

# Mamara New Capital City Development – Phase 1 Environment Impact Statement (EIS)

## Chapter 14: Environment Management Plan (EMP)



Combined report

August 2020

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## 1.0 INTRODUCTION TO THE ENVIRONMENT MANAGEMENT PLAN (EMP)

This Environment Management Plan is developed for Metropolis Mamara Development Ltd for the development of the Mamara New Capital City Phase 1. Phase 1 is the development restricted to the areas of study in this EIS which covers 100 hectares of land that is the southern end of the main road from Poha bridge to Mamara stream. The management plan is specific to the follow development;

1. Gravel extraction and Reclamation of the site
2. construction of 1234 residential houses, access roads, drainage, supporting utilities that include water treatment, bottling and wastewater treatment plant and diesel generator plant and associated infrastructure.
3. Full occupancy of the residential house and operation of associated utilities

## 2.0 ENVIRONMENT MANAGEMENT PLAN OBJECTIVES

Metropolis Mamara Development Ltd is committed best practices and Solomon Island standards to minimise the environment and social impacts through this Environment Management Plan. This include all the three phases of development which are excavation and reclamation, construction, and operation phases. The main objectives of the EMP are to;

1. Propose measure to avoid, reduce, restore, or compensate adverse impacts
2. Mitigate any significant impacts on biodiversity and ecosystems
3. Protect human health and safety
4. Inform development process on environment and disaster related risk for their design
5. Propose and plan management actions and monitoring for all potential impacts

## 3.0 EMP STRUCTURE

The EMP is structured based qualitative assessment from respective experts undertaking the baseline studies. These baseline studies provide data and information on existing condition and potential impacts from the development. The respective experts formulate mitigation measures that are further actioned in to the this EMP and synthesised based on the following criteria;

1. **Identify Potential Impact Sources** - identify the project actions or activities (impact sources) likely to affect environmental or social attributes. An impact identification matrix was used for this purpose.
2. **Assess Impacts** – assess each impact according to a set of impact criteria.
3. **Assess Impact Significance** - assess significance of each identified impact. (**High, medium, and Low**) based qualitative assessments.

4. **Management Actions** – identify actions to avoid or reduce negative or adverse impacts.

## 4.0 EMP IMPLEMENTATION – MONITOR, RESPOND AND REPORT

The EMP implementation will include monitoring, respond and reporting on incidence that occur. There will be regular monitoring done according respective potential risk especially around water quality and pollution. Other management actions will also be monitored by and environment and pollution officer and occupational health and safety (OHS) officers.

Appropriate response mechanisms will be put in place for high risk incidence and OHS related issues during the construction. The operational phase will involve multiple and diverse stakeholders and a lot the issues will addressed by appropriate authorities. For this development, the proximity of national agencies, Guadalcanal province and the establishment of Mamara city council will go a long way in addressing many of impacts and related issues.

The overall management of all monitoring tasks will be the responsibility of Metropolis Mamara Development Ltd. This covers all aspects of the required activities including coordination with other agencies that have national responsibilities over some of the tasks. The company is responsible for general project execution and with day-to-day project management activities, as well as monitoring.

The company is responsible to implement the EMP for all its operation described in this EIS including emergency and safety plans. The company is responsible to employ an environment and safety officer whose responsibilities will include:

- Coordinating with Environment and Conservation Division (ECD) for updating the EMP.
- Participating in monitoring with ECD to ensure that environmental management activities are reported as required.
- Facilitating consultation with the affected stakeholders and ensuring smooth implementation of the development.
- Reporting any matters of emergency with regards to pollution or safety.

## 5.0 GRIEVANCE PROCEDURE

It is expected that Metropolis Mamara Development Ltd will establish a Mamara city council that is expected to have in place community relations department that deals with people concerns. This department will address grievances under this EIS in the implementation of the EMP. Any concerns will need to be addressed quickly and transparently though the Mamara taskforce or through the Mamara Metropolis Development Ltd Office.

Most complaints arising during any civil work are expected to be complaints concerning siltation, safety, dust, health & safety, and noise should be bought to the attention of Metropolis

Mamara Development Ltd. Affected people can bring their complaints directly with Metropolis Mamara Development Ltd and/or the Ministry of Commerce through the Mamara taskforce Secretariat.

For more complicated complaints, Metropolis Mamara Development Ltd management and the Ministry of Commerce who will have a minimum of 15 working days to resolve the complaint and convey a decision to the affected parties. If the complaint is dismissed, the party or person will be informed of their rights in taking it to the next step. A copy of the decision is to be sent to the ECD and other responsible parties.

Should the AP not be satisfied, the AP may take the complaint to the Director of the ECD to review the complaint and monitor compliance to the EMP. The Director will have 30 working days to decide and respond.

## 6.0 ENVIRONMENT MANAGEMENT PLAN - MAMARA NEW CAPITAL DEVELOPMENT

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Phase1- Gravel Extraction and Reclamation</b>						
	<b>Physical Environment</b>					
<b>Climate and Disaster Risks</b>	Risk of landslide and surface runoffs into the Mamara stream when carrying out gravel extraction and reclamation activities during the rainy periods or rainy days.	Short term	M	<p>Gravel extraction and site reclamation should take place during the dry season (May-Oct).</p> <p>Consult the daily weather forecast or the seasonal climate outlet for weather and climate conditions from the SI Met Service.</p> <p>Built bund wall 20m from the Mamara riverbank. Part of the Mamara river park.</p>	<p>Water quality</p> <p>Landslides</p> <p>Surface runoffs and sedimentation.</p> <p>Weather events</p>	<p>Metropolis Mamara Development Ltd</p> <p>G- Province Health</p> <p>ECD</p>
	Risk of workers getting sick from very hot and humid conditions.	Shor term	L	Work procedures for hot and humid conditions. Also, provision of shading	Workers sick record. OHS safety guidelines.	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				and air-condition for relevant work areas		MCILI and MHMS-G Province
	Risk of changes to the landscape resulting in potential water and vector borne diseases. E.g. breeding sites for malaria are created where gravel extraction took place	Medium term	M	Landscape extraction have will be filled to avoid water bodies as breeding sites vector borne diseases such as Malaria.	Modified landscape. Local climate conditions. Local Health reports.	Metropolis Mamara Development Ltd  G-Province Health
	Collapse of steep slopes because of gravel excavation on hillside.	Short term	L	Determine the correct angle at which extraction should be done to avoid soil moving downhill	Evidence of collapse. Gravel Excavation PER.	Metropolis Mamara Development Ltd
<b>Geotech</b>	Cutting of ridgelines will change catchment area & may result in increased flood levels and siltation into waterways	Long term	H	Planting woodlands on unstable soils along the catchment and floodplain river corridors, use of silt traps	Turbidity Evidence of planting woodlands and use of silt traps	Metropolis Mamara Development Ltd ECD
	Underground water regime may also change; result in decrease storage	Long term	M	A detail study of landform modification implication should be undertaken, with respect to the Mamara Spring	Detail study of landform modification completed	ECD
	Gravel extraction may result in aggradation	Long term	M	Harvest excess gravel to avoid bridge inundation & bank overtopping	Evidence of aggradation	Metropolis Mamara Development Ltd ECD



