Environmental Social Management Plan / Public Environmental Report (PER)

Tingoa Solar Hybrid Subproject

October 2020

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ACRONYMS

AP	Affected person
BMP	Building Materials Permit
BOQ	Bill of Quantities
CESMP	Construction Environment and Social Management Plan
CITES	Convention of International Trade in Endangered Species
ECD	Department of Environment and Conservation
EIA	Environment Impact Assessment
EIS	Environment Impact Statement
EMP	Environment Management Plan
EPC	Engineering Procurement Construction Contract
ESIA	Environment Social Impact Assessment
ESMP	Environment Social Management Plan
ESO	Environmental Safety officer
GEF	Global Environmental Facility
GRM	Grievance Redress Mechanism
HH	Household Head
MECDM	Ministry of Environment, Conservation, Disaster Management and Meteorology
MID	Ministry of Infrastructure and Development
MMERE	Ministry of Mines, Energy and Rural Electrification
NAPA	National Adaptation Plan of Action
NEMS	National Environment Management Strategy
PER	Public Environment Report
RPG	Rennell and Bellona Provincial Government
SIDS DOCK	Strategic Climate Fund and Small Islands Development State Initiative Multi-Donor Trust Fund
SIEA	Solomon Islands Electricity Authority
SIEAREEP	Solomon Islands Electricity Access and Renewable Energy Expansion Project
SIG	Solomon Islands government
SINDS	Solomon Islands National Development Strategy 2011 - 2020
SINEP	Solomon Islands National Energy Policy 2014-2024

SIWA	Solomon Islands Water Authority
SOP	Standard Operating Procedures
SP	Solomon Power
SWIM	Supporting Work in Mission
TCPB	Town Country Planning Board
UXO	Unexploded Ordnance
WB	World Bank

EXECUTIVE SUMMARY

1. Solomon Islands Electricity Authority (SIEA) trading as Solomon Power (SP) established under the Electricity Act 1969 is the sole provider of grid electricity throughout Solomon Islands. Within Honiara itself, it has two power stations (where more than 95% of the energy is from diesel generators) located at Lungga and Honiara producing a combined capacity of 32MW. Development partners over the last 10years have provided financial assistance to Solomon Power (SP) in its efforts to meet obligations under the Solomon Islands National Energy Policy 2014-2024 (SINEP).

2. Recently, World Bank (WB), Global Environment Facility (GEF), Strategic Climate Fund and Small Islands Development State Initiative Multi-Donor Trust Fund (SIDS DOCK) have agreed to finance capital works under the Solomon Islands Electricity Access and Renewal Energy Expansion Project (SIEAREEP). The SIEAREEP comprise of International Development Association (IDA) Credit 5.55m, IDA Grant 4.75m), and trust funds (Strategic Climate Fund 7.1m, GEF Grant 0.9m and SIDS DOCK grant 1.6m). The project development objective is to increase access to grid-supplied electricity and increase renewable energy generation in Solomon Islands. SP will therefore utilize this funding to increase its footprint throughout Solomon Islands through service connection subsidies and the expansion of solar farms at Henderson and Rooftop of SP building together with Solar Hybrid systems and to increase the share of renewable energy from its current and proposed power stations. The project is divided into three (3) components:

3. Component 1: Involve installation of new hybrid mini-grids in key locations within Solomon Islands.

4. Component 2: involve new electricity service connections and subsidies for household wiring for low-income households accessing electricity services connecting to the mini-grids to be built under Component 1, and others across Solomon Power's grid network.

5. Component 3: involve the installation of 0.22MW and 2MW of solar (PV) generation to be connected to the existing grid on Guadalcanal.

6. Planning and designs of the subprojects are underway by SP Engineers. The completion of the SIEAREEP project in the next five (5) years will go a long way in promoting the use of clean energy with minimal effects on the environment.

7. The Tioga Solar Hybrid is a subproject under component 1. Construction activities for the solar hybrid will be restricted to creating a driveway onto the site, removal of vegetation from the site, installing foundations for the solar arrays, erection of a secure building to house storage batteries, a diesel generator for generation backup and other ancillary equipment, installing the solar arrays and controllers, and installing of security fencing. Construction of the distribution grid will involve excavating holes for placement of power poles alongside existing roads and tracks, erecting the poles, stringing the power wires, and establishing the electrical connections to existing buildings.

8. The WB Policy has been triggered for this subproject[1]. As a result, an Environment Social Management Plan or Public Environment Report (PER) is required. This is to comply with SP Environment Social Management Framework (ESMF) for the SIEAREEP. The ESMF outlines the procedures and requirements for environmental and social safeguards. In addition, the subproject is classified under Public Works Sector in the Solomon Islands

[1] SIEAREEP is the project, subproject are referred to as individual sites where specific works are to be delivered.

Environment Act 1998. In order to comply with the Solomon Islands development consent process, a proposal application was submitted to ECD for screening.

9. A Grievances Redress Mechanism (GRM) was developed for the project in the ESMF because it is possible that people may have concerns with the overall project's environmental, social performance including the implementation of the Construction Environment Social Management Plan (CESMP). Common complaints arising during construction are expected to be minor concerning dust, noise pollution and health and safety implications that should be promptly addressed and resolved.

10. The ESMP/PER concludes that the subproject has few impacts, none of which are catastrophic. All of the impacts can be satisfactorily mitigated..

1.0 INTRODUCTION

1.1 Project Background

11. The growing need for electrification in the Solomon Islands has increased significantly both in urban, semi-urban and rural communities. Following this need, the government through the Ministry of Mines, Energy and Rural Electrification(MMERE) developed a National Energy Policy 2014-2024 (NEP) to guide the country in its efforts to provide electrification for the growing population by exploring opportunities in renewable energy sources.

12. SP, as the agency responsible for generation, transmission and distribution of electricity is a key figure in the realization of this strategic area of development. The company is embarking on Solar Hybrid projects to support its current supply grids and has taken steps to expand the initiative to semi-urban and rural communities. Recently, WB, GEF, Strategic Climate Fund and SIDS DOCK have agreed to finance capital works under the SIEAREEP. The SIEAREEP comprise of IDA Credit 5.55m, IDA Grant 4.75m), and trust funds (Strategic Climate Fund 7.1m, Global Environment Facility Grant 0.9m and Small Islands Developing States Initiative SIDS DOCK grant 1.6m).

13. The Tingoa Solar Hybrid is a subproject under component 1 of the SIEAREEP. Construction activities for the solar hybrid will be restricted to creating a driveway onto the site, removal of vegetation from the site, installing foundations for the solar arrays, erection of a secure building to house storage batteries, a diesel generator for generation backup and other ancillary equipment, installing the solar arrays and controllers, and installing of security fencing. Construction of the distribution grid will involve excavating holes for placement of power poles alongside existing roads and tracks, erecting the poles, stringing the power wires, and establishing the electrical connections to existing buildings. Based on the high-level concept design, the system will be comprised of battery storage of 263kWh and a 53kW backup diesel generator.

14. Tingoa is the provincial capital of Rennell and Bellona Province. It is approximately one hour by plane from Honiara. Rennell and Bellona are inhabited by Polynesians with a population of 3041, 2009 census. The islands being located south of the main Solomon group lies in the path of annual cyclones and is frequently hit by the cyclones that usually originate and pass through the Solomon group on southeast and southwest directions.

15. WB Safeguards Policies and Solomon Islands Legislation for Environment were triggered for this subproject. As a result, SP is preparing an ESMP/PER to meet these policy and legislative requirements. The ESMP/PER will be submitted to both the WB and the Solomon Islands Government (SIG) for approval.

16. In Solomon Islands, Solar Hybrid installation is a prescribed development under public works, 2nd schedule of the Environment Act. SP is required to produce PERs and management plans for the subproject. PER's are undertaken for activities that are likely to have an impact on the environment and are subject to the decision of the national authority, the Environment Conservation Division (ECD) under the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM). The ESMP/PER will be approved by the Director ECD who will then issue a development consent for the subproject.

1.2 Scope and Objectives of the study

17. The main objective of this assessment is to identify potential environmental and social impacts of the subproject and formulate recommendations to ensure that the proposed subproject takes into consideration appropriate measures to mitigate any adverse environmental and social impacts during construction, operation and decommissioning.

18. The assessment was undertaken in full compliance with the WB ESMF and the Solomon Islands environment impact assessment guideline. In addition, appropriate sectorial legal provisions relevant to such subproject have also been referred to for the necessary considerations during the construction, operation and decommissioning of the subproject.

19. Specific objectives of the study include the following:

- Establish the environmental, social baseline conditions of the subproject area and review available information and data related to the subproject;
- Identify key areas for environmental and social concerns as well as the anticipated impacts associated with the subproject implementation;
- Establish a comprehensive environmental, social management plan covering the preconstruction, construction, operation phases and decommissioning of the subproject; and
- Preparation of an ESMP/PER and submission to WB and ECD for approval.

1.3 Report Structure

20. The ESMP/PER consists of ten chapters: Chapter 1 - Introduction; Chapter 2 - Legal and Policy Framework; Chapter 3 - Description of Project; Chapter 4 - Description of Environment; Chapter 5 - Potential Impacts and Mitigation Measures; Chapter 6 - Analysis of Alternatives; Chapter 7 - Environment and Social Management Plan; Chapter 8 - Public Consultation and Participation and Chapter 9 - Grievance Redress Mechanism 10 - Conclusion and Recommendation.

1.4 ESMP/PER Methodology

21. The ESMP/PER assesses the potential negative impacts of the subproject on the biophysical, ecological and social environments. It suggests measures for addressing any potential impacts that may have been identified. A site visits to investigate the environmental and social parameters and associated impacts was conducted in June 2019.

22. The approach taken to develop this ESMP/PER include:

(i) A review of existing baseline data (climate, geology, soil, physiography and biological resources);

(ii) consultation with stakeholders including Rennell and Bellona Provincial Government (RPG), MEMRE, MECDM and Affected Person (AP);

(iii) Identification of potential impacts based on the design and scope of work;

(iv) Identification of mitigation measures for potential impacts and

(v) Preparation of ESMP matrix as part of the ESMP/PER.

2.0 LEGAL AND POLICY FRAMEWORK

2.1 Solomon Islands Legislations and Regulations

23. Environmental impact assessment in the Solomon Islands is provided for under the Environment Act of 1998 and the accompanying regulatory instrument, the Environment Regulation, 2008. The MECDM administer the Act and regulations. Refer to annex 2 for relevant Acts.

2.1.1 Environment Act 1998

24. The Environment Act covers all the environmental issues in Solomon Islands and makes provisions for conservation and protection of the environment and establishes the ECD. The Act provides for an integrated system of development control, environmental impact assessment (EIA) and pollution control. The Environment Act has considerable power by virtue of Article 4 (1) which states that in the event of a conflict between the Act and other Acts, the provisions of the Environment Act shall prevail.

25. As required in Part III of the Act, all developer who intends to carry out or are carrying out a 'prescribed development' activity must make an application for development consent together with the relevant EIA report and any other relevant information as may be required by the Director. The Director with responsible staff and government agency then reviews the application with the relevant EIA report and make a decision whether to grant or not to grant development consent. The developer shall not commence operation or continue to carry out any prescribe development unless it has complied with relevant provisions of the Act, been issued a 'development consent' or the Director has exempted the development from relevant approval requirements.

2.1.2 Environment Regulation 2008

26. The Environment Regulations 2008 covers detailed requirements for EIA. The Act has a schedule which lists all "prescribed' developments' that need to undergo the EIA process. All prescribed developments require a simple assessment through "screening" or "scoping" process to see what form of additional assessment is required. Most development projects require a PER, while many major projects will also need a second stage of appraisal which include technical, economic, environmental and social investigations presented in an EIA or environmental impact statement (EIS) report. Forms 1 and 3 are relevant forms in the second schedule of the environmental regulation that provides guidelines to assist in the preparation and drafting of the EIS/PER. This ESMP/PER report is a fulfilment of the environmental regulation and Act.

2.1.3 Electricity Act 1996

27. Under the Electricity Act 1969, SIEA trading as SP is an autonomous, government-owned entity, endowed with the necessary powers to carry out its functions as the responsible authority for the generation, transmission, distribution and sale of electrical energy throughout the Solomon Islands. The Authority falls under the portfolio of the MMERE, and in accordance with the Electricity Act, SP is responsible to the Minister for MMERE.

2.1.4 Land and Title Act 1996

28. The Land and Titles Act is the major legislation that deals with land tenure in the Solomon Islands. Three main categories of land are recognized under the Act, and that includes:

(1) Customary Land;
(2) Fixed Term Leases;
(3) Perpetual Estates

29. The Lands and Titles Act has a system of registration of different types of leases which allows individuals and groups to acquire titles to land and own land, but one must develop the land that has been acquired or registered or else lose the title to the land. The land transfer for Tingoa was done in accordance with the Land Titles Act. See attached the land title in annex 7.

2.1.5 Town and Country Planning Board Act 1996

30. The TCPB Act was enacted to administer, control and regulate all land developments other than those under customary land. TCPB was duly established in order to administer and implement the Act. Section 6 provides for the duty of the Board to prepare local planning schemes in consultation with the provincial assembly or the city council in the case of Honiara city. Then, submissions will be made for approval by the Minister, so the schemes are gazette. Under the local planning scheme, the Board may under section 7, declare an area as "a local planning area".

31. The subproject is located in the provincial capital of Rennell and Bellona; therefore, a permit or consent is required from the RPG TCPB. In the Act "Development" is strictly defined and means; the carrying out of the building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land'. It, however, does not cover issues relating to agriculture, fishing and forestry developments.

2.1.6 Mines and Minerals Act (Amendment) 2008

32. Provide management for mining and mineral prospecting by regulating controls in all mining and prospecting associate activities, including alluvial mining. Part II of the Act regulates the mandate of the Minister to designate any area as a reserved area and prohibit the carrying out of reconnaissance, prospecting or mining thereon. The same section regulate reconnaissance, prospecting, and mining are prohibited in or any village, place of burial, tambu or other sites of traditional significance, inhabited house or building, any cultivated land or land rendered fit for planting and habitually used for the planting of crops, any land designated as town land, under the Lands and Titles Act, any state forest or controlled forest within the meaning of the Forest Resources and Timber Utilization Act unless some kind of arrangement authorized by the Minister in consultation with landowners and commissioner of forestry are established.

33. Section 65 outlines the format of the Building Materials Permit (BMP) application that will be made to the Director of Mines with a prescribed fee that is usually paid at the Inland Revenue Division (IRD) and a receipt attached to the application. Section 66 outlines the forms and content of the Building Materials Permit (BMP) application, and Sections 67 and 68 have provisions regarding the rights and obligations of the BMP holder, respectively. While Section 69 provides for exemptions for the national government or provincial government to mine building materials on any land that is owned by a government department or a provincial government.

2.1.7 Environmental Health Act [Cap 99]

34. The Environmental Health Act (Public Health Act), enacted on 1st August 1980, provides for the management and control of community health in the Solomon Islands. Mainly

administered by the Minister, the provisions also identify Enforcement Authorities for purposes of preventing the occurrence or for checking the spread of any noticeable diseases, provision and protection of water supplies and management of drainage and sanitation practices.

35. The Public Health Act serves as the Health Impact Assessment reference in identifying the necessary practicable measures for preventing all conditions liable to injurious or dangerous to health arising from the erection, or occupation of the subproject.

2.1.8 Safety at Work Act

36. This Act consists of 4 parts.

- Part II: Article 4 states that it is the duty of every employer to ensure the health and safety at work of his employees.
- Article 6: states that it is the duty of the employer to provide a safe workplace for persons other than his employees.
- Articles 7 and 8: requires manufacturers, suppliers of tools and equipment and suppliers of chemicals and other hazardous substances to ensure that these are safe and without health risks.
- Article 12: states that any employer who operates unsafe machinery or substances and is injured will be responsible for the damages.
- Part III: Article 15 requires the employer to protect people from dust, fumes, etc. Article 16 provides for limits of exposure to dust and fumes.
- Articles 17, 18, 19 and 20 require employers to comply with the operating requirements for (i) pressure and vacuum systems; (ii) machinery; (iii) dangerous machinery; and (iv) electrical installations.
- Articles 21 and 22 require workplaces to have fire protection and to take precautions against explosions.

2.1.9 Wildlife Protection and Management Act 2010

37. The Wildlife Protection and Management Act 2010 provides for the conservation, management and protection of wild flora and fauna in the country. It regulates the export and import of wildlife, ensuring compliance to obligations set under the Convention on International Trade in Endangered Species (CITES). The Solomon Islands is a refuge for many species of wildlife (that includes rare and endemic). Their need for protection and sound management is remarkable. The act prohibits the poaching of wild fauna and flora as well as harvesting of protected species.

2.1.10 Custom Recognition Act 2000

38. The Custom Recognition Act 2000 provides recognition to the existence of any customary law and the nature of such customary law in relation to a matter, and its application in or relevance to any particular circumstances shall be ascertained as though they were matters of fact. However, the existence shall be provided in the proof as required under section 5 of the act.

2.1.11 Unexploded Ordnance (UXO)

39. Technically WWII ordnance found in the Pacific Islands can be defined as either unexploded (UXO) or abandoned (AXO). Unexploded ordnance is defined as explosive ordnance that has been primed, fused, armed or otherwise prepared for use in armed conflict but has failed to explode. Abandoned explosive ordnance is defined as explosive ordnance

unused during an armed conflict and subsequently abandoned or left behind. UXO and AXO are defined collectively as Explosive Remnants of War (ERW)[2.]

40. Solomon Islands was the scene of bitter fighting during World War II. While this was over 60 years ago, unexploded (UXO) may still be found around Guadalcanal. Should UXO be discovered, the contractor is to immediately cordon off the area, arrange the evacuation of nearby residences and inform the police of the find. Currently, all UXO finds are reported to the police who arrange the pickup, transport, storage and ultimate disposal of the finds. While construction sites are expected to be swept for and cleared of UXOs, a chance finds procedure for handling the UXOs during the construction is included in the ESMF. This will be the responsibility of the contractor. Ultimately, the SP will be responsible for the supervision and monitoring of the contractor.

2.2 World Bank Safeguard Policies

2.2.1 OP4.01

41. OP4.01 (Environmental Assessment) sets out the general policies and principles for environmental and social protection and the requirements for assessment of impacts and implementation of plans and measures to mitigate or manage impacts. The OP4.01 has been used to classify projects or subprojects. In SP case the Tingoa Solar Hybrid is called the subproject.

42. The four categories defined in the OP4.01 are:

- **Category A.** The subprojects are likely to have a significant adverse impact on sensitive and valuable ecosystems (protected areas, wetlands, wildlands, coral reefs, and habitats of endangered species), cultural heritage sites (archaeological, historical sites or existing cultural sites), densely populated areas where resettlement is required or pollution may be significant, heavy development areas and conflict in natural resource allocation, water bodies and land or water containing valuable resources. Seeing the impacts are adverse, the required level of assessment is an Environment Impact Assessment (EIA) or EIS as for the Solomon Islands.
- **Category B.** Potential adverse impacts on human population and environmentally important areas (e.g. wetlands, forest, grasslands and natural habitats) are less adverse, temporary, reversible and can be mitigated more readily than those of category A subprojects. The level of assessment required is equivalent to the SIG PER.
- **Category C.** The subprojects are likely to have minimal or no adverse environmental impacts. Category C subprojects do not require an EIA/EIS or PER. The subprojects require ESMP developed.
- **Category FI.** Subprojects involve credit line or an equity investment in a financial intermediary. Involves subprojects that will have insignificant environment social impacts and do not require ESMP.

43. The Environmental and Social Management Framework (ESMF) was prepared to guide SP's social and environment safeguards requirements for the SIEAREEP. Following the screening exercise (see Annex 1 for screening checklist), the subproject is classified as Category C because it is expected to have minimal environmental, social impacts. These impacts are expected to be temporary and can be readily mitigated.

[2]Francis S, L and Alama L, 2011. *World War II Unexploded Ordnance,* Retrieved at URL on 29thof October 2013 at URL: http://www.forumsec.org/resources/uploads/attachments/documents/UXO%20final.pdf.

2.2.2 Other WB Policies

Table 1: Other WB policies

Policy	Policy Triggered	Reasons
OP4.04 (Natural Habitats)	No	The original vegetation cover was cleared in the provincial government.
OP4.36 (Forests)	No	No natural forest present.
OP4.09 (Pest Management)	No	The subproject does not involve pesticides.
OP4.11 (Physical Cultural Resources)	No/yes	There is no physical, cultural resources present, but excavation of earth may uncover some cultural resources.
OP4.10 (Indigenous People)	No	The site is located in a provincial government boundary, crown land. Transmission and distribution line easement will be covered under the negotiated agreement (MOU/MOA)
OP4.12 (Involuntary Resettlement)	No	SP has acquired the site for the solar farm. No need for involuntary resettlement. However, SP has prepared an ARAP.
OP 7.50 Projects on International Waterways	No	No subproject activities are in international waters.

2.3 Solomon Islands Environment Assessment Process

44. The guideline for Environment Impact Assessment is designed to administer schedule 16 of the Environment Act 1998. The guideline is comprised of EIA procedural descriptions, stakeholders in the EIA process and fees required for development type. “The guideline was prepared by the ECD with the aim of simplifying the procedures in the Act, provide basic advice and guidance to government officers, planners, developers, resource owners on the environmental impact assessment process” (MECM, 2010). The EIA guideline was reviewed by Technical Assistance under Asian Development Bank in 2015.

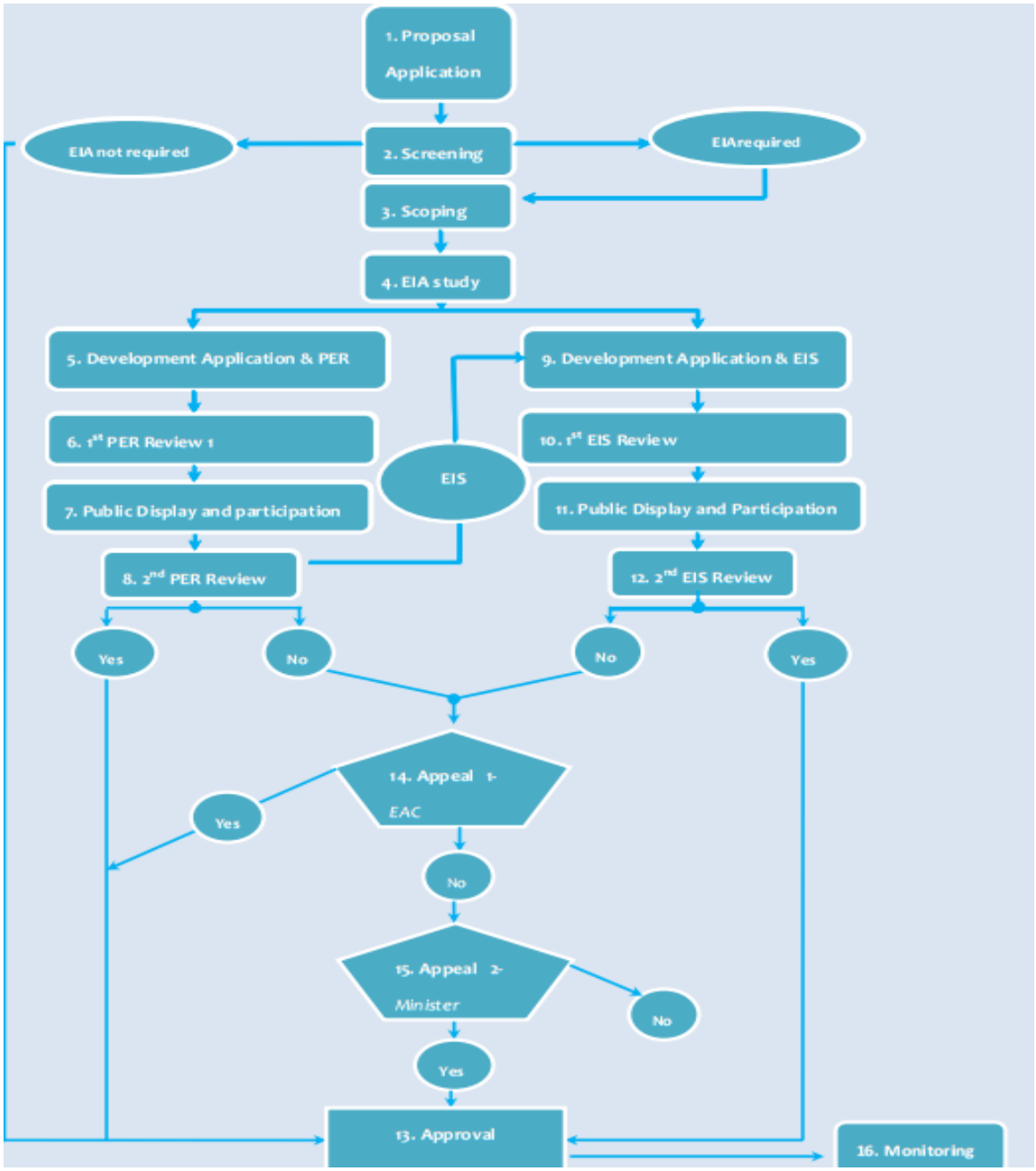


Figure 1: Procedural steps of an EIA[3]

[3] MECM,2010, EIA Guideline

2.4. Solomon Islands National Policies

2.4.1. National Development Strategy (NDS)

45. The National Development Strategy is a very comprehensive policy that strategizes ways in order to achieve the development aspirations of the country. Using the 17 Sustainable Development Goals (SDGs), "Transforming our World: the 2030 Agenda for Sustainable Development" as a reference, the NDS highlights five important long-term development goals and two of them; 1. NDS Objective One: Sustained and inclusive economic growth, and 2. NDS Objective Six: Develop Physical Infrastructure and Utilities to Ensure all Solomon Islanders have Access to Essential Services and Markets, are relevant to this subproject.

46. In order to achieve all the NDS objectives; it must be realized that access to electricity is crucial to all sectors. The subproject objective is in line with the NDS and promotes economic empowerment and sustainable development.

