

Initial Environmental Examination

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SOLOMON ISLANDS URBAN WATER SUPPLY AND SANITATION SECTOR PROJECT

AUKI WATER SUPPLY PROJECT

Prepared by Solomon Water, Solomon Islands for the Asian Development Bank

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
APs	Affected Persons
ADWF	Average Dry Weather Flow
AMSL	Above Mean Sea Level (in metres)
AUD	Australian Dollar
BCD	Bid and contract documents
BMP	Building materials permit (issued by Dept. of Minerals - Ministry of Mines, Minerals and Rural Energy)
CoL	Commissioner of Lands
CEMP	Construction environmental management plan (of the contractor)
COD	Chemical oxygen demand
CSS	Country safeguard system
DN	Diameter Normal
EAG	Executing Agency
EA	Environmental assessment
EARF	Environmental Assessment and Review Framework
ECD	Environment Conservation Division (in MECDM)
EHS	Environmental, Health, and Safety Guidelines (of World Bank Group)
EIA	Environmental Impact Assessment
EMP	Environmental management plan
ESO	Environmental safeguards officer (in the PMU)
EU	European Union
FTE	Fixed Term Estate
GBV	Gender Based Violence
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HIV	Human Immunodeficiency Virus (HIV)
H and S	Health and Safety
HSP	Health and Safety Plan (part of the CEMP)
IAG	Implementing Agency
IA	Impact assessment
IEE	Initial environmental examination
IES	International environment specialist
JICA	Japan International Cooperation Agency
LPS	Auki Local Planning Scheme
M.A.S.L.	Meters Above Sea Level
MDAPC	Ministry of Development Planning and Aid Coordination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MoFT	Ministry of Finance and Treasury
MoLHS	Ministry of Lands, Housing and Survey
MID	Ministry of Infrastructure Development
ML/d	Million liters per day
MPN	Most Probable Number
NRW	Non-Revenue Water
NTU	Nephelometric turbidity units
PCCSP	Pacific Climate Change Science Program
PE	Perpetual Estate
PER	Public Environment Report (under the CSS)
PMU	Project Management Unit (in SW)
PSC	Project Steering Committee
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
ROW	Right of Way
SBD	Solomon Islands Dollar (code)
SEA/SH	Sexual exploitation and abuse and sexual harassment

SIG Solomon Islands Government
SPS Safeguard Policy Statement 2009 (of ADB)
STI Sexually Transmitted Infections
SW Solomon Islands Water Authority trading as Solomon Water
SWL Standing water level
TOR Terms of Reference
TSS Total suspended solids
UNDP United Nations Development Program
UWSSSP Urban water supply & sanitation sector project
USD United States Dollar
WB World Bank
WBSP World Bank Safeguards Policies.

CURRENCY EQUIVALENTS

USD 1.00 = SBD 8.30
(as of January 2020)

1 Contents

ABBREVIATIONS AND ACRONYMS	II
EXECUTIVE SUMMARY	1
1 INTRODUCTION	3
2 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK	4
2.1 Country Safeguards System	4
2.2 Other Relevant Laws	4
2.3 ADB Safeguard Policy	5
2.4 World Bank Safeguards Policies.....	5
3 PROJECT DESCRIPTION	10
3.1 Water Investment Strategy	10
3.2 Project Background	10
3.3 Current Supply Situation.....	10
3.4 Project Objectives	12
3.5 Project Scoping	12
3.6 Project Components	15
3.6.1 Gallery Site	15
3.6.2 Proposed 1ML Steel Liner Tank and Pump Station	18
3.6.3 Components and Activities of the development.....	18
3.6.4 Scheduling	21
3.6.5 Installation of chlorination system at key locations	21
3.6.6 Repair and minor liner works to existing Gallery and ADB tanks	21
3.6.7 Security fencing works at the new tank and the ADB and High Ridge tank sites	21
3.7 Auki Water Catchment Area - Zoning controls of the Auki Local Planning Scheme.	21
3.8 Infrastructure and transport components.....	25
3.9 Other features of existing or past land use	26
3.10 Measures to ensure long term reliability of water abstraction from Auki catchment	26
4 DESCRIPTION OF THE ENVIRONMENT	27
4.1 Physical Environment	27
4.1.1 Elevation.....	27
4.1.2 Climate.....	27
4.1.3 Soils	27
4.1.4 Geology	27
4.2 Air quality.	28
4.3 Project - Climate and disaster risk.....	28
4.4 Natural Hazards	28
4.4.1 Extreme rainfall and flooding	28
4.4.2 Storm surge and Seal Level Rise	28
4.4.3 Landslide and Tsunami	29

4.5	Biological Environment.....	29
4.5.1	Flora and fauna	29
4.5.2	Watercourses and water bodies	29
4.6	Socio-economic Profile of Auki	33
4.6.1	Legal ownership of the land	35
4.6.2	Province and villages	38
4.7	Socio Economic - Climate and disaster risk	38
4.8	Noise level.....	38
4.9	UXO Clearance	38
4.10	Cultural Sites	38
4.11	Transportation Routes.....	38
5	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	41
5.1	Design and Pre-construction Phase.....	41
5.1.1	Environmental management system and environmentally responsible procurement.....	41
5.2	Physical Environment for Preconstruction Impacts	42
5.2.1	Sourcing of local construction materials.	42
5.2.2	Climate change vulnerability.	42
5.2.3	Soil erosion and sedimentation.....	42
5.2.4	Disposal of excavation spoils.....	42
5.2.5	Land access and use.	43
5.2.6	Solid waste management.	43
5.3	Biological Environment for Preconstruction Impacts.....	43
5.3.1	Vegetation Clearance	43
5.3.2	Potential Contaminated Ground Water Quality.....	43
5.4	Socio - Economic Impacts for Preconstruction Impacts	44
5.4.1	Land Access and Resettlement	44
5.4.2	Disruption to utilities and services.	44
5.4.3	Damage to unknown archaeological and cultural assets.	45
5.5	Construction Phase Impacts on the Physical Environment.....	45
5.5.1	Modification of site topography.....	45
5.5.2	Solid waste management.	45
5.5.3	Storage, use and transportation of hazardous materials.	46
5.5.4	Air pollution.....	46
5.6	Construction Impacts on the Biological Environment.....	47
5.6.1	Impacts on rare or endangered species.	47
5.6.2	Terrestrial habitat alteration	47
5.7	Construction Impacts on the Socio-Economic Environment	47
5.7.1	Construction noise and vibration.	47
5.7.2	Vehicular traffic congestion and hindrance to public access.	48
5.7.3	Biosecurity of Imported Material (Invasive Species) on Machinery.....	48
5.7.4	Potential social issues due to influx of workers.	48
5.7.5	Occupational Health and Safety.	49
5.7.6	Community Health and Safety.....	50
5.8	Operational Phase - Environmental Impacts	51
5.8.1	Chemical Spills.....	51
5.8.2	Water Quality Monitoring	51
5.8.3	Planned Outages or Emergency Outages	52
5.8.4	Occupational Health and Safety.	52

5.8.5	Community Health and Safety.....	53
5.9	Operational Phase - Socio- Economic Impacts.....	53
5.10	Consultation, Information Disclosure and Community Participation	54
5.10.1	Consultations during Project implementation.....	54
6	<i>GRIEVANCE REDRESS MECHANISM</i>	56
6.1	Purpose.....	56
6.2	Process.....	56
6.2.1	Stage 1.....	56
6.2.2	Stage 2.....	56
6.2.3	Stage 3.....	57
6.3	Miscellaneous	57
7	<i>ENVIRONMENTAL MANAGEMENT PLAN</i>.....	59
7.1	Introduction	59
7.2	Institutional Arrangements	59
7.2.1	Project Management Unit.....	59
7.2.2	Construction contractors.....	59
7.2.3	Environment Conservation Division.....	59
7.3	Environmental Mitigations and Monitoring Matrices	63
8	<i>MONITORING AND REPORTING</i>.....	82
9	<i>CONCLUSION AND RECOMMENDATIONS</i>.....	83
10	<i>BIBLIOGRAPHY</i>.....	84
	APPENDIX A – Solomon Islands International Agreements.....	86
	APPENDIX B – Site Photos.....	88
	APPENDIX C – Auki Consultation Meetings	92
	APPENDIX D – Grievance Log Information.....	94

List of Figures

Figure 1:	Auki Existing Water Supply Schematic Diagram	11
Figure 2:	Project area for the Auki Water Supply Upgrade Project.....	14
Figure 3:	Map of Project site showing location of existing and proposed infrastructure	17
Figure 4:	New 1ML tanks and Pump Station layout and Longitudinal Section.....	20
Figure 5:	Auki Local Planning Scheme showing the project site as water catchment area.....	23
Figure 6 :	Auki Town Zoning Plan - with water catchment designated as Utility Use.....	24
Figure 7:	Existing SIEA power lines (Source: Solomon Power GIS, April 2018)	25
Figure 8-	Site Vegetation	30
Figure 9 -	Flood prone Area at Auki.....	31
Figure 10 -	Storm Surge Prone Area at Auki	32
Figure 11:	New Land fill site at Auki	34
Figure 12:	Auki site map identifying land plots	37
Figure 13:	Auki Town Boundary	40

List of Tables

Table 1: World Bank Safeguard Policies: Main Objectives, Applicability And Triggered By The Project	7
Table 2: E. Coli Results At The Gallery Well (Mpn/100 Ml)	16
Table 3: Selected Socio-Economic Indicators For Malaita Province	33
Table 4: Summary Of Fte Holders Of Adjacent Land	36
Table 5: Summary Of Environmental Management Responsibilities In The Project	60
Table 6: Environmental Mitigation And Monitoring Plan.....	63

EXECUTIVE SUMMARY

The Project. The Asian Development Bank (ADB), World Bank (WB), European Union (EU) and Solomon Islands government (the government) have established the Solomon Islands Urban Water Supply and Sanitation Sector Project (UWSSSP). This project is aimed at improving the water supply infrastructure in Auki to meet the town's future demand and ensure reliability of service. The scope covers the design, procurement, construction, installation, testing and commissioning of a 1ML liner tank, a pump station and associated piping works by implementing high priority components identified in Solomon Water's 30-Year Strategic Plan and 5-Year Action Plan.

Safeguard Policies. This IEE was conducted in accordance with ADB's Safeguard Policy Statement 2009 (SPS), with WB Safeguards Policies (WBSP) and the requirements of the Solomon Islands Environmental Act (1998), Environment Regulations (2008) and Environmental Impact Assessment Guidelines (2010). The IEE was prepared as per the environmental assessment and review framework (EARF) to guide the process for screening, assessment, review and monitoring of components that are designed and implemented following approval. The Project is deemed Category B for environment per ADB's environmental screening, because physical impacts are involved, with site specific, manageable impacts related to the construction phase that can be readily mitigated and/or managed. This category is also appropriate under the WBSP. This proposed project, is screened as a Category B project under ADB's social safeguards policy as it requires a resettlement plan. This category is also appropriate under the WBSP.

Outcomes. The IEE found no significant negative social or environmental impacts or risks that could not be mitigated. It was determined that a full environmental impact assessment is not warranted. Since the detailed assessment has been completed, the IEE will serve as the Project's final social and environmental assessment.

Anticipated impacts. Scoping and assessment of the project has identified social and environmental considerations for the Project's pre-construction, construction and operational phases.

- Pre-construction considerations include compensation; climate change vulnerability; integration of the IEE and EMP and development consent conditions in the bid and contract documents; grievance redress and management; disruption of utilities and services land access arrangements. Actions necessary to address pre-construction considerations will be included in tender documents and construction contracts.
- The construction phase impacts are site access and clearance; soil erosion and sedimentation control; dust control; solid waste management; construction noise and vibration; traffic management and community and occupational health and safety. The Contractor will be required to prepare a construction environmental management plans (CEMP) based on the EMP included as part of the environmental assessment reflecting their construction approach and methodology to ensure appropriate environmental management during the construction period.

Environmental management plan. Based on the Project's EMP, contractors will be required to prepare their construction EMP (CEMP) to ensure appropriate environmental management during the construction period. In responding to the

Project's EMP, the CEMP is to be site and activity specific reflecting the contractor's construction methodology and approach and include all sub-plans (health and safety plan, traffic management plan, erosion and sediment control plan, waste management plan, hazardous substances management plan) as required.

Climate change adaptation. The Project will address the critical need for climate change resilience, given Auki's vulnerability to the effects of intense rainfall; engineering assessment of potential site erosion will determine appropriate erosion protection.

Institutional arrangements and capacity building. The Ministry of Finance and Treasury (MoFT) is the executing agency (EAG) and Solomon Water (SW) is the implementing agency (IAG) for this Project. SW's Project Management Unit (PMU), will supervise the construction contractors and ensure that the CEMP is properly implemented and monitored. The PMU is in the process of appointing an environment officer¹ who will work with the international environmental specialist receiving training and capacity building. This will include supporting PMU's environmental management and training and guidance on environmental monitoring.

Consultation and participation. SW conducted consultations during project preparation and will continue to do so during the construction phase.

Grievance Redress Mechanism. The Project will use the SW grievance redress mechanism (GRM). This ensures procedures meet the requirements of Solomon Water infrastructure projects, ADB SPS and WBSP.

Conclusion and recommendations. The findings of the IEE are that, no further environmental or social assessment is required. The recommendations are:

- specific mitigation and/or design specifications of the project EMP's will be included in the design process and integrated into the bid document along with any conditions of the development consent(s).
- It will be a requirement of the contract that the contractor will submit a CEMP for SW approval prior to any physical works commencing.
- The construction contract will also require the contractor to respond to the Project's CCP and GRM in their CEMP.
- SW will continue the process of public consultation and information disclosure during detailed pre-construction, construction and operation phases as guided by the Project's CCP.

