Table 5-13: Potential Environmental and Social Impacts during the Construction Phase

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
Soils	Site clearance and excavation work	Onsite soil	Deterioration of soil quality and alteration of morphology of the land	Out	No contamination and disruption of the soil present onsite knowing that the proposed WWTP will be constructed on a reclaimed land
	Accidental oil or chemical spillage	Onsite soil Surface and ground water	Soil pollution due to accidental spill of oil or chemicals	In	Scoped in with regards to the contamination of soil near the Mediterranean Sea
	Contaminated reclaimed land	Onsite soil Surface and ground water	Mobilization of contaminants in the soil from used material for reclamation and, the creation of new pathways for contamination to reach groundwater and surface water resources i.e. via leaching and run-off.	Out	Scoped out for studies; however mitigation measures to be incorporated into the management plans. Impacts on water quality will be addressed under Groundwater and Surface Water Sections.
	Rehabilitation/construction activities of sea outfalls	Seabed	Disruption of seabed	In	Depending on activities proposed, especially if a new outfall will be installed, some may be intrusive and cause changes to the seabed.
Water Quality	Inappropriate discharge of wastewater from	Mediterranean Sea and nearby water bodies	Sea water pollution	Out	Scoped out for additional studies; however, mitigation measures to be

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
	construction activities and workers camps				incorporated into the management plans.
	Improper management of the generated solid waste	Mediterranean Sea and nearby water bodies	Contamination of sea water quality and nearby water bodies	Out	Scoped out for additional studies; however, mitigation measures to be incorporated into the management plans.
	Improper management of the generated solid waste along with the improper handling and storage of chemicals	Surface and groundwater within site and network catchment area	Transport of pollutants and suspended solids into nearby water bodies	Out	Scoped out for additional studies. However, mitigation measures on best practices will be incorporated into the management plans.
Air quality	Movement of machinery and vehicles on unpaved surfaces Excavation activities	Onsite workers; local community living in residential areas	Increase in exhaust emissions and dust in the atmosphere at the project site and surrounding areas and within the wastewater network rehabilitation/installation areas	In	Scoped in with respect to the health problems associated with exhaust and dust emissions in comparison to baseline conditions
	Construction activities including assembling of WWTP (welding, use of lubricants)	Onsite workers	Release of VOCs	Out	These emissions are low and not considered to induce significant impacts. However, mitigation measures will be included in the management plans.
Noise	Use of heavy construction machinery such as concrete mixers, drillers and movement of heavy vehicles	Onsite works Nearby residential areas	Health problems affecting construction workers Nuisance effects on local community where the wastewater network will be rehabilitated/installed	In	Scoped in with respect to the health problems (hearing problems) that might affect workers for residential areas within the wastewater catchment area

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
Socioeconomic Conditions	Hiring of workers for construction activities	Local community	Social tension between local and non-local workers resulting from competition for employment	In	Scoped in for local communities on the issue of hiring foreign workers in new projects
	Construction works	Local businesses	Local businesses may indirectly benefit from construction activities	Out	Scoped out for additional studies but mitigation measures will be incorporated into the management plans.
	Construction works of WWTP and wastewater network rehabilitation or installation	Local businesses in study area and within network catchment area	Surrounding businesses may be disrupted	In	The WWTP will be constructed on a reclaimed land away from surrounding businesses. However, area within network catchment area may experience business disruption
Biodiversity	Construction activities	Terrestrial and marine habitats	Disturbance of marine animals and existing birds due to vibration, noise and accidental falling of material or leaking of chemicals into the sea and nearby areas within the wastewater catchment area	In	Scoped in with regards to marine biodiversity
Occupational Health and Safety	Construction activities	Construction staff	Accident and injuries to workers, Dust generation and noise may cause health related problems for workers	In	Scoped in for the site workers and addressed under the management plans.

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
Public Health	Construction activities	Local community	Risk of accidents due to excavated areas for network installation and other project related accidents	In	Scoped in for nearby local communities and will be addressed under the management plans.
	Potential labor influx	Local community	Potential occurrence of Gender Based Violence, Sexual Abuse and Exploitation and Sexual Harassment incidents	In	Scoped in as foreign workers might reside in Bourj Hammoud residential area. This will be addressed under the management plans.
Traffic	Increased vehicle traffic to and from the WWTP construction sites due to the transportation of construction material	Local road users	Traffic congestion in all roads leading to construction site	Out	No significant impact will be generated at roads leading to the WWTP site as these roads are located on the seaside and not frequently used by locals. Mitigation measures will be proposed in the management plans.
	Potential road closures within network catchment area	Local road users	Traffic accidents or congestion due to the road closure	Out	Scoped out but mitigation measures will be proposed in the management plans.
Cultural Heritage	Construction work within WWTP site and network catchment area	Archeological and Cultural heritage sites	Potential psychical damage to Archeological and Cultural heritage sites	Out	The WWTP is located on a reclaimed land away from any archeological and cultural heritage sites. As for sites within network catchment area, the effect on these sites will be minimal, chance find

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
					procedures will be included in the management plans.