2.4.2. National Energy Policy 2014-2024

47. The NEP recognizes the importance of reducing dependency on imported fossil fuel. The Solomon Islands have renewable energy sources such as solar, hydropower, geothermal and biomass and wind energy. NEP was developed to guide the country in its efforts to provide electrification for the growing population by exploring opportunities in renewable energy sources. SP is a key player and is embarking on solar farm and hydrothermal projects to meet obligations under this policy.

2.4.3. National Energy Policy Framework 2007-2009

48. The National Energy Policy Framework sets out Government's policies for planning and management of the energy sector over the next 10 years. The framework defines strategies the government is taking to ensure the objectives of this policy are fully realized. Twelve strategic areas covered in the policy include 1. Energy Sector Planning; Coordination and Management; 2. Petroleum Sector; 3. Transport Sector; 4. Electricity Sector – Urban; 5. Electricity Sector – Rural; 6. Renewable Energy; 7. Environment; 8. Energy Conservation and Efficiency; 9 Capacity Building and Information; and 10. Legislation and Regulations. The transmission line subproject is a fulfilment of the 4th strategic areas (Electricity urban).

2.4.4. Climate Change Policy

49. The Solomon Islands Government, through the MECDM, launched the Climate Change Policy, highlighting steps the government would take in aiding the country and its people to exist and adapt to present imminent climate change and its impact. The Policy aims to integrate climate considerations within the framework of national policies and to guide the government and its partners to ensure the people, natural environment and economy of the country are resilient and able to adapt to the predicted impacts of climate change. The SIEAREEP is partially funded by Strategic Climate Fund and SIDS DOCK. Hence, the commitment to greenhouse gas reduction by reducing reliance on diesel generators by SP is clear cut to global efforts.

2.4.5. National Environment Management Strategy

50. The primary document for environmental policy in the country is the 1993 National Environment Management Strategy (NEMS), although outdated; it is an important document at the present time in the absence of an environment policy.

2.4.6. National Waste Management and Pollution Control Strategy

51. The formulation of the National Waste Management and Pollution Control Strategy (NWMPCS) 2016-2024 is part of the ongoing efforts in the country to address the issue of waste and pollution as the country enters a period of rapid social and economic change. The objectives are:

1. The development of our natural resources does not compromise the wellbeing of natural environment, ecosystems and wellbeing.
2. Ensure that existing legislations, strategies and guidelines on waste management and pollution control are effectively implemented and enforced.
3. Support, encourage 4Rs and where relevant regulate waste minimization for solid wastes noting that organic waste forms a large component of wastes produced in the country.
4. Develop institutional capacity and train waste and pollution experts for the country.
5. The government, through MECDM, provincial government and Ministry of Infrastructure Development (MID) ensure that all provincial centres have in place proper landfills or waste disposal sites and a functioning waste collection system.
6. All Solomon Islanders are aware of the issue of waste and pollution and are taking appropriate actions to address it.
7. Waste management and pollution control activities are undertaken based on accurate data and research, update information, new innovation and technology
8. Encourage public-private partnership and investment in waste management and pollution control.
9. There is in place a long financial mechanism at the national level to manage waste and address pollution issues.
10. International guests and tourist are able to enjoy the natural beauty and aesthetic value of the country.
11. Waste management and pollution control are fully addressed in responding to climate change and natural disasters.

One of the highlights of the strategy is the management of e wastes, such as solar batteries. It is important that all waste collection and disposal associated with the subproject during construction, operation and decommissioning are in line with the strategy.

3.0 PROJECT DESCRIPTION

3.1 Project Proponent

Name of Company: Solomon Power

Address: Solomon Power, P.O. Box 6, Ranadi, Honiara

Contact Person: Jeremy Maneipuri

Official Designation: General Manager Capital Works (Ag)

Tel: + 677 42463,

Email: Jeremy.Maneipuri@solomonpower.com.sb

3.2. Project Objectives

52. The subproject development objective is to increase access to solar grid-supplied electricity and increase renewable energy generation in Solomon Islands. This will, in turn:

- Promote clean, renewable energy;
- Assist in reducing green-house gas emission;
- Promote environmental benefits by reducing fossil fuel and oil usage including disposal;
- Supports the realization of the NEP renewable energy target and
- Reduce reliance on diesel-generated electricity.

3.3. Project Category

53. The subproject is triggered as category B under the WB safeguards policy and SP ESMF. This is equivalent to PER under the Solomon Islands Environment Act 1998.

3.4. Project Justification/Need

54. The obligation of SP is to support SIG commitment to the SINDS goals and targets. Tingoa is the provincial capital for Rennell and Bellona. It is located on the western end of Rennell. Tingoa administers important services including law and order, health, education, retail and commercial. In terms of electricity, Tingoa does not have a centralized system; thus, all the generators are privatized. Government agencies, institutions, religious organizations, and communities consulted confirmed that access to electricity is important to their daily operations, programs and creates an opportunity to generate income. The private sector enterprises, especially business people, reiterate the need for consistent and reliable electricity.

3.5 Project Location

55. The subproject site lies within the Tingoa Provincial boundary. It is located 60m south of Tingoa runway and 300m North West of the Provincial headquarter. This site is fairly flat comprising of trees, shrubs and old gardening sites. The acquired land area is 2.6 hectares.

Figure 2: Subproject Site Tingoa.

3.6. Project Scope of Work

3.6.1 Vegetation Removal during Surveying, Demarcation and Clearance

56. Minor impacts on the terrestrial habitats and flora are expected as a result of surveying, demarcation and clearance. There are no vegetation species that have significant conservation nor representative of original vegetative cover. All material, slash and debris resulting from clearing works, would be disposed at provincial council designated site on the approval of the Project Manager (PM).

3.6.2 Road around/within the solar farm

57. Provisions shall be made for a 4m wide road around the solar panels. The design details will be part of the EPC contract.

3.6.3 Fencing and security

58. The subproject site will be fenced off with twenty-four hours security surveillance. The specification recommends a chain-link fence and five layers of barb wire. The contractor will provide secure perimeter fencing to prevent the ingress of unauthorized personnel, general populace and animals such as cats and dogs. Positioning shall be nominally at the property boundaries. Fencing for the system shall attach to and expand the area boundary of the existing system. SP preference is galvanized fence type with sufficient galvanizing layer to resist corrosion in the environment. Fencing should not shade the solar Photovoltaic (PV) panels during prime generation periods. Sufficiently heavy padlocks resistant to corrosion are to be provided by the contractor to secure access gates provided. It is standard practice for Solomon Power to fence areas acquired for all Solar Farm sites. This would not only provide public safety during construction but long term safety measures for resident near the project

site and public at large. There are no impacts associated with restrictions on local community access since there are no foot tracks or roads inside the acquired area. The solar farm site does connect to a provincial road access. The contractor will be required to submit a traffic management plan as part of the CESMP to manage traffic during construction. According to a provincial member interviewed, the traffic in the area is very low, approximately 3-5 vehicles passing every day. Vehicles do use the common route or main road rather than the one that connects to the Solar farm. An indicative design would include:

- A heavy mesh fence of 2.5 m overall height with the upper section barbed. Steel posts shall be “hockey stick” design, heavy-duty galvanized, in concrete foundations.

- A continuous concrete strip approximately 200x150mm reinforced with 2x12mm rebar with an upper surface at ground level is proposed. The lower section of mesh shall be secured to the strip using galvanized rebar or stainless steel loops set in the concrete and secured to the fence by stainless steel fixings at intervals not exceeding 600mm.

- At access gates, the strip shall be further reinforced for heavy traffic to 300mmx300mm and necessary reinforcement.

3.6.4 Installation and mounting of solar

59. The main component of the system is an array of solar panels mounted above ground level. Based on the high-level concept design, the system will be comprised of PV capacity of 232kWp. The proposed height at this stage is 2m. The solar panels will be mounted on a reinforced concrete platform. There will be a walkway between the solar rows and or columns to enable maintenance and regular inspection.

60. The mounting structures (also referred to the mounting system), which includes its footings or piles, shall be appropriate for the site. The modules shall be positioned in such a way as to maximize the annual electrical energy output and avoid shading from adjacent structures (including PV arrays) and trees. The PV mounting structure should be from at least a Tier-1 manufacturer with a strong technical, service and warranty capability and with the following minimum requirements:

- Structure requirements apply to all items required to accommodate the modules and associated electrical equipment including rails, module clamps, fasteners, cable trunking/purlins, cable clamps etc.;
- Structures shall be fixed, metallic and having appropriate design and adequate strength which can withstand the load of the modules, snow loads (not likely to be encountered in the applicable climate), seismic loads, cyclonic and high wind velocities as specified in this document;
- The mounting structure including fastenings shall be constructed of non-corrosive, UV-stable materials to meet the durability requirements for tropical marine environments;
- Use of dissimilar metals in contact with each other shall be avoided where practically possible in order to prevent galvanic corrosion. Where dissimilar metals must be used, suitable measures shall be employed in order to prevent galvanic corrosion (e.g. insulating material between dissimilar metallic materials);
- The structures shall be designed for simple mechanical on-site installation with no requirement for welding, cutting, drilling or painting of metal structures onsite;
- The mounting structure shall avoid the accumulation of water or moisture within the structure and shall accommodate an adequate flow of water off the structure;

- The design of the array mounting structures should ensure that all parts are pre-cut, pre-drilled and prepared before delivery to the Site and should not require the need to be cut in the field. This is to avoid damage to corrosion-resistant coatings. All sharp edges are to be removed at the factory;
- Modules shall be secured in line with the module manufacturer recommendations;
- Each PV module shall be fastened securely at least at four points or completely along two opposite sides, but under all circumstances adhere to the minimum fixing requirements as required by the PV module manufacturer;
- Module manufacturer requirements with regards to mounting locations and cable management;
- Ability to expand/add additional modules without modifying the existing structure;
- Air ventilation to the back of the panel to prevent Power de-rating due to thermal buildup;
- The structure shall provide facilities for earthing of all metallic parts (inclusive of the modules);
- The mounting structure design shall be in accordance with the standard requirements and certification by the manufacturer to this extent would be required;
- Provision shall be made for cable management with no sharp edges that could result in damage to cables or persons during installation, maintenance or decommissioning (e.g. through the implementation of rounded edges or end covers/clamps on rails);
- Structures shall have a design life of at least 25 years.
- Solar PV modules mounted on the array frame structures shall be situated above the expected flood level and be at least consistent with the existing system design in terms of installed height.[4]

3.6.5. PV Modules

61. Only PV modules with the following minimum requirements should be considered:

- Poly or Monocrystalline cells including bifacial, back contact or other silicon cell design arrangement (thin film or amorphous is not preferred);
- Power tolerance shall be a positive power tolerance (+0 to +3Wp or better);
- The PV module shall withstand the wind loadings present at the Site;
- The PV module shall include drain, earth and mounting holes in its frame. No holes shall be drilled on-site;
- The PV module frame shall be made from marine-grade anodized aluminium or stainless steel with appropriate seals to prevent water ingress and damage to the active components;
- No specific colour (frame, back foil) requirements are requested;
- The front glass of the PV module shall be tempered glass with a minimum thickness of 3.2mm;
- The PV module shall comply with International Electro-technical Commission (IEC) 61215, IEC61730, IEC61701 ED2 and IEC 62716;
- Potential-Induced Degradation-free PV cells and modules, unless the PV system is appropriately designed to reverse PIE-effects;

[4] James, J (2019), *Solomon Power Visale and Tingoa Solar Farm specs.*

- Bypass diodes are required on each module. No reverse blocking diodes for the system are required;
- Standard locking connectors (e.g. MC-4 or equivalent) certified to EN 50521 are acceptable for panel connections. Corrosion of terminations causes increased voltage drops; therefore, the number of connections shall be limited. A wiring layout diagram defining the PV panel interconnections will form part of the documentation to be provided by the Detailed Design;
- The terminals must be clearly marked with + and – for the corresponding connections;
- Test certificates must be available;
- The manufacturer cannot be insolvent or going through (partial) bankruptcy at the time of design or installation of the PV System; and
- The modules shall be under the manufacturer's active production and shall not be superseded stock.

62. Manufacturer documentation with the following information about the PV modules must be available:

- Temperature coefficients for current, voltage, and power;
- I-V curves under different temperature and radiation conditions;
- Physical dimensions and weight;
- Details of the materials used in the module's frame;
- Type and number of cells per module;
- Cell efficiency and/or module efficiency;
- Details of the connectors used and the length of the connecting wires;
- The warranty statement and testing certificate;
- Proof of manufacturer financial stability;
- Solar Modules supplied must have individual flash test data available in soft copy; and
- Pallets and packaging PV modules are supplied within must list modules serial numbers contained within the pallet on the outside of the pallet in a collectable print out.

63. Note that the Contractor shall illustrate that the design allows for system flexibility to accept more than just one type of PV panel by providing a ranked list of 2 or more other OEM PV panel types suitable for conjoint use. It is expected that the concept design presented shall be able to have PV modules changed to the next highest power class if needed due to manufacturing improvements. Total installed panels at commissioning should guarantee the required plant sizing and output at 10years. [5]

3.6.6. String and Central Inverters

64. By definition, a String or Central Inverter (or a grid-tie inverter) is connected directly to the PV panels and contains an embedded Maximum Power Point Tracker (MPPT) which enables the Inverter to optimize energy production from the PV panels. The Contractor is required to specify the appropriate inverters for the site with respect to the capacity and suitability for the designed PV System. The minimum requirements for both types of inverters include:

[5] IBID 4

- String inverters are connected to the PV panels and shall provide a balanced three-phase power output to the AC bus;
- The string inverters shall be located near the PV panels unless larger central inverter types are used, have a protection rating of IP 65 (according to IEC 60529) and be protected from sea spray. For Sites where the inverters are located in an indoor dry space, this requirement may change to IP55;
- The string inverters shall have as a minimum one maximum power point tracker (MPPT) and only PV panels mounted on the same horizontal angle and orientations should be grouped together and connected to the same MPPT. It is however encouraged to use the same inverter but a separate MPPT to convert power from two strings mounted at different horizontal angles but with the same orientation because this will increase the conversion efficiency;
- Grid-tied inverters shall be sized appropriately for the maximum module peak power rating under all weather conditions of the Site;
- The Contractor shall ensure and confirm that the DC operating voltage window and current limits of the inverters are not exceeded under all environmental conditions.
- The inverter shall be designed to operate from -20 to +60 degrees centigrade and from 5% to 95% relative humidity;
- It is of paramount importance that the output voltage capability of the inverter is matched with the supply voltage from the utility;
- The Contractor shall ensure that the ventilation and air requirements are appropriately specified so that the cooling requirements of the inverter can be met;
- The Contractor shall specify suitable mounting positions for the inverter (and enclosure, if applicable), in accordance with the manufacturer's specification;
- Electronic components will be sealed from contact with salt air, and all cooling will be through external heat sinks and not through ambient or forced air flowing across the electronic components;
- The inverters shall not be placed in direct sunlight;
- The location and installation of the inverter shall comply with site restrictions for appropriate and safe access during operation of the inverter;
- The Total Harmonic Distortion injected onto the grid by the inverter shall be less than 3%, and the output of the inverter shall be a true sine wave;
- The Contractor shall endeavour to minimize the number of different types of string inverters by standardizing on a typical inverter size to reduce the number of spares. SP prefers the use of 3-phase string inverters with a minimum unit rating of 20 kW. On this basis sizing of any plant can be increased or decreased by this as a multiple and that any section of 20kW (or greater) may be taken out of service for maintenance with minimal overall Plant impact;
- The power conversion efficiency of the DC>AC string inverter shall exceed 97% and that of the bi-directional inverters >94% while operated above 20% of PV array rated power. Cable length and cable diameter shall be carefully considered to optimize system efficiency;
- Terminations between PV panels and string inverters shall be in accordance with the manufacturer specifications, and no installation practices or terminations shall be used that may void manufacturer warranties;

- Inverters shall comply with AS/NZS 4777.1, 2 & 3 and shall have an option or setting to respond to grid voltage to curtail the power fed from the PV panels to the local grid. This is possible in the case of a high ratio of on-grid generation to load;
- Inverters shall have a valid Certificate of Suitability, numbered and dated to testify on its testing, which was conducted within the last five years;
- The inverters shall have passive and active anti-islanding protection as per AS 4777.
- The string inverters shall detect islanding mode when the grid fails and automatically shut down the power from the PV system as per the requirements of AS 4777.3;
- The inverters shall detect normal main grid supply and automatically start supplying power from the PV system as per the requirements of AS 4777.3;
- Open protocol standard such as Modbus for seamless integration to third party systems is required. Closed or proprietary protocols are not acceptable unless approved by the Employer. It is anticipated that a separate energy meter for the system with MODBUS communications available as a minimum is installed on the main Solar PV feeder to facilitate future monitoring from the future SCADA system installation;
- A separate, external manual isolation switch shall be installed to provide isolation of the inverters from the LV network;
- Inverters are to be installed in order to not interfere with the onsite backup generation or transfer switching arrangements;
- The inverters shall be from a Tier 1 original equipment manufacturer (OEM) of inverters with a strong regional technical and service capability for Central and String inverters; and
- The minimum standard warranty shall be 5 years[6].

3.6.7 Solar System Integration and Electrical Interconnections

65. Electrically a string of PV modules is connected in series to form a PV string with a higher output Direct Current (DC) voltage. The strings may be collated in DC combiner boxes (generically referred to as combiner boxes) before it is supplied to the string inverters. The Alternating Current (AC) power supplied by the string inverters is collated in an AC distribution board (generically referred to as a DB), from where AC power is supplied to an AC bus which interconnects the system to the site electrical infrastructure and electricity grid. For all interconnection boxes in the PV system, such as junction boxes, combiner boxes and Low Voltage (LV) distribution, the Contractor shall ensure that the design allows for the following:

- Junction boxes (or combiner boxes) shall comply with AS/NZS 60529;

- All cable entries shall maintain the enclosure IP rating;

- Within the junction boxes, switchboards and equipment, conductors are loomed and laced together, with PVC straps or strings. The conductor is appropriately bent to ensure straight entry into the terminal, allowing sufficient spacing and length of the wire for easy disconnection and reconnection;

- DC from the PV arrays inputs shall be suitably fused with disconnectable fuse holders to provide overcurrent protection and PV array disconnection;

[6] IBID4

- Should a DC system rated to 1500VDC be used, not just the cable insulating ratings but the plugs, sockets, interconnectors, fuse holders, surge diverters etc. shall be rated to 1500V DC;

- AC power inputs and outputs will be adequately protected by well-coordinated circuit breakers (CBs);

- The box is manufactured from powder-coated hot-dipped galvanized or Aluzinc coated steel or glass-reinforced, and UV stabilized plastic material and featured an IP65 rating or higher suitable for corrosive marine environment;

- All cable entries shall maintain the enclosure IP rating;

- Where conductors enter a box without conduit, a tension relief system shall be used to avoid cable disconnections inside the junction box;

- All conductors inside the boxes shall be loomed and laced together, with UV rated straps, rated to be suitable for the life of the project; and

- Conductor if bent to enter terminals shall comply with manufacturer bending radius and be done in such a way as to allow sufficient spacing and length of the wire for easy disconnection and reconnection.

66. The Contractor shall ensure that all cable trays and other cable support systems for all cables, wiring and communication cables, allows for the following:

- The support system shall be positioned adequately to provide access and room for inspection, replacement or additional cabling;

- All components including but not limited to bends, connectors, trays, brackets shall be sized to adequately support the installed cable; and
- Sufficient spacing shall be provided for no less than 20% of additional cabling;

67. The cables shall be fixed to the support system by appropriate ties, straps or saddles. Stainless steel straps shall be used on cables that supply essential safety services. The UV stability of all fixings shall be considered; Nylon 12 cable ties are commonly used for small cable support in areas exposed to direct UV radiation although non-plastic materials such as Acetal are the only known materials that will provide a design life greater than 20 years.

- Cable trays shall be designed to ensure that there are no water accumulation points inside the tray;
- Provide segregation for LVAC, DC and communication circuits
- Cables exiting ground level must be mechanically protected by conduit or steel covering arrangement to at least 300mm above ground level so that maintenance use of mowers, trimmers or whipper snippers shall not risk damaging cable insulation near ground level;
- Provide conduit and cable management design such that termites or other insects shall not be able to affect cabling;
- Ensure bending radii are met on cabling; and
- Effectively manage thermal resistivity of soils and thermal loading on bunched cabling and conductors.

68. For all electrical cables or interconnecting wiring used in the PV System, the Contractor shall ensure that the design allows for the following:

- Installation, protection, termination and jointing of cables in accordance with relevant Australian standards and particularly Australia/New Zealand Standards (AS/NZS) 3000, AS/NZS 3008 and manufacturers' recommendations;
- All PV System wiring is designed in accordance with all relevant standards including AS/NZS 5033 and AS/NZS 3000 and AS/NZS 3008.1;
- The DC cabling from the PV modules to the inverters is sized such that the installed voltage drop for each circuit remains below 2% at all times;
- The AC cabling from the inverters to the connection point meter is sized so that the installed voltage drop of each circuit remains below 1% at all times;
- DC Cables are double insulated and sheathed. Cable sheathing is UV stabilized to ensure that no degradation throughout its working life occurs;
- DC cables are neatly secured behind modules and between sub-arrays. Also, DC cables are sheltered from direct rainfall;
- All cables are protected from the effects of climatic conditions and in particular UV radiation;
- No cabling is exposed to direct sunlight, even if sheathing is labelled as UV stabilized. All cabling that may be exposed must be routed through UV stabilized conduit;
- All cables are protected from mechanical damage in accordance with AS/NZS 3000;
- Cables shall be clamped in order to relieve tension and prevent conductors coming loose. Plastic cable ties must be protected from both direct and reflected UV radiation. Cable ties exposed to UV must be stainless steel;
- DC cabling shall achieve type test in accordance with EN50521 for 1500V.
- DC cables are rated to operate at the open-circuit voltage (Voc) generated by the longest string of modules in the facility at the lowest expected temperature at the site;
- Cables are secured and mechanically protected over their entire length. Steel wire armour shall only be used for large sub-array DC voltages and multi-core cabled for AC voltages;
- Energy losses due to cabling shall not exceed 2% of generated power (considered from the main LV circuit breaker at the connection transformer);
- Cables shall occupy less than 66% of the available conduit space;
- All conduit installed within reach of the PV rays shall be UV resistant or protected from UV using an appropriate method;
- Cables are provided with protection against vermin, where required by site conditions;
- DC cables are installed in a manner which minimizes induction loops between positive and negative cables. In particular, for string cables, large loops of excess DC cabling shall be avoided;
- All underground cable routes (if applicable) are clearly marked with suitable above-ground cable markers to prevent accidental damage to the underground cables;
- Cable joints are limited by planning continuous cable runs along entire cable route lengths;
- Marking of all electrical equipment (including conduits and ducts) are compliant with the Standards and Regulations (or as otherwise agreed upon with the Employer) for marking. All signs and signage are clearly visible, located visibly on the equipment, constructed and installed to remain legible for the design life;
- Markings distinguish between operable control devices, equipment, wiring, indicators, isolation switches, outlets and enclosures to provide instant and ready identification to aid

operability and maintainability. The terminology of the marking and labelling matches the documentation provided;

- The numbering system is applied to all DC wiring, AC wiring, PV strings, combiner boxes and inverters. Also that isolating devices such as switches, fuses, isolators and push buttons are numbered and labelled in accordance with the local regulations and good industry practice. Where appropriate, that each label includes the unique number and a description of the device;
- If 1500VDC rated arrays are designed, cabling insulation must be rated to 1500/1500 VDC to achieve 1500V DC conductor to ground rating. The sheath thickness shall be in accordance with AS5000.1 with Nylon 12 extruded jacket or double brass tape to prevent insect attack; and
- Detailed calculations of cable rating covering maximum anticipated load and fault currents shall be provided together with the construction drawings prior to the procurement of the cable. The calculation shall show all derating factors applied to the cable and shall consider all methods of cable installation used (e.g. direct buried, conduits, etc.)[7].

3.6.8 Secure storage shed for spares and control room

69. All building shall have raised floor and concrete basement. They may have all the necessary appliance for running the solar PV, including batteries, transmitters, and transformers. Relevant buildings will have the necessary components of standard building codes such as storerooms, toilets facilities, and sewage system to the agreed standard.

70. The shed shall be at least of large enough size that the amount of spare PV modules required by this document shall fit securely within with enough space left for storage of sundry maintenance tools for vegetation management including trimmers and a ride on mower. The shed shall have secure roller-shutter door, personnel door access and adequate ventilation from whirly-birds or similar arrangements, if windows are included then they are to be of a type that is secure or resistant to forced entry. All entry points are to be lockable. The shed shall be constructed of weatherproof sheeting, and design shall consider the climatic conditions outlined in Section 4. The shed will be constructed inside the area acquired by Solomon Power.

3.6.9. Diesel generator

71. A diesel generator shall be installed as standby and automatically start when any the PV and battery cannot support the load. The generator shall be fitted with associated auxiliary equipment, switchgear, radiators for cooling of the generator and appropriate fuel storage and supply system. The site will have a concrete basement and sheltered from extreme weather events. The site and drainages will incorporate an oil separator to remove oil from surface run-offs and bund walls to protect the oil from spillage. The oil shall be pumped back to drums and stored at a secure storage.

3.6.10 Distribution network

72. All other necessary electrical infrastructure and interconnection to the local network is part of the subproject. These include the installation of poles, lines and cables. Clearing for installation of these infrastructures will require removal of vegetation along the roadside. It is standard practice to compensate for non-land assets based on SIG MAL rates.

[7] IBID 4

3.6.11 Telecommunication

73. The main supplier of telecommunication services in the Solomon Islands is “Our Telekom”. All connections to the main telecommunications system and the various services such as phone and internet will be arranged through “Our Telekom”.

3.6.12 Water Supply

74. There are no water supply systems in Tingoa. The current plan is to harvest rainwater in a 400L tank. The water will be used for domestic purposes and on-site fire incidents. The installation will ensure that water does not pool and cause mosquitoes to breed.

3.6.13 Material requirements

75. The subproject requires gravel for concrete production. Gravel sourced from Honiara will be assessed and certificated to be free from pest by the Ministry of Agriculture Livestock-Quarantine Division before they are transported to Tingoa. Cables, solar panels, poles, cement, solar installation parks, to name a few will be sourced from Honiara and Overseas. It is an Engineering Procurement Construction (EPC) contract which means the contractor is responsible for detail design, procurement of relevant materials, construction and commissioning.