¹ Exact designation will be confirmed by PMU in due course

1 INTRODUCTION

1. The Asian Development Bank (ADB), World Bank (WB) and European Union (EU) are supporting the Government of Solomon Islands (the government) to develop the Solomon Islands Urban Water Supply and Sanitation Development Sector Project (UWSSSP - the Project). The Project aims to improve access to safe water and improved sanitation in urban and peri-urban areas by implementing high priority components of the Solomon Water (SW) 30-Year Strategic Plan and 5-Year Action Plan. Project outputs include: secure and safe urban water supplies; effective, efficient and safe urban sanitation services; enhanced awareness of hygiene and water issues and sustained improved hygiene behavior; and the financial and technical sustainability of SW, the state-owned enterprise responsible for the management and development of urban water resources and sewerage services in Solomon Islands.
2. The Project will be implemented by SW and the Ministry of Finance and Treasury (MOFT) will be the executing agency. SW has established a project management unit (PMU) which will include one environment officer, two lands officer who also act as resettlement officers; an international social safeguards and gender specialist and an International Environmental specialist who will provide training and capacity building to PMU and contractors as required.
3. The sector Project Safeguards approach encompasses a larger project which comprises capacity building, a water awareness sanitation and health (WASH) component, and physical works—upgrading existing water supply transmission and distribution and sewerage networks (including sewer outfalls) and installing new water supply and sewage treatment facilities—in Honiara and other provincial towns. An environmental assessment and review framework (EARF) has been prepared to guide the process for screening, assessment, review and monitoring of components that are designed and implemented following approval. This initial environmental examination (IEE) is the assessment of the components that have been defined during project preparation for the Auki Water Supply Upgrade Project.
4. This IEE has been prepared in accordance with the requirements of the country safeguards system (CSS), WB's Safeguard Policies (WBSP) and the ADB's Safeguard Policy Statement 2009 (SPS). The Project has been screened as Category B for environment and social risks due to the significance of its environmental and social impacts and risks which are largely site-specific, mainly related to the construction phase and many of which can be readily managed or mitigated through implementation of the measures identified in the environmental management plan (EMP).
5. The Auki Water Supply Project is being undertaken by Solomon Water in advance of the UWSSSP approval and effectiveness and will be funded retro-actively. Preparations for the project have been taken in compliance with development partner safeguards requirements.
6. This IEE provides an assessment of the social and environmental impacts and risks associated with the Auki Water Supply Upgrade Project during pre-construction, construction, operations and maintenance. It is based on field visits to the proposed areas; review of available information; and discussions with government agencies and communities in the relevant locations.

2 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

7. The environmental safeguards requirements of the Project will be implemented to comply with Solomon Islands' laws and regulations and the SPS and WBSP.

2.1 Country Safeguards System

8. Environmental Laws and Regulations. The Environment Act (1998) provides the legal basis for environmental protection and management. It provides the foundation of the Solomon Islands' environmental impacts assessment (EIA) system, under the jurisdiction of the Environment Conservation Division (ECD) of the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM).
9. This 'prescribed activity', under the Environment Act, requires a public environment report (PER) as the development activities are considered of a minor or moderate impact.
10. ECD furthermore confirmed during consultation, that the level of assessment conducted and reported as IEE for a category B project (according to ADB's SPS) is equivalent to a PER of the Solomon Islands' Environment Act of 1998.
11. Environmental standards for the Solomon Islands are still being developed. However, ECD generally advises project proponents to follow internationally recognized standards such as those of the World Health Organization (WHO). In addition, the Project will comply with World Bank Group's Environmental Health and Safety Guidelines (EHSG).
12. Solomon Water has a Health and safety policy that is compliant to the Safety at work Act 1982. Where gaps exist, reference is made to International regulation being applied as best practice.

2.2 Other Relevant Laws

13. The Environmental Health Act (1980) provides for the management and control of public health in the Solomon Islands. It defines local authority responsibilities in relation to the construction, operation, and management of sewerage systems, including sewage disposal works. It also provides penalties for the willful pollution of a water supply source.
14. The Town and Country Planning Act (1997) provides for the administration of town and country planning in Solomon Islands; preparation of local planning schemes; and control and development of land. It applies to all urban areas.
15. The Mines and Minerals Act (2008) regulates the mining and extraction of aggregate or gravels from rivers. It requires that building material permits (BMP) be applied for prior to any extraction of construction or building materials. The application for BMP may require a PER and will require preparation of an extraction plan.
16. International conventions. Solomon Islands is a signatory to a number of international agreements (treaties and conventions) with environmental and conservation implications as well as for the protection, promotion and safeguarding of cultural heritage and traditional knowledge. These are listed in Appendix A.
17. The Health & Safety at Work Act 1982 defines the minimum legal requirements in relation to health and safety in the workplace in the Solomon Islands. In addition,

Solomon Water has its own H&S policy that applies to the company as well as its contractors, consultants and any other parties involved in SW business. The H&S policy refers to standards and practices included in H&S regulations in Australia and New Zealand.

2.3 ADB Safeguard Policy

18. Any investment funded or administered by ADB must comply with the requirements of the SPS. The SPS promotes the sustainability of project outcomes by protecting the environment and people from potential adverse impacts. The SPS comprises three safeguards—environment, involuntary resettlement, and indigenous peoples—which aim to avoid adverse impacts on the environment and people and if it is not possible to avoid then to minimize, mitigate, and/or compensate for adverse impacts; and to help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.
19. In accordance with the SPS, screening and categorization of a project (including its subprojects and/or components) is undertaken to reflect the significance of potential project impacts or risks; to identify the level of assessment and institutional resources required for the safeguard measures; and determine disclosure requirements. Consequently, the SPS categorizes potential projects or activities into categories of impact (A, B, C or FI) to determine the level of environmental assessment required. This section of the UWSSSP has been deemed category B for environment based on the low significance of its potential environmental impacts and risks. This proposed project, includes a Resettlement Plan, is screened as a Category B project. An IEE is the appropriate level of assessment for a Category B project.
20. The SPS requires compliance with the EHSg.

2.4 World Bank Safeguards Policies

21. The WBSP aim to prevent and mitigate potential damage to the environment and communities generated in the development process. The WBSP provide the environmental and social safeguard requirements that must be complied with during the identification, preparation and implementation of WB-financed programs and projects.
22. The WBSP applying to the Project include ten safeguard policies established to inform decision making, ensuring that projects financed by the WB are environmentally and socially sustainable. The Project triggers three of these policies: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04) and Physical Cultural Resources (OP/BP 4.11), (Table 1) presents these policies and their applicability to the Project.¹
23. The EHSg are technical reference documents with general and industry-specific examples of good international industry practice. When one or more members of the World Bank Group are involved in a project, these EHSg are applied as required by their respective policies and standards. The General EHSg are designed to be used together with the relevant industry sector EHSg which provide guidance on issues in

¹ The Project preparation commenced in early 2018 and therefore the WB's new Environmental Safeguard Framework (ESF) does not apply. The ESF applies to projects and programs developed from October 2018.

specific industry sectors.

24. The EHSG contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The applicability of the EHSG should be tailored to the hazards and risks established for each sub-project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHSG, projects, where possible, are expected to achieve whichever is more stringent.
 25. The General and Industry Sector EHSG are available at the following link - <http://www.ifc.org/ehsguidelines>. Contractors, as part of their construction environmental management plan (CEMP), will be required to prepare an occupational and community health and safety plan.
-

Table 1: World Bank Safeguard Policies: Main Objectives, Applicability and Triggered by the Project

Safeguard Policies	Main Objective	Applicability	Application to the Project
OP 4.01 Environmental Assessment	The objective of this policy is to ensure that projects financed by the World Bank are environmentally sound and sustainable, and that decision making is improved through adequate analysis of actions and their possible risks and environmental impacts in the natural environment (air, water and soils); human health & security; physical-cultural resources; and global and transboundary and global environmental aspects.	<p>This policy is applicable when a project or sub-project has potential to cause negative environmental impacts in its area of influence.</p> <p>Depending on the project and the nature of its impacts, various instruments can be used. An ESMF (equivalent to EARF) is required for projects that comprise several sub-projects which will be fully defined only during project implementation. An ESIA/ESMP (equivalent to IEE) is required for projects that are fully defined during preparation.</p>	<p>Triggered:</p> <p>Environmental risks associated with the project include temporary noise, waste and air quality impacts associated with construction, potential limited vegetation clearing for the purpose of creating access to new water supply sources or pipelines, constructing the water treatment plants, etc.</p> <p>An Initial Environmental Examination (IEE (equivalent to WB ESIA/ESMP), the EARF (equivalent to WB ESMF) and Resettlement Framework (RF) (equivalent to WB RPF) and Resettlement Plan (RF) establish the process to mitigate these impacts. Consultations with stakeholders and affected communities are used to inform the decision-making process.</p>
OP 4.04 Natural Habitats	<p>This policy recognizes that the preservation of natural habitats is essential to protect original bio-diversity; for the preservation of environmental services and products for human society and for long term sustainable development.</p> <p>Therefore, the Bank supports the protection, management and restoration of natural habitats by funding projects as well as via political dialogue, sector work and the economic sector.</p>	<p>This policy is used by any Project or sub-projects considered as potential originator of significant changes (loss) or degradation of natural habitats, be it directly (through the construction) or indirectly (with the human activities caused by the project).</p> <p>OP4.04 defines a natural habitat as land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions."</p>	<p>Triggered:</p> <p>Projects are located in urban or peri-urban areas, with heavily modified ecosystems with high loss of biodiversity.</p>

Safeguard Policies	Main Objective	Applicability	Application to the Project
	By funding projects, the Bank expects the proponents to apply the precautionary principle in the management of natural resources, in order to ensure opportunities for sustainable environmental development.		
OP 4.10 Indigenous Peoples	For all projects proposed Bank funding that affect indigenous peoples, the Bank requires the borrower to undertake free, prior and informed consultation with affected Indigenous Peoples to ascertain their broad community support for projects affecting them. The project financed by the Bank must include measures to: (a) avoid adverse effects on indigenous populations; or (b) when it is not possible to avoid the effects, minimizes, mitigates, or compensates for such purposes. The projects financed by the Bank are designed with the assurance that indigenous people receive social and economic benefits that are culturally appropriate and adequate gender and inter-generations.	This policy is applied when the Project affects direct or indirectly indigenous people.	<p>Not Triggered</p> <p>The project is located in areas where Indigenous Peoples are the sole or the overwhelming majority of direct project beneficiaries.</p> <p>The project will focus on rehabilitating failed water supply and sanitation infrastructure or providing new infrastructure, this will benefit the community as a whole.</p> <p>An RF should be prepared which sets out the methodology for land acquisition / access for the project, if needed. Once land access is required, the process will include consultations with local government, local communities and various community groups (i.e. youth and women groups). The IEE/EARF will ensure free and prior informed consultation is undertaken and broad community support is achieved for the project.</p>
OP 4.11 Physical Cultural Resources	The objective of this policy is to assist countries to avoid or mitigate adverse impacts on physical cultural resources from	This policy is used by any Project or sub-projects considered as potential to cause changes (loss) or degradation of physical cultural resources.	<p>Triggered:</p> <p>The project involves construction works in modified urban and peri-urban areas, where it is unlikely that</p>

Safeguard Policies	Main Objective	Applicability	Application to the Project
	<p>development projects that it finances.</p> <p>Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.</p>	<p>OP 4.11 defines physical cultural resources as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.</p> <p>Depending on the project and the nature of its impacts, various instruments can be used. An Environmental Assessment capturing impacts on physical cultural resources is required for the project and sub-projects.</p>	<p>unknown physical cultural resources will be encountered. However, a chance find procedure is included in the IEE to ensure appropriate measures are taken in the event cultural resources are encountered.</p>

3 PROJECT DESCRIPTION

3.1 Water Investment Strategy

26. As the UWSSSP developed during 2018 it was agreed by ADB and World Bank that the Auki project was consistent with Output 1 of the UWSSSP project and as such could be financed under the UWSSSP using the Retro-finance mechanism. This would allow the project to commence in advance of the UWSSSP approval, funded by SW to time of project effectiveness with these funds being reimbursed after effectiveness (currently estimated as end October 2019).
27. In order to qualify for retro-active financing the project must comply with SIG and Development Partner safeguards and procurement policies. To this end an Environmental Consent application was made to MMCDMM and a resettlement plan was completed identifying affected persons as a result of the project. It should be noted that affected persons under the resettlement plan have been compensated in accordance with ADB policy prior to work commencing on site. SW have a grievance redress mechanism in place to address concerns which may arise from time to time as a result of the implementation of the project.

3.2 Project Background

28. The proposed Auki Water Supply Upgrade Project is located in Auki, Malaita Province. Auki is the provincial capital of Malaita with a population of approximately 5,105 in 2009. The average population annual growth rate for Auki is 2.4%, it is estimated that the population in 2019 is approximately 6200.²
29. The ongoing population growth and increasing water demand places continual demands on the existing water supply system. Due to a number of budgetary constraints and under investment in Auki, the current water supply system is under stress and requires and urgent upgrading. In addition, the Solomon Islands Electricity Authority (SIEA) has requested that SIWA relocate its water supply assets from the SIEA site at “Gallery” in Auki to the adjacent parcel of land that is owned by SW.
30. Solomon Water provides water for approximately 64 percent of households in Auki. Current water production in Auki is approximately 1300 KI/day with an average of 75% in Non-Revenue Water (NRW). This NRW accounts to a substantial loss in revenue. Reasons range from high leakages in existing network and tanks, illegal and unauthorized connections to meter inaccuracy. Coupled with that is the need to secure the water catchment area, increase water production, supply duration and water treatment to comply with acceptable service standards and meet demand with efficiency.

