# ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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FINAL DRAFT

# ESTABLISHMENT OF HYBRID GENERATION SYSTEM IN SEGHE

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# ACRONYM

ECD	Environment and Conservation Division
EIA	Environment Impact Assessment
ESMP	Environment and Social Management Plan
GPOBA	Global Partnership on Output Based Aid
MECDM	Ministry of Environment Climate Change Disaster Management Meteorology
MID	Ministry of Infrastructure Development
OP	Operational Policy
O&M	Operation and Maintenance
PER	Public Environment Report
RTC	Rural Training Centre
SI	Solomon Islands
SIG	Solomon Islands Government
SOP	Standard Operating Procedure
SP	Solomon Power
UXO	Unexploded Ordinances
WB	World Bank

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#### A. EXECUTIVE SUMMARY

- The WB supported activities will comprise connection of the households to the low voltage cables installed along roads under independent funding from Solomon Power. SP will use the Hybrid Generation System to supply the mini-grid in Seghe. The WB project cannot operate without the low voltage power being generated and distributed under the SP project. Similarly the SP project cannot be effective without household's connection. Thus the WB funded activity and the SP funded activity are linked for WB's safeguard policy application. The safeguard policy requires application of WB Safeguard Policies in the SP project, covering micro-grid installation. This ESMP is prepared based on SIG's law and WB's Safeguard Policies. The proposed project is categorized as environmental category 'B', impacts are site specific and readily mitigated. This ESMP meets the requirements of SI's Environment Act of 1998 and Environment regulation of 2008 and complies with the WB's Safeguard Policies. The scope of this ESMP is limited to the sites of proposed interventions.
- 2. The Hybrid Generation System in Seghe will install new grid equipment i.e. 150 kWp solar panel and string inverters, 200kWH battery system including chargers and inverters, one diesel generator system mounted on skids and fuel system, new concrete footing and shelter to install the generator, switchboard and fuel system, water tank for solar panel washing, cable and poles for distribution networks.
- 3. Land is required for the solar panels, generator house for SP site office. SP has identified and surveyed the required land that belongs to United Church. SP will lease the land and is currently negotiating a lease. The installation of LV network will traverse along corridors agreed by SP, the community and the landowner.
- 4. The installation of new micro-grid and the extension of grid required to support the project will not have any significant long term adverse environmental impacts. The main environmental impacts are short-term and will be created during the installation stage of new poles, cables and the hybrid generation system. Impacts from noise and dust emissions due to transportation of equipment and material as well as operation of construction machineries will be readily managed. Operational impact includes management of used equipment i.e. poles, batteries etc. All these impacts are manageable by implementing mitigation measures proposed in this ESMP.
- 5. Local communities and stakeholders were involved in the process of preparing the ESMP through discussion. As the project will have minor environmental impacts and will provide measurable and important benefits, local communities and community leaders support the project. The ESMP is available on SP's website and at SP's head office and will be disclosed to a wider audience via the WB website. The consultation process will be continued and expanded during the project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation and understand that there is a process in place for them to submit any complaints.

# A. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

6. Environmental assessment of the proposed project has been carried out in compliance with the WB safeguard policies and the SIG's law and regulations.

#### 1. Solomon Islands Environmental Laws and Regulation and Environmental Assessment Process

- 7. The Environment Act covers all the environmental issues in SI and makes provisions for conservation and protection of the environment and established the Environment and Conservation Division (ECD). The Act provides for an integrated system of the 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 conflict between the Act and other Acts, the provision of the Environment Act shall prevail. The Environment Regulations 2008 covers detailed requirements for EIA. The Act has a schedule which lists all "prescribed developments" that will need to undergo some form of EIA. All prescribed developments require a simple assessment through "screening" and "scoping" process, to see what forms of additional assessment is required. Most development projects require a public environment report (PER), while many major projects will also need a second stage appraisal which include technical, economic and environmental and social investigations presented in an EIA or environmental impact assessment (EIA) report. All types and works of aggregate extraction activities are included in the schedule as a "prescribe development" activity and need to undergo some form of environment impact assessment as detailed in the regulation. This report is the fulfillment of the requirement of the Act. As required in Part III of the Act, all developers who intend 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 decision whether the grant or not to grant development consent. The developer shall not commence operation or continue to carry out any prescribe development unless it has compiled with the relevant provisions of the Act, been issued a "development consent" or the Director has exempted the development from the relevant approval requirements. Based on the Project description, the proposed project is expected to require a PER.
- 8. Some of the relevant Standard Operating Procedures (SOPs) are listed below:
  - SOP Managing Air Quality during Construction and Operation
  - SOP Fueling Vehicle
  - SOP Transportation of Fuel + Chemicals to Project Site
  - SOP Surface Water Quality Monitoring
  - SOP Waste Oil Collection Storage and Removal
  - SOP Hydrocarbon Spills
  - SOP Erosion and Sediment Control
  - SOP Strom Water Design Drainage Techniques
  - SOP Vegetation Clearing
  - SOP Wood Waste and Timber Off-cuts Handling, Disposal and Management
  - SOP Oily Rags Waste Handling, Disposal and Management
  - SOP Waste Scrap Steel and Metals Handling, Disposal and Management