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Water and Sediment Quality</b>	High turbidity in rivers and sea waters due to River crossing by machineries	Short term	M	Avoid machineries crossing rivers	Turbidity	Metropolis Mamara Development Ltd ECD
	Impact due to Untreated dispersal of machinery parts into rivers or buried underground	Long term	L	Avoid disposal of machinery parts into rivers. Dispose at the designated site approved by the responsible agency	Evidence of proper storage and disposal of machinery parts	Metropolis Mamara Development Ltd ECD
	Increased sedimentation into rivers during gravel extraction and reclamation	Long term	M	Use of silt traps, bund, coffer dams and sediments ponds	Turbidity Evidence of using sediment control devices	Metropolis Mamara Development Ltd ECD
	Watershed, catchment, and drainage loss during land levelling	Long term	H	Company to make sure that levelling does not develop flooding	Evidence of levelling and effective drainage design.	Metropolis Mamara Development Ltd ECD
	Alteration of groundwater recharge zone when covering the area with concrete cement	Long term	L	All facilities associated with concrete covering designed to agreed standards	Building codes practiced	Metropolis Mamara Development Ltd ECD
	loss of wetland due to land reclamation	Long term	H			



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Marine and Coastal Impacts</b>	Increase turbidity because of Sedimentation due to excavation and reclamation	Long term	M	Apply standard best practise and erosion/sediment management control measures	Water Quality parameters	Metropolis Mamara Development Ltd ECD
	Increase run-off from construction of water way crossings, vegetation clearing, and earthworks	Short term	M	Prepare Standard best practices for Erosion and sediment control. Develop water management plan for the new city	Water Quality parameters	Metropolis Mamara Development Ltd ECD
	Spills of hydrocarbons (fuels) and other potential contaminants from vehicles in operation, oil spillage	<b>Long term</b>	M	Fuel, oil, and chemical handling to be undertaken in accordance with standard best practises for stockpile and runoff handling and implement spill management	Water Quality parameters	Metropolis Mamara Development Ltd ECD
	Machinery noise and movement impacts on marine and coastal fauna	Long term	M	Have in place work schedule and allow for buffers for marine and coastal biodiversity	Noise (decibels)	Metropolis Mamara Development Ltd ECD
<b>Freshwater biodiversity</b>	Increase in suspended solids and siltation	Medium term	H	Establish the Mamara river nature park with 20m buffer in place  Ensure that no intrusion beyond 20 m buffer	Mamara river nature park in place  20 m buffer crated for Mamara river	Metropolis Mamara Development Ltd ECD G-Province

<b>Development Phase and Thematic Impacts</b>	<b>Potential Impacts</b>	<b>Timeframe (Long/ Short term)</b>	<b>Intensity (High-H, Medium-M and Low-L)</b>	<b>Management Actions</b>	<b>Monitoring</b>	<b>Responsible Agency</b>
	River pollution (oil, contaminant residues, infectious diseases, hazardous substances)	Short term	H	Maintain 20m buffer for the Mamara river  Spill emergency response plan in place	Emergency response plan	Metropolis Mamara Development Ltd ECD
	Disturbance of aquatic habitats and aquatic life	Short term	M	Creation of buffer protect river flora and fauna	Maintain 20m buffer	Metropolis Mamara Development Ltd ECD G-Province
	Changes in sediment dynamics downstream creating blockades or barriers for aquatic migratory fish species	Long term	M	Ensure that river is dredged as part of the nature park management plan	Sediments build up  Nature park management plan	Metropolis Mamara Development Ltd ECD G-Province
	Degradation of aquatic habitat	Long term	M	Establishment of Mamara river nature park will conserve aquatic life	Aquatic life monitoring	Metropolis Mamara Development Ltd ECD G-Province
<b>Flora and Fauna</b>	Habitat Destruction and Species Loss. (Alteration of Habitat)	Long term	H	Identify important trees and collection of planting materials (seeds and wildings) for replanting	Support the nursery on site or invest in existing nursery such as the Botanical Gardens for revegetation	Metropolis Mamara Development Ltd ECD MOFR



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Establish the Mamara River Park with 20 me buffer along the river and coastline	Buffer along the river and park being established	ECD Metropolis SIG- MOFR
	Change in species composition and status	Long term	H	Establish the Mamara River Park with 20 me buffer along the river and coastline  Establish a Nature Park (Protected Area) within the Watershed Upstream of Poha and Mamara	Demarcation of boundaries for the Coastal Green space and Mamara River Park.	Metropolis Mamara Development Ltd ECD MOFR
<b>Built Environment and Socio-economic Impacts</b>	Less income from market sale	<b>Short term</b>	M	Provide a designated site for market stalls to be built or provide formal market/vendor facilities	Vendor facilities provided to market vendors	Metropolis Mamara Development Ltd
	Less agricultural produce for sustenance and income	Short term	L	Allow/secure land for agricultural farming especially idle customary land	Affected people continue agricultural farming.	Metropolis Mamara Development Ltd  Customary landowners
	Dependency rate increases	Short term	M	Increase employment opportunity and priorities nearby communities	Employment records	Metropolis Mamara



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>Allow local labor in the workforce</p> <p>Allow for alternative income generation opportunities</p>	<p>No. community members employed</p>	<p>Development Ltd</p> <p>G-Province</p>
	<p>Less or no money for health and education</p>	<p>Short term</p>	<p>M</p>	<p>Increase employment opportunity</p> <p>Priorities local labor community members around Mamara for employment</p> <p>Support efforts for alternative income generation</p> <p>Allow market stalls to be built or provide formal market/vendor facilities</p> <p>Provide free transportation to nearby clinics</p> <p>Education scholarship for affect households</p>	<p>Vendor facilities available to affected people.</p> <p>Employment records</p>	<p>Metropolis Mamara Development Ltd</p>