3.6.14 Construction Force and Equipment

76. Construction force of approximately 20 personals comprising of solar engineers, civil engineers, operators, securities and managers will be based at the Tingoa for the duration of the construction. Workers will be engaged at different stages during construction, so the precise number of workers will be 10 personals per day. Majority of the workers will be based in Tingoa and travel to subproject site during the day time periods.

4.0 DESCRIPTION OF THE ENVIRONMENT

4.1. Physical Environment

4.1.1 Climate

77. The Solomon Islands is often subject to the south-easterly trade winds from May to October and the north-westerly trade monsoon winds from December to March. Due to proximity to the equator, the air temperature has very little variation. The average annual rainfall ranges from 3,000 to 4,000mm. The daily average rainfall is 190mm and 330mm November to January as being the rainiest months.

78. The climate in Rennell is tropical with distinct wet and dry seasons. The rain is significant, with precipitation even during the driest month. Generally, the weather between March and November is dry and humid, followed by a wet season from December to April. The average annual temperature is about 26.1°C and about 2659 mm precipitation annually.

79. Like other Pacific nations, the Solomon Islands are exposed to climate variation. The National Adaptation Program of Action (NAPA) shows that surface air temperatures for Auki (1962-2007) and Henderson Field (1975-2006) have increased by about 1^0C during these periods. Accordingly, adopting the Intergovernmental Panel on Climate Change (IPCC) global assessment, the following changes are expected:

- Global temperatures may rise between 1.1^0C and 6.4^0C during the 21st century with the best estimate for temperatures to rise by between 1.8^0C and 4^0C;
- Sea levels will rise by 18 cm to 59 cm by 2100 mostly from thermal expansion of the oceans;
- There is a greater than 66% confidence level that there will be more frequent warm spells, heat waves and heavy rainfall; and
- There is a greater than 66% confidence level that there will be an increase in droughts, tropical cyclones, extreme high tides and storm surges[8].

80. Rennell Island is located south of the main Solomon group lies in the path of annual cyclones and is frequently hit by the cyclones that usually originate and pass through the Solomon group on southeast and southwest directions. According to BOM, eighteen cyclones have occurred within 200km from the subproject site from 1967 to 2018. Eight of the cyclones actually crossed the mainland of Rennell. It indicates, Rennell is one of the riskiest areas in the Solomon group. In fact, cyclones have been the most influential factor in the vegetation, fauna and lives of the people of Rennell. The island has experienced significant vegetation and forest destruction and faunal loss periodically.

[8] National Action Plant on Adaptation, 2008.

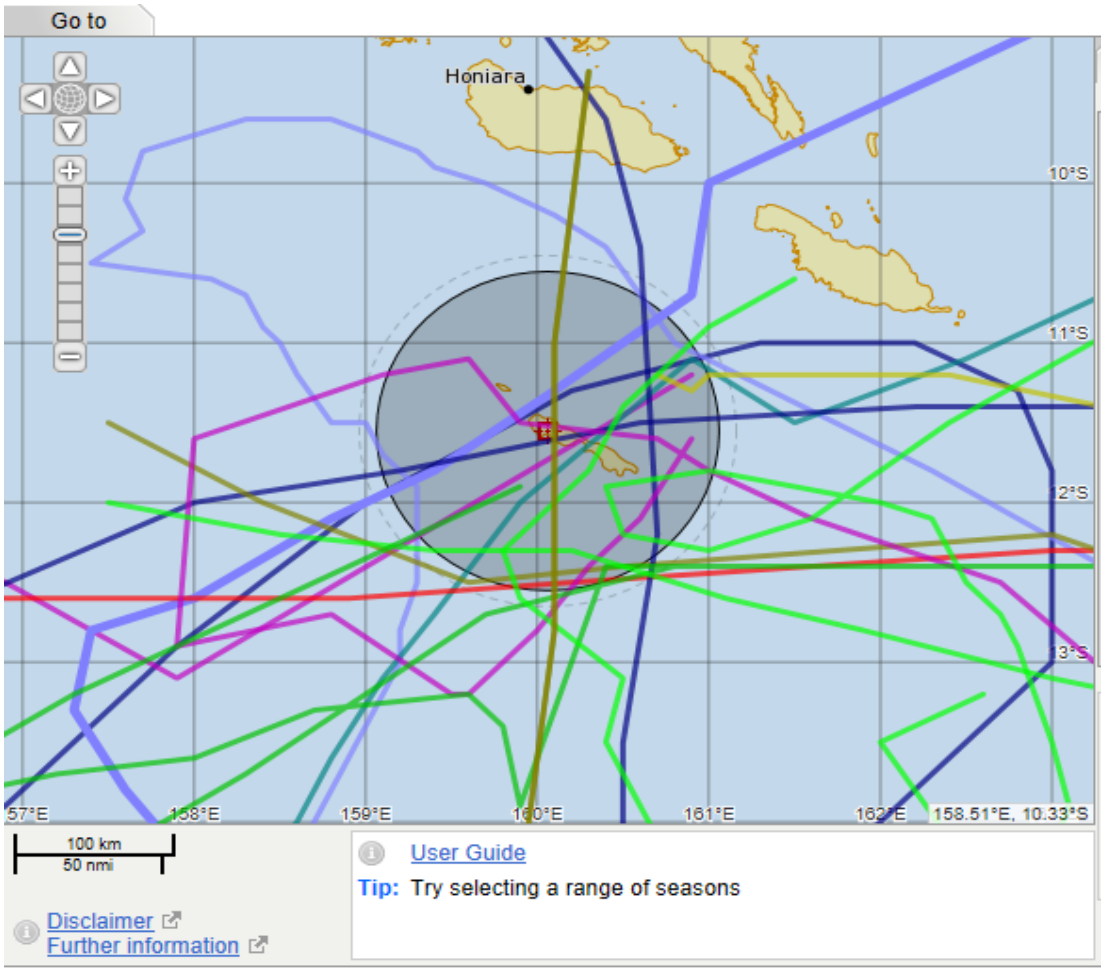


Figure 2: Cyclones occurring within 200km from the subproject site

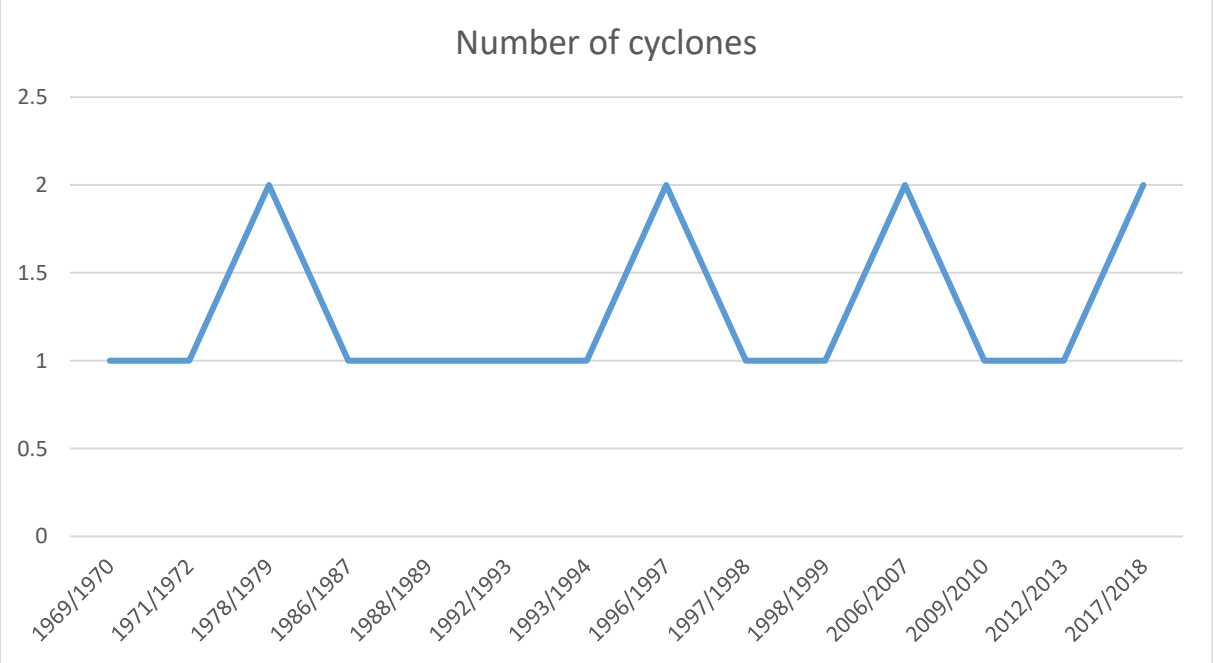


Figure 3: Cyclone trend, 1967-2018

81. Air quality in the Solomon Islands is excellent, as there are very few industries and less vehicle fleet generating emissions. In Rennell, air quality is healthy as there are no major development activities.

4.1.2 Topography

82. Rennell Island is a long narrow island with around 80km in length and 14km width. It has a two-lobed basin-shaped atoll system with approximately 680 km^2 in area. The island has rocky landscape dominated by karst limestone (landform of jagged and eroded limestone karst rising to 200m). It comprises of steep slopes along the coastal edges of the island and high ridges along the coastal rim. These features show evidence of the original reef and lagoon floor system. The ridges at Kangava Bay separates the two basins into east and west Rennell. The unique feature of the island is the Lake Tengano in the east which was originally formed from the atoll lagoon.

83. The subproject site is located in a relatively flat area and is approximately 7.0 km inland from the nearest coastline.

Figure 4: Rennell.

4.1.3 Geology

84. The whole of Rennell Island is thought to have been originally deposited as coralline algae limestone and then dolotomized. The dolomitic reef complex is overlain by younger undolotomized reef limestone. The recent structural evolution of Rennell is due to post-dolotomisation uplift accompanied by block faulting. The North West has emerged as a discrete block to about 200 meters of height with no tilting evidence. A major fault zone at

Kagavu Bay separates the northern and central blocks where the uplifted reefs have dropped 30 meters vertically. Major step fault also occurs across the north of Lake Tengano.

85. The structure and geomorphology of Rennell show that the Rennell ridge is currently in an active uplift phase following a long history of subsidence. The thickness of the sedimentary pile above basement on the Rennell ridge is about 500 meters. According to current atoll formation theories, such thickness of reef deposits were formed from a slowly descending basement platform[9].

4.1.5. Soils

86. Most fertile soils in the Solomon Islands are found on larger islands which are associated with volcanic origin. Unlike small lowland uplifted coralline atolls, contain thin soil weathered from the coral limestone. The soil type found in Rennell is mainly coral rock or undolotomized coral which is untenable for agriculture. Studies indicate that Rennell has the soil with pH ranges from 6 at 1cm depth to 8.5 at 6cm[10].

4.1.6. Water Resources

87. There are no rivers or streams in Rennell, except for the lake as the major surface water source and sinkholes, rock pools, swamps and caves. Due to the lithology of Rennell Island, most freshwater peculates through the crevice into the water lenses below. Lake Tegano is a combination of underground water springs around and the nearby water basin system. It is brackish in nature and home to diverse aquatic fauna and flora. People who live near the lake use the lake and sub-surface water spring as the water quality is safe to use. However, in Tingoa, people use rainwater tanks and wells as a source of water daily.

[9] (Wingham, 1997)
[10] IBID 1

Figure 5: Water Resources.

4.2. Biological Environment

4.2.1. Forest

88. Despite the geographical spread of islands and relatively varied flora in the Solomon Islands, the climax vegetation in the Solomon Islands archipelago shows the similarity of appearance between islands. The five major vegetation types that have been identified in the Solomon Islands include:

i. Grassland
ii. Swamps
iii. Lowland Rainforest
iv. Montane Forests
v. Secondary Vegetation

89. Further classification of these forest or vegetation types takes the subtypes of the main types to several more unique forest types recognized so far. On Rennell, there are three major vegetation types; the low mature forest on the karst ridge (island perimeter), tall lowland forest in Interior Island, and the coastal flora along the coast. The vegetation type for the subproject area is lowland forest of interior land. The lowland tall forest is depressed where the bauxite pockets are and are characterized as degraded forest due to subsistence activities. These are the only place where fertile soils are found.

4.2.2. Terrestrial Flora

90. Rennell is covered with the main canopy tree species. Many of these canopy trees are rare to be found on elsewhere in the Solomon Islands. The flora of the island is significant as the species composition is biogeographically unique. There are three main types of vegetation on the island; low forest karst ridge along the island perimeter, the tall forest of interior island and the beach flora along the lake.

91. According to studies, the lake has rich diatoms and algae present. There are freshwater species, alkaline forms and living forms along the lake region. Majority of the species are cosmopolitan, and about eight species and four varieties are endemic. For now, no tree species have been identified as endemic; however, ten plants are endemic. These are; two endemic pandanus species *(P. lacustris and P. rennellensis),* erect understory palm *(Drymophloeus sp.nov.), Pseuderanthemum bibracteatum* Fosberg (Acanthaceae); *Dischidia melanesica* Fosberg (Asclepiadaceae); *Acalypha crockery* Fosberg (Euphorbiaceae); *Hedyotis rennellensis* Fosberg (Rubiaceae); An endemic fungus, *Lasiosphaeria noona-daniae*; Carroll and Munk (*Sordariaceae*), (Wingham, 1997).

92. Solomon Power acquired approximately 2.6ha of land west of the Tingoa station. Vegetation remain intact on this 1ha of land. See map below. The intact area does not require clearance at this stage. The subproject area (pink colour) is now degraded low forest with regenerating scrubland. The subproject site is mostly dominated by few taller trees, smaller plants and creeping legumes. The typical vegetation along the subproject site are shown in the figure below. Field observation established that none of these terrestrial floras is of any significant conservation value.

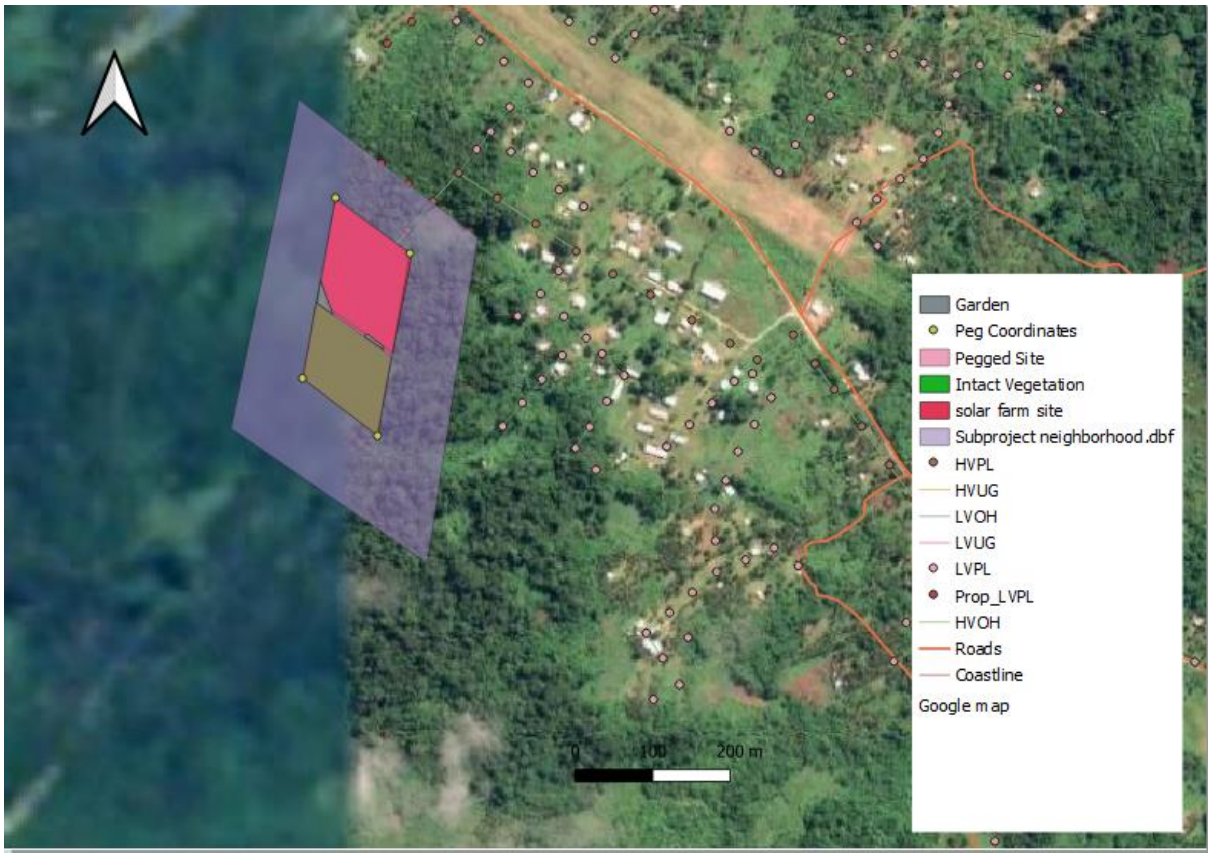


Figure 6: Subproject area and vegetation

Figure 7: Typical Vegetation

4.2.3. Terrestrial Fauna

93. According to (Filardi, Christopher E; Smith, Catherine E; Kratter, Andrew W; Steadman, David W; Webb, Price H, 1999), on Rennell Island, there are six species of resident

birds previously reported on the island that may have been extirpated and not found in a survey conducted in 1997. The six resident bird species include; Australian Black duck *Anas superciliosa pelewensis*, Gray Teal *Anas gibberifrons remissa*, Sooty Rail *Porzana tabuensis*, Bridled Tern Sterna *anaethetus anaethetus*, Nicobar Pigeon *Caloenas nicobarica* and Barn owl *Tyto alba crassirostris*. Four criteria were used to categorize birds species observed on Rennell namely; rare, common, uncommon and abundant.

94. Bird species identified on the island are summarized in the table below;

Table 2: List of Bird species

Common Names	Scientific Names	Species Distribution	Habitats
Australian Dabchick	Tachybaptus novaehollandiae rennellius	Endemic to Rennell; occur from E/Java through New Guinea, Australia and Solomon Islands	Common and confined to the lake
Brown Bobby	Sula leucogasterplotus	Occur widely in western Pacific	Uncommon in the lake; found on forest and coast
Great Frigate Bird	Frigata minor minor	Occur widely in western pacific	Common at the lake; found on forest and coast; observed at the airstrip
Lesser Frigate Bird	Frigetaarielariel	Occur widely in western pacific	Common on the lake; uncommon at the airstrip
Great Cormorant	Phalacrocorax carbo novaehollandae	Occurs in New Guinea and Australia; absent from most tropical pacific and elsewhere in Solomon islands	Common at the lake;
Australian vagrant	P.C novaehollandiae	Occurs in	
Little Pied Cormorant	Phalacrocorax melaneoleucos brevicauda	Occurs from eastern Indonesia through New Guinea, Australia to New Caledonia and New Zealand; Endemic to Rennell (Lake Tegano)	Abundant on Lake;

Pacific Reef Heron	Egretta sacra sacra	Widespread on coasts and islands in western tropical and subtropical	Rare on lake
Black Bittern	Ixbrychus flauicollis woodfordi	Widespread from India & south-east Asia to new guinea & Australia; Endemic to Solomon Islands	Uncommon on airstrip
Sacred Ibis	Threskiornismoluccapygmaeus	Widespread nominate from endemic to Rennell & Bellona; Unknown elsewhere in Solomons	Common at the lake; uncommon on forest and coast; common on the road; common on airstrip
Australian Goshawk	Accipiter faciatus faciatus	Occurs in Timor, Australia, Tasmania, Rennell and Bellona	Uncommon at the lake; uncommon on forest and coast; uncommon on airstrip and road
Osprey.Magi bae	Pandian haliaetus melvillensis	Occurs in East Indies, Philippines,South to Northern Australia, Solomon Islands, New Caledonia	Uncommon at the lake, noticed on Kagava bay, not recorded on Forest, Coast and Airstrip
Purple Swamphen	Porphyrio porphyrio samoensis	Africa, S.E Asia, Philippines, Australia, New Zealand, Western Oceania	Common at the lake in disturb or lakeshore habitats, not on record on Forest and Coast, road & airstrip

Source: Filardi et al., 1999

95. Apart from bird species diversity found on the islands, a total of 11 bats species are reported which includes the locally endemic Rennell flying-fox Pteropus Rennell (VU). The other species of bats reported from previous surveys include the Pacific flying fox *P. tonganus*, Solomons bare-backed fruit-bat *Dobsonia inermis*, spurred leaf-nosed bat *Hipposideros calcaratus* and Schreiber's long-fingered bat *Miniopterus schreibersii*. The Pacific rat, *Rattus*

*exulans*is, is one of the most problematic invasive species present on the island. Luckily, the Giant African snail has not yet reached the island. Lake Tegano is the only known location for the endemic Rennell Island sea krait *Laticauda crockeri* (VU), the other is the yellow-lipped sea krait is *Laticauda colubrina* which often comes on land when not foraging and hides in rock crevices and holes[11].

96. Five species of geckos, four skinks, one monitor lizard *Varanus juxtindicus* and three snakes, all of which are widespread in the region. No amphibians have yet been recorded for Rennell Island: this is unusual as the rest of the Solomon archipelago has a rich and peculiar fauna of frogs and toads. The lack of amphibians on the island may be attributed to the lack of surface water except for the brackish Lake Tegano. Coconut crab *Birgus latro* and two other species of land hermit crab *Coenobita spp*. occur in abundance on the island. Rennell has 27 species of land snails, seven of which are endemic to the island. About 731 insects have been recorded on Rennell and Bellona. The Moths (Lepidoptera) have the greatest number of species: 246 in all, with 35 species and 25 subspecies exclusive to Rennell and Bellona[12].

4.2.4. Marine / Aquatic Flora

97. Solomon Islands is located within the Coral Triangle; as such, it is rich in marine flora. The Indispensable Reef south of Rennell Island is found to be covered with corals. According to UNEP, due to the location and isolation of Rennell, its islands aquatic flora is unique in the sense that it has a high endemism per hectare compared to other islands in the Solomon group. On Lake Tegano, the type of aquatic flora commonly found within the lagoon are the mangroves and pandanus trees. Algae are important for coral reef-building as it is the main primary producer.

98. The Indispensable Reef south of Rennell Island is found to be covered with corals. According to UNEP, due to the location and isolation of Rennell, the islands aquatic fauna is unique in the sense that it has a high endemism per hectare compared to other islands in the Solomon group. Studies conducted have also identified at least 21 water birds are endemic to Rennell Island itself. The aquatic bird species endemic to Rennell include the Rennell shrike-bill *Clytorhynchus hamlini*, Rennell fantail *Rhipidura rennelliana*, Rennell white-eye *Zosterops rennellianus*, bare-eyed white eye *Woodfordiasuperciliosa* and the Rennell Starling *Aplonis insularis*. The common aquatic birds found on the Lake Tegano is the little pied cormorant *Phalacrocoraxmelanoleucos* and Australasian grebe *Tachybaptus novaehollandiae*[13].

99. As such, marine fauna has provided for a very important source of everyday livelihood for the people of Rennell and neighbouring Bellona Island over the past years. The protein from fish from the lake, fish from offshore and nearshore, contributes an important diet to most family's daily meal.

4.2.5. Rare and Endangered Species

100. Solomon Islands is home to many rare and endangered species. Rennell Island has some of the rarest and endangered species in the world.

101. Some of the rarest species identified are;

Rare endemic orchid, (*Dendrobium rennellii*) (Cribb, 2015)

Rennell White-eye, (*Zostwrops rennellianus*) (Balen, 2019)

[11] Wingham, 1997 cited in UNEP
[12] IBID 1
[13] Source: UNEP

Rennell Starling, (*Aplonis insularis*) (Graig, A. & Feare, C, 2019)

Rennell Shrikebill, (*Clyntorhynchus hamlini*) (Gregory, 2019)

Rennell Fantail, (*Rhypidura rennelliana*) (Bole, 2019)

102. Some of the endangered mammals identified are;

Rennell island Monitor (*Varanus juxtindicus)* (Harlow, P. & McCoy, M., 2013)

Rennell Flying-fox, (Pteropus renneli) (Lavery, 2017)

Sea krait-endemic, (*Laticauda crockery)* (Wingham)

4.2.7. Protected Areas

103. The protected areas are defined as geographical spaces, recognized, dedicated and managed through legal or other effective means, to achieve the longest term nature of conservation with associated ecosystem services and cultural values. There were about 42 protected areas within the country. The PA is management by the NGOs and the local communities, with most, are managed through 'community-based resource management' approach as the resources are owned by traditional communities. The government also supported the management of a few protected areas. The nearby area that was recently declared protected for heritage values under the protected areas Act 2010 is the 'Lake Tengano', known for the unique endemic species only found in the lake and its unique features. It was recorded as one of the World Heritage and the second largest lake in the pacific region.

104. Rennell Island is often referred to as a "natural laboratory" on its own. In it, you see ongoing biological evolution and speciation developing over hundreds of years. Being a newly raised coral atoll in the South Pacific, it gained the attention of scientists and naturalists all over the world. In 1998 the United Nations Educational, Scientific and Cultural Organization (UNESCO) inscribed East Rennell on the World Heritage list. This is due to its outstanding natural values. According to (Price, 2014) this means the site represents major stages of earth's history, including the record of life, significant ongoing geological processes in the development of landforms or significant geomorphic or physiographic features. Some other factors which made it unique were it was the first site which is customarily owned and listed under natural values. And when it was declared World Heritage it was not protected under national law or provincial ordinances or even a management plan. According to (Price, 2014), East Rennell World Heritage area is 34,100 ha of which 15,900 ha is the Lake Tegano. However, on 18 June 2013, the World Heritage Committee in its 37th Meeting decided to put East Rennell World Heritage in the "In Danger" list. According to (Turton, 2013), The key reason for the listing is the occurrence of logging in West Rennell and the possible impact of this logging and associated invasive species on the world heritage values of East Rennell.