3.3 Current Supply Situation

31. Water for Auki is produced from a spring source that contributes approximately 55% to supply and three boreholes each producing around 15% of supply. Storage is provided at a mid-level site – The gallery Tank Site and a high level reservoir – High Ridge Tank. Figure 1 below shows the schematic layout of the SW system.

² Provincial Profile of the 2009 Population & Housing Census Malaita, Solomon Islands Government

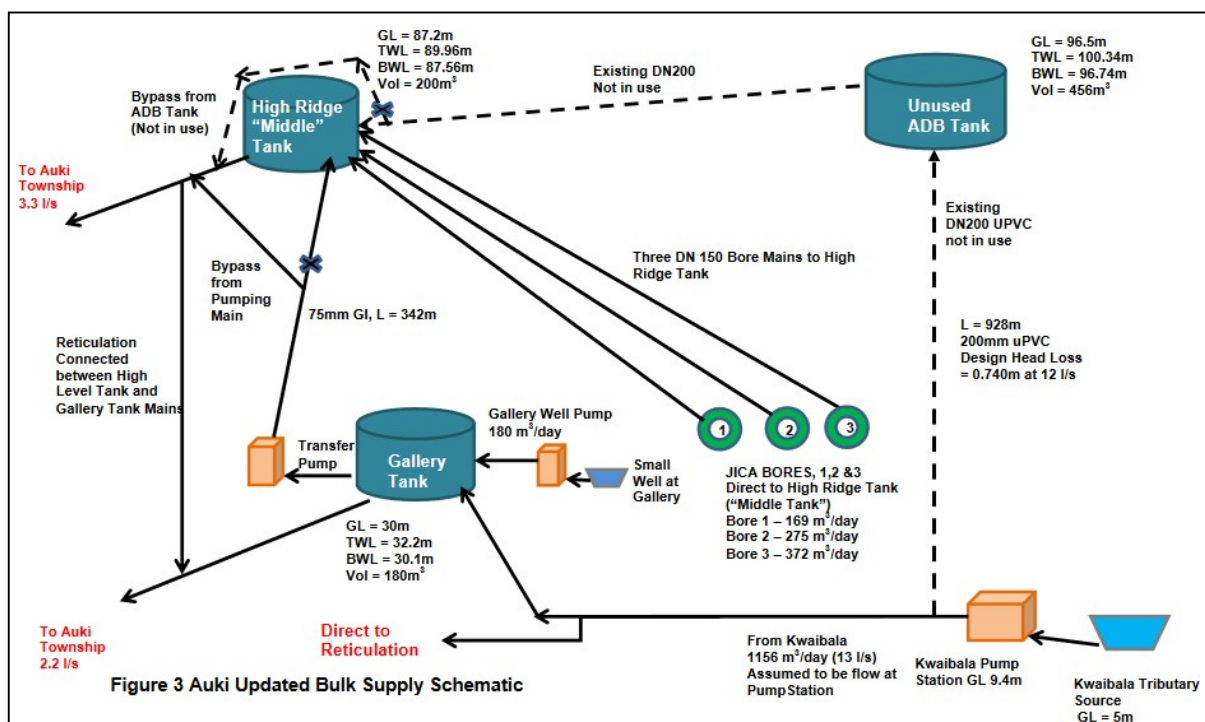


Figure 1: Auki Existing Water Supply Schematic Diagram

32. Water from the Kwaibala spring source is pumped to the Gallery storage tank (there are 2 x 250 kl steel tanks; one is not in use and the operating one is in very poor condition with leakage estimated at around 150kl/day). A small area is also supplied immediately off the pumping main to the east of Auki town. From the Gallery tank water is pumped into medium and low- level supply areas and a portion is pumped to the High Ridge Tank a 200 kl steel storage tank. The Gallery site is co-located with SIEA's power station.
33. The three borehole wells in the Auki catchment area pump directly to the High Ridge Tank at an elevation of approximately 70 metres. The wells were installed under a JICA project in 2014/15. The wells were constructed in such a way as to prevent surface water ingress and contamination to the wells.
34. The Auki catchment area was declared a number of years ago with titling of land within the catchment taking place. The Auki Land Board have now agreed to transfer title for all untitled land to SW and this is in process. SW will be undertaking stakeholder consultations and intend to enforce safe sanitary management of septic tanks in properties that are already constructed in the catchment area.
35. The risk of contamination of the deeper aquifers from human habitation in the existing catchment is considered low. The risk of contamination of the deeper aquifers from human habitation in the existing catchment is considered low because: (i) there are only a few number of properties in the area; (ii) the aquifer that is tapped is a deep aquifer (SWL at 40m and pumps at 70m); (iii) given the steep topography and favorable morphology of the catchment, surface contamination appears to be discharged washed down through natural drainage channels rather than infiltration to groundwater. Under the Auki Water Supply Upgrade project. chlorination of all sources is to be introduced to mitigate contamination risks. The chlorination of the borehole source water will take place at the High Ridge Reservoir.

36. In addition to these two tanks there is a third tank at high level that was constructed under a previous project – the tank (named the ADB tank) has never been used due to inability to pump water into the tank.
37. There are also concerns with limitation on the reticulation system and loss in pressure with reliance on booster pumps from the Kwaibala source and high loss of water on the existing tanks and pipelines.
38. A project to upgrade and replace some of the existing network and install flow meters was completed at the end of 2018 by Solomon water construction team; a further section of main was to be replaced in 2019 funded by SW – the original intention was to undertake this as part of the routine network replacement program however cash flow constraints have precluded this taking place. When the new Kwaibala pump set was tested in December 2019 the existing old pipeline burst in a number of places – as a result a variation to the construction contract has been agreed to include the replacement of this section of pipeline under the Auki Water Supply Upgrade project.
39. Water production in Auki also decreases when there is high turbidity from the Kwaibala water source during heavy rains and/or low production from the existing boreholes. Plans are being developed to increase production from existing sources through borehole cleaning and improving the gallery filtration at Kwaibala source.

3.4 Project Objectives

40. The ongoing population growth (i.e. 2.4% per annum) and increasing water demand in Auki places continual demands on the existing water supply system. In response to the issues highlighted and the ongoing water production, storage and supply issue, SW objectives through the project are to:
 - Improve water production and storage capacity
 - Increase pressure in the system
 - Increase supply duration
 - Achieve compliance with WHO water quality and service standards

3.5 Project Scoping

41. A diagnostic survey was commissioned by SW to review and quantify the water supply issues found in Auki and to consider options to deliver the project objectives. The Auki water supply system is a relatively small and simple system. There was no need for an extensive analysis of options to assess for the project. The water sources have been defined for a number of years, some of the assets constructed in the past were not being utilized and issues with the condition and effectiveness of the Gallery storage tanks have been self-evident for a number of years.
42. From SW perspective doing nothing was not an option – as the SOE with responsibility for water supply in Urban centers across SI service efficiency, reliability and quality are essential pre-requisites to support sustainable expansion to the urban community in Auki. The project delivers these objectives in cost efficient manner.
43. From the diagnostic work a design brief was put together to:
 - expand the system storage volume with a new 1ML Steel liner tank at an elevated position above the existing Gallery Site; and utilization of the ADB tank allowing the Gallery tank to be decommissioned,

- upgrade pump sets including construction of a new 3.35 x 8.5m pump station fitted with pumps, backup generator and switchboard next to the new steel liner tank;
 - lay new pipelines to improve distribution efficiency and reduce operating costs, namely the Installation of DN200mm, DN150mm and DN 100mm HDPE pipelines (rising main and gravity main) and appropriate valves from existing boreholes to pump station and tank;
 - Installation of chlorination system at key locations in the system;
 - Repair and minor liner works to existing High Ridge and ADB tanks; and
 - Security fencing works at the new tank, boreholes and the ADB and High Ridge tank sites.
44. The Auki Water Supply Upgrade Project Feasibility Study undertook financial and economic modeling of the project. The feasibility study included a water demand forecast taking into account population growth and connection growth in Auki over a 30-year period; it also excluded the gallery shallow well production source as operation of this well was discontinued in late 2018.
45. The growth in demand in Auki, over the 30-year period, can be met from existing sources (excluding the gallery shallow well) coupled with a realistic decrease in NRW over the project period.
46. The project area is shown in Figure 2.
47. The workforce to undertake this project is relatively small. Three expatriates and between 10-20 local labour/support staff will be required during construction.
48. The sources of data and information included in this report are from a number of official Solomon Island government documents, engineering feasibility studies and detailed design and community consultation.

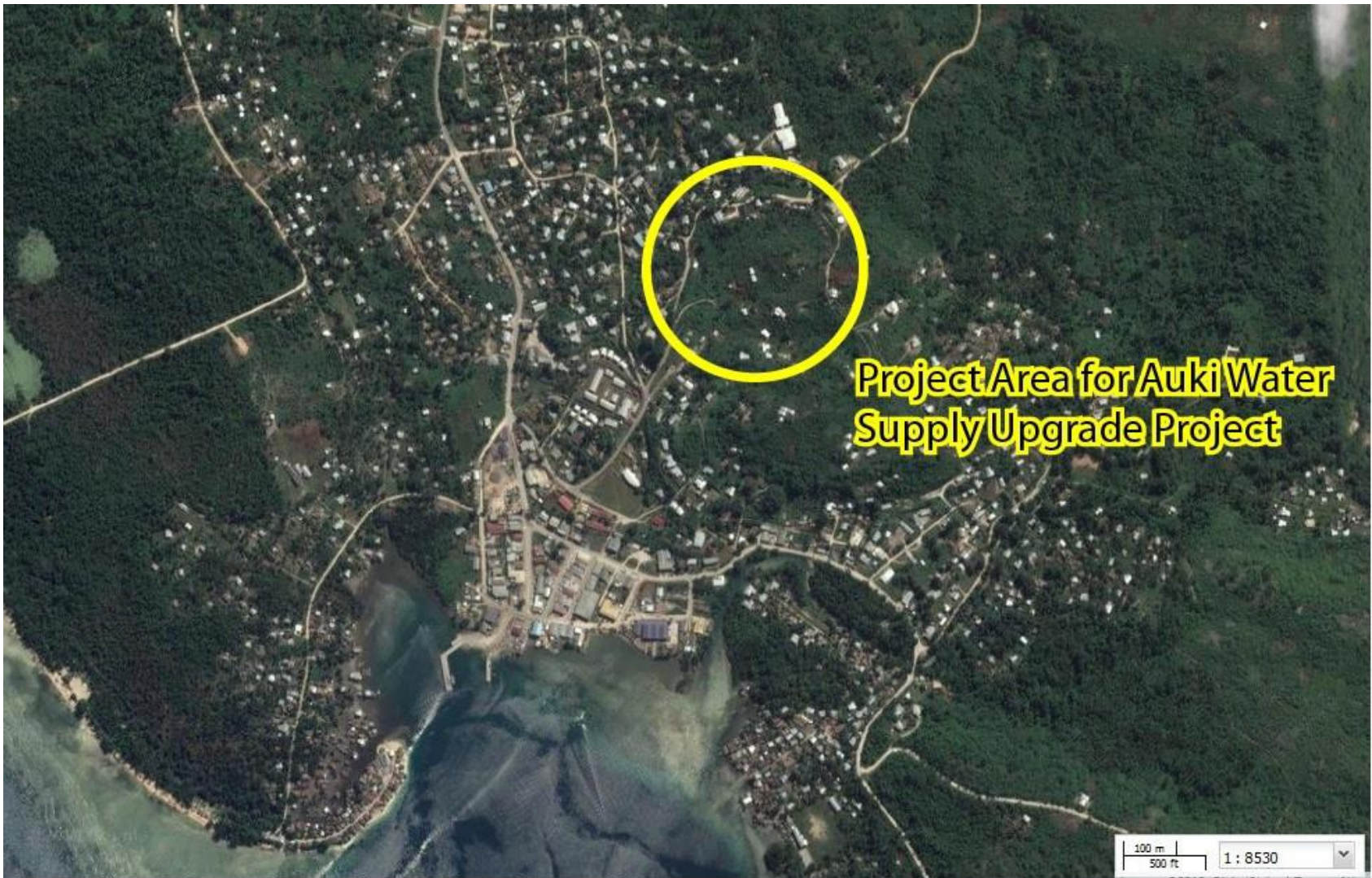


Figure 2: Project area for the Auki Water Supply Upgrade Project

3.6 Project Components

49. The new tank and pump station will be constructed above the gallery site close to the ADB and High Ridge tank sites.
50. The piping route will start from the gallery site to the ADB tank site. The new pump station and tank will be located at Borehole 3 site.
51. The pipeline will follow the proposed route shown in the Figure 3.