#### 2. World Bank Safeguard Policy Requirements

9. This environmental assessment is carried out in compliance with WB safeguard policy Operational Policy (OP) 4.01 Environmental Assessment so as to ensure that potential adverse environmental and impacts are identified, avoided where possible and managed or addressed.

- 10. As per OP 4.01 the objective of Environment Assessment is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision making process. Under OP 4.01 the WB categorizes projects into category 'B' project based on the sensitive component. Accordingly this ESMP is prepared to meet the requirements of a category B project under OP 4.01.
- 11. The project triggers the WB's OP 4.10 on Indigenous Peoples (IP) as most of the communities in the provinces the project is targeting fulfill the characteristics of indigenous peoples as per paragraph 4 of OP 4.10. Because an overwhelming majority of people in the project area IP, the borrower will not prepare a separate Indigenous Peoples Plan/Indigenous Peoples Policy Framework, instead the components of an IP plans are integrated into the project design.
- 12. There are no other WB safeguard policies triggered. The new distribution network will involve only minor civil works such as soil digging of holes for power poles and easement provision for over-head line. For purpose of erecting power poles may require land, however very small. All poles will be located either along existing road corridors or within communal/community owned land as a result of community consultation and negotiated agreement. The implementation of micro-grid (out station) facility will be built on the ground and need land around 1 Ha. This will be land leased by SP from the Uniting church. The project will not invoke involuntary resettlement or compulsory acquisition procedures. All activity conducted by SP in the project are based on obtaining consent from the landowner. Therefore the project does not trigger WB Policy OP 4.12 on Involuntary Resettlement.

#### 3. Institutions

13. The principal national agency charged with environmental protection is the Environmental and Conservation Division (ECD). The ECD will need to be involved in the various aspects of the environmental management activities. Under the requirements of the Environment Act 1998, ECD will need to review the EIA and monitor the progress of implementation activities if consent is given. The ECD has been fully informed of the status of the project and also awaits the submission of the EIA. The ECD will need to be consulted during the construction phase of the project to ensure that all monitoring requirements are adhered to. The ECD will be tasked also to assist in the auditing of implementation of the EMPs and ensure that environmental management and mitigation of the project is undertaken to a good standard.

#### 4. Extent of ESMP

- 14. This ESMP seeks to assess and manage potential environmental, health, safety and social impacts of the proposed construction and operation of a new micro-grid and hybrid generation system in Seghe.
- 15. This ESMP study is conducted base on primary data from field observation, including consultation with community and relevant parties and secondary data collected from various sources. The result of the consultations have been incorporated into this assessment.