105. No PAs are within the subproject site.

4.3 Socio-Economic Environment

4.3.1 Wider Subproject area

106. The beneficiaries of the subproject are communities in ward five (5) with a population of 569[14] people. The majority of the locals in Tingoa are customary landowners and do have access to social services, but a large number still lack basic services.

4.3.2 Sub-Project Neighbour Hood

107. The subproject neighbourhood is households located within the 100 meters from subproject location.

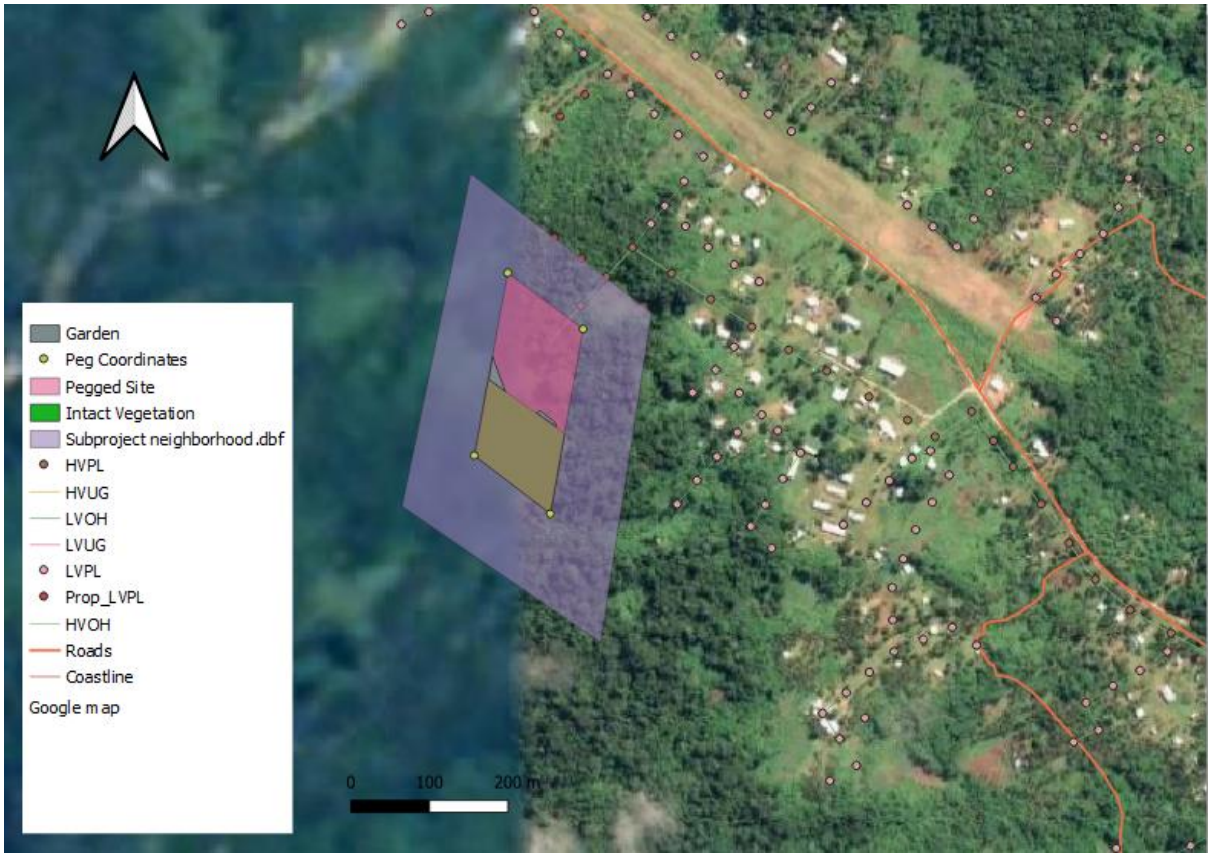


Figure 8: Subject Neighborhood Boundary

4.3.3 Household and standard of living

108. **Dwellings:** A large majority of the people in the wider area are residing in permanent and semi-permanent buildings. According to the SP planning survey in 2017, there are 223 permanents and 21 semi-permanent buildings. A substantial increase in housing is expected from local investments including from the province, private sector and the national government. Consultation with the province, business people, school deputy principal, and a few locals revealed the station is growing and more structures are expected. These buildings are approximate number of customers likely to be connected to the grid in the future. None of these buildings will be affected by the subproject construction activities or were affected due to the land acquisition for the solar farm site.

[14] Census survey 2009.

Table 3: SP planning survey, 2017

Building Type	**Total**
Permanent house	223
Semi-permanent house	21
School Buildings	10
Mini Hospital building	2
Shops or Canteen buildings	2
Church buildings	6
Rest Houses buildings	3
Total Proposed Customers	**273**

Water and Sanitation: The communities here use rainwater, water caves and well. A water supply project is currently being pursued by the province and is financed by donors. It is a borehole system, and its design will include the use of a solar battery system, pressure pumps and storage tanks. A former provincial member indicated that the current design would not be able to drive the system unless a more reliable energy source is available. Majority of the homes surveyed do not have proper sanitation. Very few owned flush toilets inside the house (9%). The majority have toilets built outside the house (55%). 11% of HH use communal, and the other 11% use the surrounding environment.

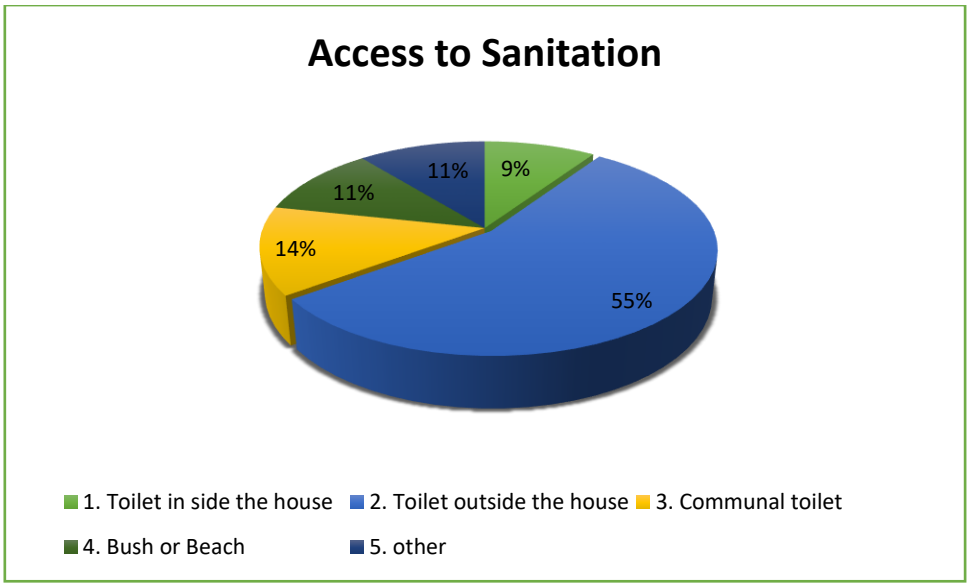


Figure 9: Access to Water.

109. **Energy:** Everyone uses solar with limited energy output, and few use diesel/petrol generators. According to the survey, the majority use 20-40W solar panels and batteries. People revealed that these solar systems (Panels and batteries) are low quality, low capacity and the life span is 1-3 years.

4.3.3. Community Consultation

110. Public consultation for the subproject ESMP/PER was conducted on Sunday 2nd of June 2019 (ANNE 4: Meeting summary note). In addition to that, a social survey was also conducted to understand the social baseline in the area. Consultation outcomes are detailed in chapter 8.

4.3.4 Social Services

111. **Health and Education:** People in the area have access to basic health care and education. People travel to Tingoa Clinic for medical attention. Emergency cases are being referred to as the Honiara Central Hospital. Health challenges for the local population are malaria, respiratory conditions (pneumonia, colds & flu) and gastrointestinal infections. The buildings have access to water tanks. There are solar panels installed which provide electricity to the clinic. However, not enough to drive all the clinic equipment.

Figure 10: Tingoa Health Center (Clinic).

112. The closest schools are Tupuaki Primary and Tupuaki Provincial Secondary School (TPSS). TPSS is a boarding school with classes from new entrants to form 5. According to the deputy principal, the TPSS comprise of over 200 students. Students normally walk or cycle to the school. School facilities include 10 classroom/admin buildings, 2 dormitories and 3 staff houses. The school is planning to build additional classrooms for forms 6 and 7, science labs, library, school hall and staff houses. The Primary school population is approximately 120 students. The primary school have 1 staff house and 3 school buildings (classrooms and admin office). Majority of the teachers reside in the villages nearby.

113. **Communication:** The subproject area has access to communication services. Tingoa has Telecom coverage, including opportunities for data services.

114. **Transport:** Access to Tingoa is by air, land and sea transport. Transport of people and goods to and from other communities are primarily by truck and bicycle. Transport to other islands is by ferries or aeroplane.

4.3.5 Income generations

115. **Employment:** Majority of the locals are farmers, and most women are housewives. Public servants are mainly teachers and nurses. Labours are those worked in mining and logging companies. See figure below.

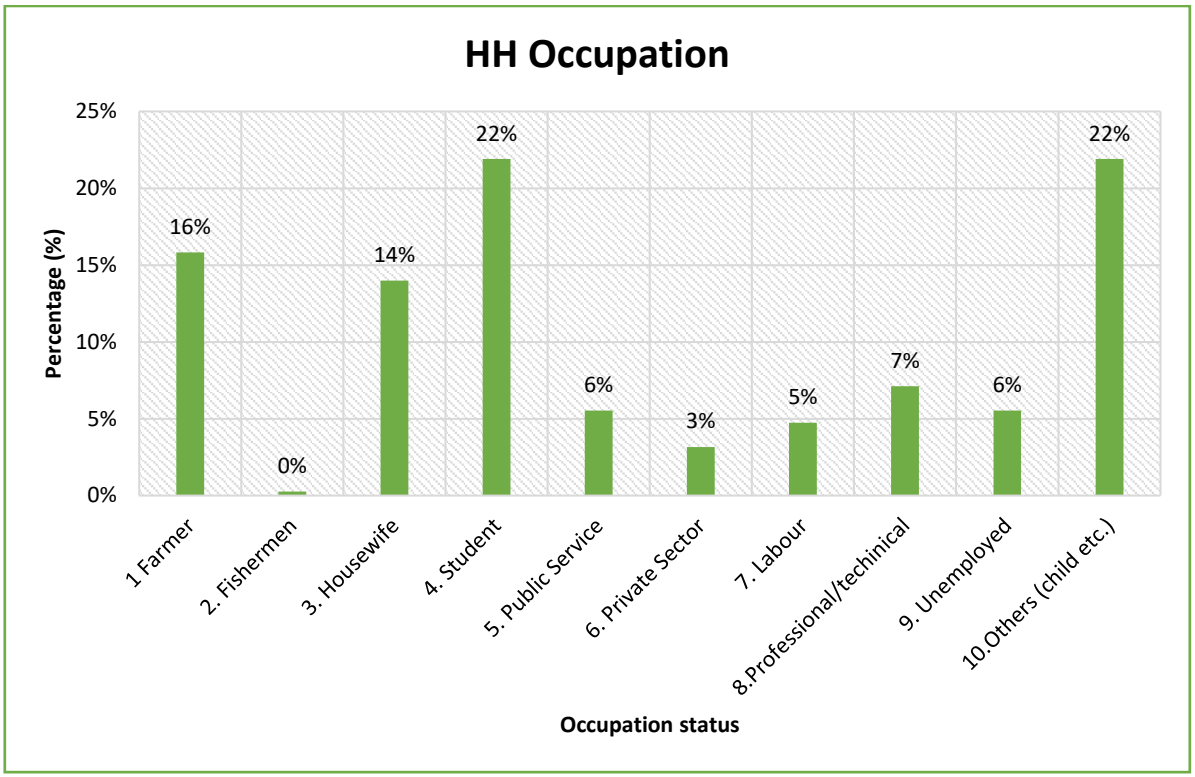


Figure 11: Occupational Status.

116. **Betel Nut:** Betel nut is increasingly becoming an important source of income for people in the area. It is bought from markets in Honiara and resold locally. Normally, the beetle-nut sellers earn up to SBD500 per day on average. This source of cash income is controlled by women who use the income to meet the food and basic needs of the family.

117. **Retail Shops (canteen):** SP planning survey in 2017 recorded two shops or canteens in Tingoa. These canteens are typically family-run convenience shops. The average weekly income ranges from SBD500 to SBD 4000.

118. **Farming:** Few households kept local chickens; however, do not have proper fencing and chickens are left to hover around. Common agriculture crops include cassava, potatoes, taro, cabbage, and corn, in which farmers earned an average of $ 300 per week.

4.3.6 Livelihood and Economic Development

119. **Livelihoods:** The livelihoods and communities of the Tingoa subproject area are based on small-scale agricultural production, with priority being food production for consumption. Agriculture is based on shifting horticulture, the staples being root crops and vegetables. The SP social survey found that 13% of households are growing vegetables and

root crops for both consumption and selling. Only 1% of household engage in fishing for both subsistence and sale.

120. The main source of cash income for local households are from the sale of root crops, betel-nut & cigarettes, cake, cooked food (27%), salaries and wages (35%), remittance and royalties (15%), canteen and bottle shop (8%), and art & craft, poultry and furniture (8%), accommodation and transport service (7%).

121. Analysis of household income indicated 22% earn between SBD 0 – 500 dollars per week, 25% households SBD 501-1000 per week, 14% households SBD 1001-1500 per week, 13% households SBD 1501-2000 per week, 7% households SBD 2001-2500 per week, 7% households SBD 2501-3000 per week, and 12% households more than SBD 3000 per week.

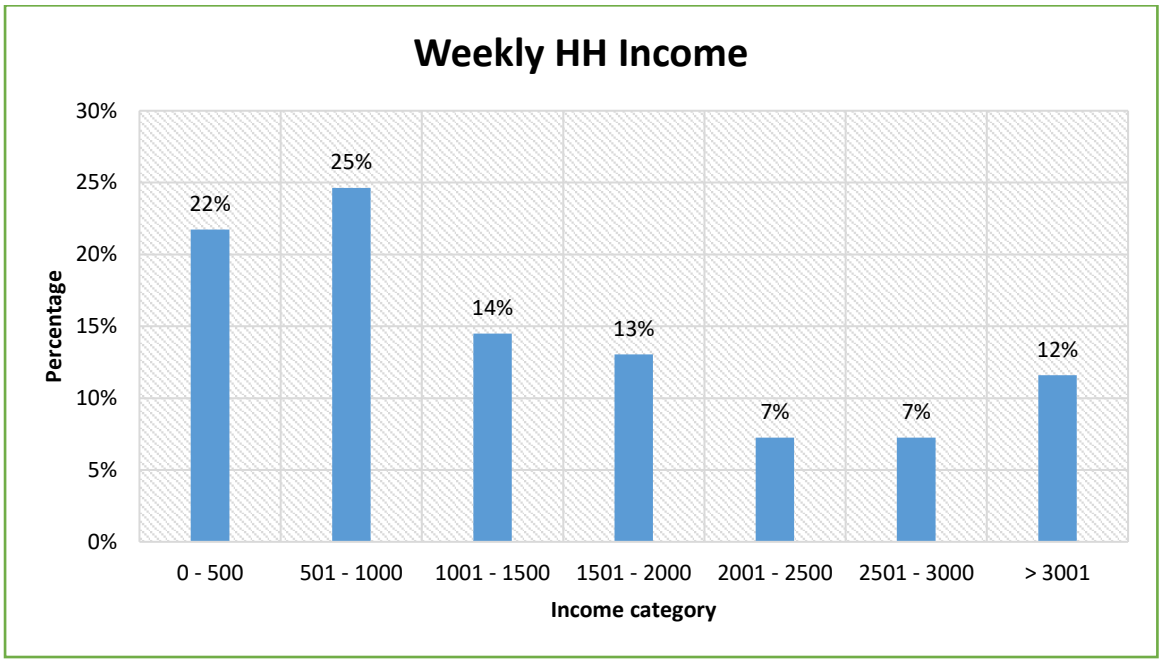


Figure 12: HH Income, Tioga.

122. **Economic development:** Tingoa and other coastal villages are very rich in marine products. Discussions with the locals reveal that marine products can be harvested and sold for income. However, transport and markets have been the challenge for the communities and the province.

123. There are extensive logging and mining of customary lands in Rennell hinterland, with landowners receiving a royalty (or stumpage) at each shipment. Payments from commercial loggers and mining usually go to the customary land trustees and are distributed to the landowners who may invest in improving their housing and transport, and/or use it to pay for school fees or start a small business. In other cases, it is treated as windfall income and spent on consumables, alcohol, and even gambling.

124. Today, most dressed timbers are produced at the household level by pooling family labour. The trees are felled and dressed using chain saws. Portable (walkabout) mills are expensive and require collateral security and upfront payment which the local people cannot afford. The main markets for dressed timber are local. The main problem people face in timber production is transporting the products to reliable markets, for example, Honiara.

125. The communities in East Rennell recently declared Lake Tegano as a Protected Area under the Protected Areas Act. The protection of the lake will attract researchers, tourists and investors—a great opportunity to invest in tourism due to its uniqueness and classification as a World Heritage Site.

126. The major source of income for almost all household in the area is from art & craft, sale of crops and cake, salaries and wages, and the remittance & royalties from logging and mining companies. Discussion with the community confirmed that people travel to Honiara to sell the arts and craft.

4.3.7. Social Organization

127. **Tribal Affiliation:** Rennell Island and Bellona comprise of mainly Polynesian people by origin. Since Tingoa is a provincial centre, other cultural groups are also present due to people coming to work or intermarriage with the locals. Originally, the area of the subproject site belongs to the tribal units in West Rennell. It was recently that the province and the national government acquired the provincial land to establish the station.

128. **Leadership:** Tingoa is a provincial substation managed by the Rennell Bellona Provincial Government. Communal affiliation at the subproject site does exist. Just like any Polynesian and Melanesian society, the area would have big men, chiefs and elders who were charismatic leaders or focal points able to use their personal abilities and enterprise to organize community activities. All tribal units do have chiefs who are responsible for tribal affairs, including dealing with land matters and tribal issues.

129. **Religion:** The survey recorded three religious groups. The two main groups are the Seventh Day Adventist (SDA) church and South Seas Evangelical Church (SSEC). The Anglicans as the minority group. Thus, Matahenua, western gate, Baegau, Sigiagabu, Potuhenua, Magae are SDA communities and Hatagua, Ngongona, Tongatapu are SSEC communities.

130. **Women, Youth and Gender:** The women and youth in Tingoa are either part of a church-based group or women's association. Women are a vital socio-economic instrument in this area because they do almost everything to support their household. The women in Rennell and Bellona are known for weaving kete-magu, basket weaved from local materials to earn income. Weaving is part of their culture and becoming a carrier for many women. Women are also subsistent farmers, and surplus from the gardens is sold. This income supports their household needs such as school fees, foods and clothes. In addition to that, women are also responsible for cooking, washing and collecting water and firewood, and to ensure that family needs are met on a daily basis.

5.0 ANTICIPATED ENVIRONMENTAL SOCIAL IMPACTS AND MITIGATION MEASURES

5.1 Significance of Impacts

131. The potential environment and social impacts for the subproject have been identified, and their significance assessed. The duration of the impacts is assessed with reference to the scope of work and the bio-physical and social environment in the subproject site. Mitigation measures are designed in order to avoid and/or minimize each of the potential environmental and social impacts. Impacts may be minor, moderate, major or negligible based on the scale of impact itself and whether it be mitigated or not.

5.2 Potential preconstruction impacts and mitigations

5.2.1 UXO

132. During WWII, the subproject site was not a significant spot to the allies. The two parties have travelled or crossed between the Guadalcanal and Rennell Sea. However, the scuttled World War II American Catalina flying boats are found in the bottom of the Lake Tengano. Thus, it is possible that a chance discovery of a UXO may occur.

5.2.2 Preliminary designs and design specification

133. Preliminary designs and design specification will need to be approved by SP and the RPG TCPB to certain extend. The board will issue a building permit or consent for the development to proceed. This process is a legal requirement under the Town Country Planning Act which means it has to be carried out before the construction commences. The concept drawings and route are designed to avoid resettlement impacts and disturbance to vegetation.

134. 5.2.3 Land Acquisition

135. SP acquired the land for the Tingoa solar farm as a Fixed Term Estate leaseholder for a lease period of 75 years. See Annex 7 for land title.

5.3 Potential construction impacts and mitigations

5.3.1 Impact on Flora and Fauna

136. During the construction phase, flora and fauna can be affected, but any potential impacts are considered to be minimal as the construction will be performed at a previously disturbed site. Measures to be included in the subproject to ensure the protection of flora and fauna within the site include:

- Adequate knowledge to construction workers in relation to the felling of trees, not requiring to be cleared by the subproject;
- The contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. Prohibit poaching of fauna; and
- Construction workers will be informed about general environmental protection and the need to avoid unnecessary felling of trees whenever possible. The original vegetation in the area acquired by Solomon Power was removed by the Provincial Government. However, there are few tree strands (less than ten trees that need to be felled to avoid shading on the solar panels). Among others the area is mostly covered with shrubs and regrowth.

5.3.2 Impacts on Air Quality

137. The quality of air within the subproject site is typical of a rural setting in the Solomon Islands. The construction works will have a temporary impact on local air quality through emission from construction machinery, as well as through dust generation from vehicles transporting materials and from exposed stock-piles. Exhaust emission generated by vehicles transporting or erecting power poles, cables, and other construction materials, and for excavation equipment and concrete mixers. There are a number of good engineering practices that can be employed to ensure that any air quality impacts generated during construction are mitigated. These include:

- Construction equipment is maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and SP will record the checks as part of environmental monitoring;
- Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the subproject sites;
- Provide workers with protective safety equipment including masks;
- Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the sides and tail of the vehicle) during transportation;
- Material stockpiles being located in sheltered areas and are covered with tarpaulins or other such suitable covering to prevent material becoming airborne; and
- Periodic qualitative air quality monitoring (by observation rather than testing).

5.3.3 Impacts on Water Quality

138. Water quality can be affected during construction when soils, wastewater, oils and lubricants, sewage and other materials are allowed to move into the environment. Construction activities that may exacerbate the movement of these materials into the water environments will be examined and given special attention. Mitigation measures include:

- Sediment controls such as silt fences or other sediment reducing devices (silt barriers), to prevent both siltation and silt migration when works are being undertaken;
- Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from subproject site will not be dumped in near wells or other water sources.
- Hydro-carbons, fuel, and other chemicals as required for the works will be stored in secure containers or tanks located away from the surface waters. Any spills will be contained and immediately cleaned up as per the requirements of the emergency response plan prepared by the contractor; and
- All water, waste-water and other liquids used or generated by project works and activities will be collected and disposed of in an approved manner and in an approved location. Such disposal will not be permitted to cause either pollution or nuisance.

5.3.4 Impacts on Soils and Erosion

139. There will be minor excavation work during construction inside the acquired area to secure platform for the solar farm and associated facilities. Measures will be taken to avoid the movement of eroded soil from the site onto adjoining areas, including the worksite. At the completion of work, all disturbed areas will be stabilized by natural re-vegetation. Existing patterns of erosion, soil characteristics and topographic conditions were taken into account in

the design of the subproject. Certain types of earthworks, e.g. clearing, can result in sedimentation.

140. The potential impacts on soil, or from erosion, during construction are from (i) turbidity impact on the adjacent water bodies; (ii) soil erosion and loss of protective vegetation; and (iii) soil contamination from fuel, chemicals and/or construction material spillage. Material stockpiles will be susceptible to erosion, creating sediment-laden run-off, particularly during rains and re-suspension of dust during the dry season. Stockpiles will not be permitted near water bodies. Potential soil impacts and erosion will be mitigated by:

- In the event, the contractor causes damage to agricultural land, productive land or gardens. SP will ensure that the contractor is solely responsible for repairing the damage according to the laws of the country. The Contractor will be advised by SP accordingly during the induction meeting;
- Designs used that protect soils in order to reduce erosion; and
- Random and uncontrolled tipping of spoil, or any material, will not be permitted.

5.3.5 Impacts on Noise Levels

141. There are no noise standards in Solomon Islands, and as any noise generated by the subproject will be temporary (i.e. during construction) and intermittent, preparing a baseline of ambient noise levels for subsequent monitoring is not considered warranted.

142. Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation, location and function of equipment. During construction, there will be a temporary impact due to the noise from construction equipment, especially when construction activities are carried out close to residents. WB standard noise levels can be used as a guide[15].

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

Table 4: WB Noise guide

143. The most sensitive receptors are mainly residential buildings, government buildings, school and private business. It is the responsibility of the contractor to arrange meetings between affected residents on feasible work schedules (hours of equipment operation, etc.). Ideally, noise should not exceed 45 dB measured at the outside of any residence. Measures to be included in the subproject to mitigate the effects of noise include:

- Requirements in the ESMP and contract documents that all vehicle exhaust systems and noise generating equipment be maintained in good working order and that annual equipment maintenance will be undertaken;

[15] https://www.ifc.org/wps/wcm/connect/4a4db1c5-ee97-43ba-99dd-8b120b22ea32/1-7%2BNoise.pdf?MOD=AJPERES&CVID=ls4XYBw

- Prohibition of any construction activities between 9pm and 6am in, or close to, residential sites;
- The contractor will prepare a schedule of operations that will be approved by affected stakeholders. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction activity and identify the types of equipment to be used;
- Workers will be provided with noise abatement equipment; and
- Any complaints regarding noise will be dealt with by the Contractor in the first instance through the redress grievances mechanism.

5.3.6 Impacts on Access

144. The subproject will cause disruptions to traffic using the public access during the construction period. Where applicable, the contractor will develop a traffic management plan as part of the CESMP. Mitigation of impacts on access will include:

- SP and the contractor will inform the MID and the provincial government when there is a need to restrict movement near the solar farm area or during the construction of distribution lines;
- Care must be taken during the construction period to ensure disruptions to access and traffic are minimized;
- Signage and other appropriate safety features will be used to indicate construction works are being undertaken; and
- The contractor will ensure that access roads to privately owned land are not disturbed.