<b>Development Phase and Thematic Impacts</b>	<b>Potential Impacts</b>	<b>Timeframe (Long/ Short term)</b>	<b>Intensity (High-H, Medium-M and Low-L)</b>	<b>Management Actions</b>	<b>Monitoring</b>	<b>Responsible Agency</b>
	Welfare diminishing	Short Term	M	<p>Increase employment opportunity for community members</p> <p>Allow for alternative income generation</p> <p>Allow market stalls to be built or provide formal market/vendor facilities</p> <p>Invest in transportation that can be accessed nearby clinics</p> <p>Education scholarship for affect households</p>	<p>Employment records indicate recruitment of locals</p> <p>Evidence of health and education programs to support affected people</p>	<p>Metropolis Mamara Development Ltd</p> <p>SIG</p> <p>G-Province</p>
<b>Social and cultural Impacts</b>	Disturbance to daily lives of the local people	Short term	M	Establish a team or an office that responsible to carry out ongoing awareness about the risks and dangers that construction might cause	Records of safety awareness	Metropolis Mamara Development Ltd
	Increases in population from external workers	Short term	H	Priorities employing workers from Mamara community and those in from Honiara to reduce presence of workers permanently	Employment records	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Land related issues disputes resulting in conflict	Short to Long term	H	<p>Collaborate with the national government to address outstanding issues e.g. compensation (ethnic tension outstanding issues) of the Tandai ward.</p> <p>Work along with the chiefs, (the Tandai house of chiefs), church groups, work along with the local structure (traditional way of solving things)</p> <p>Work with the government to create an avenue to review the Mamara – Tasivarongo – Mavo Development Agreement Act 1997</p>	Evidence of MOUs and Development Agreements	Metropolis Mamara Development Ltd MCILI Tandai house of chiefs Mamara Taskforce
	Impacts on natural environment threatens quality of life	Short term	M	Development to focus on project site only	No further expansion into customary land areas	Metropolis Mamara Development Ltd SIG
	Increase in anti- social behaviours	Short term	M	Work with the chiefs, the Tandai house of chiefs, church groups, work along	Grievance records	Metropolis Mamara Development Ltd



Metropolis Pacific



Telios Corporate and Consultancy Services

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				with the local structure and the government		G-Province Tandai House of Chiefs
	Public intrusion into the community from foreign workers	Short term	M	Company to have rules and employment contract restricted workers access into nearby communities	Employment contract and work conditions	Metropolis Mamara Development Ltd G-Province Tandai House of Chiefs
	Threat to culture values and practice	Long term	M	Workers to focus refrain from interacting with communities	Employment contract and work conditions	Metropolis Mamara Development Ltd G-Province Tandai House of Chiefs
	Intrusion threat to tabu sites, community, and historical site	Short term	H	Workers to focus refrain from interacting with communities	Employment contract and work conditions	Metropolis Mamara Development Ltd G-Province Tandai House of Chiefs



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Health Impacts</b>	Disease incidence rate increase – communicable diseases	Short term	M	<p>Awareness and support for local and healthy food consumption</p> <p>Regular health monitoring provincial health centres at Marara</p> <p>New health facilities (mini hospital) to provide health services</p>	Health records	MHMS ECD
	Occupational health & safety – increases chances of accidents, air, and water- borne diseases	Short term	L	<p>Develop a standard OHS- Occupational health &amp; safety program plan</p> <p>Develop a policy for public and worker safety</p> <p>Work with Environmental Health OHS unit for more awareness and protective measures training</p>	<p>Accidents recorded.</p> <p>Evidence of OHS training and awareness to workers and public</p>	<p>Metropolis Mamara Development Ltd</p> <p>MHMS ECD</p>
	Demand for additional health services increases	Short	M	Provide health infrastructure support such as an ambulance or transport for emergencies	Workers receive effective health care services e.g. vehicles, resources	<p>Metropolis Mamara Development Ltd</p> <p>MHMS ECD</p>



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Metropolis to recruit/contract health workers to manage its workers health.		
	Impact on nutritional status	Long term	L	Company to provide balanced diet and healthy amount of food to its workers	Health records	<b>MHMS</b>
	Accident and injuries	Short	M	Design and implement an OHS health program plan for the project  All staffs must effectively follow standard OHS plan	Records of safety inductions and awareness programs	Metropolis Mamara Development Ltd  MHMS ECD
<b>Phase 2- Construction of Buildings, Roads and Utilities</b>						
	<b>Physical environment</b>					
<b>Climate and Disaster Risks</b>	Risk of drainage blockage or overflow as well erosion of the road especially during heavy rain periods (The highest records for Honiara in 2014 and 2009 should be used as minimum threshold.)	Long term	L	Design and construct surface water drainage and sediment control facilities that can cater for maximum daily rainfall.  Proper drainage systems to along the roads and the roads must be properly tar sealed	Road specifications approved by relevant authorities  Sealed roads constructed with drainage in place	Metropolis Mamara Development Ltd  MID  Mamara Taskforce G-Province

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Construction workers in temporary buildings have a very high chance of discomfort if the buildings are not properly designed to allow good ventilation or if not fitted with proper cooling systems	Long term	L	Temporary building designs and site plan should consider rainfall patterns, wind velocity, high relative humidity, and high temperature  Provide electric fans and air condition for workers offices and residence	Building design approved by the relevant authority. Electric fans availability	Metropolis Mamara Development Ltd  MID
	There is risk of temporary buildings and other infrastructures being damaged due to strong winds and tropical cyclones	Short term	M	All buildings and other infrastructures should be designed to withstand tropical cyclones, flooding, and storm surges.	Building design approved by the relevant authority	Metropolis Mamara Development Ltd  MID
	There is risk of flood causing damage/inundation to the east side of the development site  Flood risks and threat to the proposed wastewater treatment facility based on flood projection for Poha river for 2009 and 2014	Short term	M	Shift the proposed wastewater treatment facility to other low risk sites.  Engage surrounding community to plant trees along Poha riverine as means of adaptation from flooding.  Alternative site to be proposed for the wastewater treatment	All structures and utilities on high ground.  Evidence trees are planted as protection to flooding  Flood containment fall to consider recent flood projections	Metropolis Mamara Development Ltd  ECD  MID  G-Province