#### **B. DESCRIPTION OF THE PROJECT**

#### 1. Project Background

- 16. Seghe is a community located on a peninsula in the strait between the large island of New Georgia (to which the peninsula is attached) and the island of Marovo. The community is built around an airstrip from the Second World War and is today highly influenced by the present church. The airfield's landing strip splits Seghe into two inhabited areas, the northern area is controlled by the United church and southern area is controlled by the province. There is village further south (3.5 km) of the church land.
- 17. Seghe has no existing public power infrastructure. However, there are several privately owned generation, and a generator and solar PV system at the hospital. Furthermore, many of the households have got micro solar panels and small battery packs installed used for lighting in the evenings.
- 18. SP will install new 415 V network to supply neighboring village as shown below. The layout of the mini-grid will consist of the following: 150 kWp solar panel and string inverters; 200 kWh battery system including chargers and inverters; one diesel general system mounted on skids and fuel system; new concrete footing and shelter to install the generator, switchboard and fuel system, water tank for solar panel washing.
- 19. The installation of new power system will give access to community living in Seghe for electricity. The provincial side comprises around 35 residential structures (of which 3 houses for police officers) and 10 commercial structures (of which 3 guesthouses and 7 shops). The church side comprises around 57 residential structures (of which 40 are large and of good quality) and 2 school buildings, 1 hospital building, 1 Rural Training Centre (RTC), 2 churches, 1 market place and 4 retail shops. The village south (Nazaret village) is estimated that there will be at least 50 houses. This can be easily to be connected to the proposed mini-grid, however has not been considered as part of the mini-grid for this business case at this point in time.
- 20. Location of the project is in Seghe. The proposed location for new line is within road reserve in church and provincial land. For mini-grid installation, one hectare size lot of land (100M x100M) SP is in the process of acquiring. Land is also needed to build SP site office. SP has identified and surveyed the required land that belongs to United Church that will be obtained through lease. Community consultation has been conducted to obtain consent. The location of the is indicated on the map below.
- 21. There are no natural habitats, forests or physical cultural resources. No works will be required in private or community owned land; therefore no land acquisition is required.



#### 2. Project Component and Activities

- 22. For new distribution network, SP has erected new poles within road reserve in church land and the new poles will follows the same line as pictures provided in Annex 3. Overhead cable will be installed in the church and provincial land. Under-ground installation will be conducted in the airstrip areas also depicted in the above map.
- 23. New hybrid generation system will consist of: 150 kWp solar panel and string inverters; 200 kWh battery system including chargers and inverters; one diesel general system mounted on skids and fuel system; new concrete footing and shelter to install the generator, switchboard and fuel system, water tank for solar panel washing.

#### 3. Implementation Arrangement and Schedule

- 24. The ESMP will be implemented by the SP. SP has key hands on expertise in network upgrading and ESMP implementation and will also carry out the operation and maintenance of the network.
- 25. It is envisaged that the construction will take approximately 15 months. The tendering process for the major items including solar panels, Batteries and inverters will begin in June 2016 and expected to be completed in August 2016. According to the project schedule. Bid evaluation and contract should be awarded in after June 2016 during the tendering process for major items and the installation work is expected to start in July 2016 given all the required materials are on project sites.

#### 4. Project Benefits and Justification

26. The project will provide electricity access for people living in remote areas. The hybrid technology is relatively new and has much lower operating costs than generation by diesel engine. SP will use the hybrid Generation System to supply mini-grid in that area. Number of people connecting to the mini-grid will have significant impact on viability of the project.

# C. ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

#### 1. Impacts and Mitigation Measures Due to Pre-construction Activities

- 27. The hybrid generation system will be installed on the land leased by SP from United Church. The new grid distribution system will be in the road reserve within church and provincial land. Therefore the proposed project facilities do not encroach any privately owned or occupied land or the environmentally sensitive areas. To ensure that the installation will not encroach any private land, SP will submit notification to Ministry of Infrastructure Development (MID) to get consent on using road corridor.
- 28. There are no sites of any archaeological importance in and around the project facilities. The new poles will have over-head cables in the residential areas and under-ground cabling in the airstrip that only need small footprints. Therefore impacts associated with project sitting on physical environment are negligible.
- 29. From field observation, trimming trees overhang the road reserve will be minor since the new poles will be located in open space.
- 30. It is possible that a chance discovery an Unexploded Ordinances (UXOs) may occur. The proposed project area and alignments will be swept for UXO and if found will be cleared as per the established procedures before the sites are handed over for civil works. During construction, should UXO be discovered, SP and/or the contractor is to immediately stop work, cordon off the area, arrange evacuation of nearby residents and inform the Police of the find. The procedure is attached as Annex 1.
- 31. The impacts on the social-economic environment will be mostly positive by providing electricity access to community in remote areas and also to enable future development in electricity sector.