3.6.1 Gallery Site

52. The Gallery site located at the back of the Auki power station currently contains 2 existing 250k liter tanks, a pump station and borehole 1. One of the tanks has been decommissioned and the other is leaking heavily and does not provide the required pressure and flow for Auki customers.
53. Water is currently being pumped directly from the existing Gallery site pump station to customers and to the High Ridge Tank which then supplies water by gravity to Auki Customers.
54. The Gallery water storage and shallow well site is located within the grounds of SIEA powerhouse. The shallow well source was decommissioned by SW operations team by removing the pump pipework connections. The main line from the pump was disconnected at the suction side pump union, preventing the suction lift of the pump and preventing any water from entering the system. This was undertaken approximately 12 months ago and this has not affected Solomon Waters ability to meet its operational targets for supply duration.
55. During periods of rain the shallow well was affected by high turbidity and E. Coli which has no chlorination (Table 2)³. The remaining storage tank and associated equipment at the Gallery site will also be decommissioned once the new storage tank under the project is commissioned.
56. Concerns about the risk of contamination of the shallow well source from run off from the SIEA diesel tank storage area was raised with them by SW some 12 months ago. Subsequent to that discussion SIEA have amended their fuel handling practices - diesel drums are stockpiled in a stack that is diamond pitched about the horizontal axis in single row that does not exceed 1.8m in height, this equates to 3 drums in the vertical sense; full fuel drums received on site are immediately decanted into a newly installed double bunded fuel tank. The empty drums are stored along the fence line on a metaled hard stand. While the drums are not stored in a bunded area this is considered to be a low risk due to the empty state of the drums, and the relative impermeability of the coralis hard stand. Drums are removed from site at regular intervals which further reduces risk. SW believes that as a result of these changes there is no risk of diesel contamination to the deep aquifer.
57. Prior to commissioning of the project and the capping of the shallow gallery well, SW will conduct testing of the gallery well and, adjacent boreholes BH1 and BH2 for hydrocarbons. The main mechanism to prevent contamination is the double bunded fuel tank and handling procedures. This ensures all fuel is subject to double containment from receipt on site. Concrete capping of the shallow well and subsequent sealing of the bore, is considered sufficient to prevent direct ingress of contaminants.

³ SW Water Quality Laboratory

58. Closure of the shallow well has not had a deleterious effect on supply. The de-commissioning of the badly leaking Gallery tank will save around 15% of water into supply. The Auki FS which is derived from the work in the SW 30-year strategic plan confirms that the combined total daily production of the Kwaibala source and the bore field which is approximately 2.1ML/d is sufficient to supply current and future customers. There will be no need for additional sources of water in Auki to achieve the long-term forecast growth for the town. The shallow well head will be concrete capped at the end of the project.

Table 2: E. coli results at the Gallery Well (MPN/100 ml)

Date		
	<i>E.coli</i>	Total Coliform
18/05/2017	648.8	>2419.6
1/07/2017	20.2	191.1
7/10/2017	35	72.9
4/11/2017	>200.5	>200.5
15/12/2017	9.9	88.5
15/03/2018	30.7	>2419.6
12/04/2018	25.9	2419.6
12/03/2019	29.5	>2419.6
2/07/2019	74.9	>2419.6
13/07/2019	1299.7	>2419.6
20/08/2019	16	>2419.6
7/09/2019	12.1	>2419.6
19/09/2019	21.8	>2419.6
27/09/2019	42.8	>2419.6
11/10/2019	5.2	>2419.6



Figure 3: Map of Project site showing location of existing and proposed infrastructure

3.6.2 Proposed 1ML Steel Liner Tank and Pump Station

59. The proposed new 1ML Steel liner tank and new pump station has been constructed on an elevated position above the Gallery site. The new elevated tank will provide the needed pressure and flow to supply customers in Auki. The new tank has been designed and constructed to relevant AS/NZ standards with structural and liner warranty requirements for 20 years.
60. The new pump station is located next to the new tank and was fitted with a standby generator, switchboard and relevant pumps and accessories.
61. The proposed DN200 rising mains has been installed to pipe water from the existing boreholes to the new 1ML steel liner tank. Alternately, new DN150 pipe mains may be installed from the new tank to connect to existing mains supplying customers from the Gallery Site. All pipe mains are buried to a minimum depth of 600mm. Thrust blocks were provided at changes of direction or as per the design.

3.6.3 Components and Activities of the development

3.6.3.1 1ML steel liner tank

62. The construction activities associated with the proposed 1ML steel liner tank include the following works:
 - Bulk earthworks, access and site grading;
 - Clearance of vegetation;
 - Installation of sediment and erosion control measures, where necessary;
 - Installation of tank concrete base;
 - Installation of tank;
 - Installation of connecting / maintenance / terminal valves and chambers;
 - Site rehabilitation; and
 - Hydro testing and commissioning.
63. In operation, the tank will require periodic inspection and maintenance to ensure operational integrity with a tank structural warranty of 20 years, liner warranty of 20 years and service life tank structure of 20 years.

3.6.3.2 Pipeline Construction

64. The design, construction activities and supply of products and materials associated with pipeline construction (across all segments) are based upon the SIWA Water Supply Design and Construction Code 20163.
65. The construction included the following works:
 - Demarcation of proposed pipeline corridor;
 - Clearance of vegetation along pipeline corridor, where necessary (a pipeline Right of Way of 3 – 5 m will be used to facilitate construction);
 - Trenching works: Trenches will be approximately 800mm wide. Depth will vary, but will generally provide a minimum cover of 600mm;
 - Dewatering and installation of silt and sediment traps and erosion control

measures, where necessary;

- Pipe laying and installation. The pipeline shall be laid in accordance with the manufacturers specifications;
- Installation of connecting / maintenance / terminal valves and chambers and concrete thrust blocks, where required;
- Back filling and compaction of trenches;
- Site rehabilitation; and
- Hydro testing (to be tested in sections).

66. All existing services on site shall be located and protected and the repair of any damaged services shall be carried out promptly. These shall be done by potholing every 20-50m intervals in advance of pipe laying. The new pipeline will be laid at an offset distance of 1.0 - 2.0m from any existing pipelines.

67. Materials temporarily excavated as part of trenching were stockpiled immediately adjacent to the trench and then used to refill the trench upon completion. Stockpile material was protected from erosion.

68. Concrete thrust blocks were constructed at key locations on the pipeline to counteract pipe movement. Thrust block designs will be as per SW standards.

69. In operation, the pipeline will require periodic inspection and maintenance to ensure operational integrity.

3.6.3.3 Pump Station

70. The construction activities associated with the new Pump Station include the following works (see Figure 4):

- Bulk earthworks, access and site grading;
- Clearance of vegetation
- Installation of silt and sediment traps and erosion control measures, where necessary;
- Foundation trenching;
- Construction of concrete foundation and floor slab;
- Installation and construction of wall steel frames, block wall structure and tin sheet roofing;
- Installation of or relocation (where necessary) of standby generators, pumps, electrical switchboard and fittings;
- Connection to SIEA grid from the nearest 415V pole;
- Site rehabilitation; and
- Testing and commissioning works.

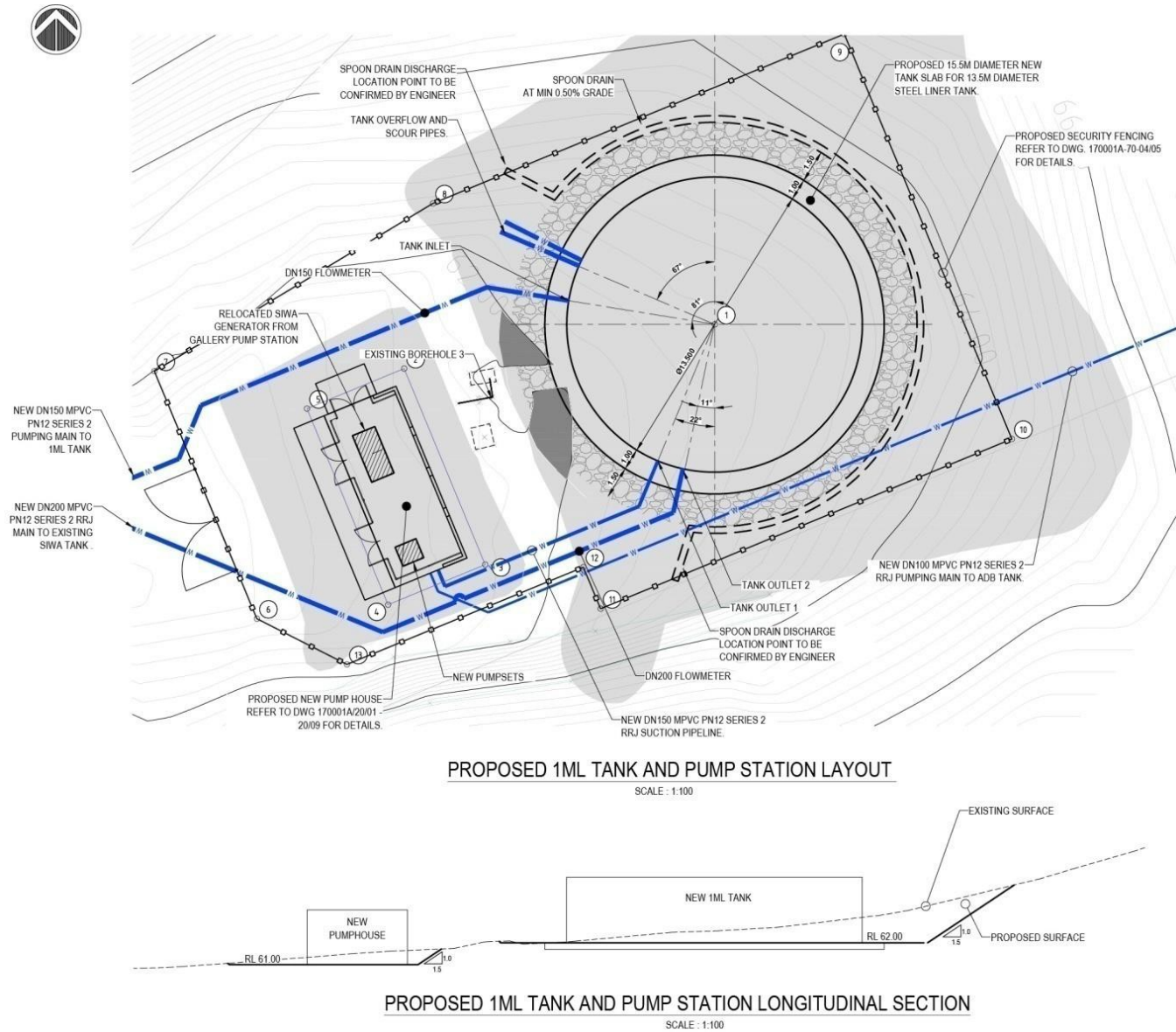


Figure 4: New 1ML tanks and Pump Station layout and Longitudinal Section

3.6.4 Scheduling

71. The overall construction duration will be undertaken over a 6-month period from the start date.
72. Normal working hours will be between 7am and 5pm every weekday with some night works and work over the weekend may be required. Community awareness will be undertaken prior to changes in schedule times.

3.6.5 Installation of chlorination system at key locations

73. SW carries out water chlorination as part of its treatment to ensure safe water is distributed to customers. In Auki at the moment, samples of water tested comply with Total coliform and E.coli compliance standards. There is however the need to chlorinate all the raw water sources and the new system will ensure chlorine is injected at key locations before distributing to customers.
74. Chlorination will be undertaken at the inlet to the High ridge tank before any customers are supplied and, where all 3 boreholes can be dosed where the flow combines. Chlorine will be flow paced dosed in order to achieve a chlorine residual that is in line with WHO guidelines for drinking water.
75. Chlorination is undertaken using sodium hypochlorite solution. Based on the loss of efficacy of the chemical, the dose rates and amounts to be stored will be calibrated at commissioning. There will be a 200L tank at the dosing house as the dosing pump feed. Excess chlorine will be stockpiled off site with the Chlorine that is currently utilized at Kwaibala.

3.6.6 Repair and minor liner works to existing Gallery and ADB tanks

76. The existing ADB tank has not been in service since its construction in late 2007 because of issues with low pressure to supply tank from the pump station at Kwaibala source. Plans are in place to replace the pump at the Kwaibala source to enable water to be pumped up to the ADB tank which is outside of this scope. Part of this scope was to recommission the ADB tank through supply from the new pump station and put it back into service. This will ensure added storage capacity and increase the supply area to support supply redundancy in the event another tank is out of service for various reasons.

3.6.7 Security fencing works at the new tank and the ADB and High Ridge tank sites

77. The security of the water source and infrastructure and water quality is important. To avoid unauthorized entry and the risk of contaminating the water supply, a security fence will be constructed on new and existing sites.

3.7 Auki Water Catchment Area - Zoning controls of the Auki Local Planning Scheme.

78. An Auki Local Planning Scheme (LPS) was prepared by the Malaita Provincial Town and Country Planning Board in accordance with Part III of the Town and country Planning Act [Cap.154] with assistance from the Ministry of Lands, Housing & Survey

in 2017.

79. The LPS sets out controls over how land should be subdivided, used and developed into the future. A series of Zones and Overlays were introduced to establish what types of land uses are permitted in particular locations.
80. The LPS identified the blue shaded area as the water catchment area. This area also encompasses the proposed pipeline route, pump station and tank site (Figures 5 and 6). It is also where the 3 boreholes supplying approximately 45% of Auki's water need are located.