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>facility and potential engineering options such as flood containment wall to be build downstream Poha</p> <p>Rehabilitate and protect the Mamara riverine to protect the site as well as existing ecosystems</p>		Mamara Taskforce
	<p>There is high risk of the port and landing facilities being damaged by strong winds (mostly easterlies) and accompanied storm surges and high waves.</p> <p>Future sea level rise should be considered in the designs as well</p>	Short term	M	<p>Design ports and barge landing facilities based on coastal tides, maximum easterly and westerly winds with associated and waves.</p> <p>Also design these facilities considering 8mm rise of sea level rise per annum for at least the next 50 years</p>	Port design to agreed standards.	Metropolis Mamara Development Ltd MID
	Ground movement due to earthquake with magnitude greater than 8 Mg had a moderate to high impacts on the location of Mamara	Short term	L	The design and constructions of roads, drainage systems and building should be engineered to withstand earthquake with magnitude greater than 8 Mg	Design specification	Metropolis Mamara Development Ltd  MID

<b>Development Phase and Thematic Impacts</b>	<b>Potential Impacts</b>	<b>Timeframe (Long/ Short term)</b>	<b>Intensity (High-H, Medium-M and Low-L)</b>	<b>Management Actions</b>	<b>Monitoring</b>	<b>Responsible Agency</b>
	Bursting of river Poha bank due to sediment build-up within the main channel can cause surface flooding	Long term	M	The main channel of the Poha River should be continuously dredged to remove sediment deposits	Records of best practice to remove sediment deposits	Metropolis Mamara Development Ltd
<b>Geotech</b>	Increase in paved surface, i.e. less water infiltration into the ground which will lead to decreased subsurface water levels	Long term	L	Use of injection wells to directly discharge water into water-bearing zones	Injection wells installed	Metropolis Mamara Development Ltd
	Increased paved surfaces will lead to larger runoffs and may in turn cause flooding through inundation	Long term	M	Tree roots increase water saturation. Proper stormwater drains to collect surface water & discharge at suitable locations	Effective drainage design system	Metropolis Mamara Development Ltd
<b>Water and Sediment Quality</b>	Accidental release of hydrocarbon from construction machines impacting soil and water and frequent machine exposure to sea or water releases hydrocarbons	Short term	M	<p>Ensure all construction machines are well maintained</p> <p>A prestart on construction machine carried out every morning</p> <p>Oil/fuel remediation agents, oil pads, oil booms and geo-fabric</p>	<p>Construction machineries maintain in good working order</p> <p>Spot check for visible oil Water quality</p> <p>Any emergency response plan developed by Metropolis Mamara Development Ltd.</p>	<p>Metropolis Mamara Development Ltd</p> <p>ECD</p> <p>G-Province</p>



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				clothes are ready for usage as <i>per emergency response plan</i> ; ( <i>Hazardous material management manual</i> ).		
	Reservoir construction for water supply could change stream flow	Long term	L	Metropolis Mamara Development Ltd to ensure consistent stream flow in the reservoir detail design	Reservoir design	Metropolis Mamara Development Ltd ECD Water Resources - MMERE
	Spilling paint and other hazardous construction materials	Short term	L	Metropolis Mamara Development Ltd formulate an emergency response plan to cover hazardous materials/oil storage, spills, and accidents; <ul style="list-style-type: none"> <li>▪ Chemicals will be stored in secure containers 20m away from the coastline;</li> <li>▪ Chemicals stored in area or compound with concrete floor</li> </ul>	Ensure storage sites are using concrete base. Effective bund walls  Emergency response plan in place	Metropolis Mamara Development Ltd ECD G-Province



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				and weatherproof roof and fire extinguishers; <ul style="list-style-type: none"> <li>▪ Spills will be cleaned up as per emergency response plan;</li> <li>▪ Accidents reported to relevant authority within 24 hours;</li> </ul> <i>(Hazardous material management manual)</i>		
<b>Marine and Coastal Impacts</b>	Spills of hydrocarbons (fuels) and other potential contaminants from vehicles in operation, oil spillage	<b>Short term</b>	M	Fuel, oil, and chemical handling to be undertaken in accordance with standard best practises for stockpile and runoff handling and implement spill management  emergency response plan includes marine and coastal emergency or spillage	<ul style="list-style-type: none"> <li>• Construction machineries maintain in good working order</li> <li>• Spot check for visible oil</li> </ul> Water quality  Emergency response plan in place	Metropolis Mamara Development Ltd  ECD
	Increase in litter and solid waste into marine water	Short term	M	Formulate a waste management plan for the new city	Evidence indicating hygiene and cleanliness	Metropolis Mamara Development Ltd  ECD

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Must have standard best practice for waste disposal and storage.	Waste management plan for new city in place	
	Direct/permanent loss to marine flora and fauna due to land reclamation dredging (if any) due to reclamation and dredging should there be any	Long term	M/H	Avoid sensitive and critical marine habitats where possible during construction phase	Spot-check and coastal and reef monitoring of flora and fauna specimens	Metropolis Mamara Development Ltd ECD
	Increase in noise vibration and human activity during excavation, and reclamation,	Short term	L	Enforce speed limit at vicinity of new city and nearby areas. Also use soundproof materials on strategic areas to reduce noise	Decibels	Metropolis Mamara Development Ltd ECD G-Province Env Health
<b>Freshwater Biodiversity</b>	Impact on trophic resources i.e. flow of food within the freshwater system	Medium term	L	Mamara river nature park will reduce such impacts	Regular monitoring as part of the river nature park management plan	Metropolis Mamara Development Ltd ECD G-Province Env Health
	Water quality degradation			Mamara river nature park will help maintain water quality  Reduce human activities in the river	Regular monitoring as part of the river nature park management plan	Metropolis Mamara Development Ltd ECD G-Province Env Health

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Overfishing			Mamara river nature park will reduce such impacts.  Ensure that no human activities including fishing in the area	Regular monitoring as part of the river nature park management plan	Metropolis Mamara Development Ltd ECD G-Province Env Health
	Increase invasive species in the area due to ecology or habitat shift			Eradication programme part for the Mamara river nature park management plan	Regular monitoring as part of the river nature park management plan	Metropolis Mamara Development Ltd ECD G-Province Env Health
<b>Flora and Fauna</b>	Alteration of Habitat	Long term	H	Identify sites/spots for replanting and match with species  Creation of the Mamara river nature park	Evidence of replanting  Mamara river park established	Metropolis Mamara Development Ltd  ECD
	Change in species composition and status	Long term	M	Establish Mamara river nature park with 20m buffer  Replant trees within the upper catchment and along the riverbanks and coastline where birds and	Mamara river nature park established  Evidence of replanting	Metropolis Mamara Development Ltd  ECD