#### 2. Impacts and Mitigation Measures Due to Construction Activities

- 32. Impacts on topography due to installation of grid and mini-grid will be insignificant. The distribution of new lines and poles will be in the road reserve and will be follow the existing line and only need small footprints. The installation of mini-grid will be over land leased by SP. therefore in installation phase there will be no impact soil quality of the area.
- 33. Impacts on water resources are not anticipated as there will not be any storm water or wastewater generation from the project activities and no interference with surface or ground water bodies.
- 34. Considering the nature and scope of the construction works, it is certain that only minor and manageable environmental disturbances will be created during installation, with minimum impact on nearby communities. The installation of micro-grid will be in fairly remote area, within 4 to 5 km residential areas and away from school. Noise predicted will be minor and temporary. Environmental disturbances during installation will be minor and transient.
- 35. The project does not require clearing of large areas of vegetation. During installation work, clearing of small land area for the footing of the poles and trimming some trees near the conductor within the road reserve may be required. Marking of trees or vegetation to be removed within the road reserve (if any) prior to trimmed. Clearing land for micro-grid installation will be on land leased by SP.
- 36. The installation of work will require at least 4. Linesman from SP with assistance from the locals in terms of unskilled labour, provided by the nearby communities and villages. A rental accommodation is available for the SP workers during the course of constructing the distribution network.
- 37. The nature of the construction works indicates that no toxic or hazardous materials will be used, apart from fuel oils for vehicles, which will be properly stored. The limited construction wastes will be sorted out by SP for recycling and disposal at an appropriate landfill.
- 38. The impacts associated with civil works activities will be controlled by adapting suitable mitigation measures such as:
  - Selection of installation techniques and machinery seeking to minimize ground disturbance and noise vibration
  - Proper maintenance and operation of construction equipment
  - Demolished materials and construction materials will be disposed of at designated site
  - These wastes should be removed fairly immediately at the first instance during the construction phase to allow accessibility and for health and safety reasons. Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from worksites will not be dumped in streams or near streams.
  - Protect or preserve topsoil and reinstate after construction completed
  - Construction activities only undertaken during the day and prohibition of any construction activities between 9pm and 6am in, or close to, residential sites.
  - Local communities informed of the construction schedule. No work will be carried out on Sunday.
  - Safe handling and disposal of phased out equipment

- Environmental. health and safety training session for all workers
- Putting signage and barriers around work areas to prevent health and safety risks to bystanders
- Periodic qualitative air quality monitoring (by observation rather than testing).
- Provide personal protection gear
- SP with otherwise implement their health and safety plan including safety manual and training requirements.

#### 3. Impacts and Mitigation Measures from Operation

- 39. The operation of the distribution system and micro-grid generation system will have negligible environmental impact during operation. There will be waste products, no requirements for cooling, no moving parts, no noise and no impact on significant habitats, flora and fauna. Tree trimming will be an ongoing maintenance issue, along with the potential for the escape of polluting substances from switchgears and transformers.
- 40. SP will have site office in Seghe that also will be responsible for emergency situation during operation period. Workers are trained to deal with the emergency situations.

#### 4. Impacts and Mitigation due to Decommissioning

41. The project's assets are expected to have an economic life of 20-50 years. The suppliers will accept the decommissioned assets particularly switchgears for recycling based. Dismantling of the switchgears will be handled by supplier that offer the best price for used switchgears in the future. To control these possible impacts, it is proposed that the disposal of the switchgears and transformers will be handled by suppliers and SP.

## 5. Cumulative Impacts

- 42. The micro-grid and grid assets under the project will be maintained and upgraded in the origin location and along the route of the existing grid. This will not result in disruption to any new areas.
- 43. The project will enable more renewable energy generation developments in Seghe area, which will have cumulative long term benefits for reducing greenhouse gas emissions from the energy network by substituting diesel generation. The distribution network will continue to be upgraded and expanded to allow further development of renewable energy generation and to meet the needs of people and of a growing economy and population.

# **D. ANALYSIS OF ALTERNATIVES**

44. The hybrid technology is relatively new and has much lower operating costs than generation by diesel engine. The hybrid system will assist in: i) reducing the cost of generation of electricity when compared with generation of diesel only option; ii) reducing the hours of operation of diesel generator and therefore amount diesel fuel used; iii) reducing generator operation hours which will lead to lower maintenance cost and only one generator will be required.

45. SP has currently identified 8 locations for possible installation of hybrid generation systems in the provinces, which will increase the number of people having access to electricity by over 21000. Seghe is one of the 8 identified locations.

# E. CONSULTATION AND INFORMATION DISCLOSURE

#### 1. Stakeholders/Community Consultations

- 46. As part of the environmental assessment, stakeholder consultation was carried out by a contractor assisted by SP staff . An initial consultation was conducted in Seghe on September 28, 2015. The brief note of the consultation is presented in the annex 2.
- 47. Seghe is a small community and SP has a permanent representative in the community. Consultation with local communities will continue during the project implementation stage, prior to construction. Media will be used to inform community about the works in their area, including using radio and SP website. Feedback will be encouraged and any concerns will be addressed prior to civil works commencing or at any time they are raised throughout the project period.