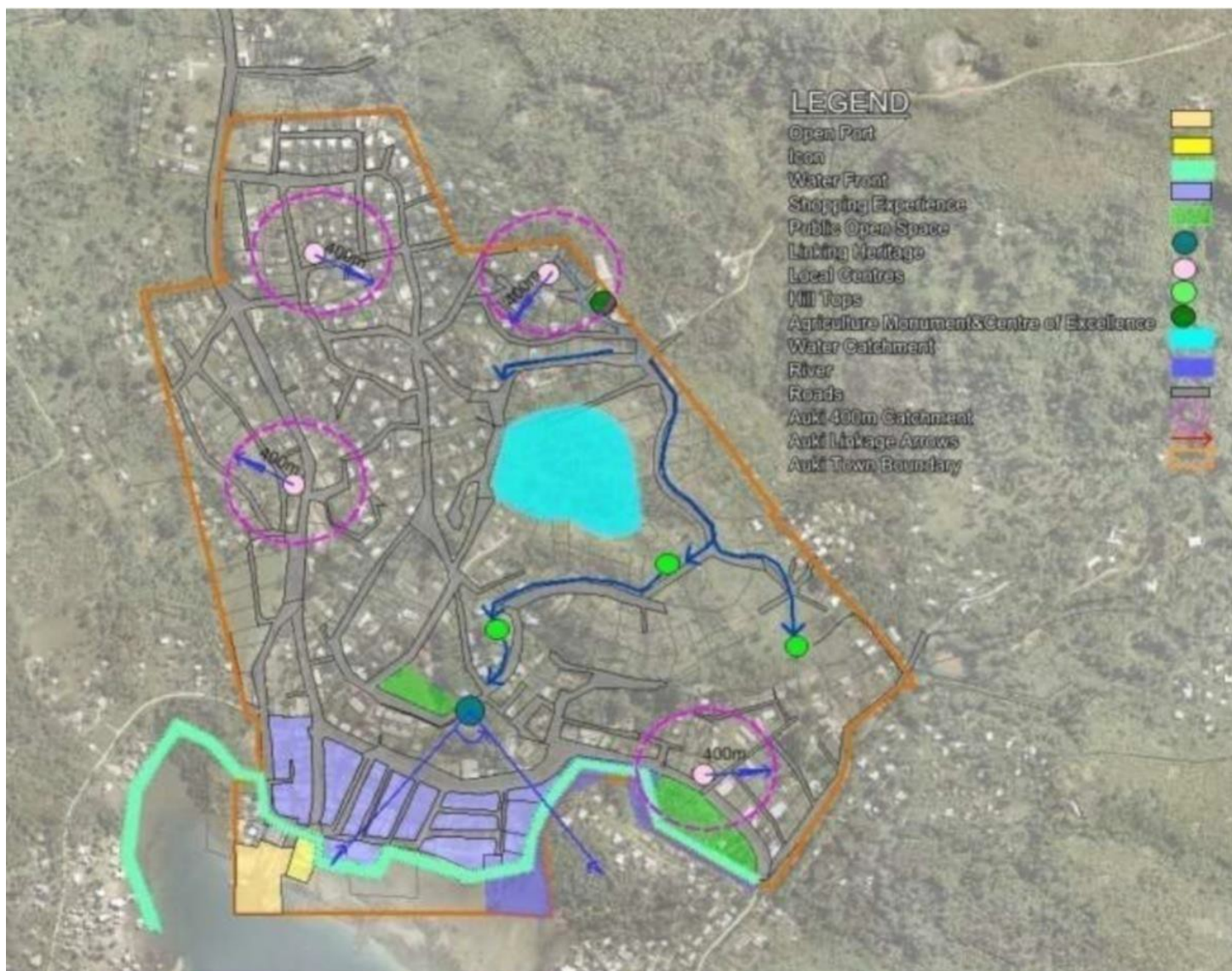


Figure 5: Auki Local Planning Scheme showing the project site as water catchment area

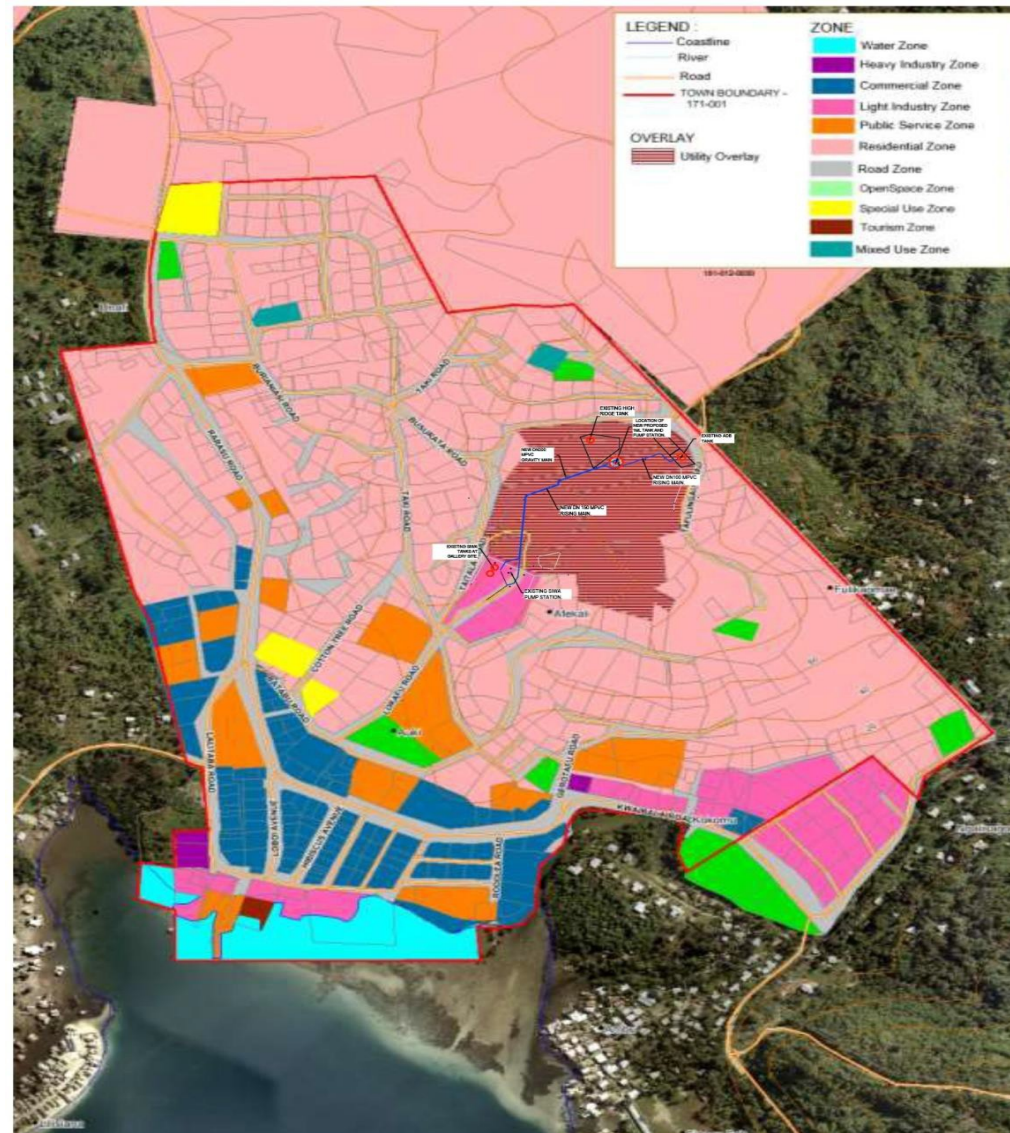


Figure 6 : Auki Town Zoning Plan - with water catchment designated as Utility Use

81. To protect the water catchment area, the area designated, as per the LPS is prohibited for any other development except for SW whenever there is a need for maintenance on its existing boreholes and tanks or for any development to preserve water quality and production.
82. This proposed project lies within the designated water catchment area.

3.8 Infrastructure and transport components

83. The existing road network is the Dukwasi road originating from the foothill of the SIEA power station. The road runs alongside the proposed piping corridor but does not cross into the proposed pipeline route. The existing boreholes have an existing feeder road built and maintained by SW specifically built for access. The current SW access road starts the top of the Gallery site and ends at the proposed new tank and pump station site.
84. The major project components will not interfere with any current electrical and telecommunication network services as they are outside of the project corridor and site. The new pump station and tank site will require power and this will be supplied via connection to the 415v network adjacent on neighboring hill to the high ridge tank (
85. Figure 7).



Figure 7: Existing SIEA power lines (Source: Solomon Power GIS, April 2018)

3.9 Other features of existing or past land use

86. Current land use as per the local planning scheme is water catchment area. However, there are some residential properties adjacent to the proposed piping corridor and project sites. These properties are not affected by the alignment of the proposed corridor for pipe laying or tank and pump station.
87. There are no cultural, sacred sites or industrial facilities. Land is currently used by locals for subsistence agriculture.
88. The proposed route and site is government owned land with the Commissioner of Lands (CoL) as the Perpetual Estate (PE) holder.⁴ Several plots adjacent to the site have been leased as Fixed Term Estate (FTE) to individuals⁵. Customary land borders with the town boundary but will not have any direct influence on the project.
89. The title for the remainder of the catchment area and all areas to be impacted by the project work currently rests with the CoL as the government authority responsible for land within the Solomon Islands. Following the project, it is expected that the land will be titled to SW. There are no plans to relocate any title holders within the catchment area. SW working assets will be fenced to ensure safe and continuous production as required by the SW draft water safety plan for Auki. This fencing will not block existing access ways all of which are currently informal. The Auki RP details actions that may be taken in the catchment area.

3.10 Measures to ensure long term reliability of water abstraction from Auki catchment

90. Solomon Water will rely on a number of measures to ensure the long-term reliability of water abstracted from the Auki catchment area. These are:
- Effective chlorination of all water produced in Auki –this is a key component of the Auki Water Supply Upgrade project;
 - Stakeholder and local community awareness about the need to protect critical water supply catchments. This will include awareness on the interface between human activity and transmission of pathogens in particular from sewage waste; it will also cover SW role and responsibility along with Provincial and National Governments to ensure catchment integrity and the powers provided to achieve this.
 - Implementation/enforcement of policy relating to the use of septic tanks – design, installation and ongoing maintenance – by households;
 - Relocation of properties to outside the catchment area could possibly happen in the future but only as a last resort to ensure groundwater quality. If this is necessary SW will follow the resettlement requirements of SI Government and development partners.
 - Production and maintenance of a Water Safety Plan will be completed after commissioning.

⁴ PE the ownership of the land is indefinite i.e. freehold

⁵ FTE – The land title is granted for a period of time e.g. 75 years

4 DESCRIPTION OF THE ENVIRONMENT

4.1 Physical Environment

4.1.1 Elevation

91. The project site is located at an elevation between approximately 30m to 70m amsl. Lower lying areas adjacent to the project site are occupied by the SIEA power station, some residential properties, the Auki Prison, Auki Primary school, the Malaita Diocese offices and the Auki Town itself. The medium level elevation of the site presents no risks from sea level rise, storm surge or potential flooding; run off from the catchment area is channeled through surface drainage to lower elevations.

4.1.2 Climate

92. Malaita's climate is extremely wet with Auki receiving an annual rainfall of 3252mm. It is located in the Intertropical Convergence Zone ("Doldrums") with trade winds during the Southern Hemisphere winter, and from about April to August they blow from the southeast fairly steadily. During the summer, fringes of monsoon blow over the island. The climate in Auki is hot, oppressive, windy, and overcast. Over the course of the year, the temperature typically varies from 23°C to 30°C.

4.1.3 Soils

93. Wall and Hansell (1972)⁶ profiled soils on Malaita with the widespread soil of the Dala land system, occurring chiefly around northern and southern Malaita, usually less than 120 amsl. The soils are shallow to deep, dark brown, brown clays and well drained. The parent material is coral and calcareous sediments.
94. The vegetation/land use associated with these soils is described as poor garden regrowth, 4-5 years old, consisting of woody shrubs, ferns, and gingers. The subsistence agriculture is shown in Figure 8.

4.1.4 Geology

95. The geology of northern Malaita consists of basalts overlain by a pelagic calcareous sediments, respectively the Malaita Volcanics and Malaita Sediments of Hughes and Turner (1976) for southern Malaita and the Alite Volcanics and Malaita Group of Rickwood (1957) for north Malaita.⁷ This sequence is characteristic of the "Pacific Province" (Coleman, 1965) of which Malaita is the major element in Solomon Islands.
96. Malaita is an uplifted and intensely folded portion of oceanic crust. The older rocks were extensively deformed mainly during Pliocene, producing structures with northwesterly trends. Subsequently the island has been tilted, submerged and

⁶ J. R. D. Wall & J. R. F. Hansell (1973) - Soils of some Quaternary marine terraces in the British Solomon Islands Protectorate and some problems in their agricultural use, New Zealand Journal of Agricultural Research, 16:2, 271-286,

⁷ Petterson M (1995) - The Geology of North and Central Malaita, Solomon Islands including implications for Makira, Savo, Santa Isabel, Guadalcanal and Choiseul. Government of Solomon Islands

uplifted to varying degrees to produce the present geomorphology. The present geomorphology closely related to fold structures, i.e. anticlines are often hills and synclines valleys.

4.2 Air quality.

97. There are no available air quality data for Auki as there is currently no environmental standards being implemented for air quality.
98. In general, the peri-urban areas of Auki, where proposed components will be located, have no major sources of anthropogenic emissions and noise generators. For these areas, it is therefore expected that the average ground level concentrations of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and particulate matter (PM10) will not exceed the values in IFC's guidelines (EHS Guidelines of April 2007).

4.3 Project - Climate and disaster risk

99. The effects of climate change (temperature, rainfall, sea level) and associated risks are likely to have minor impacts on the project. During construction, management of soil erosion is noted and appropriate soil erosion containment measures will be adopted by the contractor. The relatively short period of construction is expected to mitigate against landslides which are exacerbated primarily by earthquake activity, though heavy rainfall events may also trigger localized land slips on the steeper slopes
100. Rising sea level, over time, may have an effect on salt-water intrusion into the ground water affecting the water quality of the boreholes and will need to be monitored closely.