5.3.7 Impacts on Health and Safety

145. The subproject's activities can cause a range of health and safety impacts. The main impacts on health and safety are associated with (i) risk of accidents, and (ii) traffic safety issues and (iii) chemical spills. The risk of the spread of communicable disease is considered to be negligible.

146. Observing general health and safety requirements, including the provision of safety and protective gear and equipment to workers, will reduce the risk of accidents subproject site. Air pollution and noise, which also have a health and safety aspect, have already been discussed.

147. The contractor will need to observe general health and safety requirements and, as a minimum, must be compliant with the Labor Act of 1978 and the Safety at Work Act of 1996.

148. Mitigation measures for reducing and avoiding impacts on health and safety include:

- SP and contractor to provide workers health and safety induction, and on the specific hazards of their work;
- Provide workers with personal protection equipment, such as safety boots, safety glasses, reflector vests, helmets, gloves, and protective clothing and ensure workers adhere to OH&S policy at all times;
- Garbage receptacles will be setup at subproject sites, which will be regularly cleared. The garbage will be dumped only at the approved site;
- Provision of adequate protection to the general public in the vicinity of the worksite, including advance notice of commencement of works, installing safety barriers if required and signage or marking of the work areas; and

- SP/Contractor will issue general and hot work permits at every stage of the work outlining the scope and precautionary and protection measures.

5.3.8 Fire

149. Smoking near fuel storage areas, causing fire and loss to construction resources are expected to be minor. Mitigations measures include:

- Prohibit smoking close to fuel storage areas;
- Erect signage of no go smoking zones; and
- Provide extinguishers and fire hydrants, including training workers on their use.

5.3.9 Accidental discovery of archaeological resources

150. Any site clearance, digging, and excavation activities undertaken during construction can un-earth archaeological sites or resources. In the event this occurs, work shall cease immediately, and the authorities (National Museum Tambu Register, Ministry of Culture and MECDM) shall be informed.

- Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue. The contractor will be responsible for complying with the requirements of authorities, and the SP shall monitor the same.

5.3.10 Accidental chemical spills

151. Rennell Islands is prone to cyclones and extreme weather events. The contractor will be responsible for the preparation of an emergency response plan as part of CESMP, which will cover the containment of hazardous materials, oil spills, and work-site accidents. The plan will detail the process for handling, and subsequently reporting, emergencies, and specify the organizational structure (including responsibilities of nominated personnel).

5.3.11. Impacts on Protected Areas and other Sensitive Ecosystem

152. The subproject site is located further away from any protected area. There is no sensitive ecosystem other than the nearby Lake Tegano, which is approximately 5hrs drive east.

5.3.12 Risk of Spread of Communicable Disease

153. The spread of STI and HIV cannot be overstated during construction due to the influx of workers on the island. Nonetheless, all risks will be considered as a precautionary measure and mitigation measures developed. Implementation of the STIs/HIV/AIDS awareness and prevention campaign will be undertaken during the pre-construction phase as well as construction by the contractor.

5.4.13 Employment.

154. The contractor will employ skilled and unskilled workers. These workers will need temporary shelters and the provision of water, food and basic sanitation during the construction phase. Approximately ten workers are expected; however, it will be confirmed at the detail design stage. SP will ensure equal opportunity for all gender in terms of workforce, whether it is skilled or unskilled labour. Communities nearby will be given priority for all skilled

and unskilled work. Payments to women will be equal to the men's salary or wages. The SP team will monitor and ensure contractor complies with gender initiative under the contract.

5.4.14 Antisocial Behaviors.

155. The subproject-induced influx of workers and an increase in cash in the local economy has the potential to generate antisocial behaviours in the local area, including increased alcohol and substance abuse, Gender-Based Violence and family desertion. This would represent a significant negative effect and would impact disproportionately on vulnerable groups, including women, children and the elderly. It would also impact negatively on living standards, community peace and cohesion in the area. Mitigation measures include: (primarily through recruitment/ employment policies, Code of Conduct, employee training and communications and engagement with and capacity development of women's and other representative groups) through which the increased risk of antisocial behaviours will be addressed.

5.3.15 Social concerns

156. A grievance redress mechanism (GRM) is in place for any concerns that the community might have further detail is provided in chapter nine. Key impact on adjacent residential buildings is anticipated to be from the noise produced by the equipment, and other potential social risks include the spread of diseases, GBV/SEA/SH risks between the construction team and the residential population, while is deemed minor or negligible the risk can escalate quickly. Appropriate STI/HIV awareness and GBV awareness and mitigation measures are to be set up. The contractor will provide first aid kits, safety equipment for workers and identify a response to any incident related to STI/HIV or GBV response. The contractor will be responsible for providing adequate information sessions to better inform the construction workers and the public on matters relating to occupational health and safety (OHS). Appropriate action will be taken to respond to workers behaving inappropriately and under the influence of alcohol on the project site or during project hours. Mitigation measures include:

- Contractor to ensure worker's code of conduct is followed and any actions reported through the GRM and
- Adequate information will be provided and made available to all workers to ensure public properties and other important services are not destroyed.

5.3.16 Generation of waste during construction

157. Construction waste comes in solid and liquid form from different construction components. The ECD regulates the discharge of any substances on the environment. All construction materials, whether liquid or solid, will be disposed at a designated site approved by the Project Engineer with prior approval from Guadalcanal Province, Landowning Units or ECD.

158. **Segregation of Solid Wastes**: Solid is generally understood as solid or semisolid, non-soluble material (including gases and liquids in containers). All other forms of waste except for anything non-solid can be categorized as solid waste. Solid waste represents a majority of the waste produced during the construction. Construction waste will include drums, cables, timber and metal offcuts and kitchen waste, to name a few. The contractor will sort or segregate all solid waste before disposal. Willy Bins will be labelled with different waste categories, for example, "cans, plastic and organic" waste and be installed at designated sites, especially at the entrance, campsite and construction area. The contractor's obligation is to remind construction workers to adhere and comply with the segregation methods and penalize workers who defied the rules established.

159. **Liquid waste management:** Liquid waste can be fluids of any form, dirty or clean, toxic or not, can be oil, grease, fats, sewage, to name a few. All these are expected during the construction period and will be managed at acceptable standards. Obviously, waste oil is common during construction; as a result, will be stored in a safe location. There is provision for spate toilet at all construction sites.

160. Where fuel is being transferred from a vehicle, the tank truck must be certified to standard and that all trucks used to transport fuel tanks meet commercial vehicle inspection requirements. There should be signs, indicating that the ignition must be turned off and smoking is not permitted while the vehicle is being refueled and must be visible to every driver. Travelling along highway should be not more than 60km/hr. to avoid accidents. Maintain at least one 20-B:C portable fire extinguisher with the tank vehicle. Refueling equipment from a tank vehicle is permitted if the following conditions are met:

- the fueling is conducted outdoors on commercial or industrial establishments;
- the fueling is conducted using approved hose-reel and automatic closing nozzles; and
- appropriate training and equipment are supplied to deal with any incidental spillage.

161. All storage tanks for combustible and flammable liquids will be built and maintained regularly. There will be thorough inspections for possible leakages and faults. Whenever a problem occurs, a spill response kit capable of containing and absorbing fuel spills will be made available and maintained. Company will ensure spills are recovered and that contaminated soil is removed or treated. Post spill response procedures and maintain an emergency response plan with the fuel facility.

162. **Asbestos Removal and Disposal**: No demolition works required for this subproject. However, when contact with asbestos, herewith are the management measures. If asbestos fibres are present in the air and are inhaled, there is a risk that they may cause a variety of serious health problems. Asbestos cement products will be handled with care and through the use of standard operating procedures (SOP) or Material Safety Data Sheets (MSDS). Release of asbestos fibres into the air comes from drilled or cut during construction, especially if broken in the process may release asbestos fibres. A number of good engineering practices will be carried to avoid such risk:

- Workers familiarise themselves with the type and condition of asbestos cement product that will require removal and disposal of at the site.
- Will obtain approval for an appropriate disposal site prior to demolition.
- Will remove asbestos cement demolition materials immediately from the site to the disposal site without storing it.
- All workers handling the materials are supplied with the appropriate protective clothing and equipment, which are:
  - White disposable overalls to wear during the operation;
  - Disposable dust mask suitable for work with asbestos; and
  - Disposable gloves.
- Ensure that the following are available at the site:
  - A hose and a supply of water for wetting down materials;
  - A plastic groundsheet that can fully wrap the quantity of asbestos cement sheeting and which will be disposed of with it; and
  - Packaging tap to seal the wrapped sheeting.
- Prevent children or anyone else who may be affected by the work, from entering the immediate work area.
- Wear a suitable disposable dust mask to prevent inhalation of asbestos fibres.

- Wear disposable overalls. These should be taken off at the site and disposed of with the AC sheets. These overalls will prevent asbestos fibres clinging to your clothes where they could cause contamination

163. **Hazardous Waste Management:** Hazardous and chemical wastes can be generally referred to as materials either in their solid, liquid or gas states that exhibit a 'hazardous characteristic', usually ignitability, corrosivity, reactivity and toxicity when made in reference to chemicals. It is possible that hazardous chemicals will be used during construction. Hazardous waste materials, such as catalysts, will be handed back to the suppliers for specialist disposal. All Hazardous waste shipped from the site will be subjected to waste manifest to track generation, transportation through licensed and approved contractors. The contractor will:

- Store kerosene, diesel, petrol and lubricants in a bunded area with an impervious surface and with storm water drainage provisions as approved by the Engineer.
- Store paint and chemicals in a hazardous materials storage shed with walls, roof, ventilation and a bunded floor with an impervious surface;
- Ensure that the storage capacity of each bunded area is at least 105% of the total volume of hazardous material stored;
- Secure the areas and sheds used to store hazardous materials by erecting a security fence of minimum height 1.80m around each facility with the fence located outside the bund;
- Locate the hazardous materials storage areas at least 10.0m away from any watercourse;
- Contain and mop up spills of hazardous materials in accordance with manufacturer's specifications.

164. **Waste management training and awareness**: SP and the contractor will pursue training on waste management protocols with the construction team before civil works commence. In addition to that, all new staff or visitors will be briefed on the waste management requirements before he/she takes up a job or visit site. Workers will be reminded regularly through weekly meetings or daily pre-starts on waste management obligations. The contractor has the right to penalize workers when waste management protocols are not being followed.

5.4 Potential Operation impacts and mitigations

5.4.1 Community Health Concerns

165. For concerns that the communities may have regarding safety and accidents. For example, electrocution and skin disease. Mitigation measures will include:

- Potential risks will be identified, evaluated and addressed in a manner that follows the safeguard policies;'
- Potential risks will be communicated through forms of community consultations or as deemed appropriate, in particular, risks associated with transmission lines to nearby communities;
- Provision for training will be made available to local communities to ensure that an understanding of OHS and social risk awareness is in place during accidents.

5.4.2 Natural Disaster Impacts

166. Rennell Island is highly vulnerable to cyclones. Therefore, it is important infrastructures, and utilities are design proof to such conditions. Extreme weather events may cause damage to the distribution line and solar farm. SP will develop an emergency response plan to manage and respond to such events

5.4.3 Climate Change

167. The risks to the subproject as a result of climate change revolve around the ongoing operation and maintenance of the assets. The main climate change risk would be related to occurrences of extreme tropical cyclones. These events have the potential to damage the solar hybrid, including the poles and distribution lines. Over time, it could lead to tear and wear of distribution lines and associated apparatus. Risk of impacts on the subproject can only be addressed through inspection and routine maintenance works.

168. Fumes from construction machinery will contribute to the emission of greenhouse gases; however, considered to be negligible on a global scale. Therefore, the subproject will not have any significant impact on climate change.

5.4.4 Health and Safety

169. Observing general health and safety requirements, including the provision of protective gear and equipment to workers, will reduce the risk of accidents at the work sites. Measures include ongoing training of workers and reviewing Standard Operating Procedures (SOP) to suit condition at the subproject.

170. Mitigation measures include:

- Provide workers with training in occupational health and safety (OHS) issues, and on the specific hazards of their work;
- Ongoing training in SOPs; and
- Provide workers with personal protection equipment, such as safety boots, safety glasses, reflector vests, helmets, gloves, and protective clothing.

5.4.5 Management of waste

171. There is a possibility that the remains of the construction and demolished materials accumulate at the subproject site. The demolished materials and construction materials will be disposed at the designated site approved by SP. These wastes should be removed at the first instance during the construction phase to allow accessibility.

172. Operation of the subproject will generate wastes including drums, cables, timber and metal off-cuts and kitchen. The contractor will develop a waste management plan as part of its CESMP. Waste management measures will include the following measures:

- Regular collection and disposal of waste at the approved site;
- Regular inspection on oil sumps;
- Waste oil inventory and oil stored in safe containers, careful attention given during overhauls and maintenance;
- Discussion currently being pursued with the ECD on possible export of waste oil.

5.4.6 Sewage and Hydrocarbons

173. The offices, workshop and related facilities will have piped sewerage connections to a specified septic tank. Sludge shall be stored in holding tanks. The holding tanks will be periodically pumped out and the sludge buried at a suitable location which minimizes the risk of any leaching to water bodies.

174. Activities likely to cause spillage of hydrocarbons either into land or water shall be undertaken so far as possible in bund areas. In particular, vehicle wash downs, maintenance and refueling, except in emergencies, should take place in workshops and other hardstand

areas with appropriate drainage systems, dump, including the capacity to intercept spilt hydrocarbons or oily water; Earth-bund locations within the subproject site where spilt hydrocarbons or oily water can be contained within the bund.

5.4.7 Water Tank

175. SP ensures the water pumps, tanks and reticulation network are always operational through regular maintenances'. Continuous supply of water is important to subproject site for use in emergency responses as well as domestic purposes.

5.4.8 Impacts on Air Quality

176. The impacts on air quality during operation of the subproject are negligible unless there is a need for maintenance and the use of heavy machinery. Engineering practices that can be employed to ensure that any air quality impacts generated during operation are minimized includes the following:

- Equipment will be checked at regular intervals to ensure they are maintained in working order and SP will record the checks as part of environmental monitoring; and
- Periodic qualitative air quality monitoring (by observation rather than testing).

5.4.9 Noise

177. Noise from the operation of the subproject is negligible unless there is maintenance from the use of machinery.

5.5 Decommissioning Impacts

5.5.1 Waste Impacts

178. Decommissioning of the solar hybrid will result in recycled materials including glass, semiconductor, steel, aluminium and copper. At the end of its operational life, the component parts can be dismantled using minimal impact approach and recycled or disposed of safely. SP will manage all waste according to the SIWMPCS. At this stage, SP is yet to identify oversea companies who would be interested in recycling such waste. Normally ECD will facilitate waste transactions under the Waigani Convention. Following SP and ECD discussions on the matter, SP will explore the viability of exporting solar waste overseas. SP will develop a waste management plan to address the issue of waste and pollution in the energy sector.

5.5.2 Storage sites

179. Minimal space is available for storage of waste materials unless it is recycled immediately after decommissioning. In Solomon Islands, recycling is a major concern as there are limited to no technology available. Therefore, SP and ECD will have to discuss a prior arrangement for recycling with companies overseas. Alternatively, while discussing disposal methods, a first priority will have to be determined for the appropriate sites for storage.

5.5.3 Access and Mobility

180. During decommissioning, access and mobility at the subproject site will have minor impacts. The contractor will agree on the work schedule with nearby communities or residential areas before decommissioning activities commence.

5.5.3 Vegetation restoration.

181. The emphasis will be on the use of local provenance species of native plants and that the emerging vegetation type and composition be similar, or at least close, to that was present before the transmission line, at the same time considering vegetation types and densities that will produce a quick coverage to minimize further damage to the environment and restore functional ecosystems, as well as vegetation types of cultural and economic significance preferred by end-users.

5.6 Cumulative impacts

182. The SIG granted foreign companies Mining License and Timber rights to mine and log over East Rennell. These developments promote socio-economic development in Rennell Island through Tax, royalties, community projects and employment. On that same note, there are also negative environmental and social impacts from the developments. In Feb 2019, a ship wreckage spill oil in the Lavuga bay triggering an environmental disaster. Recently, in July 2019, another wreckage, spill bauxite in the same area. Lavuga was used as a landing site because it is relatively calm compared to other locations in Rennell. Bauxite and harvested logs are normally transported to Lavugu from central and west Rennell tenement and lease areas.

183. In Tingoa, pockets of customary lands near the station were already mined and logged. These activities, including land-use activities, have caused dust, noise and siltation to groundwater resources. SP will ensure construction activities associated with the subproject does not eventuate into negative impacts that will enhance the existing environment and social issues in Rennell and at the subproject site.

Table 5: Cumulative impacts

Impacts of Solar Hybrid	**Mining**	**Logging**	**Settlements**
Solar Site subject to clearance in the past	Mining requires larger space and vegetated areas to be cleared.	Logging requires clearance of vegetation.	Population increase prompt establishment of new settlements. Requires felling of trees and vegetation to build homes and settlements.
Water Quality Impacts	The use of chemical to treat bauxite can impact water quality.	Siltation/sedimentation from soil exposure can impact water quality.	Increase settlement patterns will generate silt and contamination to water bodies from inadequate sanitation facilities.
Disturbance to flora and fauna	Vegetation clearance will result in degradation of precious habitats.	Vegetation clearance will result in degradation of precious habitats.	Vegetation clearance will result in degradation of precious habitats.
Creates employment	Creation of unskilled and skilled employment.	Self-employment.	Majority of the homes are semi-permanent. These buildings have had to acquire minimum labour.
Solar hybrid site accessible.	The network of roads was built and continuously repaired by the	The network of roads was built and continuously repaired by	Increase settlements demand new road access.

	mining company in the area	logging companies	

6.0 ANALYSIS OF ALTERNATIVES

184. This section looks at undertaking the various alternatives of the subproject. There are three basic options: (1) Alternative Design, and Technology (2) Alternative Site Options (3) leave the subproject as it is now without undertaking the proposed expansion (no subproject option). If the subproject were to continue, it would be necessary to take technical, environmental and social aspects of the subproject into consideration and ensure that these concerns are adequately considered in the decision making. It is therefore important to consider all practicable options and ensure that the best available option(s) is/are chosen. The following section details the development options.

6.1. Alternative to Design and Technology

185. The contract arrangement is an EPC contract. The contractor is responsible for design, procurement, construction and commissioning of the subproject. The installation will be carried out in compliance to SP specification and SOPs for Solar Hybrid installations. The contractor will design and furnish all materials and equipment to be fully compatible with electrical, environmental and space conditions of the site. It will include all equipment to safely support the full demands of the solar hybrid and be designed for unattended operation.

186. Installation of the solar hybrid requires technical machinery and or equipment operated by technically approved people. Localized machinery and equipment may be used as support.

6.2. Alternative Site Options

187. Four sites were identified in the initial survey in 2017. However, it was reduced to a single site now due to the challenges experienced by SP dealing with customary lands. In addition to that, access to other sites passes through customary land. SP has therefore decided to pursue negotiation on registered land owned by the provincial government. In this case, other alternatives are not feasible to be considered as they will induce major expenses and exacerbate social and environmental issues. Unfortunately, it has been observed that no other realistic alternative, for the location, can be proposed that will provide the same economic, environmental, and social advantage.

188. Summary justifying why the work will need to be done at the current site:

- Registered land;
- Further away from residential buildings; and
- Access to the road.

6.3. No Development Option

189. The “No Development Option” implies not proceeding with the subproject rather choosing to leave the site as it is at the current state, which is certainly provided with no alternative for the subproject. This option would likely lead to socio-economic impacts including but not limited to, the following:

- Limited energy to meet growing demands;
- Without such expansion, SP will be unable to meet SINEP targets set by the SIG;
- Failure to realize that improving energy efficiency will boost the potential for increased income generation through various business undertakings,

In view of the above, it is important to consider that the positive benefits of the subproject will outweigh the potential negative environmental and social effects. Therefore, the “No Development Option” is not recommended.

7.0 ENVIRONMENTAL SOCIAL MANAGEMENT and MONITORING PLAN

7.1 Summary of the ESMP.

Table 6: Environment Social Management and Monitoring Plan

IMPACT MANAGEMENT					**IMPACT MONITORING**		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
PRE-CONSTRUCTION PHASE							
UXO Survey	• Contact with UXO.	• Completion of the UXO survey by qualified personnel.	• Contractor.	• To be included in the BOQ	• The survey has been carried out by approved personals	• Certificate showing the project area is UXO free before any site clearance or construction could start	• RSIPF and SP
Development of preliminary designs /site plans/maps.	• Resettlement and damage to vegetation.	• The concept drawings and route are designed to avoid resettlement impacts and disturbance to vegetation.	• Contractor and SP	• To be part of the proje	• Plans approved by SP and TCPB	• Building permit	• SP and RPG

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
				ct cost.			
Land Acquisition	• Restriction on land usage	• The land situated on registered provincial land. • SP will avoid encroaching on customary lands. Note: SP has acquired the solar farm site.	• SP	• Project Cost	• Detail design avoids the relocation of non-land assets.	• No relocation.	• SP
CONSTRUCTION PHASE							
Vegetation clearance for transmission/distribution lines and solar hybrid site.	• Removal of grass, shrubs and trees. •	• Minimize clearance to construction perimeter and area acquired by Solomon Power. • Unnecessary clearance avoided. • Commercial trees and crops will be compensated based on MAL rate.	• Contractor	• Include in construction cost	• Area of vegetation; area of felled trees/vegetation removal	• During survey and activities - visual inspection before, during and after	• SP
Operation of construction machinery generating emissions.	• Emission of exhaust from vehicles and machinery. • Emissions of CO_2 and POPs.	• Maintain construction equipment. • Prohibit the use of equipment that causes excessive pollution (e.g. generates smoke).	• Contractor.	• Inc. in construction cost.	• Air quality, emissions.	• Weekly or after complaint - periodic visual inspection; • Any particulate	• SP.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
						matter and smoke.	
	• Dust caused by construction vehicles running at high velocity, • Degrade air quality/ Increase TSS in the atmosphere.	• Thorough watering to avoid dust.	• Contractor	• Inc. in construction cost	• dust, particulate matter; • Use of tarpaulins and loading of vehicles; • Stockpiles.	• Weekly or after complaint - periodic visual inspection.	• SP
Operation of construction machinery creating noise	• Noise impacts.	• Less than ten households are within the project neighbourhood boundary, area likely to receive noise impacts. Provincial buildings and schools are 200-500m east of the subproject site. The contractor will agree on work schedules with nearby residential buildings. • Construction machine exhaust systems and noisy equipment will be maintained to minimise noise.	• Contractor.	• Inc. in construction cost.	• Adherence to agreed schedule; • Complaints (no. logged with resolution).	• Weekly or after complaint - review schedule. • Consultation (ensure schedule being adhered to).	• SP • ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• Limit noisy construction activities to day time hours, i.e. construction activities. Prohibited between 9pm and 6am. •					
	• Impacts on construction workers.	• Workers limit of exposure to noise will be strictly below 70 decibels per 8-hour shift (See WB guideline in table 4) • Provide workers with noise abatement equipment (ear-muffs, etc.). • Complaints through the GRM will be addressed by the contractor.	• Contractor.	• Inc. in construction cost.	• Workers safety equipment.	• Weekly • Workers are provided with safety equipment.	• SP • ECD
Stockpile of Construction Materials.	• Construction materials washed out into the marine environment • Increase siltation and turbidity.	• Construction materials will be stockpiled away from the drain and covered when necessary. • Placement of diversion ditches around stockpiles.	• Contractor.	• Inc. in construction cost.	• No stockpiling close to water bodies.	• Weekly-Visual Inspection.	• SP • ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Dust from exposed stockpiles.	• Material stockpiles located in sheltered areas and to be covered.	• Contractor	• Inc. in construction cost	• dust, particulate matter; • Stockpile covered.	• Weekly or after complaint - periodic visual inspection	• SP
Excavation work, installation of the solar farm and transmission/distribution lines.	• Risks of accidents.	• Standard Operating procedures (SOP) for instalment implemented. • Worker codes of conduct • Workers wear protective equipment, including clothing, helmets, safety boots, earmuff etc.	• SP • Contractor	• Inc. in construction cost.	• Workers wore safety equipment.	• Workers are provided with safety equipment. • Daily inspection.	• ECD and SP.
	• Accidental Discovery of UXO.	• The contractor will arrange for UXO clearance before any construction. Should UXO be discovered, the contractor is to immediately cordon off the area to arrange the evacuation of nearby residences and inform the UXO contractor and RSIPF of the find.	• Contractor, SP	• Include in construction cost	• The occurrence of UXO at the construction site	• Upon discovery of UXO	• SP and RSIPF