Table 5-14: Potential Environmental and Social Impacts during the Operation Phase

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
Water	Discharge of treated effluent from sea outfall	Mediterranean Sea	Discharge of treated effluent to the sea and the improvement of the coastal water quality in the region due to reduction of wastewater pollution. However, there is possible pollution of sea water with nutrients due to lack of denitrification	In	Due to the foreseen lack of denitrification in the treatment process, dispersion modelling will be undertaken to assess impact at the discharge points.
	Removal of all wastewater outfalls used to discharge raw wastewater into Beirut River and installation of wastewater networks connected to the WWTP	Beirut River	Improvement of the Beirut River mouth where wastewater used to be disposed before WWTP construction	In	The treatment of the generated wastewater will have a significant impact on improving Beirut River water quality. Mitigation measures will be proposed to capitalize on this benefit.
Soil	Treatment of generated domestic wastewater Replacement of septic tanks	Soil and sediments within WWTP site (soil and coastal sediments) and sediments of Beirut River	Improvement of soil and coastal/river sediments in areas where wastewater used to be disposed	In	The treatment of the generated wastewater will have a significant impact on improving soil and sediment quality. Mitigation measures

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
					will be proposed to capitalize on this benefit.
Solid Waste Management	Generation of sludge	Water bodies and soil	Improper disposal of sludge may lead to pollution of water or soil	In	Due to lack of government policy on sludge disposal, an assessment will be made of sludge management options and the proposed option will be evaluated.
Air quality	Generation of foul odor from wastewater treatment process (inlet works, screening and grit channels, and sludge management) generating hydrogen sulfide (H2S) and ammonia (NH3)	Local community Operation workers	Emission of foul odor from the wastewater treatment plant	In	Scoped in with regards to the failure of odor control unit and addressed in management plans.
	Combustion of fuel for power generation	Local community Operation workers Global community	Emission of greenhouse gases (GHG) such as carbon dioxide (CO2), nitrous oxide (N2O) and methane (CH4) and other pollutants	In	This will increase emissions in comparison to baseline conditions and measures will be added to minimize these emissions.
Noise	Operation of pumping stations and movement of trucks of disposal of sludge	Local community Operation workers	Noise may disturb nearby residents within WWTP study area and at locations were pumping stations are installed	Out	This impact will not be significant as residential areas are around 1 km away from WWTP site. Mitigation measures will be proposed to protect workers from noise.
Biodiversity	Discharge of treated wastewater into the Mediterranean Sea	Marine and fresh aquatic life	Improvement of the marine biodiversity due the reduction of wastewater pollution	In	The treatment of wastewater will have a significant impact in improving the water quality of

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
	Removal of wastewater outfalls discharging raw wastewater into Beirut River				the Mediterranean Sea and Beirut River. Measures will be proposed to ensure maintenance of this benefit.
	Improper management and disposal of generated sludge	Marine and fresh aquatic life	Deterioration of biodiversity from the improper management and disposal of sludge	In	This will have a significant impact on the water quality if sludge is disposed in the sea
Workers Health and Safety	Exposure of the workers to untreated wastewater and sludge	Operation workers	Serious health problems is workers are exposed to pathogens, gases, heavy metals, microorganisms and chemicals through ingestion, inhalation, or contact with skin	In	Scoped in and measures to be proposed protect health and safety of workers
	Generation of gases from treatment process	Operation workers	Health impact from emissions from the facility	In	Scoped in for workers on site such that health and safety measures will be included in the management plans
	Exposure to toxic emissions in confined spaces during maintenance activities	Maintenance/Operation workers	Health impact associated with noxious gas emissions which might lead to death	In	Scoped in for maintenance workers such that health and safety measures will be included in the management plans
Public Health	Treatment of wastewater Removal of septic tanks	Local community within the entire catchment area	Enhancement of ground and surface water quality used by the local community Decrease is waterborne diseases	In	The treatment of wastewater will have a significant impact in improving ground and surface water quality and thus public health conditions.
Socioeconomic Conditions	Tariff imposed for the provision of wastewater treatment service	Local community	Lack of affordability to pay for wastewater service among poor and vulnerable population	In	Current economic conditions will make disposal income less available for the local

Environmental / Social Issue	Source of Impact	Receptor	Potential Impact	Scoped In/Out	Justification for Scoped In/Out
					population, decreasing their affordability to pay for additional public services.
	Operational activities and maintenance	Local community	Job opportunities for local population in the facilities	In	Scoped in with regards to local community and measures to improve local hiring to be proposed in management plans
	Installation/rehabilitation of wastewater networks and manholes	Local community	Improvement of road condition where overflow of wastewater used to occur	In	Scoped in for areas where wastewater networks are installed/rehabilitated
	Treatment of wastewater	Local community	Increased tourism because of the improvement of the environment in the area	In	This will have a significant impact on improving sea water quality and reducing current fouling odor in the region. Measures will be proposed to capitalize on this benefit and ensure maintenance of improved conditions.