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				other biodiversity can inhabit.		
<b>Built Environment and Socio-economic Impacts</b>	Less income from market sale	Long term	M	Designate market for local community market/vendor facilities	Facilities for market vendors established	Metropolis Mamara Development Ltd  G Province
	Less agricultural produce to sustenance and income	Short term	L	Work with customary landowners to designate sites for agricultural farming	Affected people continue agricultural farming.	Metropolis Mamara Development Ltd  Mamara taskforce G-Province
	Dependency rate increase	Short term	M	Increase employment opportunity for nearby communities  Priorities local labor from nearby Mamara communities in the workforce  Allow for alternative income generation	Employment records	Metropolis Mamara Development Ltd Mamara taskforce G-Province



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Less or no money for health and education	Short term	M	<p>Increase employment opportunity</p> <p>Priorities local labor for all nearby communities in the workforce</p> <p>Allow for alternative income generation</p> <p>Allow market stalls to be built by nearby communities or provide formal market/vendor facilities</p> <p>Provide transportation to nearby clinics.</p> <p>Discuss new education opportunities for affect households</p>	Vendor facilities available to affected people. Employment records	Metropolis Mamara Development Ltd Mamara taskforce G-Province
	Welfare diminishing	Short Term	• M	<p>Increase employment opportunity</p> <p>Priorities local labor from nearby communities in the workforce</p>	Employment records indicate recruitment of locals Evidence of health and education programs to support affected people	Metropolis Mamara Development Ltd  Mamara taskforce



Metropolis Pacific



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Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>Allow for alternative income generation</p> <p>Allow market stalls to be built or provide formal market/vendor facilities</p> <p>Provide free transportation to nearby clinics</p> <p>Education scholarship for affect households</p>		G-Province
	Increase of poverty	Short term	M	<p>Increase employment opportunity for local community</p> <p>Priorities local labor in the workforce</p> <p>Allow for alternative income generation</p> <p>Allow market stalls to be built or provide formal market/vendor facilities</p> <p>Provide free transportation to nearby clinics</p>	<p>Employment records indicate recruitment of locals</p> <p>Facilities established for local vendors</p>	<p>Metropolis Mamara Development Ltd</p> <p>Mamara taskforce</p> <p>G-Province</p>



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Education scholarship for affect households		
<b>Social and Culture Impacts</b>	Occupational health and safety issues	Short term	H	Provide standard safety plan for all workers (OHS) Safety induction and awareness to communities	Records of safety trainings and awareness OHS plan in place	Metropolis Mamara Development Ltd Mamara taskforce G-Province
	Anti-social behaviours -	Short term	M	Work along with the chiefs, the Tandai house of chiefs, church groups, work along with the local structure and the government	No reported cases of Ani-social behaviours	Metropolis Mamara Development Ltd G-Province Police Tandai House of Chiefs Mamara taskforce
	Public/Workers intrusion into the community	Short term	H	Workers contract include not allowed to intrude into nearby communities		Metropolis Mamara Development Ltd

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Company and community to collaborate for community policing with G-Province Police		G-Province Police Tandai House of Chiefs Mamara taskforce
	Traffic increase to the community -Increase chances of accidents (injuries)	Short term	M	Safety signs and barricade	Records of accidents	Metropolis Mamara Development Ltd G-Province Police Tandai House of Chiefs Mamara
	Liquid and solid waste discharge into the rivers and coastal environment	Short term	M	Septic tanks and garbage receptacles will be set up at construction camp sites which will be regularly cleared by the company;  The company to prepare waste management plan for the new city  All wastes from work sites and camps to be disposed	Waste management plan formulated  Provision of sanitary facilities; No direct discharges to local streams or rivers; Regularity of waste removal  Landfill site identified and used	Metropolis Mamara Development Ltd  SIG  G-Province  Mamara taskforce



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>of in approved landfill / areas;</p> <p>The company will provide sufficient training in appropriate waste disposal methods;</p> <p><i>Waste Management Manual (Hazardous material management manual).</i></p>		
	Noise pollution	Short term	M	The company will develop a schedule of operations with village chiefs and Engineer to identify days of no work and hours for certain activities.	Decibels	Metropolis Mamara Development Ltd SIG G-Province
	Air pollution	Short term	M	Prohibit use of equipment that causes excessive pollution (e.g. generates smoke);	Air quality, emissions. Any particulate matter	Metropolis Mamara Development Ltd SIG G-Province
	Loss of cultural values, knowledge, and stories in the community	Long term	H	Support community efforts to maintain ether culture and traditional value	Culture maintained	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Support cultural events such as utilizing them for cultural entertainments		SIG G-Province Tandai house of Chiefs
	Threat to Poha historical sites	Short term	H	Support efforts by the SIG to develop Poha as a historical site  Awareness undertaken for all workers and visitors about the significance of Poha cave	Support provided	Metropolis Mamara Development Ltd SIG- Ministry of Culture and Tourism G-Province Tandai house of chiefs
	Intrusion into tabu and customary sites	Medium term	H	Ensure that workers contract include no intrusion into tabu and customary sites  Community preserve their tabu site areas from an activity	Worker contracts and company policies for workers  Enforce ordinances protecting tabu sites	Metropolis Mamara Development Ltd SIG G-Province Tandai house of chiefs
<b>Health Impacts</b>	Disease incidence rate – communicable diseases	Short term	M	Always wear protective clothes from dust and other injuries	Health records	Metropolis Mamara Development Ltd

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Regular health monitoring provincial health centres at Marara new health facilities (mini hospital)		MHMS ECD
	Impacts for air and water-borne diseases	Short term	L	Develop a standard OHS-Occupational health & safety program plan  Develop a policy for public and worker safety  Work with Environmental Health OHS unit for more awareness and protective measures training	Incidence recorded.  Evidence of OHS training and awareness to Workers and Public	Metropolis Mamara Development Ltd  MHMS ECD
	Accident and injuries	Short term	M	Design and implement an OHS health program plan for the project  All staffs must effectively follow standard OHS plan	Records of safety inductions and awareness programs	Metropolis Mamara Development Ltd  MHMS ECD
	Accommodate the needs and health welfare of staffs/workers of the project	Long term	M	Include in OHS management plan staff health welfare and safety	OHS Management Plan	Metropolis Mamara Development Ltd  MHMS ECD