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Silt generation.	• Avoid unnecessary vegetation clearance. • Use of silt control devices and sediment traps/fences when required. • Construction of sediment settling ponds and bunds. Diverting turbid water to sediment settling ponds.	• Contactor	• Include in construction cost	• Reduced soil erosion and sedimentation • Vegetation clearance minimized • No dump sites near waterways	• Weekly - visual inspection •	• SP and ECD
	• Accidental release of hydrocarbon from the construction machinery.	• Ensure that all construction machines are well maintained. • A prestart on construction machine carried out every morning. • Oil/fuel remediation agents, oil pads, oil booms and geo-fabric clothes are procured for usage as part of the emergency response plan.	• Contractor	• Include in construction cost.	• Construction machinery maintained in good working order. • Spot check for visible oil • Water quality.	• Weekly - visual inspection.	• SP and ECD. •
	• Access and Mobility at several road sections will be prohibited	• Contractor to allow sections of the road area to be continuously accessed by the public.	• Contractor	• Include in Contract	• Maintenance of access; • Signage;	• During activities - Visual inspection;	• SP and ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Respon sibility**	**Mitigatio n cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	temporarily during the construction.	• Signs and other appropriate safety features will be used to indicate construction works are being undertaken. • The contractor will develop a Traffic Management Plan as part of the CESMP to manage all traffic related matters.			• Road free of materials and debris; • Haulage routes rehabilitated	• Consultati ons; • Review of the traffic managem ent plan	
Fueling construction machines and storage of Hydrocarbons	• Hydrocarbon leakage/spills from the construction sites/workshops.	• Detailed Emergency Response Plan (as part of CESMP) prepared by the contractor to cover hazardous materials/oil storage, spills and accidents. • Store kerosene, diesel, petrol and lubricants in a bunded area with an impervious surface and with storm water drainage provisions as approved by the Engineer. • Store paint and chemicals in a hazardous materials storage shed with walls, roof, ventilation and a	• Cont ract or.	• Includ e in constr uction cost.	• Ensure storage sites are using existing—concrete base.	• Weekly inspection .	• SP and ECD.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		bunded floor with an impervious surface; • Chemicals will be stored in secure containers away from the drainage. • Chemicals stored in area or compound with concrete floor and weatherproof roof and fire extinguishers. • Ensure that all construction machines are well maintained. • Accidents reported to police within 24 hours.					
	• Smoking near storage and workshop areas causing a fire	• Prohibit smoking close to fuel storage areas. • Put up signs of no go smoking zones. • Provide extinguishers and train workers on their use.	• Contractor.	• Include in construction cost.	• Signs and fire extinguishers.	• Code of conduct and housekeeping rules being adhered to. • Verify records of accidents	• SP and ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
Presence of construction workers	• Waste generated at construction and installation sites causing nuisance and potential contamination to adjacent water bodies	• Garbage receptacles will be set up at construction sites, which will be regularly cleared. • Prepare waste management plan (as part of CESMP). • All wastes from the work sites shall be disposed of in approved landfill/areas by the provincial authority. • Provide sufficient training in appropriate waste disposal methods.	• Contractor.	• Include in construction cost.	• Waste management - visual inspection that solid waste is disposed of as per CESMP.	• Monthly as required and spot checks - visual inspection. • Review of the waste management plan.	• SP and ECD.
		• No wastes shall be dumped in waterways. • Ensures wastes not discharged to rivers or coastal waters and that all wastes disposed of in proper areas. • Provide adequate and safe drinking water.	• Contractor	• Include in construction cost	• No direct discharges to local streams, coast or rivers; • The regularity of waste removal	• Visual inspection Weekly	• SP and ECD

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Possibility of conflicts or antagonism between the public and the workers	• Facilitate reconciliation between parties- affected person, Contactor to involve in resolving the issue. • Call the Police once it goes beyond control. • Facilitate grievances through the GRM process if it's relevant to the subproject.	• Contractor	• Include in construction cost	• No. concerns raised and resolution; •	• Ongoing - consult with the public to monitor environmental concerns.	• SP and ECD
Cultural and Archaeological sites	• Encroachment into historical/cultural sites • Impacts on cultural values	No cultural sites or archaeological sites were recorded during the survey. In the event that such sites are accidentally discovered, the area will be cordoned off, and the national museum will be informed of the find. •	• Contractor	• Construction cost	• Sites and/or resources discovered and their protection.	• During activities - stop-work order issued; • Site/resources dealt with appropriately.	• Contractor, • Solomon Power.
Employment	• Grievances can arise due to lack of community participation and employment in the project.	• Advise contractor to engage all four neighbourhood communities.	• Contractor	• Include in construction cost.	• No. concerns raised and resolution. •	• Ongoing - consult with the public to monitor environme	• Contractor, • Solomon Power.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Respon sibility**	**Mitigatio n cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		• The allocation of vegetation clearing along the route will be divided into 4 zones and rivers as boundaries. • Women's wages and salaries are equal to men. • Project neighbourhood communities are given priority in unskilled and skilled labour.				ntal, social concerns.	
Antisocial Behaviours	• Increased alcohol and substance abuse. • Gender-Based Violence and family desertion. •	• Workers induction on company policies (rules and regulations). • Ensure respect for culture and governance in the locality. • Conduct awareness and training to workers and communities on gender-based violence and impacts. • Provide awareness to women and youths regarding their rights in the Solomon Islands Legislations.	• Cont ractor	• Includ e in constr uction cost.	• Equal opportunities for men and women. • Recruitment of locals in the communities. • Ongoing - consult with the public to monitor environmental , social concerns regarding employment.	• Contractor 's employme nt records weekly. • GRM register weekly.	• Contractor, • Solomon Power.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
Supply chain management.	• Grievances arise regarding workers' conditions. • Child Labour etc.	• Develop provision in the tender document for contractors to comply with conditions in the Solomon Islands Labour Act.	• Contractor	• Include in construction cost	• No issues relating to gender-based violence. • Complete training and awareness of gender-based violence.	• GRM register weekly. • Contractor's employment record indicates induction completed.	• Contractor, • Solomon Power
OPERATIONAL PHASE							

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
Operation of the solar farm	• Impacts from the maintenance of machinery	• Maintain machinery at standard working condition • Safety PPE for workers. • Workers carrying out maintenance are trained to avoid electric shocks.	• SP	• Include in operational cost.	• Air quality, emissions.	• Monthly or after complaint - periodic visual inspection. • Any particulate matter and smoke.	• SP
	• Accidents (involving electric shocks and burning).	• All SP workers and contractors complete OHS training. • All households are wired by grade A licensed contractor. • Advice communities during awareness to report to SP	• SP.	• Operational cost.	• Zero incidents.	• Incident reports.	• SP.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
		and Fire services of any burning incidents.					
	• Public safety on the use of electricity.	• Community Education and awareness at the preconstruction, construction and prior to commissioning of the facility. • Awareness conducted at schools and church groups. • Awareness through media.	• SP.	• Operational cost.	• Zero Incidents.	• Incident reports. •	• SP.
	• Establishment of the network infrastructure throughout the district will introduce more roadside obstacles and the potential for collisions.	• Road safety assessment (the majority of the poles will be within the road corridor and will be 4m from road pavement-SP will avoid encroaching into people lands). Traffic in the area is lower and does not seem to pose any risk to the poles unless people are drunk, which is a law and order issue.	• SP.	• Operational cost.	• Zero Incidents.	• Incident reports.	• SP.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Road Accidents and safety of women associated with no street lamps.	• There are provisions to install streetlamps on its distribution network for the sake of community safety, however not at this stage. Assessment of suitable locations for street lights will commence soon after the project.	• SP.	• Operational cost.	• Budget for installation of street lamps.	• Installation of street lamps.	• SP.
	• Waste generated at the solar hybrid site(Solid waste) old batteries	• Garbage receptacles will be set up at construction sites, which will be regularly cleared by the SP. • SP to prepare a waste management plan. • All wastes from worksites to be disposed of in approved landfill/areas by SP. • Workers will provide sufficient training in appropriate waste disposal methods.	• SP	• Include in operational cost.	• Waste management - visual inspection that solid waste is disposed of as per CESMP; • Visibility of oil and fuel.	• Monthly, as required and spot checks - visual inspection; • Review of the waste management plan. •	• SP and ECD
DECOMMISSIONING							

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	• Solar waste	• SP will manage all waste according to the Solomon Islands Waste Management and Pollution Control Strategy. At this stage, SP is yet to identify buyers of solar waste. Normally ECD will facilitate waste transactions under the Waigani Convention. Following SP and ECD discussions on the matter, SP will explore the feasibility of exporting solar waste overseas.	• SP	• To be part of operational cost.	• Solar Panels and associated E-wastes.	• During decommission.	• SP/ECD
	• Storage of waste materials to a certain extent can occupy space unless they are recycled or removed immediately after decommissioning.	• Storage facilities spaces and secure.	• SP	• To be part operational cost	• Storage facility	• After decommissioning	• SP/ECD
	• During decommissioning, access and mobility at the subproject site	• SP will agree on work schedule with the contractor before	• SP	• Operational cost	• Road access, signage	• During decommissioning.	• SP/ECD.

IMPACT MANAGEMENT					IMPACT MONITORING		
Project activities	**Potential Environment and Social Impacts**	**Mitigation approaches**	**Responsibility**	**Mitigation cost**	**Parameter to monitored**	**Means of verification and frequency**	**Responsibility**
	will have minor impacts.	decommissioning activities commence.					
Dismantle of the standby generator and fuel tank.	• Spillage of oil and fuel.	• Ensure standard operating procedures for the dismantling of generator and tank are in place. • All fuel and oil from generator pumped into drums before lifting to vehicle.	• SP	• Operational cost	• spillage	• During decommissioning.	• SP/ECD.

7.2 Environment Monitoring and Reporting.

190. Monitoring is a component of impact management purposely to combat uncertainties pertaining to unanticipated impacts, to ensure mitigation measures are working and to reassure public on the progress of the development. Progressive monitoring will accompany various stages of the subproject activities (construction, operational and decommissioning phases). The environmental and social monitoring plan is based on the potential temporary and readily manageable impacts and mitigation approaches identified during the screening and assessment. It comprises of parameters to be monitored, frequencies and responsible authorities per impact. The contractor will require preparing a detailed environmental and social monitoring plan based on table 6. SP, Lenders and ECD are responsible for monitoring compliance, review the company's monthly monitoring report and suggest ways to improve or strengthen mitigation approaches. A monitoring checklist is in Annex 3.

7.3 Contractor's Non-Compliance to CESMP.

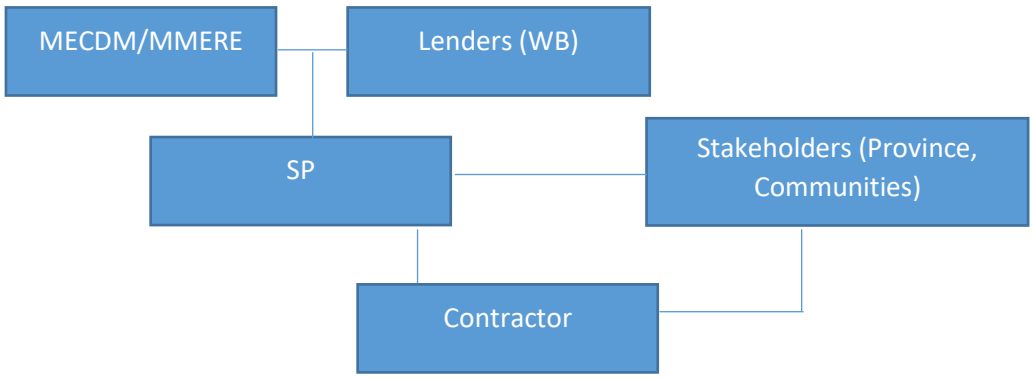
191. Contractor's ESO, SP safeguards officers, ECD officers will report any Non-compliance to the SP project manager. The bidding and contract document will reflect that the SP project manager will formally inform the contractor in writing of its non-compliance and instruct the contractor to rectify the issue within 28 days. If the contractor does not address the issue within days given, then a stop notice will be issued.

7.4 Implementation Arrangement.

192. This section identifies implementation arrangement for managing environment and social impacts and mitigations and reporting.

193. The overall organizational structure for environmental management for the subproject is shown in Figure 13 below.

Figure 13: Organizational Structure for Environmental Management.



7.4.1 Solomon Power.

194. The company is responsible for general execution of the subproject and with day-to-day management and monitoring. This covers all aspects of the subproject activities required, including coordination with other agencies that have national responsibilities over some of the tasks.

195. SP will be responsible for compliance monitoring during the construction and operation of the subproject. The ECD will also be responsible for verifying the monitoring undertaken by SP through audits and spot-checks. The outcomes of the monitoring will be included in the monthly progress report by the contractor.

196. SP, through the Capital Works Division, will be the key contact for the subproject. The division is responsible for the delivery of all capital programs aimed at expanding and developing SP's position to meet future demands and challenges. A consultant was engaged by SP recently to manage safeguards work pursued under the capital works division. The key Tasks of the consultant includes:

- Arrange for ESMP to be attached to Bid Documents;
- Arrange for reports to be sent to the MECDM and WB for evaluation. Following approval by the MECDM and the issuing of permits/approvals advise the SP and WB of the approval;
- Evaluate and approve the CESMPs prepared by the contractors as a condition of the contracts;
- Assist the management of GRM;
- Undertake regular site visits to monitor the contractor's compliance with the CESMP independently; and
- Provide reporting on the CESMP implementation in the quarterly project reports.

7. 4.2 Contractor.

197. The contractor will be responsible for preparing a CESMP at construction stage and during implementation, whenever additional engineering information is available. This CESMP will be shared with the ECD for information and reference. These include an emergency response plan, health and safety plan, waste management plan, vegetation clearance plan, erosion control plans and social managements. The contractor will also be responsible for implementing all environmental, health and safety actions included in the CESMP. As a condition to contract, the contractor will recruit an environmental and social safeguards officer (ESO) whose responsibilities will include:

- Coordinating with SP for preparing the CESMP;
- Provide training and awareness on the requirements of the CESMP, as well as occupational and community health and safety;
- Undertake STIs/HIV/AIDS/Malaria/Dengue briefings and awareness-raising amongst the contractor's employees;
- Contractor complies with the clauses in the contract and bidding documents in respect of the environment, health and safety;
- Ensuring the contractor does not commence construction activities until requisite approvals have been received from ECD, provincial authorities and SP;
- Participating in monitoring with SP to ensure environmental, social management activities are reported as required;

- Produce monthly environment and social monitoring reports to SP; and

- Facilitating consultation with the affected stakeholders and ensuring smooth implementation of the project.

7. 4.3 Environment & Conservation Division.

198. As the national agency responsible for environment and conservation, the Environment & Conservation Division (ECD) will need to be involved in environmental, social management activities. Under the requirements of the Environment Act 1998, the ECD will need to review the ESMP and monitor the progress of construction, operation and decommissioning activities. The ESMP was formatted as Public Environment Report (PER) to be compatible with the Solomon Islands EIA guideline. Development Consent for the Tingoa subproject was granted in February 2020. See annex 8 for the copy of EDC's development consent.

7. 4.4 Ministry of Mines, Energy and Rural Electrification.

199. The focal point and executing agency for project is the Ministry of Mines, Energy and Rural Electrification (MMERE). The Ministry is responsible for ensuring smooth implementation of the project and from time to time will carry out inspection, ensuring project indicators are implemented on time and compliance with national requirements. SP is an important stakeholder to the TRHDP and thus responsible for the construction of the transmission line. SP will report to both the TRHDP Project Office, and perhaps the PS of MMERE on the progress of transmission line works.

7. 4.5 Rennell and Bellona Province.

200. The Guadalcanal TCPB shares an important role in approving development plans to a certain extent. SP is responsible for liaising with TCPB for consent. A building permit is tendered when a plan is being approved by the Board.

7.4.6 Public and communities.

201. The public will be informed about the development and the impacts it may have through consultations. Tribal chiefs and community elders are required to facilitate discussion and understanding with affected people, provide support to SP on GRM issues, identifying land and garden owners, signing the MOU and ensuring smooth implementation of the project.

202. The ESMP Report will be available from SP and publicly disclosed on Lenders websites.

Table 7: Responsibilities for Environmental Management & Monitoring.

Project Stage.	Responsible Organization.	Responsibilities.
Feasibility studies and appointment.	Solomon Power.	• Prepare ESMP; • Preliminary design.
Feasibility studies and project review and approval.	ECD.	• Review and approval of ESMP.

Project Stage.	Responsible Organization.	Responsibilities.
Detailed Design.	Contractor.	• Prepare detailed design and specification; • Submit design to GP TCPB for approval; • Prepare CESMP based on specifics of detailed design; • Submit CESMP to SP for review and approval.
Construction.	Contractor.	• Implementation of CESMP; • Submission of monthly reports; • Provision of awareness/training to workers; • Regular Safety awareness as part of toolbox meetings (covering OH&S, PPEs and safety signs displaying work progress); • Consultation and awareness to workers on code of conduct and management of communicable diseases.
	SP.	• Supervise the implementation of CESMP; • Audit the construction phase through environmental inspections and review monitoring data.
	PO.	• Undertake monthly monitoring and reporting as part of the overall project.
	ECD.	• Audits and spot checks.
Operation.	SP.	• Provide a budget to undertake environmental monitoring; • Undertake environmental monitoring and prepare bi-annual reports; • Prepare maintenance reports to adaptively manage environmental risks related to operations (as per ESMP).
Decommissioning.	SP.	• Ensure all waste associated with decommissioning are disposed of in a manner acceptable by ECD. Provide a budget for waste export; • Consult with ECD, who will provide options on disposals and processes.
	ECD.	• Provide support to SP on Waigani Process and other conventions on the export of waste.

7.5 Training.

203. SP and contractor will carry out the environment, social, health and safety training for all workers before construction commences. The training will prepare workers to manage and protect the environment, to manage any potential social impacts and to ensure the safety of the public and the construction team.

7.5.1 Environmental and Safety Induction Training.

204. Mandatory, all workers attend the Environmental Safety Induction Training. The training covers legislation and regulations, policy, organization structure, duties and responsibilities, mitigation measures, targets in the ESMP and housekeeping rules/guidelines. The major topics will include air pollution control; waste management; vegetation clearance controls, health and safety; handling of hazardous substances, emergency preparedness; and, first aid training.

7.4.2 Environmental and Safety Toolbox Talk.

205. In addition to that, all workers will attend the weekly environmental and safety toolbox talk. The purpose of the talk is to rectify lesson learnt and re-emphasizing the importance of environment and safety procedures. The Environment Safety Officer will update all workers when Standard Operating Procedures (SOP) is being developed or reviewed.

7.4.3 Refresher training.

206. There is provision for refresher training on specific topics. These can be done annually depending on the nature of the work and approval from the SP management.

8.0 PUBLIC CONSULTANT AND PARTICIPATION

8.1 Consultation Activities

207. The major stakeholders in this subproject include the RPG, MECDM, MLHS and MMERE. All these agencies are important, and perhaps they produce approvals and permits important for the subproject. Initial consultation was completed by SP, including subproject evaluation and economic viability through cost-benefit analysis. The subproject plans and schedules are already known to the SIG and RPG. The consultation and household survey for the ESMP/PER were conducted in June 2019. It includes community awareness and social survey to understand the socio-economic baseline.

208. Further public consultations and media awareness will be carried out prior to commencing construction to alert the stakeholders about the construction schedule.

8.2. Results of Household survey and interviews

209. The result of the household survey provides the opportunity to understand the current social-environment issues. Majority of the analysis are provided in section 4 of this report. Agenda on public consultation includes customer service, safety, project overview and environment and social impacts and mitigations. SP officers from each of the concerned department were given the opportunity to share and discuss subproject information with the community. Issues raised during the consultation.

Table 8: Consultation issues and measures suggested

Issues raised	**Measures Suggested During Consultation**
• Vegetation clearing for a transmission line, in particular, will require felling of important crops or trees along the road corridor. Communities feel that SP and its contractor must compensate affected owners based on SIG rates.	• SP will compensate crops and trees affected by the subproject based on SIG MAL rates.
• Tingoa communities and elders feel that a review in the tariff will enhance economic activities in the area. Perhaps there will be wide usage of electricity in the community. A reasonable rate for rural communities is important, and SP management, according to elders, should relook at it.	• Electricity tariff remains the same for urban and rural. There is the provision to review tariff however not at this stage.
• Reiterate the importance of electricity usage and its safety	• Awareness on the use of electricity, including standard safety requirements, will be conducted prior to commissioning of the subproject.
• Public safety during construction and operation-Will there be noise or disruption to access.	• The contractor will be obliged in the bidding/contractual document to submit a traffic management plan, ensuring safety signs and speed limits. Sunday/Saturday will be observed as a rest day unless something important requires action. Contractor to disclose appropriate information regarding road closure and anything that may impact on small businesses/ access to households.

	This is likely to occur during the construction of distribution lines but is considered too minimal.
• Wiring and connection cost.	• Cost of wiring and connection will be covered under the OBA arrangements. SP will meet all wiring and connection cost to each household. Each household will pay the minimal cost to SP when they submit their applications. Majority of the buildings in Tingoa are permanent structures, therefore will require the normal SP connection application procedure.

Figure 14: Public Consultation, Tingoa.

8.3. Consultation and Disclosure

210. The ESMP/PER documenting the mitigation measures and consultation process will be submitted to MECDM and will be available for public review. Further consultation and disclosure will be carried out during the implementation, through:

- The media before construction and operation commences; and
- Information regarding the approved subproject and the proposed environmental management measures will be posted at suitable locations at the subproject site.

211. The ESMP/PER report will be available to the public from SP upon request through email or phone.

9.0 GRIEVANCES REDRESS MECHANISM

212. Any concerns, issues or grievance during the course of the project will be addressed in a transparent and timely manner, and without retribution to the affected person (AP)[16]. These concerns may pertain to the subproject's environmental performance or social risks.

213. An initial process has been set up to address any issues and/or problems raised directly at the subproject level in the first attempt. However, if this cannot be resolved, then the grievances will be addressed through a mechanism of referral to ECD within the MECDM. The GRM process and forms will be made available to all households within the subproject neighbourhood.

9.1. During construction

214. It is anticipated, that during the construction phase, most complaints that may arise are expected to be minor complaints regarding dust, health & safety and noise, and can be resolved easily. All complaints received at the site office are to be entered into a registry kept on the site, this includes information such as date, name, contact address and reason for the complaint. A duplicate entry copy is given to the AP for their record when the complaint is registered. The register will indicate the party responsible for resolving the complaint and the date when this was made together with the date the AP was informed of the decision and how the decision was given to the AP. The register is then signed off by the person responsible for a decision to be made and dated. The register must be kept at the front desk of the SP office, and it is a public document. The copy given to the AP will show the procedures for assessing the complaint with a statement affirming the AP rights to make a complaint. There are no costs involved when applying to AP for raising a complaint.

215. Complaints received by the AP are discussed directly with the SP Project Manager. For straightforward complaints, the PM can make an on-the-spot determination to resolve the issue. For complicated complaints, the PM will forward the complaint to the SP Management. The Management has two days to resolve the complaint and make a decision to the AP. If the AP can discuss the grievance directly with the SP Management. If the AP complaint is dismissed, the AP will be informed of their rights to take it to the next level. A copy of the decision is to be sent to the ECD and MED.

216. If the AP is not satisfied, the complaint can be taken to the ECD Director, who will appoint the ECD Officers to review the complaint. The Director will then have 15 days to make a determination.

9.2. During Operation and Decommissioning

217. During operation, the same conditions apply; i.e., there are no fees attached to the AP for making a complaint, the complainant is free to make the complaint which will be treated in a transparent manner.

[16] *Affected Person (AP) refers to anyone affected by the development, can be an organization or government agency.*

10.0 CONCLUSION

218. The study indicates that there are no significant environmental and social impacts and the ESMP has described mitigation measures ensuring that all impacts can be mitigated to environmentally friendly levels. A consultation carried out shows that stakeholders are supportive of the subproject as they recognize its importance to the socio-economic development of the province and nearby communities. No significant flora or fauna will be affected nor will any conservation, cultural or archaeological sites will be affected.

219. Prior to commencing construction, the contractor will need to prepare a CESMP when further engineering details are available. During construction, SP will be responsible for monitoring and supervising compliance with the CESMP and World Bank and national safeguards policies.

220. The subproject has minimal impacts, none of which are catastrophic, all of which can be satisfactorily mitigated. Based on the above, it is concluded that adverse environmental, social impacts arising from the subproject can be reduced to minor levels. There is no need for further assessment or EIS.

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ANNEX

Annex 1: Environment Screening Checklist

SCREENING QUESTIONS	Yes	No	REMARKS
A. Subproject Siting Is the Subproject area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		No	There is no cultural heritage site near or inside the proposed solar farm site.
Protected area		No	No protected areas near or inside the proposed solar farm site. The renowned Lake Tegano is approximately 41km south east of the proposed solar farm site.
Wetland		No	No wetland near or inside the proposed solar farm site.
Mangrove		No	No mangroves near or inside the proposed solar farm site. The proposed site is approximately 5km from the nearest coastline.
Estuarine		No	Rennell is an uplifted atoll island, therefore, no rivers on the island. Water resources are mainly wells and caves.
Buffer zone of protected area		No	No protected areas nearby or inside the solar farm site.
Special area for protecting biodiversity		No	There are no such areas for protecting biodiversity in the proposed site for solar farm.
B. Potential Environmental and Social Impacts Will the Subproject cause . . .			
• Encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		Yes	There are no historical and cultural areas in or near the proposed sites. Potential discoveries will be condoned off and reported to the Ministry of Culture and Tourism.

• Encroachment on precious ecosystems (e.g. sensitive or protected areas)?		No	There are no sensitive or protected areas near or within proposed sites.
• Alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	Yes		Minor silt generation due to clearing and exposure of soil surface.
• Damage to sensitive coastal/marine habitats by the construction of solar hybrid?		No	Proposed site approximately 5km from the nearest coastline.
• Deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps, and chemicals used in construction?	Yes		There is potential for such an incident to occur if silt are allowed to move into the environment or once there are inadequate sanitary facilities for workers on site.
• Increased local air pollution due to rock crushing, cutting, and filling?		No	No crushing, cutting or filling are required. Minor dust nuisance generated from vehicles transporting materials to construction sites.
• Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during subproject construction and operation?	Yes		No radioactive hazards to be used in this subproject. Chemical handling may result in spillages of fuel and oil. However, considered to be minimal.
• Chemical pollution resulting from the chemical clearing of vegetation for the construction site?		No	No chemicals will be used for clearing vegetation.
• Noise and vibration due to blasting and other civil works?		No	No blasting. Noise generated from the operation of construction machinery.
• Dislocation or involuntary resettlement of people?		No	No dislocation or involuntary resettlement of people is required. No non land assets will be affected by the subproject.
• Disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		No	The subproject promotes socio-economic opportunities including employment for local people.

• Social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?		No	No roads or walking tracks for community access are inside or will be affected by the project activities. The project does connect to a road. A traffic management plan will be submitted as part of the CESMP to manage traffic during construction. Vehicles do use the common route or main road rather than the one that connects to the Solar farm. All the roads in Tingoa are coronous compacted roads.
• Hazardous driving conditions where construction interferes with pre-existing roads?		No	Traffic in Tingoa is very small. As stated above, a traffic management plan will be submitted as part of the CESMP to manage traffic during construction.
• Creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		NO	The subproject activities will ensure no ponding in the subproject site.
• Dislocation and compulsory resettlement of people living in the right-of-way of the power transmission lines?		No	Transmission route avoids resettlement of people. SP to remind the contractor at the detail design stage.
• Environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	Yes		Minimal or negligible and will be within the transmission corridor. Trimming of vegetation is important to avoid vegetation contact with the conductor.
• Facilitation of access to protected areas in case corridors traverse protected areas?		No	There are no protected areas near or within the proposed sites.
• disturbances (e.g. noise and dust)	Yes		Minor noise and dust disturbance from construction machinery.
• Population influx during subproject construction and operation that cause an increased burden on social infrastructure and services (such as water supply and sanitation systems)?		No	There will be no campsites. Workers will be drawn from nearby communities. Workers who are based in Tingoa station will travel to the construction site during working hours (8am to 5pm).