4.4 Natural Hazards

4.4.1 Extreme rainfall and flooding

101. The flooding overlays indicated in Figure 9 are areas that have experienced flooding between 2012 and 2017.⁸ The shaded area is within the Kwaibala River catchment. The proposed work area is located outside this flood prone area. The existing SW Kwaibala spring source is in the vicinity of the flood prone area and is vulnerable to flooding causing turbidity issues when there is heavy rain.

4.4.2 Storm surge and Sea Level Rise

102. Areas identified at Auki, at risk of storm surges and sea level rise due to tropical cyclones and other effects associated with climate change are identified in Figure 10⁹. The proposed work areas lie outside the predicted storm surge area and sea level rise.

⁸ Draft Auki Local Planning Scheme (February 2017) - Prepared by the Malaita Provincial Town and Country Planning Board in accordance with Part III of the Town and Country Planning Act [Cap.154] with assistance of the Ministry of Lands, Housing & Survey

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4.4.3 Landslide and Tsunami

103. Although the proposed work area site has gentle to steep slopes, there is no recent history of landslides. There is no immediate threat to the site by Tsunamis as the site is located inland and on elevated ground.

4.5 Biological Environment

4.5.1 Flora and fauna

104. The proposed site is predominantly covered with small to medium shrub vegetation which is a result of land scale clearing of the original indigenous vegetation. Surrounding vacant land is cultivated for root crops and vegetable by locals living around the area (Figure 8).

105. Crops and fruit trees grown in subsistence gardens include but are not limited to: sweet potato, cassava, banana, slippery cabbage, papaw, corn, Coconut, Taro, Peanuts, Eggplant and Sugar cane. There are also a wide variety of invasive species, including ornamentals and fruit trees.

106. The fauna will be impoverished because of the highly modified nature of the flora often with introduced species dominating.

4.5.2 Watercourses and water bodies

107. The three existing boreholes (B1, B2, B3) currently are located in an aquifer supplying Auki's water need.

108. The Kwaibala spring source is filtered through an infiltration gallery. During very heavy rains it is sometimes necessary to close the supply from this source. In this case production relies on the 3 boreholes. The provision, through the project, of additional storage in the system will help SW to mitigate the impact of temporary closure of the spring source.

109. Small perennial streams flow in the valleys along the pipeline route with water quality heavily impacted from the highly modified terrestrial ecosystems.



Figure 8- Site Vegetation



Figure 9 - Flood prone Area at Auki



Figure 10 - Storm Surge Prone Area at Auki

4.6 Socio-economic Profile of Auki

110. Auki is the provincial capital of Malaita province, one of the main island provinces of the country. It is situated about 100 km northeast of Honiara. It is composed of four islands, Big Malaita (where the main town Auki is located), Small Malaita, Sikaiana Island and Ontong Java Atoll. Its total land area is about 4,225 km².

111. Auki serves as the main administrative, educational and economic centre for the province. It has a population of just over 5,100 with an average density of 468 people per square kilometre. The province however is densely populated hosting about a third of the total population of Solomon Islands. Auki town can be reached directly by plane or ferry from Honiara. Table 3 provides some selected socioeconomic indicators of Malaita Province.

112. From the 2009 census data, in Auki, the proportion of female/male is 50% for both sexes with 873 households. There is an average of 5.8 persons are in each household. The population of Auki is ~ 4 % of the population of Malaita Province and Auki's census data is captured in the Province's census data collated in Table 3.

Table 3: Selected Socio-economic Indicators for Malaita Province¹⁰

Indicators	Malaita
<i>Total Population</i>	137,596
Male	62,232
Female	68,364
Ave. Annual Population Growth Rate (%)	1.2
Population Density (pop/km ²)	33
<i>Urbanization</i>	
Urban Population	5,105
Percent Urban	3.7
<i>Household</i>	
Number of Households	24,421
Average Size of Households	5.6
Employment-Population Ratio	16.0
Male	22.1
Female	9.9
Unemployment Rate	0.8
Male	1.1
Female	0.6
<i>Education</i>	
School enrolment Rate, 6-12 yrs (%)	75.3
Male	74.9
Female	75.8
<i>% of pop aged 12 and older with</i>	
No school completed	26.9
Primary education	55.0
Secondary education	12.2
Tertiary Education	2.2
Vocational/professional training	0.5
Literacy rate	70.4
Male	78.8
Female	62.4

¹⁰ Report On 2009 Population & Housing Census, Solomon Islands Government

113. Malaita Province has various national and regional government offices, social infrastructure facilities such as Kilufi'l hospital, Atoifi hospital, clinics and area health centres, several primary and secondary school, churches, BSP bank, market, hotels, restaurants and shops.

114. About 33% of the total households in Malaita rely on rivers and streams and unprotected well for their main source of drinking water while about 46% rely of communal facility tapped directly from streams and rivers. In terms of sanitation, only 10% have access to sanitary toilet; mostly in Auki and other urban centres at Malu'u. Majority use either pit latrines and/or open spaces for defecation. Likewise, on garbage and other waste, majority use their backyard the river/stream/seas or other open spaces for its disposal. In Auki the landfill/garbage disposal area has been disputed and wastes are now being dumped close to the Auki market (

115. Figure 11).



Figure 11: New Land fill site at Auki

116. Only about 64 percent of households in Auki are connected to the SW reticulation system for their source of water. This is approximately 561 of 873 households, both in the commercial and domestic category. The remainder either share or purchase their water from active customers or use private rainwater tanks and wells.

117. Educational and medical services in and around Auki town are Auki Clinic, Kilufi'l

hospital, Auki Primary and High School and Aligegeo Secondary School. These are all government services under the Ministry of Health and Medical Services and the Ministry of Education and Human Resources Development.

118. 45% of the residential, commercial and institutional establishments of Auki are going to be the primary beneficiaries of the project. However, customers connected to the spring source at Kwaibala are also likely to benefit when the redundant ADB tank is re-commissioned under this project.

4.6.1 Legal ownership of the land

119. Solomon Water has submitted an application to the MoLHS through the Lands Trust Board to formally acquire the land and be registered with SW. Plots adjacent to the proposed pipeline corridor are currently owned by individuals (see Figure 122). Some of these individuals have already received titles while others have been allocated plots but are yet to receive FTE titles. A number of these plots have been developed while others are still undeveloped. An independent valuer engaged by SW has valued the developed properties along the route.

120. The Malaita Town and Country Planning Board and Executive supports SW's endeavor to formally acquire and declare the site as water catchment area. This will give SW exclusive rights over the land to:

- protect the water catchment of the boreholes, water well and aquifer⁴
- ensure good quality of water for all Auki residents
- prohibit any development except for SW whenever there is a need for maintenance or any development to preserve water quality.

121. The proposed pipe route and new tank site will be located adjacent to existing property boundaries, namely lots 841, 804, 814, 813, 812, 723, 564 and 583.

122. There will be no need for relocation of any of these properties during construction. The project has had minimal impact on land use in the area such as the relocation of a greenhouse, encroachment of a pipeline with some impact on land being cultivated. Solomon Water has taken appropriate measures to manage the impact through consultation, negotiation and agreed compensation by all parties and has documented the process. Relocation of properties to outside the catchment area could possibly happen in the future but only as a last resort to ensure groundwater quality. If this is the case, it will be necessary that SW follows the resettlement requirements of SI Government and development partners at that time.

123. Plans are in progress with the MoLHS to acquire the land for registration with SW for water security purposes. Approval has been granted by the Land Board for SW to progress the development as per its development plans on the proposed site(s) subject to relevant permits from the Provincial Town and Country Planning Board.

Table 4: Summary of FTE holders of adjacent land

PARCEL NUMBER	LOT NO	P/E Holder	FIXED TERM TITLE HOLDERS	NAME AGAINST I/S No.
No parcel number yet	841		NO FTE YET	Gregson Angisia
No parcel number yet	804		NO FTE YET	Rex Aega
171-001-0617	723	COL	Josiah Irosaea	Josiah Irosaea
171-001-0554	583	COL	NO FTE YET	Robert Soekeni
171-001-635	812	COL	NO FTE YET	R Soekeni
171-001-636	813	COL	NO FTE YET	Subdivision of lot 582 into Lots 812-814
171-001-637	814	COL	NO FTE YET	A Loaki, R Butala
171-001-0521	564	COL	NO FTE YET	SIWA

⁴ AUKI LOCAL PLANNING SCHEME February 2017, Malaita Provincial Town and Country Planning Board and Ministry of Lands, Housing & Survey

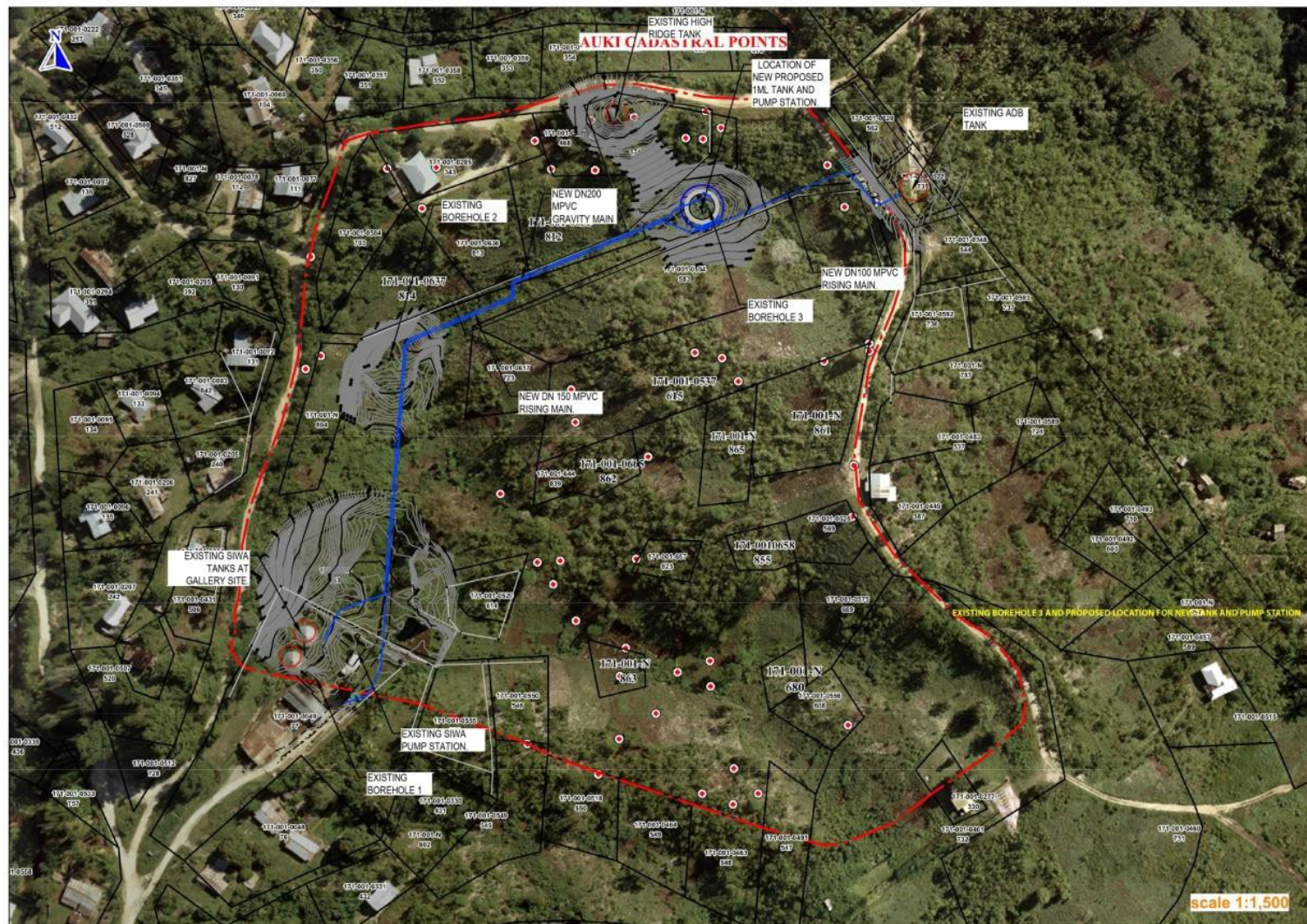


Figure 12: Auki site map identifying land plots

4.6.2 Province and villages

124. The project is located within the town boundary, Auki, Malaita Province (Figure 133). There are no villages in the vicinity of the project site. The nearest village is more than one kilometer away and will not be affected by the project.

4.7 Socio Economic - Climate and disaster risk

125. The effects of climate change (temperature, rainfall, sea level) and associated risks are likely to have minor impacts on the project and the local community. Increased rainfall events may lead to greater soil and crop loss which may be countered by changing farming practices e.g. contouring.
126. The relatively short period of construction is expected to mitigate against landslides which are exacerbated primarily by earthquake activity, though heavy rainfall events may also trigger localized land slips on the steeper slopes. This may be associated with crop and financial losses.
127. Rising sea level, over time, may have an effect on salt-water intrusion into the ground water affecting the water quality of the boreholes and will need to be monitored closely.

4.8 Noise level

128. There is no available noise data for Auki. For urban areas, such as along existing main roads; noise levels are expected to be higher due to traffic volumes, particularly during the daytime rush hour periods.