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Development Phase 3 – Operation of Residential, Commercial and Supporting Utilities</b>						
	<b>Physical Environment</b>					
<b>Climate and Disaster Risks</b>	<p>There is risk of damages to the site from flooding of Poha River,</p> <p>Strong winds, storm surges, cyclones, and continuous sea level rise during the operational phase of the development should flooding and coastal dynamics and not continuously monitored for timely action</p>	Long term	H	<p>Install AWSs to monitor daily weather variables such as rainfall, temperature, wind, and humidity.</p> <p>Install tide gauges on the coast for sea level and coastal monitoring. Install flood gauges especially at Poha River to monitor flooding</p>	<p>AWS in place</p> <p>Tidal and flood gauge functioning</p>	<p>Metropolis Mamara Development Ltd SIG- Met Service G-Province MECDM – Climate change office</p> <p>Water resources division</p>
	Ground movement due to earthquake with magnitude greater than 8 Mg had a moderate to high impacts on the location of Mamara	Short term	L	The design and constructions of roads, drainage systems and building should be engineered to withstand earthquake with magnitude greater than 8 Mg	Design specification	<p>Metropolis Mamara Development Ltd</p> <p>MID</p>



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Bursting of river Poha bank due to sediment build-up within the main channel can cause surface flooding	Long term	M	The main channel of the Poha River should be continuously dredged to remove sediment deposits	Records of best practice to remove sediment deposits	Metropolis Mamara Development Ltd
	CO <sub>2</sub> emission from operation of diesel Generator	Long term	M	Discuss the option of connecting to Solomon Power Grid which means access to Sustainable Hydro power	Evidence of plan to establish renewable energy sources	Metropolis Mamara Development Ltd  MECDM Energy Division – MMERE Sol POWER
<b>Geotech</b>	Commercial operations may introduce chemical waste into the soil and environment	Long term	M	Both solid and liquid waste need to be handled, treated, and disposed appropriately	Evidence of effective handling of chemical waste	Metropolis Mamara Development Ltd  ECD
	Increase in human waste. The potential impact is the discharged effluents into natural water bodies	Long term	M	Wastewater treatment facility will address all liquid waste	Wastewater treatment facility operational	Metropolis Mamara Development Ltd  ECD
<b>Water and Sediments Quality</b>	Oil and other hydrocarbon substances spill from power station	Long term	L	Chemicals stored in area or compound with concrete floor and	Emergency response plan in place	Metropolis Mamara



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>weatherproof roof and fire extinguishers</p> <p>Spills will be cleaned up as per emergency response plan</p> <p>Ensure all construction machines are well maintained</p> <p>Accidents reported to police and ECD within 24 hours</p>	<p>Ensure storage sites are using existing concrete base</p> <p>Spills cleaned and area rehabilitated</p>	<p>Development Ltd</p> <p>ECD</p>
	Untreated Effluent waste disposal into river and onto the ground that can affect surface and ground water quality	Long term	M	Ensures wastes not discharged to rivers or coastal waters and that all wastes; disposed of at designated site	<p>No direct discharges to local streams or rivers;</p> <p>Effectively implement and monitor the waste management plan</p>	<p>Metropolis Mamara Development Ltd</p> <p>ECD</p>
	Disposal of household wastes (liquid and solid) into rivers	Long term	M	Garbage receptacles set up at residential sites, which will be regularly cleared by the Metropolis Mamara Development Ltd	<p>Waste management - visual inspection that solid waste disposed of regularly at designated site.</p> <p>A waste management (solid and liquid)</p>	<p>Metropolis Mamara Development Ltd</p> <p>ECD</p>



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
					strategy will be developed for the new township that includes new landfill development	
	Nutrient enrichment through storm water runoff	Long term	M	Use of silt control devices and sediment traps/fences and sediment settling ponds	Water quality parameters	Metropolis Mamara Development Ltd ECD
<b>Marine and Coastal Impacts</b>	Spills of hydrocarbons (fuels) and other potential contaminants from vehicles in operation, oil spillage	Short term	M	Fuel, oil, and chemical handling to be undertaken in accordance with standard best practises for stockpile and runoff handling and implement emergency response plan	Construction machineries maintain in good working order Spot check for visible oil water quality	Metropolis Mamara Development Ltd ECD
	Increase in litter and solid waste into marine water	Short term	M	Must have standard best practice for waste disposal and storage	Evidence indicating hygiene and cleanliness and implementation of a waste management strategy for the new township	Metropolis Mamara Development Ltd ECD
	Increase in Nutrient enrichment due to storm water run-off from wastewater (sewage) affects water quality	Long term	M	Prepare Standard best practices for erosion and sediment control.	Water quality parameters and implementation of a waste management	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Develop water management plan for the new city	strategy for the new township.	ECD
	Increase in noise, vibration, and human activity during operation impacts on marine and coastal biodiversity	Long term	L	Awareness on the need to protect that coastal and marine life	Have in place reef and coastal monitoring regime	Metropolis Mamara Development Ltd G-Province ECD
	Increase in fishing pressure	Long term	M	Manage and apply restrictions measures fishing activities in different zones along the coastal area Conduct Catch per unit effort study.	Spot check for fishing practices. Evidence of Catch per unit effort study.	Metropolis Mamara Development Ltd ECD
<b>Freshwater Biodiversity</b>	River pollution from increase sedimentation and siltation	Long term	H	Maintain the 20m buffer to ensure no development in the river	Mamara river nature park management plan Water quality and sediments monitoring undertaken regularly	Metropolis Mamara Development Ltd G-Province Env Health ECD
	Disburdens on amenity values in the reduced access to livelihood sourced areas	Medium term	H	Local community will be provided with reticulated water supple as part of the development agreement	Mamara river nature park management plan	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
					Water quality and sediments monitoring undertaken regularly	G-Province Env Health ECD
	Clearance and development for water treatment and bottling facility	Short term	H	<p>Include management of water quality and sediments in the Mamara river nature park management plan</p> <p>Ensure that riverbanks are not modified or changed</p>	<p>Mamara river nature park management plan</p> <p>Water quality and sediments monitoring undertaken regularly</p>	Metropolis Mamara Development Ltd G-Province Env Health ECD
	Loss of freshwater flora and fauna	Long term	H	Mamara river nature park management plan to focus on conversation of freshwater flora and fauna	<p>Mamara river nature park management plan</p> <p>Water quality and sediments monitoring undertaken regularly</p>	Metropolis Mamara Development Ltd G-Province Env Health ECD
	Introduction of invasive and alien species	Long term	M	Ensure that management plan for the Mamara river nature park include invasive species management	<p>Mamara river nature park management plan</p> <p>Monitor and assess invasive species</p>	Metropolis Mamara Development Ltd G-Province Env Health ECD Biosecurity Division
	Waste (liquid and solid) being dumped into the streams and rivers	Long term	H	Formulate and implement a waste management strategy for the new city	Wastes being dumped and monitoring of the waste management	Metropolis Mamara