• Social conflicts if workers from other regions or countries are hired?		No	Contractor to conduct awareness on code of conduct. Training on local culture norms for workers.
• Poor sanitation and solid waste disposal in construction camps and worksites, and possible transmission of communicable diseases from workers to local populations?	Yes		Contractor to produce a waste management plan as part of the CESMP
• Risks to community safety associated with maintenance of lines and related facilities?		No	Advance notices and awareness to alert nearby communities.
• Community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		No	Electromagnetic fields are negligible. However, thorough testing to be carried out to maintain health and safety standards.
• Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	Yes		From vehicles running at high velocity. No explosives will be used during construction or operation.
• Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the subproject (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout subproject construction, operation, and decommissioning?	Yes		Accidental and natural hazard can result in injury to the local communities nearby. SP to conduct training and awareness to local communities on approach and response to natural disasters.
C. Land Acquisition and Access Issues Questions regarding land acquisition and access for the Subproject include:			
• Will there be land acquisition?	Yes		SP has acquired the land for the proposed solar farm. The subproject is subject to a voluntary land protocol procedure. Transmission lines will be covered under a Memorandum of Understanding (MOU).
• Is the site for land acquisition known?	Yes		The land owned by the Premier Rennell and Bellona Province.
• Are the ownership status and current usage of land to be acquired known?	Yes		The Perpetual Estate Title is with Premier Rennell and Bellona Province..

• Will existing rights-of-way (ROW) be used for transmission line or distribution line easements?	Yes		There is road network in the provincial capital. SP will ensure, existing rights of way be used for transmission line.
• Will there be loss of shelter and residential land due to land acquisition?		No	The acquisition does not affect any shelter or residential land.
• Will there be loss of agricultural and other productive assets due to land acquisition?		No	The Province cleared the proposed area. The site comprises mainly regrowth and less than ten trees. There was no sign of farming in the area.
• Will there be losses of crops, trees, and fixed assets due to land acquisition?	Yes		Yes, there will be minor loss of a few strands (less than ten).
• Will there be loss of businesses or enterprises due to land acquisition?		No	Nothing was done on the land. Therefore, no loss to business or enterprises due to land acquisition are expected.
• Will there be loss of income sources and means of livelihoods due to land acquisition?		No	There are no farms or what so ever development at the proposed solar farm site.
• Will people lose access to natural resources, communal facilities and services?		No	There are no facilities within near or inside the proposed solar farm site. People will continue to access local resources near the proposed sites.
• If land use is changed, will it have an adverse impact on social and economic activities?	Yes		Access to efficient electricity promotes socio-economic activities.
• Will access to land and resources owned communally or by the state be restricted?		No	Communities will continue to access resources for example gardens near the proposed sites.
D. Indigenous Peoples Issues			
• Are there socio-cultural groups present in or use the subproject area who may be considered as "tribes" (hill tribes, schedules tribes, tribal peoples), "minorities" (ethnic or national minorities), or "indigenous communities" in the subproject area?		NO	There are no socio cultural groups present or use the proposed sites.

• Are there national or local laws or policies as well as anthropological researches/studies that consider these groups present in or using the subproject area as belonging to "ethnic minorities", scheduled tribes, tribal peoples, national minorities, or cultural communities?		No	NA
• Do such groups self-identify as being part of a distinct social and cultural group?		No	NA
• Do such groups maintain collective attachments to distinct habitats or ancestral territories and/or to the natural resources in these habitats and territories?		No	NA
• Do such groups maintain cultural, economic, social, and political institutions distinct from the dominant society and culture?		No	NA
• Do such groups speak a distinct language or dialect?		No	NA
• Have such groups been historically, socially and economically marginalized, disempowered, excluded, and/or discriminated against?		No	NA
• Are such groups represented as "Indigenous Peoples" or as "ethnic minorities" or "scheduled tribes" or "tribal populations" in any formal decision-making bodies at the national or local levels?		No	NA
• Will the subproject directly or indirectly benefit or target Indigenous Peoples?		No	The Tingoa Population are direct beneficiaries of the project from increased power efficiency. The subproject is expected to promote socio-economic activities and employment.
• Will the subproject directly or indirectly affect Indigenous Peoples' traditional socio-cultural and belief practices? (E.g. child-rearing, health, education, arts, and governance)?		No	There will be no impacts on cultural beliefs and practices.
• Will the subproject affect the livelihood systems of Indigenous Peoples? (e.g., food production system, natural resource management, crafts and trade, employment status)?		No	It will otherwise promotes trade and employment.

• Will the subproject be in an area (land or territory) occupied, owned, or used by Indigenous Peoples, and/or claimed as an ancestral domain?		No	No physical displacement involved. The land is registered as PE to Premier Rennell and Bellona Province.
• Will the subproject activities include physical displacement from traditional or customary lands?		No	No physical displacement involved. The land is registered as PE to Premier Rennell and Bellona Province.
• Will the subproject activities include establishing legal recognition of rights to lands and territories that are traditionally owned or customarily used, occupied or claimed by Indigenous Peoples?		No	The land is registered as PE to Premier Rennell and Bellona Province.
• Will the subproject activities include acquisition of lands that are traditionally owned or customarily used, occupied or claimed by Indigenous Peoples?		No	The land is registered as PE to Premier Rennell and Bellona Province.

PROJECT CATEGORISATION FOR ENVIRONMENTAL IMPACTS

Based on the definition of impacts in World Banks Safeguards Policies, what is the category?

- Category A, significant environmental social impact, a full ESIA/EIS is required []
- Category B, marginal environmental social impacts, an ESIA/PER is required [ ]
- Category C. minor or no adverse environmental impacts. Category C projects do not require an EIA/EIS or PER. The projects may require an Environment Social Management Plan (EMSP) developed. [✓]
- Category FI. Projects involve credit line or an equity investment in a financial intermediary. Involves subprojects that will have insignificant environment social impacts and do not require ESMP. [ ]

The foregoing has been reviewed and agreed with by:

Name & Signature Cynthia (Environment Officer)/Winston Lapo (Environment and Social Safeguard's Specialist (national) Date…2nd June 2019……

Annex 2: Other important Legislation

Act	Date	Main objectives
River Waters	1973	Control of river waters for equitable and beneficial use; establishes activities for which permits are required.
National Parks	1978	Establishes national parks; establishes restrictions on use and provides for appointment of park rangers.
Wild Birds	1978	List scheduled birds for protection. Establishes bird sanctuaries and strict hunting season for several birds.
Agriculture and Livestock	1982	Applies to agricultural and livestock industries. Defines noxious weeds and their control.
Forest Resource and Timber Utilization	1991	Governs licensing of felling of trees and sawmills; timber agreements on customary land. Establishes State Forest and Forest Reserves and management systems. The Forestry Bill 2004 seeks to replace the Act and provide more control in conservation of forests and improved forest management.
Fisheries	1998	Framework for fisheries management and development, including licensing of fishing vessels and processing plants. Lists prohibited fishing methods, provides for establishment of Marine Protected Areas (MPAs) and coastal management plans.
Provincial Government Act,	1997	The Provincial Government Act of 1997 gives power to the provinces to make their own legislation including environment and conservation. Schedule 3 of the Act provides a list of activities for which the provinces have responsibility to pass ordinances. The State of the Environment Report (2008) shows that eight provincial ordinances have been passed which include: o one environmental protection ordinance, o six wildlife and wildlife management and conservation area ordinances, and o one marine and freshwater ordinance.
Labour Act	1978	This Act deal with employment of workers. Part IX Care of Workers, requires the employer under: o Article 65: to provide workers with rations. o Article 66: to protect workers and dependents from malaria. o Article 67: to provide workers with an accessible supply of clean, non-polluted water for drinking, washing and for other domestic purposes. Water supplies may be inspected by a Health Officer. o Article 68: requires the employer to make sufficient and proper sanitary arrangements for workers.

		○ Article 69: requires the employer to provide accommodation for the worker and his family if they are not conveniently located to the work place. ○ Article 70: requires the employer to provide medical care at the workplace. ○ Article 71: states that depending on the circumstances the employer may be required to provide medical facilities,
The Safety at Work (Pesticide Regulations)	1983	This regulation is included as a component within the Safety at Work Act and deals with the following: ○ Article 3: requires the formation of a Pesticides Registration Advisory Committee. ○ Article 4: Requires a Register of Pesticides to be maintained. ○ Article 13: shows that all pesticide containers are to be labelled with the following: a. The trade name of the pesticide. b. The net weight and ISO approved name of the active ingredient, together with its formulation. c. Directions for use and what the pesticide is to be used for. d. Hazard label regarding storage, and handling and safety equipment required for application. e. Minimum withholding periods prior to harvest. f. First aid treatment. g. Name of manufacturer and registration number of the pesticide. ○ Article 15: shows that no unlabelled pesticides can be imported, while Article 16 states that pesticides cannot be sold, supplied or used other than in the original container. ○ The First Schedule classifies pesticides into 4 hazard levels depending on their oral or dermal toxicity as follows: 1a - extremely hazardous; 1b - highly hazardous; II - moderately hazardous; and III - slightly hazardous.

Annex 3: Monitoring Checklist (pre-construction and construction)

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
PRE-CONSTR	UXO Survey	• Contactor	• Completion of the UXO survey by qualified personnel.	• SP,	• The survey has been carried out	• Certificate showing the	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
UCTION PHASE					by approved personals	project area is UXO free		
	Development of preliminary designs /site plans / maps	• Contractor	• The concept drawings and route are designed to avoid resettlement impacts and disturbance to vegetation.	• SP.	• Plans approved by HCC and the town country planning board	• Building permit	•	•
CONSTRUCTION PHASE	Vegetation clearance	• Contractor	• Minimize clearance to the construction perimeter; • Unnecessary clearance avoided. • Compensation based on MAL rates.	• SP, Contractor	• Area of vegetation; area of felled trees/vegetation removal.	• During survey and activities - visual inspection before, during and after	•	•
	Operation of construction machinery generating emissions	Contractor	• Maintain construction equipment; • Prohibit the use of equipment that causes excessive pollution (e.g. generates smoke).	SP, Contractor	• Air quality, emissions.	• Weekly or after complaint - periodic visual inspection; • Any particulate matter and smoke		
		Contractor	• Thorough watering to avoid dust	SP, Contractor	• dust, particulate matter; • Use of tarpaulins and loading of vehicles; • Stockpiles.	• Weekly or after complaint - periodic visual inspection	•	•
	Operation of construction machinery creating noise	Contractor	• Construction machine exhaust systems and noisy equipment will be maintained to minimise noise. (See WB noise guideline in Table 4).	SP, Contractor	• Adherence to agreed schedule;	• Weekly or after complaint - review schedule	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
			• Limit noisy construction activities to day time hours, i.e. construction activities prohibited between 5pm and 6am • Agree works schedule with stakeholders		• Complaints (no. logged with resolution).	• Consultation (ensure schedule being adhered to)		
		Contractor	• Workers limit of exposure to noise will be strictly below 85 decibels per 8-hour shift • Provide workers with noise abatement equipment (ear-muffs etc.) • Complaints will be addressed by the contractor	SP, Contractor	• Workers safety equipment.	• Weekly • Workers are provided with safety equipment	•	•
	Stockpile of Construction Materials	Contractor	• Construction materials will be stockpiled away from the drain and covered when necessary. • Placement of diversion ditches around stockpiles	SP, Contractor	• No stockpiling close to water bodies.	• Weekly-Visual Inspection	•	•
		Contractor	• Material stockpiles located in sheltered areas and to be covered	SP, Contractor	• dust, particulate matter; • Stockpile covered.	• Weekly or after complaint - periodic visual inspection	•	•
	Clearing, excavations and installation of solar	Contractor	• Standard Operating procedures (SOP) for instalment correctly executed.	SP, Contractor	• Workers wore safety equipment.	• Workers are provided with safety equipment • Daily inspection	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
			• Workers wear protective equipment including clothing, helmets, safety boots, earmuff acts					
		Contractor	• The area surrounding the instalment site bund and secure. • Spills clean as per emergency response plan	SP, Contractor	• emergency response plan; • Spills cleaned and the area rehabilitated; • Workers are provided with safety equipment.	• Weekly inspection	•	•
		Contractor	• Should UXO be discovered, the contractor is to immediately cordon off the area arrange the evacuation of nearby residences and inform the RSIPF of the find.	SP, Contractor,	• The occurrence of UXO at the construction site	• Upon discovery of UXO	•	•
		Contractor	• Keep roadside vegetation • Use of silt control devices and sediment traps/fences when required • Construction of sediment settling ponds and bunds. Diverting turbid water to sediment settling ponds.	SP, Contractor	• Reduced soil erosion and sedimentation • Vegetation clearance minimized • No dump sites near waterways	• Weekly - visual inspection	•	•
		Contractor	• Ensure that all construction machines are well maintained.	SP, Contractor	• Construction machinery maintain in	• Weekly - visual inspection	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
			• A prestart on construction machine carried out every morning • Oil/fuel remediation agents, oil pads, oil booms and geo-fabric clothes are procured for usage as part of the emergency response plan		good working order • Spot check for visible oil • Water quality			
		Contractor	• Development footprint will be provided with effective drainage systems which will avoid direct discharge to creeks or streams (when the need arises)	SP, Contractor	• No direct discharge to water bodies	• Weekly - visual inspection • SP, ECD	•	•
		Contractor	• Contractor to allow sections of the road area to be continuously accessed by the affected party and guided through to avoid any safety problems. • Signs and other appropriate safety features will be used to indicate construction works are being undertaken. • Contractor to develop Traffic Management Plan as part of CESMP.	SP ,Contractor	• Maintenance of access; • Signage; • Road free of materials and debris;	• During activities - Visual inspection; • Consultations; • Review of the traffic management plan	•	•
	Fuelling construction machines and	Contractor	• Detailed Emergency Response Plan (as part of CESMP) prepared by the contractor to cover	SP, Contractor	• Ensure storage sites are using existing concrete base;	• Weekly inspection	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
	storage of Hydrocarbons		hazardous materials/oil storage, spills and accidents. • Chemicals will be stored in secure containers away from the water birdies. • Chemicals stored in area or compound with concrete floor and weatherproof roof and fire extinguishers. • Ensure that all construction machines are well maintained. • Accidents reported to police within 24 hours.					
		Contractor	• Prohibit smoking close to fuel storage areas • Put up signs of no go smoking zones • Provide extinguishers and train workers on their use	SP, Contractor	• Signs and fire extinguishes	• Code of conduct and housekeeping rules being adhered to. • Verify records of accidents	•	•
		Contractor	• Store kerosene, diesel, petrol and lubricants in a bunded area with an impervious surface and with storm water drainage provisions as approved by the Engineer. • Store paint and chemicals in a hazardous materials storage shed with walls, roof, ventilation and a bunded floor with an impervious surface;	Contractor	• Handling of hazardous materials.	• Weekly inspection	•	•

	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
			• Ensure that the storage capacity of each bunded area is at least 105% of the total volume of hazardous material stored; • Secure the areas and sheds used to store hazardous materials by erecting a security fence of minimum height 1.80m around each facility with the fence located outside the bund; • Locate the hazardous materials storage areas at least 10.0m away from any watercourse; • Contain and mop up spills of hazardous materials in accordance with manufacturer's specifications					

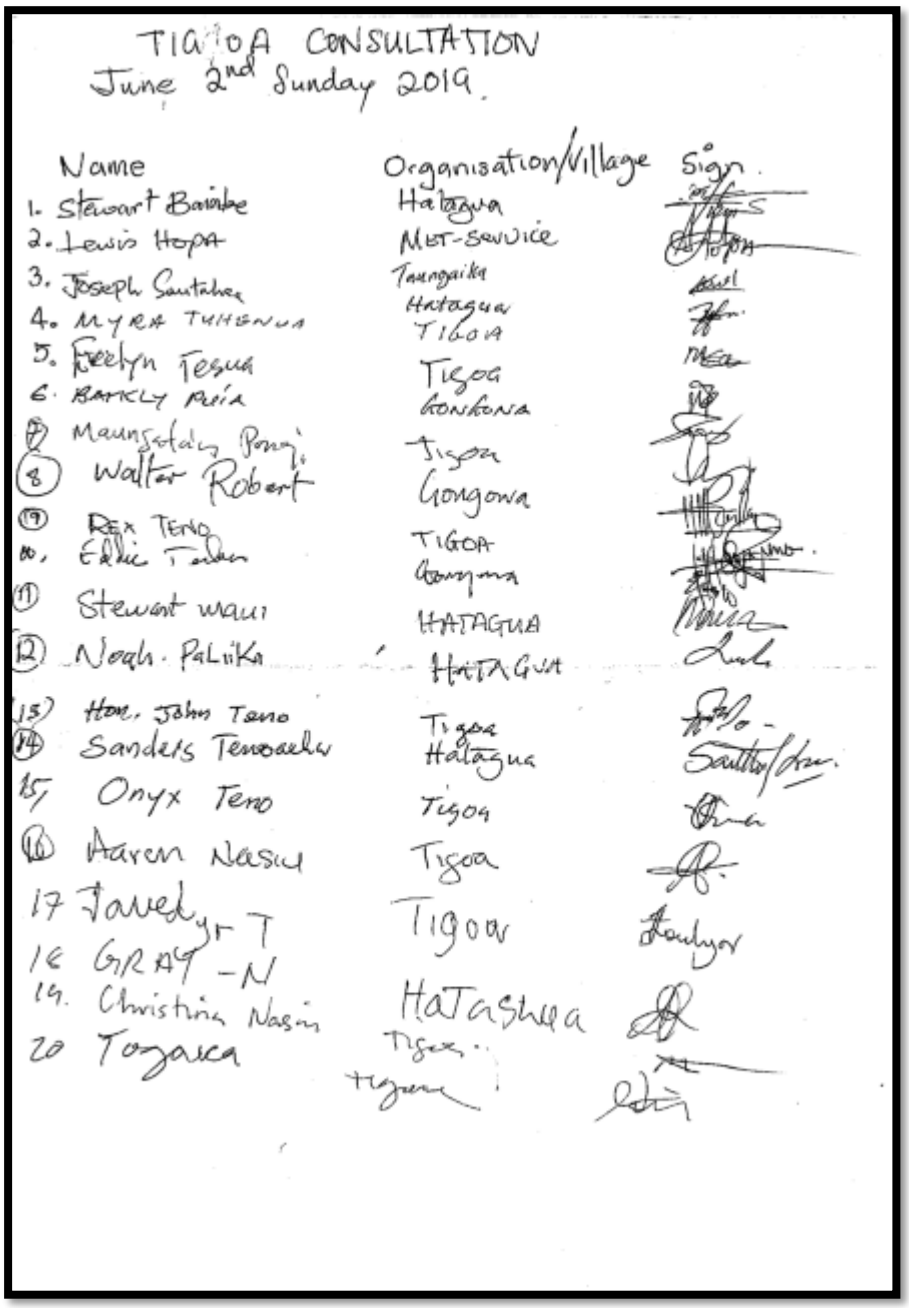
	Project activities	Applies	Mitigation approaches	Monitoring Responsibility	Parameter to monitored	Means of verification and frequency	Achieved (yes, no)	Remarks/ Action
	Presence of construction workers	Contractor	• Garbage receptacles will be set up at construction sites, which will be regularly cleared by the contractor. • Contactor to prepare a waste management plan (as part of CESMP). • All wastes from worksites to be disposed of in approved landfill/areas by RPG and SP. • The contractor will provide sufficient training in appropriate waste disposal methods.	SP, Contractor	• Waste management - visual inspection that solid waste is disposed of as per CESMP;	• Monthly, as required and spot checks - visual inspection; • Review of the waste management plan	•	•
			• No wastes to be dumped in waterways. • The contractor ensures wastes not discharged to rivers or coastal waters and that all wastes disposed of in proper areas. • Contractor to provide adequate and safe drinking water.	SP Contractor	• No direct discharges to local streams, coast or rivers; • The regularity of waste removal	• Visual inspection Weekly	•	•
		Contractor	• Facilitate reconciliation between parties- affected person, contractor to involve in resolving the issue. • Call the Police once it goes beyond control.	Contractor	• No. concerns raised and resolution; •	• Ongoing - consult with the public to monitor environmental concerns	•	•

Annex 4: Summary of the consultation and awareness meetings in Tingoa

<table>
<tr><td colspan="2">Consultation and Awareness Meeting for the Tingoa Solar Hybrid Project</td></tr>
<tr><td colspan="2">Date: 2nd June 2020</td></tr>
<tr><td colspan="2">Time: 9am-12pm</td></tr>
<tr><td colspan="2">Presenters and Topic: 1. Frenold Walter-Safety
2. Winston-Project Overview
-Environment and Social Impacts and Mitigation</td></tr>
<tr><td>Issues raised
1. Communities feel that SP and its contractor must compensate affected owners based on SIG rates for removal of vegetation caused due to construction of the distribution lines.
2. Tingoa communities and elders feel that a review in the tariff will enhance economic activities in the area. The current rate is very high.
3. Reiterate the importance of electricity usage and its safety.
4. Public safety during construction and operation. Will there be noise or disruption to access.
5. Wiring and connection cost.</td><td>Measures suggested
1. SP will compensate crops and trees affected by the subproject based on SIG MAL rates. Electricity tariff remains the same for urban and rural. There is the provision to review tariff however not at this stage.
2. Awareness on the use of electricity, including standard safety requirements, will be conducted prior to commissioning of the subproject. Solomon Power will also conduct awareness in schools and surrounding communities in Tingoa.
3. The contractor will submit a traffic management plan, ensuring safety signs and speed limits. Sunday/Saturday will be observed as a rest day unless something important requires action. Contractor to disclose appropriate information regarding road closure and anything that may impact on small businesses/ access to households. This is likely to occur during the construction of distribution lines but is considered to be minimal.
4. Cost of wiring and connection will be covered under the OBA arrangements. SP will meet all wiring and connection cost to each household. Each household will pay the minimal cost to SP when they submit their applications. Majority of the buildings in Tingoa are permanent structures, therefore will require the normal SP connection application procedure.</td></tr>
<tr><td colspan="2">Comments
A member of the provincial government indicated that consistency and reliable electricity is important to function of the provincial headquarter. It promotes socio-economic activities and employment. The Tingoa Mini Hospital currently use solar energy but not enough power for the hospital equipment.</td></tr>
</table>

A water supply project is currently being pursued by the province and is financed by donors. It is a borehole system, and its design will include the use of a solar battery system, pressure pumps and storage tanks. A former provincial member indicated that the current design would not be able to drive the system unless a more reliable energy source is available.

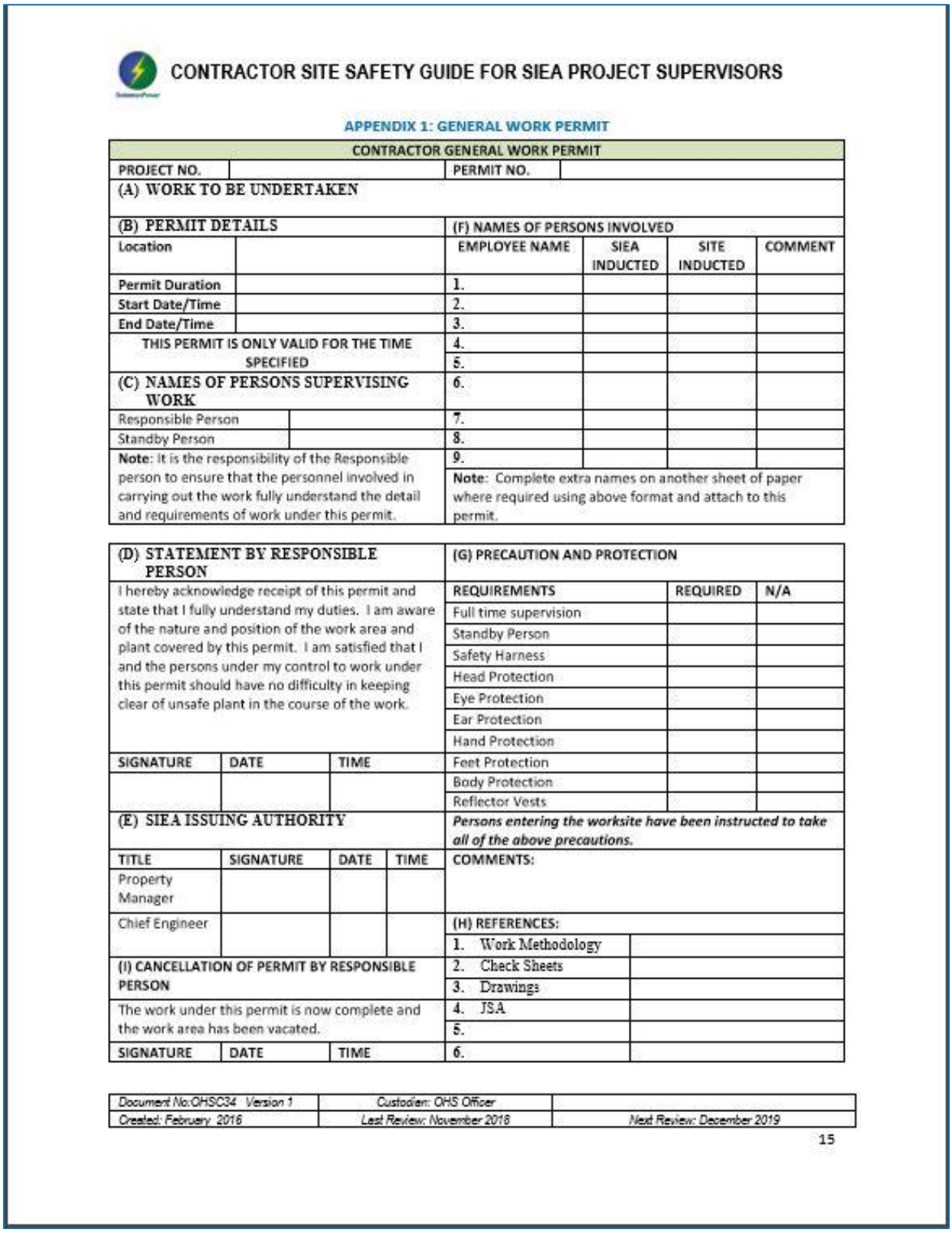
Attendance



TIGOA CONSULTATION
June 2nd Sunday 2019.