4.9 UXO Clearance

129. The Auki catchment area is considered to be a low UXO risk area by SI authorities. An informal clearance survey was carried out by SW staff at the time of the JICA borehole project across the catchment area from borehole sites to the high ridge tank area.
130. Based on this survey and that much of the area has been cultivated over a number of years, it was considered that there was no need for a detailed UXO survey to be carried out in advance of the project.
131. The low risk has been shared with the contractor prior to construction start.

4.10 Cultural Sites

132. There are no cultural or sacred sites with the land currently used by locals for subsistence agriculture.

4.11 Transportation Routes

133. Imported materials for the project will be brought in by sea transport and transported to site on trucks. A staging area will be next to the site, adjacent to the pump station at borehole 3. The transportation route will be from Auki wharf, through town and along the Dukwasi road past the Auki Primary School.
134. Local sub-contractors in Auki will be engaged to carry out civil and building works. Aggregate and sand required for the works will be sourced locally mainly from the Fiu river and Fiu Beach. An agreement is in place with the resource owners for the supply

of these local materials. Fiu is located approximately 10km from Auki.



Figure 13: Auki Town Boundary

5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Design and Pre-construction Phase

135. Design and pre-construction considerations include climate change vulnerability; grievance management; disruption of utilities and services; disposal of excavation spoils; solid waste management, potential damage to archaeological and cultural assets; and biosecurity matters.

136. The contractor will submit a CEMP prior to mobilization on site.

5.1.1 Environmental management system and environmentally responsible procurement.

Throughout the Project, for implementation of environmental safeguards to be effective, an environmental management and monitoring system was established. The PMU ensured that the EMP was updated, as required, based on detailed design and incorporated into the bid documents. The bid documents specified other environmental management requirements such as: (i) requirements to comply with applicable standards; (ii) the contractor will designate an environmental, health and safety officer (EHSO) and describe the reporting/communication lines and channels; (iii) the monitoring and reporting requirements; and (iv) delivery of induction, training and awareness sessions for workers and the community.

137. Prior to works commencing at the project site, the contractor prepared and submitted a site-specific construction EMP (CEMP) to the PMU, the CEMP was based on the project EMP and detailed the construction methodology and program to be undertaken at each site, identified the risks associated with that construction methodology and detailed mitigation measures to avoid or reduce the risks. The PMU reviewed and approved the CEMP. A No objection from the PMU was received by the Contractor before work started.

138. Once works commenced, the EHSO conducted monitoring of compliance of activities with the approved CEMP with the PMU undertaking inspections of the effectiveness of the contractor's implementation of the approved CEMP. PMU will devise the checklist to be used for the inspections and audits and will consolidate the inspection/audit findings along with summaries of the contractor's monthly reporting. WB and ADB will undertake review missions which will report on, inter alia, overall implementation of social and environmental safeguard requirements.

139. The project has established a grievance redress mechanism (GRM) to address concerns and resolve complaints and issues raised on any aspect of Project and subproject implementation. Safeguards concerns will be addressed through the GRM.

140. The CEMP outlined how the contractor will implement the relevant elements of the GRM and how and when they will provide information about construction activities and timing to the community. The contractor will provide information about the works, impacts and mitigation/control measures to the community in a timely and effective manner. The contractor's liaison and communication with the community, managed by the CLO, will be guided by the Project's CCP.

141. Workers and sub-contractors were inducted to the site and this included awareness and training on the provisions and requirements of the CEMP and how it is to be implemented.

5.2 Physical Environment for Preconstruction Impacts

5.2.1 Sourcing of local construction materials.

142. Construction materials are to be sourced by the contractor from local suppliers. Approximate volumes are

- a. Tank and building foundations 3000m³
- b. Bedding and pipe surrounds 500m³
- c. All weather access tracks 1000m³

143. Should quarries and borrow pits be required, the following criteria will be met:

- Existing operations with development consents/BMP will be used
- borrow pits will be covered by required government permits or approvals,
- will not be located within 300 meters of any urban area sensitive receptors,
- topsoil will be saved for rehabilitation during closure of the quarries and borrow pits, and
- will be provided with drainage and sediment flow controls
- proper closure of the quarries and borrow pits will be required. This will include fencing and placement of warning sign to the public.

5.2.2 Climate change vulnerability.

144. Climate change resilience is a critical consideration because Auki is vulnerable to the effects of intense rainfall. Changes in the intensity of extreme weather events and gradual change in climate parameters such as precipitation could damage proposed water supply infrastructure.

145. Soil erosion plans, if required, will be made by the contractor prior to construction.

5.2.3 Soil erosion and sedimentation.

146. Potential source of sediment runoff includes site clearing, ground leveling, excavations for the foundation of structures and pipe laying. These activities can release soil materials to the surrounding areas during rainy periods if not provided with sediment control measures.

147. The material removed during trenching, before pipe laying, backfilling and compaction, will in the event of rainfall, be contained by grass bale barriers, silt fence, sediment traps, and temporary sediment basins, preventing sediments from moving offsite.

148. The contractor, if required, will prepare an erosion and sediment control plan as part of their CEMP.

5.2.4 Disposal of excavation spoils.

149. Construction activities may generate excess excavation materials.

150. The PMU:

- required the contractors to submit a plan for the disposal of excess excavation spoils, and
- undertake inspection and approval of the contractors' suggested disposal sites prior to actual construction.

5.2.5 Land access and use.

151. An access road maintained by SW was used during construction.

5.2.6 Solid waste management.

152. Contractors will be required to Prepare a waste management plan, as part of the CEMP.

153. The Auki dump site will be utilized for all wastes with exception of site spoil and is located on provincial government land.

154. Waste generation is expected to be predominantly packaging and packing materials.

155. No distinction to different waste streams is made as recycling facilities, or hazardous goods disposal are not present in the Solomon Islands.

156. All these activities, where appropriate, will be reflected in the CEMP.

5.3 Biological Environment for Preconstruction Impacts

5.3.1 Vegetation Clearance

157. No vegetation clearance is required during the design phase. Surveying and geotechnical investigations can be conducted with no significant impact to vegetation.

5.3.2 Potential Contaminated Ground Water Quality

158. As referenced in Section 3.5 Project Components, concerns about the risk of contamination of the shallow well source were raised with SIEA and now SIEA have amended their fuel handling practices. SW believes as a result of these activities that there is no risk of contamination to the deep aquifer.

159. SW will undertake the following mitigation measures to minimize contamination potential:

- capping of the shallow well to protect the shallow groundwater,
- decommissioning of the shallow well located within the SIEA compound, and
- tapping into deeper aquifers.
- water quality testing of the two deep operational bores and the shallow decommissioned bore for hydrocarbons.
- Reference to the Water Safety Plan for Auki which details specific risks associated with supplying drinking water as per the WHO guidelines for safe drinking water. Such risks and mitigations are to be identified by SW operations

5.4 Socio - Economic Impacts for Preconstruction Impacts

5.4.1 Land Access and Resettlement

160. No permanent or temporary land acquisition during construction land acquisition is needed for the project and there is no resettlement required. Consequently, as detailed in the Resettlement Plan (RP), there is no major relocation, economic displacement and loss of income expected from the implementation of the project.
161. An estimate of the type and number of trees, root crops and other economically important plants and vegetables within the project site have been undertaken on site by both SW, the garden owner and the Extension Officer from the Ministry of Agriculture. An MOU had been signed and agreed to for compensation for 2,625.00 SDB. The inventory is provided in the Auki Resettlement Plan.
162. Compensation agreements were entered into between SW and each of the affected parties individually and compensation payments made in advance of contract signing for the upgrade project. Crop owners were given advance notice of construction start in order that they could harvest crops in advance of construction. Details of individual MoU's are included in Annexes 7 to 9 of the RP.
163. Whilst preliminary discussions have been initiated in Auki with the individuals who have been offered land around the project site and users about the project, an application and agreement was reached with the Lands Board and Provincial Town and Country Planning Board to have the whole catchment land resumed for SW. Solomon Water is taking steps to enforce the protection of the designated Auki catchment area within which there are three boreholes providing approximately 45% of the production volume for Auki water supply system.
164. SW are negotiating full ownership of the catchment area with government and private landowners and will implement catchment control measures in order to preserve future water quantity and quality.
165. In the short-term, there will be an emphasis on implementation/enforcement of policy relating to the use of septic tanks – design, installation and ongoing maintenance – by households.
166. In the longer term, relocation of properties to outside the catchment area could possibly happen in the future but only as a last resort to ensure groundwater quality. If this is necessary, SW will follow the resettlement requirements of SI Government and development partner.

5.4.2 Disruption to utilities and services.

167. Prior to construction activities, SW and the contractors undertook the following:
- During detailed design coordinated with utility providers to obtain information about locations of services and utilities;
 - coordinated with the other utility companies regarding potential disruptions;
 - made provisions to preserve the operation of current facilities, and
 - notified affected households and establishments well in advance of disruption

5.4.3 *Damage to unknown archaeological and cultural assets.*

168. While there appears to be no archaeological and cultural assets that may be affected by excavations works, precautions will be taken to avoid potential damage to any archaeological and cultural assets. These will include:

- inclusion of a chance finds procedure in the CEMP; and
- inclusion of provisions in tender and contract documents requiring the contractors to immediately stop excavation activities and promptly inform the local authorities and the Solomon Island National Museum on the presence of any unknown archaeological and cultural assets.

5.5 Construction Phase Impacts on the Physical Environment.

5.5.1 *Modification of site topography.*

169. Some additional clearing and pad preparation will be required for the new tank.

170. Site clearance and vegetation removal will be required for the water pipeline upgrade. The pipeline will be constructed along a highly modified vegetation corridor by trenching, then backfilling after the pipe has been laid.

171. Outside of the site area, no additional laydown areas are required. The contractor will create secure compounds on suitable flat ground within the site of which there are several locations which can be utilized. This shall be to the convenience of the contractor and in no way impact any existing uses.

5.5.2 *Solid waste management.*

172. Construction activities are expected to generate solid wastes including used wood materials, steel works cuttings, paint and solvents containers, used packaging materials, on-site office solid wastes, used oil from equipment, unused aggregates, and surplus earth materials. These solid wastes may cause aesthetic problems and will be potential sources of contaminants for surface runoffs and pollution of nearby water bodies. Contractors will be required to:

- Prepare a waste management plan, if required, as part of the CEMP;
- provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste;
- ensure that wastes are not haphazardly dumped within the subproject site and adjacent areas;
- regularly dispose of wastes to Landfill; and prohibit burning of all types of wastes.
- After completion of work activities, contractors will be required to remove construction wastes from sites and implement the required restoration of disturbed sites.

173. The Auki dump site will be utilized for all wastes with exception of site spoil and is located on provincial government land.

174. Waste generation is expected to be predominantly packaging and packing materials. No distinction to different waste streams is made as recycling facilities, or hazardous goods disposal are not present in the Solomon Islands. Waste generation is estimated at less than 1m³ a month (average) of total combined waste. Total waste generated

is estimated as less than 10m³

175. All these activities, where appropriate, will be reflected in the CEMP.

176. Demolition wastes shall be assessed for recycling and disposal, including the determination if any of the wastes are hazardous and prescribe the appropriate handling and disposal for such wastes.

5.5.3 Storage, use and transportation of hazardous materials.

177. The use of oil products and other hazardous materials may be used in the construction activities of the proposed project. Fuel, oil, grease, paints, and solvents associated with the operation of heavy equipment and vehicles may accidentally be released to the environment during construction and adversely affect water quality and aquatic life. Mitigation measures, where required, include:

- Prepare a hazardous substances management plan and an emergency response plan as part of the CEMP;
- ensure all storage containers are in good condition with proper labeling; and
- store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources.

178. Measures for clean-up and handling of contaminated materials will include:

- immediate clean-up of spills,
- oil stained wastes and used oil to be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities,
- ensure availability of spill cleanup materials such as absorbent pads,
- restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils,
- discharge of oil contaminated water into the environment to be prohibited; and
- construction personnel designated to handle fuels/hazardous substances to be trained particularly in spill control procedures.

5.5.4 Air pollution.

179. On-site dust generation and use of vehicles and equipment can be expected during dry periods from activities associated with site clearing, ground leveling, and excavations for pipe laying. Contractors will be required to:

- conduct regular water spraying of roads, work areas and other construction-related facilities to minimize dust generation;
- provide trucks transporting loose construction materials such as sand, gravel, and spoils with tight tarpaulin cover or other suitable materials to avoid spills and dust emission; and
- prohibit burning of all types of wastes generated at the construction sites, as well as other project-related facilities and activities.

5.6 Construction Impacts on the Biological Environment

5.6.1 Impacts on rare or endangered species.

180. There are no Red Listed terrestrial or aquatic species in the Project influence area.

5.6.2 Terrestrial habitat alteration

181. Construction activities will not involve alteration of important terrestrial habitats since the sites are highly modified.

182. Site vegetation clearance is a mixture of regenerative scrub and vines. The areas that are cleared but not incorporated into the final operational areas will be minimal and consist only of trenches outside of hard stands and access ways. This consists of strips no greater than 1m in width that is expected to regenerate without intervention. No plan has been set aside for planting and revegetation based on the small amount of disturbance and the highly modified nature of the site flora.

183. Site vegetation clearance is a mixture of regenerative scrub and vines. No area will be unnecessarily cleared and all areas that are cleared are predominantly intended for ongoing use. Areas of minor clearance are expected to regenerate without specific intervention being required, and as such no replanting is proposed.

5.7 Construction Impacts on the Socio-Economic Environment

5.7.1 Construction noise and vibration.

184. Trucks and construction equipment, which can generate noise of 80 dB(A) from a distance of 30 meters are potential sources of noise during construction. The issue is mostly applicable along the road where water supply pipelines will be installed and the sites for the WTP.