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
					strategy for the new city	Development Ltd G-Province Env Health ECD
<b>Flora and Fauna</b>	Alteration of Habitat	Long term	H	Replant and protect trees  Establish the Mamara river nature park  Have buffers between customary and Mamara land	Evidence of replanting  Mamara river nature park operational	Metropolis Mamara Development Ltd  ECD
	Change in species composition and status	Long term	M	Trees and vegetation are secured within the Mamara river nature park and coastal green buffer	Evidence of replanting  Coastal buffers and Mamara nature park in place	Metropolis Mamara Development Ltd  ECD
	Introduction of invasive and alien species	<b>Medium</b>	H	Ensure that all materials imported are properly quarantined and fumigated	Biosafety protocols and assessments	Metropolis Mamara Development Ltd Biosecurity department G-Province ECD



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
<b>Built Environment and Socio-economic Impacts</b>	Less agricultural produce for sustenance and income	Short term	L	Allow market stalls to be built or provide formal market/vendor facilities	Establish vendor facilities.	Metropolis Mamara Development Ltd
	Expanded road network - Increased road accidents	Long term	M	Enforce traffic regulations for the city based provincial and national guidelines	Evidence that traffic regulation in place for new city	Metropolis Mamara Development Ltd
	Air pollution	Long term	M	Enforce traffic regulations	Evidence that traffic regulation was adopted	Metropolis Mamara Development Ltd
	<b>Positive Impacts</b>					
	Access to electricity positive effects	Long term	H	Improvement in standard of living  Greater access to information and technology	NA	Metropolis Mamara Development Ltd
	Increase in employment opportunities	Long term	H	Increased social security  More income for households	NA	Metropolis Mamara Development Ltd



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>Increased financial viability</p> <p>Improved standard of living</p>		
	Improved education and skills	Long term	M	<p>Increased educated population</p> <p>Knowledge increase wider fields</p> <p>Skills upgrade in different trades and sectors</p>	NA	Metropolis Mamara Development Ltd
	Ecotourism opportunities	Long term	M	<p>Improved tourism facilities allow for increase in hospitality such as;</p> <ul style="list-style-type: none"> <li>▪ sightseeing &amp; bush trekking</li> <li>▪ snorkeling and scuba diving</li> <li>▪ game fishing</li> </ul> <p>Potential for establishment of nature park reserves upland and around the new city</p>	NA	Metropolis Mamara Development Ltd

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Population displacement or resettlement	Short term	H	<p>Compensation payments provides substantial income</p> <p>Sets new path in self-development by individuals and families</p>	NA	Metropolis Mamara Development Ltd
	Improved roads and accessibility	Long term	M	<p>Greater access and mobility to facilities and amenities</p> <p>Allows for increased installation of utility supplies</p>	NA	Metropolis Mamara Development Ltd
	Improved local financial capital and greater participation in economic development	Long term	L	<p>Access to financial facilities</p> <p>Ability to save</p> <p>Increased social security</p> <p>Improved economy</p> <p>Investment opportunities and increased development pathways</p>	NA	Metropolis Mamara Development Ltd
	Potential project benefits for women	Long term	M	Improved gender mainstreaming		Metropolis Mamara Development Ltd

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Greater participation in economic development		
	Remunerations and project benefits	Long term	M	<ul style="list-style-type: none"> <li>Increased social security</li> <li>Improved standard of living</li> </ul>		Metropolis Mamara Development Ltd
<b>Social and Culture Impacts</b>	Land related issues	Long term	H	<p>Collaborate with national government to address outstanding issues e.g. compensation (ethnic tension outstanding issues)</p> <p>Establishment of police station close to the township at Mamara</p>	<p>Development agreement with nearby communities</p> <p>Taskforce minutes address community issues</p>	<p>Metropolis Mamara Development Ltd</p> <p>Mamara taskforce</p> <p>MCILI</p> <p>G-Province Police</p>
	Loss of privacy and intrusion into the community	Long term	H	<p>Company policy to restrict resident occupants to intrude into community</p> <p>Awareness to new residence on community rules and culture</p>	<p>Resident and property agreements</p> <p>Awareness events</p>	<p>Metropolis Mamara Development Ltd</p> <p>Mamara taskforce</p> <p>MCILI</p> <p>G-Province Police</p>
	Domestic violence due to alcohol abuse and other issues	Long term	H	Awareness on domestic violence and alcohol abuse	Awareness events	G-Province



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
						SIG – Ministry of Women
	Increase population and urban expansion into customary land	Long term	H	The development agreement will include issues on residents and anyone purchasing any customary lands	Development Agreement in place	Metropolis Mamara Development Ltd Tandai House of Chiefs G-Province
	Threat of new informal and squatter settlements	Long term	H	The development agreement will include issues on residents and anyone purchasing any customary lands	Development Agreement in place	Metropolis Mamara Development Ltd Tandai House of Chiefs G-Province ECD
	Overharvesting of natural resources due to increase in demand	Long terms	H	Community awareness to manage their resources effectively	Awareness events	Tandai house of Chiefs G-Province ECD
	Limited or no access to Mamara river	Long term	H	Alternative water sources being considered	Development agreement include	Metropolis Mamara

Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				Water supply system to be provided to the community nearby as well	water supply to communities nearby	Development Ltd Tandai House of Chiefs G-Province ECD
	Introduction of invasive and alien species	<b>Medium</b>	H	Ensure that all materials imported are properly quarantined and fumigated	Biosafety protocols and assessments	Metropolis Mamara Development Ltd Biosecurity department G-Province ECD
	Increase risks of accident due to residential increase	Short term	H	Awareness on traffic rules and safety	Awareness events	Metropolis Mamara Development Ltd ECD G-Province Police
	Conflict between new residents and community members	Medium term	H	Work along with the chiefs, and Tandai house of chiefs, church groups and Guadalcanal provincial government.	Report of incidence of conflicts	Metropolis Mamara Development Ltd ECD G-Province Police



