.

It will be useful also to maintain leaflets of the Project impacts, GRM and contact office at the construction sites.

A stakeholder Engagement Plan that was developed in February 2022 recommended to disclose the following documents:

- Occupational Health & Safety Guidelines;
- Grievance Mechanism Procedure;
- Waste Management Plan;
- Waste Water & Sewage Management Plan; ZLD technique
- Workers' Accommodation Strategy;
- Traffic Management Plan;
- Community Health and Safety and Security Plan; and
- Any other plans (if not confidential)

The grievance mechanism will also be integrated in orientation footage to all workers, to ensure that all stakeholders are aware of both the internal and external grievance mechanisms.

Lastly, the SEP will be implemented by the community liaison team who will be assigned by NAT. Accordingly, disclosure activities will be implemented as presented in the SEP.