#### 2. Information Disclosure

48. All environmental documents are subject to public disclosure, and therefore will be made available to the public. The ESMP is disclosed on SP's website and WB's website, and a hard copy is available at SP headquarter office. SP will ensure that meaningful public consultations, particularly with project-affected persons, if any, continue to undertake prior to construction and that information is readily available on the website and at SP offices throughout the project.

## F. GRIEVANCE REDRESS MECHANISM

- 49. The process for solving environment complaints that may arise in the project is the grievance redress mechanism, which is already established as a business as usual practice at project level by SP. The process is described below:
- 50. Complaints concerning dust, health and safety implication, trimming tree/vegetation and noise that should be able to be resolved quite easily. Simple matters such as obstruction of access to the complainant's premises or more complex matters (such as unexpected issues with internal wiring, accidental damage to premises, etc.) are dealt with as soon as possible. Complaint submitted by individual will be handled one by one individual basis. Complaint raised by communal will be handled through consultation with the community to provide solution on the grievance.
- 51. Complaint on environment issues, installation, etc. the AP will be directed to discuss their complaint directly with the Project Engineer (PE). For the straightforward complaints, the PE can make an on-the-spot determination to resolve the issue. For more complicated complaints, the PE will forward the complaint to the Solomon Power Management. The SP Management has a maximum of two days to resolve the complaint and convey a decision to the AP. The AP may if so desired, discuss the complaint directly with SP Management. If the complaint of the AP is dismissed, the AP will be informed of their rights in taking it to the next step. If the complaint regarding environmental issues, a

copy of the decision will be sent to Environment Conservation Division (ECD). Should the AP not be satisfied, the AP may take the complaint to the Permanent Secretary (PS) in Ministry of Environment Climate Change Disaster Management Meteorology (MECDM) who will appoint the Director of the ECD to review the complaints. The PS will have 15 days to make a determination.

52. All complaint will be registered and responded to the complainant, informing them of the proposed solutions to the matter, with an indication of the process and time for resolution. All complaint will be entered in a Register with data on: date, name, contact address and reason for the complaint. A duplicate copy of the entry is given to affected people (AP) for their record. The register will show who has been directed to deal with the complaint and the date when this was made together with the date when the AP was informed of the decision and how the decision was conveyed to the AP. The Register then signed off by the person who is responsible for the decision and the dated. The Register will be kept at the front desk of Solomon Power office and is a public document. The duplicate copy given to the AP will also show the procedure that will be followed in assessing the complaint, together with a statement affirming the rights of the AP to make a complaint. There will be no cost to the AP for making the complaint.

# G. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

#### 1. Environmental Management Plan

- 53. This section provides the mitigation and monitoring procedures for implementation throughout the life-cycle of the project. The SP and WB will monitor the implementation progress and impacts of the project. Overall the ESMP will be implemented by SP. SP will prepare quarterly reports on the implementation of the ESMP, performance monitoring, issue resolution, and corrective action plans.
- 54. Table 1 provides the Environmental Management Plan and table 2 provides the Environmental Monitoring Plan outlining parameters and the frequency of monitoring.

#### 2. Social Management Plan

- 55. Distribution network will traverse along corridors agreed by SP, the community and the landowner. SP will submit notification to Ministry of Infrastructure Development (MID) to obtain consent to use existing road corridors. The construction of hybrid generation system will be located in land leased by SP.
- 56. During the process of carry out final surveys for line network and for hybrid generation system construction, no observed private trees within private property is identified as needing trimming or removal as they would encroach into the electricity lines or would damage the electricity lines of they were to be blown over or did collapse for any reason.
- 57. In the case, the project needs to trim private trees, SP will require consultation with the tree owner and will base on consent of the owner. If there is any demand for the compensation to remove the affected trees from the owner, SP will provide compensation for the trees in accordance with rates prescribed under law (referring to rates issued by Ministry of Agriculture).