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Conflict among residents	<b>Medium terms</b>	H	Police to address issues of conflict with community leaders	Report of incidence of conflicts	Metropolis Mamara Development Ltd ECD G-Province Police
	Anti-social behaviour - Drugs and alcohol use increase	Short term	M	Work along with the chiefs, and Tandai house of chiefs, church groups and Guadalcanal provincial government.	Records of reported Ani-social behaviours cases	Metropolis Mamara Development Ltd G-Province Police
	Loss of cultural values, knowledge, and stories in the community	Long term	H	Support community efforts to maintain ether culture and traditional value  Support cultural events such as utilizing them for cultural entertainments	Culture maintained	Metropolis Mamara Development Ltd SIG G-Province Tandai house of Chiefs
	Threat to Poha historical sites	Short term	H	Support efforts by the SIG to develop Poha as a historical site  Awareness undertaken for all workers and visitors about the significance of Poha cave	Support provided	Metropolis Mamara Development Ltd SIG- Ministry of Culture and Tourism G-Province



Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
						Tandai house of chiefs
	Intrusion into tabu and customary sites	Medium term	H	<p>Ensure that workers contract include no intrusion into tabu and customary sites</p> <p>Community preserve their tabu site areas from an activity</p>	<p>Worker contracts and company policies for workers</p> <p>Enforce ordinances protecting tabu sites</p>	<p>Metropolis Mamara Development Ltd</p> <p>SIG</p> <p>G-Province</p> <p>Tandai house of chiefs</p>
<b>Health Impacts</b>	Disease incidence rate – communicable diseases	Long term	M	<p>Develop a health taskforce or healthy committee that all responsible for the health welfare of the new city</p> <p>Work along with Ministry of health, for more health awareness, IEC materials</p>	Health records	<p>Metropolis Mamara Development Ltd</p> <p>MHMS</p> <p>ECD</p>
	Waste issues a threat to community health	Long term	H	Wastes management plan developed for new city	Effective waste management system	Metropolis Mamara



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Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
				<p>Collaborate with health relevant department for further training wastes basic management</p> <p>Mamara New Capital City to provide wastes collection vehicles</p>	Waste management plan in place	<p>Development Ltd</p> <p>MHMS ECD</p> <p>G-Province</p>
	Introduction of new pest and disease	Long term	H	Awareness of threats to health form new pest and diseases	Awareness events	<p>Metropolis Mamara Development Ltd</p> <p>MHMS ECD G-Province</p>
	New Malarial and Dengue breeding site	Medium term	H	<p>Awareness and measures taken to address breeding ground for Malaria and Dengue</p> <p>Regular health monitoring by health authorities of G-Province</p>	<p>Health card reports</p> <p>Health monitoring for new development</p>	<p>G-Province Health division</p> <p>ECD</p> <p>Metropolis Mamara Development Ltd</p>



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Development Phase and Thematic Impacts	Potential Impacts	Timeframe (Long/ Short term)	Intensity (High-H, Medium-M and Low-L)	Management Actions	Monitoring	Responsible Agency
	Change in nutrition and diet resulting in health issues	Long term	M	Collaborate with G-Province Health authorise and Ministry of Agriculture to promote local and healthy food.	Food and diet habits and health reports	SIG – MAL G-Province Metropolis Mamara Development Ltd

## 7 CONCLUSIONS

This EIS and the EMP is a highly ambitious undertaking given the timeframe required for its formulation and to a certain extent the amount of data, information and community consultation required. The TOR provided expects a fully comprehensive study with a long-term monitoring regime. Recent efforts have been made by the Metropolis Mamara Development Ltd to develop the site which resulted in a PER being submitted and a subsequent development consent was issued. However, the projects' development plan changed and requires that a more comprehensive study be undertaken.

The observations and findings from the assessment reflect on a site that has had multiple developments and therefore a highly volatile environment. The underlying geology foundation of the site is a result of its location just below Poha river and Mamara spring which means that its mostly alluvial topsoil lying on a gravel base with mixture of sand. This is typical of many Guadalcanal plains although the alluvial soil depth varies. There is not much presence of large terrestrial fauna although the freshwater and marine fauna are surprisingly in moderate conditions. Water and sediment quality for the area is highly fluid with mixed results especially with microbial results reflecting the largely uncontrolled and open defecation in the area.

There is strong evidence that many community members and settlers in and around the project site have come to heavily depend on the site for their livelihood. The presence of gardens, betel plantations, watercress farms and recreation beaches show that over the last 20 years, the community's sense of ownership and economic use of the land have flourished. This sense of ownership was re-enforced by some of the recent agreements such as the Townsville peace agreement signed as the peace agreement for the civil unrest in which the Government is expected to return alienated land to the original landowners of Guadalcanal.

The EMP attempts to address many of the environment and social issues that will arise from the development in three phases. However, there are more issues that have not been captured that will need to be considered as development occurs. Therefore, this EMP is not an exhaustive in nature and should be seen as a living document for both the company and other relevant stakeholders. The responsibility to implement the EMP is not that of Metropolis Mamara Development Ltd alone, but also of lead Government agencies and traditional leadership entities such as the Tandai house of Chiefs and community elders. The development has broad ranging impacts and thus broad ranging interest groups and stakeholders need to take responsibility.

There are few important considerations that Metropolis Mamara Development Ltd needs to immediately address to strengthen the EMP and these include development of the following plans and policy;

1. An occupational, health and safety guideline and policy (OHS) – this is for its workers and the safety of commuters, settlers, and community members.
2. An emergency spill response plan – this is to address any spillage of fuel, oil, other hydrocarbons into the rivers, streams, environment, and coastal environment.
3. Formulate a solid waste management plan and system and identify a landfill for the new city.

4. Have in place grievance procedure developed in collaboration with the Mamara Taskforce and Secretariat – this is to address community issues and concerns.

The Mamara Tasivarongo Mavo Development Act enacted in 1997 have exempted the developer from requirements under the town and country planning act making it difficult to ascertain if the design, structures and materials are reliable and suit the SI tropical environment and more so withstand tropical cyclones and earthquakes. This a major gap and is a limitation of the EIS in addition to lack of detail engineering designs.

Another challenge for the development and the EMP is that its scale and impacts on the nearby communities have not been fully comprehended and that disclosure and stakeholder engagements processes have been ad hoc in nature. In any case this is a site that have experienced over a century of multiple developments even WWII. The issues related to land is over a century old and the community within the area have been able to live and adapt to these conditions. The EMP if fully implemented will go a long to addressing the environmental and social impacts associated with the proposed development. The development should be issued a development consent with the relevant pre-conditions on the concerns raised and with ongoing monitoring of this EMP.