Name	Organisation/Village	Sign.
1. Stewart Baitabe	Hatagua	
2. Lewis Hopa	MET-service	
3. Joseph Santaka	Taungaika	
4. Myra Tuhenua	Hatagua	
5. Feelyn Tesua	TIGOA	
6. Barkly Pera	Tigoa	
(7) Maungatabu Pongi	Gongowa	
(8) Walter Robert	Tigoa	
(9) Rex Teno	Gongowa	
10. Eddie Tenda	TIGOA	
(11) Stewart Wani	Gongowa	
(12) Noah. Paliika	HATAGUA	
(13) Hon. John Teno	Tigoa	
(14) Sanders Tenoaeka	Hatagua	
15 Onyx Teno	Tigoa	
(16) Aaren Nasiu	Tigoa	
17 Javed yr T	Tigoa	
18 GRAY -N		
19. Christina Nasiu	Hatagua	
20 Tozarca	Tigoa	

Annex 5: General Work Permit



CONTRACTOR SITE SAFETY GUIDE FOR SIEA PROJECT SUPERVISORS

APPENDIX 1: GENERAL WORK PERMIT

CONTRACTOR GENERAL WORK PERMIT			
PROJECT NO.		PERMIT NO.	
(A) WORK TO BE UNDERTAKEN			
(B) PERMIT DETAILS		(F) NAMES OF PERSONS INVOLVED	
Location		EMPLOYEE NAME / SIEA INDUCTED / SITE INDUCTED / COMMENT	
Permit Duration		1.	
Start Date/Time		2.	
End Date/Time		3.	
THIS PERMIT IS ONLY VALID FOR THE TIME SPECIFIED		4.	
		5.	
(C) NAMES OF PERSONS SUPERVISING WORK		6.	
Responsible Person		7.	
Standby Person		8.	
Note: It is the responsibility of the Responsible person to ensure that the personnel involved in carrying out the work fully understand the detail and requirements of work under this permit.		9.	
		Note: Complete extra names on another sheet of paper where required using above format and attach to this permit.	

(D) STATEMENT BY RESPONSIBLE PERSON			(G) PRECAUTION AND PROTECTION		
I hereby acknowledge receipt of this permit and state that I fully understand my duties. I am aware of the nature and position of the work area and plant covered by this permit. I am satisfied that I and the persons under my control to work under this permit should have no difficulty in keeping clear of unsafe plant in the course of the work.			REQUIREMENTS	REQUIRED	N/A
			Full time supervision		
			Standby Person		
			Safety Harness		
			Head Protection		
			Eye Protection		
			Ear Protection		
			Hand Protection		
SIGNATURE	DATE	TIME	Feet Protection		
			Body Protection		
			Reflector Vests		
(E) SIEA ISSUING AUTHORITY			***Persons entering the worksite have been instructed to take all of the above precautions.***		
TITLE	SIGNATURE	DATE / TIME	COMMENTS:		
Property Manager					
Chief Engineer			(H) REFERENCES:		
			1. Work Methodology		
(I) CANCELLATION OF PERMIT BY RESPONSIBLE PERSON			2. Check Sheets		
			3. Drawings		
The work under this permit is now complete and the work area has been vacated.			4. JSA		
			5.		
SIGNATURE	DATE	TIME	6.		

Document No:OHSC34 Version 1	*Custodian: OHS Officer*	
Created: February 2016	*Last Review: November 2018*	*Next Review: December 2019*

15

SIEA UXO Clearance Framework and Guide

November 2014
Revised June 2019

Table of Contents

Acronyms

AOD	Abandoned Ordnance
CWPM	Capital Works Programme Manager
EOD	Explosive Ordnance Disposal
MID	Ministry of Infrastructure and Development
OH&S	Occupational Health and Safety
RSIPF	Royal Solomon Islands Police Force
RSIPF-EOU	Royal Solomon Islands Police Force – Explosive Ordnance Unit
SIEA	Solomon Islands Electricity Authority **(Authority)**
SIG	Solomon Islands Government
UXO	Unexploded Ordnance
WWII	World War 2

1.0 Introduction

Solomon Islands was the site of numerous severe battles between the Japanese Army and the American Allied Forces during WWII. The war resulted in hundreds of thousands of firearms and UXO items left behind.

WWII ordnance found in the Solomon Islands can be defined as either unexploded (UXO) or abandoned (AXO). Unexploded ordnance is explosive ordnance that has been primed, fused, armed or prepared for use in armed conflict but has failed to explode. Abandoned explosive ordnances are explosive ordnance unused during the war and subsequently left behind.

For the purpose of this guide, UXO is used as the general term to describe unexploded or abandoned ordnance, munitions and explosive devices left behind during WWII which represents a hazard to people and to any future development of the land on which they are abandoned.

Although UXO is not captured in the Environmental Act 1998 and Environmental Regulation 2008, UXO clearance activities have become an integral part of any development activity in the Solomon Islands. As the ministry responsible for infrastructure development in SI, MID has a draft UXO procedure developed as a means to render safe and take responsibility for UXO related hazards on any development activity occurring on SIG crown land.

Note that this guide only provides guidance for the management of UXO threats. It does not give detailed guidance on EOD contracting practice. The safety of SIEA employees, its clients and customers, developers and partners, consultants and contractors are not guaranteed.

More guidance on international standards on unexploded ordnance for the construction industry can be obtained from **CIRIA C681: Unexploded Ordnance (UXO)**

2.0 Objective of the Guide

The overall purpose of this guide is to provide a policy and framework governing responsibility and procedures to assess, mitigate and eliminate any UXO related hazard from any SIEA project site before any construction work commences. It provides guidance on the management of any UXO hazards associated with any development activity carried out by the Authority.

This guide also helps the Authority conduct appropriate UXO risk management procedures at the design phase, provide the budget for and seek appropriate advice and guidance on UXO contamination and disposal.

It provides the steps to follow to allow EOD contractors to sweep and clear contaminated project sites before any building, engineering, geotechnical investigations, and maintenance work of a construction nature starts.

3.0 Target Audience

This guide is targeted for SIEA staff, its clients and customers, developers and partners, consultants and contractors. It should be applicable to health authorities, the environmental division, landowners and other relevant local agencies and stakeholders involved in the development project.

SIEA Contractors and Engineers are equally responsible for the wellbeing of their personnel on-site. They would be advised at the initial contract meetings of their responsibility, the process to manage UXO risks and whom to contact at SIEA regarding UXO sightings and threats during project construction.

4.0 Responsibility and Risk Mitigation Measures

Risk mitigation measures are put in place to ensure so far as is reasonably practical the health and safety of SIEA employees and any other persons affected by the development activity.

4.1 Authority

SIEA and all its employees have a responsibility under the SIEA OH&S policy[17] to ensure the safety of its staff and every other person involved or affected by its normal day to day operation of any development activity.

The responsibility to report a sighting of a UXO or any suspicious article found at project sites or any SIEA location in the country resides with the SIEA and all its employees.

In the event of a suspicious UXO find, the following risk mitigation measures should immediately be followed.

- the area must be cordoned off appropriately
- physical measures put in place to avoid unauthorized tampering of the UXO find
- highly visible markings are provided at the HIGH-RISK area.
- the UXO risk is communicated to surrounding communities

The find is reported to the SIEA Capital Works Programme Manager (CWPM) and the RSIPF-EOU. The CWPM will be responsible for the assessment, mitigation or elimination of any UXO related hazard with responsible authorities and EOD clearance contractors. SIEA will keep statistics and records of UXO information from studies done on its sites and the report made available to the public upon request.

A reporting system is required to be established, communicated to all parties and managed for UXO clearance activities.

SIEA is responsible for public awareness and consultation and building employee and stakeholder capacity to respond to the UXO threats at SIEA locations

[17] The SIEA policy on Occupational Health and Safety 2010 is being reviewed.

UXO clearance will be considered and integrated into capital development activities and budget.

4.2 General Public

The general public must be consulted and encouraged to provide feedback and comments on their general short and long term safety during the planning and design stage through the operational life of the project. These public consultations are carried out as part of required activities at the initial project initiation, planning and design stage.

Public comments and concerns must be properly documented, and timely feedback provided. The mechanism to address public concerns will follow the existing SIEA mechanism for handling of customer complaints, through the Customer Service Department and the Public Relations Officer.

4.3 EOD Contractors

EOD contractors are required to be competent and registered to carry out this type of service. They are required to have the necessary expertise and equipment to identify, isolate, remove and safely dispose of all UXO threats with assistance from the RSIPF-EOU.

The EOD contractor is responsible for site safety procedures and is required to have in place appropriate strategies to manage risks and environmental impacts and have appropriate insurance coverage.

The contractor will provide to SIEA before any clearance work begins,

- Supporting documentation on competency (experience and references), insurance coverage and legal registration where necessary
- Proposed suitably qualified and experienced staffing to carry out the service
- Proposed procedures complying with international standard UXO clearance practices
- Proposed UXO identification and clearance methodology and timing
- The contract amount for the service

The typical activities to be carried out by EOD contractors is summarised below.[18]

- Carry out and complete UXO survey of the project site, including affected areas outside of the project site but related to the project.
- Cordon off areas and prevent unauthorised tampering where suspected UXO threats are determined.
- Arrange for and carry out safe removal of all UXO ordnance from the project site.
- Responsibly dispose of UXO ordnance in accordance with relevant local law

[18] The procedures are summarised from the MID's '9.0 Unexploded Ordnance Procedure'

- Ensure strategies and resources are in place to manage unintended accidents and explosions.
- Provide a report confirming completion of UXO survey, detection, removal and disposal.
- Provide necessary documentation to RSIPF – EOD and other relevant SIG agencies for the issuing of a Certificate of Clearance.
- Continuously monitor, document and report to SIEA and RSIPF any residual UXO threats arising during project implementation

The contractor will confirm and certify in accordance with **CIRIA C681: Unexploded Ordnance (UXO**) or an alternate internationally accepted standard.

4.4 RSIPF – EOU

The RSIPF– EOU is the body responsible for clearance and disposal of UXO finds. The RSIPF EOU also responds to public reports of UXO and undertake clearance activities. Where there are no nearby police stations in the outer islands, reports should be directed to relevant government district agencies which then notify police at the provincial headquarters.

The RSIPF EOU will provide a Certificate of Clearance after suspected UXO ordnances have been removed by them or by EOD clearance contractors before any construction work can begin.

5.0 Risk Assessment and Management

5.1 Preliminary Risk Assessment

Preliminary risk assessment is required to be carried out to enable SIEA to identify any potential UXO risk or threat and decide whether a detailed risk assessment is required.

Preliminary risk assessment includes:

- examination of existing historical data
- talking with surrounding local communities about any past occurrences with UXO's
- provide probability on threat potential and
- recommend further steps to take

This is to be documented and filed and communicated to the CWPM or Project Engineer. A Preliminary risk assessment form is attached in Annex 1.

If potential risks are identified, a detailed risk assessment leading to detection and identification, recovery and disposal will be initiated.

5.2 Detailed Risk Assessment

In the Detailed Risk Assessment stage, project planning will take into consideration UXO activities in the design and budget for the project.

Risk mitigation measures are put in place, and the public made aware of the UXO risk.

6.0 Contact Details

All SIEA staff, clients and customers, developers and partners, consultants and contractors are to contact the following SIEA and RSIPF personnel regarding UXO issues on SIEA land.

Organisation	**Contact Detail**
Royal Solomon Islands Police Force (RSIPF)	Director Explosive Ordnance Unit P.O. Box G1723 Honiara Tel: 23820
Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM).	Director –Tel:24070 Environmental Conservation Division P.O. Box 21 Honiara Tel: 23031/28054 Undersecretary technical
Ministry of Infrastructure Development (MID)	Under Secretary (Technical) P.O. Box G8 Honiara Tel: 24247-Undersecretary Admin Tel: 20331-Undersecretary Technical

7.0 Annex

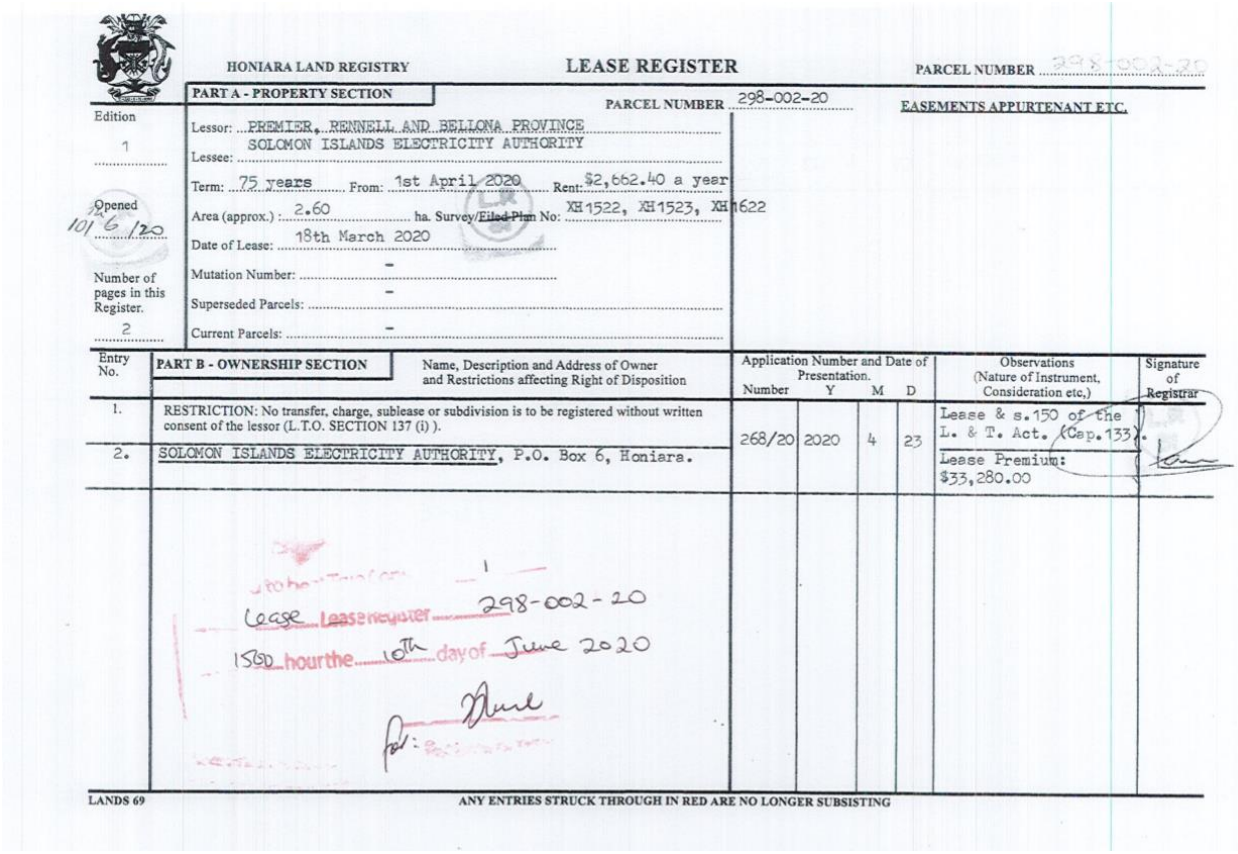
Annex 1. Preliminary risk assessment form

<table>
<tr><td></td><td colspan="3">Details</td></tr>
<tr><td>Name of assessor</td><td colspan="3"></td></tr>
<tr><td>Date of assessment</td><td colspan="3"></td></tr>
<tr><td>Site Address</td><td colspan="3"></td></tr>
<tr><td>Development Proposed</td><td colspan="3"></td></tr>
<tr><td>Historical findings</td><td colspan="3"></td></tr>
<tr><td rowspan="3">Findings from Interviews</td><td>Name of interviewee</td><td colspan="2">Detail</td></tr>
<tr><td></td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Threat potential / Probability[19]</td><td colspan="2">Probability and risk of UXO encounter</td><td>Rating</td></tr>
<tr><td colspan="2">Rating 1 LOW
Rating 2
Rating 3
Rating 4
Rating 5 MODERATE
Rating 6
Rating 7
Rating 8
Rating 9 - 10 HIGH</td><td></td></tr>
<tr><td>Recommendation</td><td colspan="3"></td></tr>
<tr><td>Other Notes</td><td colspan="3"></td></tr>
</table>

Note: Attach site plan and map of area assessed.

[19] The threat probability rating is extracted from CIRIA C681: Unexploded Ordnance (UXO)

Annex 7: SP land Title



HONIARA LAND REGISTRY

LEASE REGISTER

PARCEL NUMBER 298-002-20

PART A - PROPERTY SECTION

PARCEL NUMBER 298-002-20

EASEMENTS APPURTENANT ETC.

Edition: 1

Opened: 10/6/20

Number of pages in this Register: 2

Lessor: PREMIER, RENNELL AND BELLONA PROVINCE

Lessee: SOLOMON ISLANDS ELECTRICITY AUTHORITY

Term: 75 years From: 1st April 2020 Rent: $2,662.40 a year

Area (approx.): 2.60 ha. Survey/~~Filed Plan~~ No: XH1522, XH1523, XH1622

Date of Lease: 18th March 2020

Mutation Number: -

Superseded Parcels: -

Current Parcels: -

Entry No.	PART B - OWNERSHIP SECTION — Name, Description and Address of Owner and Restrictions affecting Right of Disposition	Application Number and Date of Presentation. Number	Y	M	D	Observations (Nature of Instrument, Consideration etc,)	Signature of Registrar
1.	RESTRICTION: No transfer, charge, sublease or subdivision is to be registered without written consent of the lessor (L.T.O. SECTION 137 (i)).	268/20	2020	4	23	Lease & s.150 of the L. & T. Act. (Cap.133). Lease Premium: $33,280.00	
2.	SOLOMON ISLANDS ELECTRICITY AUTHORITY, P.O. Box 6, Honiara.						

Lease Lease register 298-002-20

1560 hour the 10th day of June 2020

LANDS 69

ANY ENTRIES STRUCK THROUGH IN RED ARE NO LONGER SUBSISTING

Page 2.

PART C - INCUMBRANCES SECTION

LEASE REGISTER

PARCEL NUMBER 298-002-20

Entry No.	Nature of Incumbrance	Application Number and Date of Presentation				FURTHER PARTICULARS	Signature of Registrar	Surrenders, Cancellations etc.
		Number	Y	M	D			
1.	Obligations incident to lease	268/20	2020	4	23	The agreements, covenants, obligations, liabilities etc. contained or implied in the lease.		

2

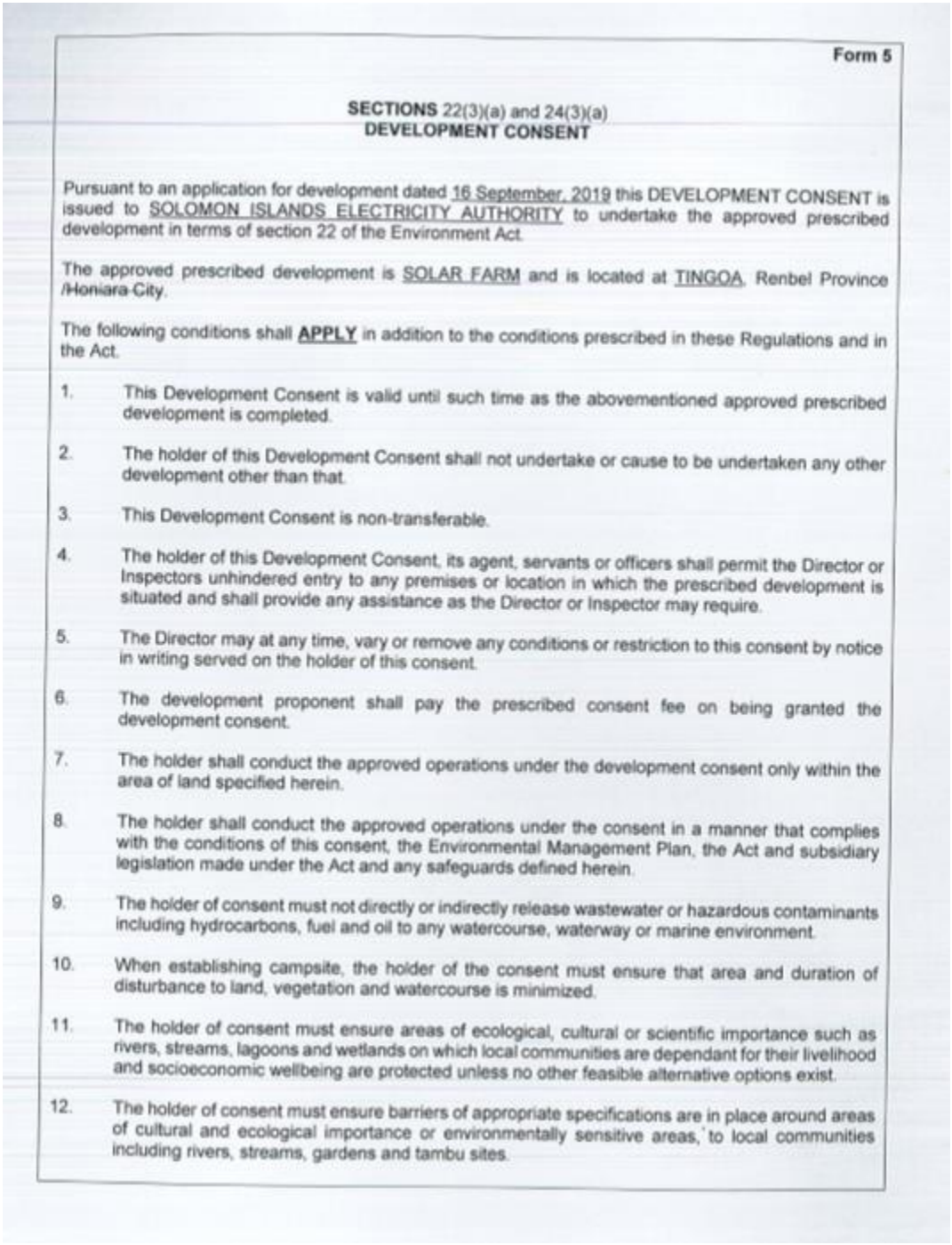
Lease Lease Register 298-002-20

1500 hour the 10th day of June 2020

for: Registrar

ANY ENTRIES STRUCK THROUGH IN RED ARE NO LONGER SUBSISTING

Annex 8: Development Consent by ECD



Form 5

SECTIONS 22(3)(a) and 24(3)(a)
DEVELOPMENT CONSENT

Pursuant to an application for development dated 16 September, 2019 this DEVELOPMENT CONSENT is issued to SOLOMON ISLANDS ELECTRICITY AUTHORITY to undertake the approved prescribed development in terms of section 22 of the Environment Act.

The approved prescribed development is SOLAR FARM and is located at TINGOA, Renbel Province ~~/Honiara City~~.

The following conditions shall **APPLY** in addition to the conditions prescribed in these Regulations and in the Act.

1. This Development Consent is valid until such time as the abovementioned approved prescribed development is completed.
2. The holder of this Development Consent shall not undertake or cause to be undertaken any other development other than that.
3. This Development Consent is non-transferable.
4. The holder of this Development Consent, its agent, servants or officers shall permit the Director or Inspectors unhindered entry to any premises or location in which the prescribed development is situated and shall provide any assistance as the Director or Inspector may require.
5. The Director may at any time, vary or remove any conditions or restriction to this consent by notice in writing served on the holder of this consent.
6. The development proponent shall pay the prescribed consent fee on being granted the development consent.
7. The holder shall conduct the approved operations under the development consent only within the area of land specified herein.
8. The holder shall conduct the approved operations under the consent in a manner that complies with the conditions of this consent, the Environmental Management Plan, the Act and subsidiary legislation made under the Act and any safeguards defined herein.
9. The holder of consent must not directly or indirectly release wastewater or hazardous contaminants including hydrocarbons, fuel and oil to any watercourse, waterway or marine environment.
10. When establishing campsite, the holder of the consent must ensure that area and duration of disturbance to land, vegetation and watercourse is minimized.
11. The holder of consent must ensure areas of ecological, cultural or scientific importance such as rivers, streams, lagoons and wetlands on which local communities are dependant for their livelihood and socioeconomic wellbeing are protected unless no other feasible alternative options exist.
12. The holder of consent must ensure barriers of appropriate specifications are in place around areas of cultural and ecological importance or environmentally sensitive areas, to local communities including rivers, streams, gardens and tambu sites.

13. The holder of consent must design, install and maintain adequate erosion and sediment controls wherever necessary to prevent siltation and sedimentation of any watercourse, waterway and coastal zones caused by stormwater runoff.

14. The holder of consent must remove and satisfactorily dispose of all used batteries, chemicals and similar pollutants or hazardous contaminants and waste from the land subject to the consent.

15. The holder of the consent must rehabilitate all areas disturbed during constructions, apart from those areas currently being utilized by the project.

16. The holder of the consent must ensure noise levels generated by the project activities do not interfere with the convenience of communities within the project site vicinity during the construction and operation phases of the project.

17. The holder of the consent must ensure the health and safety of communities within the project site vicinity are not compromised during the construction and operation phases of the project.

18. The holder of the consent must conduct environmental impact auditing at periodic intervals in order to ensure adherence to the environmental management plan and applicable technical or engineering specifications.

19. The holder of the consent must ensure resource owners receive appropriate compensation for any adverse significant impacts caused by the project.

Issued at HONIARA this 13th day of February 2020

Seal

MINISTRY OF ENVIRONMENT CONSERVATION & METEOROLOGY
COMMON SEAL

Director
Environment and Conservation Division