#### 3. Implementation Arrangement

- 58. The main institutions, Solomon Power will be the implementing agency for the project that will have overall responsibility for the project management. The Ministry of Mines, Energy and Rural Electrification (MMERE) will oversee the implementation of the project.
- 59. SP has prepared a detailed ESMP using the ESMF as a guidance document. The detailed ESMP will be submitted to the WB and ECD for review, comment and approval. The ESMP will be included as an integral part of the bid documents to enable the contractors to bid on the project with awareness of the environmental issues and mitigation measures to be implemented as part of the project. The successful contractor will prepare a Construction Environmental Management Plan (CEMP) outlining how to implement and monitor the EMP during construction.
- 60. Solomon Power will be responsible for updating the ESMP at construction stage, whenever additional engineering information is available and for implementing the environmental, health and safety actions included in the ESMP. As required, SP will be responsible for environmental monitoring during construction and operation of the project. The ECD will also be responsible for verifying the monitoring undertaken by the Solomon Power through audits and spot-checks. The outcomes of the monitoring will be included in the overall monthly progress reports to be submitted by Solomon Power to ECD.

#### 4. Environmental Management Budget and Resources

61. The cost of all compensation and rehabilitation works will be an integrated part of the overall project cost, which will be borne by the project. There are no additional expenses items as all of the implementation tasks are part of "business as usual" for SP and are already captured in the construction and operational budget either funded by project or by SP.

# Table 1: Environmental and Social Management Plan

Project	Potential Impact	Proposed mitigation measure	Mitigation	Institutional	Implementation
activity/stage			Cost	Responsibility	Schedule
Pre-construction					
Location	Encroachment into non- government / private land	SP will submit notification to Ministry of Infrastructure Development to get consent on using road corridors and also will use location agreed by SP, the community and land owners. The hybrid generation system will be on land leased by the SP.	Project cost	SP and MID	Detailed design
Climate Change and natural hazards	Creating safety hazards, black outs and waste from damaged assets	Provided switchgears with resilience to climate change through compact and preassembled systems resistant to marine environments Design of pole footings and cable system to withstand powerful cyclones and hurricanes, which will reduce any potential hazard of panels being lifted up and blown onto adjacent properties	Project cost	SP	Detailed design
Equipment specification and design parameters	Release of toxic chemicals and gases in receptors (air, water, land)	PCB should not be used in transformers and other project facilities or equipment. Processes, equipment and system not to use chlorofluorocarbons (CFCs), including SF6, halon and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirements of government of SI	Project cost	SP	Detailed design Tendering process
B. Installation	1			1	1
Location	Encroachment into non- government/private land	No work to commence until SP obtained consent from MID to use existing road corridor for line distribution.	Project cost	SP and MID	Prior to civil work construction

Project	Potential Impact	Proposed mitigation measure	Mitigation	Institutional	Implementation
activity/stage			Cost	Responsibility	Schedule
		No works to be carried out within non-			
		government / private land			
Prior to work starting	Discover UXO	The proposed project area will be swept for	Project cost	SP	Prior to civil work
		UXO and if found will be cleared as per			construction
		established procedures prior to civil work			
		commence			
Prior to work starting	Health and safety issues	Consult with households and business in the	Project cost	SP	Prior to civil work
	with bystanders and	project area prior to works starting.		~~	construction
	neighbors, nuisances			CS to support	
	from traffic diversions	Use SP website and radio announcement.			
	or access to houses or				
	businesses	Provide information on the EMP, grievance			
		mechanism, and how they can safe during			
		the works.			
		Address on windividual concerns microto			
		Address any individual concerns prior to			
Installation of arid and	Uncofe and unciphtly	Work starting.	Droiget aget	SD	Dumin a sizuil russelt
micro grid assots and	work areas	otherwise store materials tidily on the read	Project cost	Sr	During civil work
movement of vehicles	work areas				construction
Construction debris and	Dollution of water	Drovision of adaguate drainage system	Droiget aget	CD	Dumin a sizuil russelt
Construction debris and	bodies due to disposel	including controlled collection and	Floject cost	SF	During civil work
wastewater	of stormwater or debris	preliminary treatment of stormwater (if			construction
	(aarthworks/tranching)	required)			
	(earthworks/trenching)	required)			
		No dumping of debris in water ways			
Movement and	Dust and particulate	Vehicle cleaning	Project cost	SP	During land
operation construction	emission from				clearing and civil
equipment and	movement of	Road cleaning (sweeping) and watering of			work construction
materials	construction vehicles	exposed soils during windy weather			
	transporting equipment				
	and construction				
	material				
Clearing/trimming of	Loss of vegetation	Trimming of only those trees which are	Project cost	SP	During land
tree branches and	covers	necessary			clearing and civil
vegetation cover					work construction
		Trimming of trees on road reserve can			
		occurs as of night			

Project	Potential Impact	Proposed mitigation measure	Mitigation	Institutional Descensibility	Implementation
activity/stage			Cost	Responsibility	Schedule
		Seek consent and pay compensation (if there is demand) for removal of trees or vegetation from non-government land. Prohibiting illegal feeling of trees by construction workers for domestic uses. Avoid trimming removing trees from non-			
		government land where negotiation with tree owners fail			
Occupational health and safety Bystander health and safety	Impacts on worker health due to working with trucks and piling cranes, building construction high voltage work Electrocution or other safety incident	<ul> <li>Work in accordance with business continuity plan incorporating occupational health, safety and environmental plan</li> <li>Provide a specific safety plan for the project</li> <li>Supervision and inspection</li> <li>Protection gear</li> <li>Put up signs and barriers around working areas.</li> <li>Check for bystanders before undertaking work</li> <li>Let households know when working in their</li> </ul>	Project cost Project cost	SP SP	During land clearing and civil work construction During land clearing and civil work construction
C. Operation and Mainter	19000	area			
Location of poles, cables and transformers	Exposure to safety related risks	Setback of dwelling to overhead line routes designed in accordance with permitted level of power frequency	O&M cost	SP	During operation and maintenance
Tree trimming	Removal of income generating trees/crops	Tree trimming on road reserve can occur as of right. Removal of trees from non-road reserve must be negotiated and compensation paid	O&M cost	SP	During operation and maintenance
Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and system using chlorofluorocarbons (CFCs), including SF6, halon, should be phased out and to be	O&M cost	SP	During operation and maintenance

Project	Potential Impact	Proposed mitigation measure	Mitigation	Institutional	Implementation
activity/stage			Cost	Responsibility	Schedule
		disposed of in a manner consistent with the			
		requirements of the Government of SI			
Health and safety	Health hazards in the	Implement SP Business Continuity Plan	O&M cost	SP	During operation
	event of accidents	(incorporating occupational health, safety			and maintenance
	(cyclones, hurricanes	and environmental plan)			
	and emergency)				
Disposal and	Impacts from used	Store waste inside SP depot prior to	O&M cost	SP	During operation
management of	transformers (oil) and	disposal. Metal at scrap metal traders, waste			and maintenance
transformers and	switchgears	oil at waste oil traders and all other waste to			
switchgears		landfill in SP compound			
D. Decommissioning					
Dismantling of cables,	Impacts from disposal	Contract agreements with transformers and	Maintenance	SP	Post operaton
poles, transformers and	of discarded assets	switchgears suppliers for dismantling and	cost		
switchgears		disposal. Metal at scrap metal traders.			
		Waste oil at waste oil traders and all other			
		waste to Landfill in SP compound			

# Table 2: Environmental Monitoring Plan

Environmental	Aspect to be	Time and frequency	Location	Monitoring cost	Responsible party
Features	monitored	of monitoring			for implementation
Construction stage					
Compliance with	All aspects of table 1.	Project site	Project Site and SP	Project cost	SP
EMP	Visual inspections	Weekly	office		
	and inspection of	Keep records			
	documentation				
Occupational health	As specified in	Project site	Project site	Project cost	SP
and safety	project safety plan	Weekly			
		Keep records			

#### **ANNEX 1. Procedure for handling UXOs**

#### 1.0 Introduction

Solomon Islandswas the site of severe battle 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 Solomon Islands can be defined as either unexploded (UXO) or abandoned (AXO). Unexploded ordnance are explosive ordnances 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 in 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 practise. 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 apolicy 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 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 maintenancework 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, land owners 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 and would be advised at the initial contract meetings of their responsibility, the process to manage UXO risks and who 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 of 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<sup>1</sup> to ensure the safety of its staff and every other person involved or affected by its normal day to day operation or any development activity.

The responsibility to report 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 unauthorised 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 public upon request.

<sup>&</sup>lt;sup>1</sup> The SIEA policy on Occupational Health and Safety 2010 is being reviewed.

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

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

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 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 EODContractors

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

The EOD contractor is responsible for site safety procedures and are 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
- Contract amount for the service

The typical activities to be carried out by EOD contractors is summarised below.<sup>2</sup>

<sup>&</sup>lt;sup>2</sup> The procedures are summarised from the MID's '9.0 Unexploded Ordnance Procedure'

- 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 project site.
- Responsibly dispose UXO ordnance in accordance with relevant local law
- 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 undertakeclearance 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 assessmentis 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 local surrounding 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
SIEA	Nik West
	Capital Works Programme Manager
	P.O. Box 6
	Honiara
	Email: nik.west@siea.com.sb
	Tel: 32944
	Robin Simpson
	Safety Officer
	P.O. Box 6
	Honiara
	Email: robin.simpson@siea.com.sb
	Tel: 32944
	Rubina Tagana
	Public Relation Officer
	P.O. Box 6
	Honiara
	Email: rubina.tagana@siea.com.sb
	Tel: 32944
RSIPF	Officer in Charge
	Explosive Ordnance Unit
	P.O. Box G1723
	Honiara
	Tel: 20443
Ministry of Environment, Climate Change,	Director
Disaster Management and Meteorology.	Environmental Conservation Division
	P.O. Box 21
	Honiara
	Tel: 23031
MID	Under Secretary (Technical)
	P.O. Box G8
	Honiara
	Tel: 25783

Email: Mark.Greenaway@siea.com.ab

#### 7.0 Annex

#### Annex 1. Preliminary risk assessment form

	Details		
Name of assessor			
Date of assessment			
Site Address			
Development Proposed			
Historical findings			
	Name of interviewee	Detail	
Findings from Interviews			
Threat potential / Probability <sup>3</sup>	Probability and ris Raing 1 LOW Raing 2 Raing 3 Rwing 4 Raing 5 MOD Raing 5 MOD Raing 6 Raing 7 Raing 8 Raing 8 Raing 9 Raing 9	Sk of UXO encounter	Rating
Threat potential / Probability <sup>3</sup> Recommendation	Probability and ris Raing 1 LOW Haing 2 Raing 3 Raing 5 MOD Haing 5 Raing 5 Raing 6 Raing 6 Raing 8 Haing 9 10	Sk of UXO encounter	Rating

Note: Attach site plan and map of area assessed.

<sup>&</sup>lt;sup>3</sup> The threat probability rating is extracted from CIRIA C681: Unexploded Ordnance (UXO)

#### **Annex 2: A Consultation Note**

#### SOLOMON POWER CONSULTATION BRIEF NOTE IN SEGHE

The Solomon Power undertook serial initial consultations in Taro, Seghe and Afio on establishment of hybrid generation systems in the provinces during September – October 2015. The Solomon Power team consist of General Manager of Customer Services, including Public Relation Officer, Engineering Officer and Technical Officer; Health and Safety Officer under Corporate Service Department; as well as Chief Inspection of Regulatory Department.

The consultation was attended by Provincial Government Representative; member of National Parliament, people from commercial sector (kiosk owners, retailers), school representative (teacher and student in Afio and in Seghe); Church Representatives in Seghe, and community living in the project areas, including women.

During the consultation meeting the Solomon Power has introduced themselves as the national electricity agency that has task to generate, distribute and sell electricity to Solomon Islands supported by existing law and regulations. As part of the State-Owned Enterprise, Solomon Power has responsibility among others on social responsibility covering awareness activity, health and safety issues, policies, procedures including how to submit complaint, environmental issues and involving all stakeholders. The consultation informed upcoming hybrid generation system projects in the targeted provinces and explained to the people regarding the preparation of the project, including land required for the project. The Solomon Power provides awareness regarding the benefits of power for community, such as improving quality lighting, facilitating education activities, generating household income, enhancing church programs and community events.

During the consultation, an equal participation among the community was occurred, including women. Participants raised their questions and concerns freely. The main concerns raised during the consultation in three project location are i) how safety is electricity (e.g. is it safe; how to switch power); ii) the connection process (e.g. who will do the connection, procedure to apply the connection, what meter will be used); iii) cost of connection (e.g. who will pay the line; the cost amount, is it affordable).

During the consultation time, Solomon Power also conducted community awareness incorporation with local schools in Seghe and Afio to teach student on health and safety of electricity.

Some pictures from field are provided below.



Consultation meeting in Seghe



Solomon Power presentation in Seghe



Solomon Power presentation in Seghe at school on safety of electricity

# ANNEX 3. PICTURES FROM PROJECT LOCATION



Project announcement signboard



Poles have been installed by SP



Mini-grid location on land leased by SP



Airstrip in the Island