185. Significant vibration from construction activities are not expected since pipeline installation will not involve heavy compaction activities. Contractors will be required to:

- provide prior notification to the community on schedule of construction activities;
- whenever applicable, provide noisy equipment with noise reduction covers;
- position stationary equipment that produce elevated noise levels, such as diesel generators and air compressors, as far as practicable from houses and other receptors;
- prohibit operation of noisy equipment and construction works in populated areas and where sensitive receptors are found during nighttime (19:00 – 06:00);
- in necessary nighttime operation, ensure prior notification and consultation will be made with affected people and local officials, and implement suitable noise reduction measures;
- locate concrete batching plant, and rock crushing plant at a reasonable distance away from inhabited areas and sensitive receptors;
- conduct regular noise level monitoring to determine compliance with WHO guidelines for noise which should not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime.

5.7.2 *Vehicular traffic congestion and hindrance to public access.*

186. Construction activities and any temporary or partial road closures may cause traffic congestion and hinder public access. Contractors will be required to:

- prepare a traffic management and control plan as part of the CEMP and provide traffic management personnel to direct the flow of traffic in the vicinity of the construction sites and construction-related facilities;
- closely coordinate with local authorities for any closure of roads or rerouting of vehicular traffic;
- provide prior notification to the community on schedule of construction activities;
- provide traffic signs in the vicinity of the construction sites to direct motorists and pedestrians;
- schedule construction activities with consideration to periods of heavy presence of people such as festivities, processions, parades, etc. to minimize disruption to local activities.

187. During construction the access to the site will be via the SIEA access way, this is also the normal access for the maintenance of the gallery tanks and pump station which is co-located on this site. Nonetheless a Memorandum of Understanding (MOU) will be put in place with SIEA.

188. Access to the site shall always be open and the contractor shall secure only specific work areas and lay downs within the site boundary. The contractor shall store its plant and materials in such a way that established access ways are not impinged in any way.

189. The tracks that are established for the operation of the facility will be improved in order to cater for the construction equipment and materials that need to traverse the site.

190. Where access is disrupted, either vehicular or pedestrian, due to unforeseeable reasons, this will be notified directly to the AP, verbally and by use of the public posted notice in English or pidgin. Where practical, temporary alternative access will be provided.

5.7.3 *Biosecurity of Imported Material (Invasive Species) on Machinery*

191. All construction equipment i.e. bulldozers, excavators, backhoes will be sourced locally i.e. from Honiara or nearby areas and as such will limit any bio-security concerns focusing on plant invasive species control.

192. International bio-security controls for shipping of machinery is required to meet the acceptable cleanliness standards of the relevant countries' Department of Agriculture or be refused entry into that country. It is the importer's responsibility to ensure all machinery that arrives in the Solomon Islands to be free from biosecurity risk material, such as soil, seeds, plant and animal materials.

5.7.4 *Potential social issues due to influx of workers.*

193. Presence of workers i.e. three expatriates and 10-20 local workers from outside the Project area may cause some social issues; these issues should be minimized as there will be no worker's camp and the workers are not expected to be on site after

normal working hours. However, there may be potential for contact with local residents and a risk of the spread of communicable diseases including Sexually Transmitted Infections (STI's) and Human immunodeficiency virus (HIV). Measures to mitigate such risks and impacts will include:

- induction of all workers on Project requirements regarding safeguards (including child protection), Gender Based Violence (GBV), GRM and CCP requirements;
- Agreement to and implementation of protocols (including code of conduct) concerning the workers contact with the local communities;
- contractor(s) to engage an approved service to implement a communicable disease awareness and prevention program;
- contractor(s) to engage an approved service to implement GBV(Sexual exploitation and abuse and sexual harassment) /SEA/SH, awareness and prevention program; awareness and prevention programs;
- ensuring that sufficient water supply and temporary sanitation facilities are provided for workers at work sites in order that community infrastructure is not over- burdened;
- security at contractor's yard to control unauthorized access and prevent entry of the public (especially children).

5.7.5 Occupational Health and Safety.

194. Health and Safety will be managed in accordance with the Safety at Work act 1987 and where gaps exist best practice will be employed. This specifically refers to the use of Australian and New Zealand standards, guidelines and codes of practice.

195. The contractor is required to have a full-time health and safety representative that will be responsible for ongoing compliance including regular auditing and updates to project specific health and safety documentation.

196. No work is to commence before the submission and subsequent approval of a detailed site specific health and safety management (HSP). The health and safety plan shall generally include the following

- Accident and incident reporting
- Emergency plans
- First Aid plans
- Materials safety, storage and handling
- Site inductions
- Permits for high risk work
- Inspections and auditing
- Regular meeting procedures
- Specific safe work methodologies
- Plant and equipment testing
- Training records and certifications
- Management and reporting structures

197. This document will be a live document and will be subject to amendment should site conditions, methodologies, guidelines, laws or codes of practice change during the course of the works.

198. Risks to the contractor's workforce are those reasonably expected in a Water Treatment Plant construction project, no extraordinary risks are identified. This includes but is not limited to working at heights, confined spaces, deep excavations, live electrical systems, live hydraulic and pneumatic systems, lifting and craning and use of power tools. Site specific risks do exist and it is expected that the contractor will develop work methodologies that take into account all latent conditions. Bidders for the project are required to demonstrate their experience in similar projects.

199. Contractors will be required to:

- prepare and implement a health and safety plan (HSP) as part of their CEMP,
- ensure that a properly equipped and resourced first aid station is available at all times,
- provide potable water and adequate sanitation facilities,
- provide personal protective equipment (PPE) suitable to tasks and activities undertaken to minimize exposure to a variety of hazards, and
- provide fire-fighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present,
- ensure that all workers are aware of emergency response and medical evacuation procedures.
- ensure that only suitably qualified and experienced staff are utilised on the project works
- Guarantee the work practices, skills, qualifications and experience of all sub-contractors engaged to work on the project works. This shall include off site fabrication. To this end where the sub-contractor's systems, rules and policies are of a lesser standard to that of the head contractor, the head contractor shall require their sub contractors to abide by their systems, rules and policies

200. The contractor's HSP will provide guidance to its staff on how good work practices can be carried out on every activity in the construction site to prevent accidents to the workers and the general public. This will include emergency procedures and the required resources, clear description of responsibilities and management, specific requirements of occupational health and safety policies and regulations, training requirements, and site safety rules. The HSP is one of the inputs to the contractor's CEMP.

5.7.6 *Community Health and Safety.*

201. Many of the measures to manage occupational health and safety will help mitigate the risk to the community. The movement of construction vehicles, trench excavations, and various activities may pose hazards to the public. Contractors will be required to:

- implement the various plans to minimize health and safety risks to the public;
- use barriers and install signage to keep the public away from construction sites and excavation sites;
- provide prior notification to the community on schedule of construction activities;

- provide security personnel in hazardous areas to restrict public access;
- operate construction night light in the vicinity of construction sites;
- provide adequate safe passage for public, as necessary, across construction sites; and
- ensure that any access to properties or establishments that have been disrupted or blocked by the ongoing construction activities, are reinstated as quickly as possible or alternative access is provided.

5.8 Operational Phase - Environmental Impacts

5.8.1 Chemical Spills

202. Operational phase impacts will include mitigation measures for the storage or disposal of sodium hypochlorite (chlorine), planned outages or emergency outages and plans, any ongoing water quality monitoring.

203. Materials safety data sheets (MSDS) will be kept on site laminated and within the same facility as the chlorine dosing equipment and any storage areas. PPE will be kept at the facility on accordance with the requirements of the MSDS. SW will utilize the handling procedures as currently in place for the other SW sites that also utilize Sodium Hypochlorite.

204. Measures for clean-up and handling of spilled materials will include:

- immediate clean-up of spills,
- oil stained wastes and used oil to be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities,
- ensure availability of spill cleanup materials such as absorbent pads,
- restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils,
- construction personnel designated to handle fuels/hazardous substances including hypochlorite to be trained particularly in spill control procedures
- Provide workers with the appropriate PPE for fuels/hazardous substances including hypochlorite spillage

5.8.2 Water Quality Monitoring

205. Water quality monitoring is undertaken by SW in line WHO guidelines fourth edition (2017). As a State-owned enterprise with no governing regulatory body; SW undertakes direct assessment (as per section 5.1.2 of the WHO guidelines). SW collects and processes laboratory samples for submission directly to the Solomon Islands Ministry of Mines, Energy and Rural Electrification: Water resources division.

206. Sampling and testing is undertaken by suitably trained staff using approved methods and equipment calibrated to meet international standards

207. Water quality testing is regularly undertaken. Parameters tested include:

- Turbidity
- E. coli

- pH
- Chlorine

208. These parameters are tested in order to demonstrate compliance with the requirements of the WHO guidelines for drinking water.
209. As discussed above the risk of aquifer contamination is considered low. Testing to confirm the absence or otherwise, of hydrocarbons in deep ground water sources is to be implemented.
210. SW will consult with SIEA to indicate the need for a land contamination survey at the power station site.
211. Upon commissioning of the project SW will finalize a Water Safety Plan for Auki which details specific risks associated with supplying drinking water as per the WHO guidelines for safe drinking water. Such risks and mitigations are to be identified by SW operations
212. SW processes and water safety plan will target a 2log reduction in the risk of health-related ailments associated with common sources of contamination. This is achieved through selective abstraction for turbidity control and control of chlorine residual in the reticulation.
213. Onsite online analytical instruments for monitoring of turbidity will be installed to ensure selective abstraction is able to be implemented. The proposed onsite online chlorine and pH+ will ensure chlorine dosing is made to prescribed rates to ensure disinfection.
214. Additional manual sampling and monitoring shall be undertaken in order to verify the results of the online methods. This shall be as prescribed in the WSP and undertaken by SW operations staff.

5.8.3 Planned Outages or Emergency Outages

215. Mitigation measures for planned outages or emergency outages include: (i) identification of potential causes of unplanned outages and emergencies shall be conducted during operation of the water supply system and updated as necessary; (ii) written management procedures for unplanned outages and emergencies as required by the water safety plan implementation (advocated by WHO); (iii) regular inspection and maintenance of the backup power supplies and the associated Automatic Transfer Switch (ATS) of the backup power supplies at the water pumping stations to ensure uninterrupted operation during power failure; (iv) regular inspection and maintenance of pumping systems and emergency backup systems to ensure that these are in good working conditions; (v) implement flushing and disinfection, as necessary, during unplanned outages and emergencies to prevent microbial contamination of the water supply system; (vi) written standard operating procedures manual to be available at the facilities to provide guidance to the water supply system's staff on how to handle unplanned outages and emergencies; (vii) regular training of water supply system's staff on how to handle unplanned outages and emergencies

5.8.4 Occupational Health and Safety.

216. Hazards to operational workers include chemicals, noise and various potentially dangerous situations. Safety in design is incorporated into the design of the contract works and all safety features as required by the applicable standards and guidelines

are specified to be installed.

217. Measures to reduce the operational risk and safety of upgrades include: (i) workers will be trained on health and safety aspects of operating a WTP; (ii) a facility health and safety manual will be prepared to address the prevention, reduction and control of occupational injury and illness.

218. The manual will among others: clearly identify conditions that may cause acute workers health and safety problems, specify requirements that all workers should comply during normal operations and emergency situations, and specify training requirements for health and safety; provide the facility with a five-foot-high fence to control access and avoid exposing the public to any hazard due to the presence of the water supply tank.

219. Materials safety data sheets (MSDS) will be kept on site, laminated and, within the same facility as the chlorine dosing equipment and any storage areas. PPE will be kept at the facility in accordance with the requirements of the MSDS. SW will utilize the handling procedures as currently in place for the other SW sites that also utilize Sodium Hypochlorite.

5.8.5 Community Health and Safety.

220. SW will fence hazardous areas in addition to posting signs highlighting the dangers of these areas.

5.9 Operational Phase - Socio- Economic Impacts

221. Operational phase impacts will include risks to employee and public safety; health hazards due to poor water quality.

222. Operators will prepare health and safety maintenance manuals that include Health and Safety considerations to address the prevention, reduction and control of occupational injury and illness in operating water supply and sanitation facilities. The manuals will include information on: (i) clearly identifying conditions that may cause acute worker health and safety problems, (ii) requirements that all workers should comply during normal operations and emergency situations, and (iii) training requirements for health and safety in operating the facility.

223. As described in Section 4.6, the proposed assets are on government owned land with the CoL as the PE holder; as such there are no customary land issues. Several plots adjacent to the site have been leased as FTE to individuals.

224. Solomon Water has submitted an application to the MoLHS through the Lands Trust Board to formally acquire the land and be registered with SW.

225. The Malaita Town and Country Planning Board and Executive supports SW's endeavor to formally acquire and declare the site as water catchment area. This will give SW exclusive rights over the land to:

- protect the water catchment of the boreholes, water well and aquifer
- ensure good quality of water for all Auki residents
- prohibit any further development except for SW whenever there is a need for maintenance or any development to preserve water quality.

226. Plans are in progress with the MoLHS to acquire the land for registration with SW for water security purposes. Approval has been granted by the Land Board for SW to

progress the development as per its development plans on the proposed site(s) subject to relevant permits from the Provincial Town and Country Planning Board. This is documented in the Auki RP.

5.10 Consultation, Information Disclosure and Community Participation

227. Information disclosure, public consultation, and public participation are part of the overall planning, design and construction of the proposed project.
228. Consultations with all stakeholders and potentially affected persons have commenced, initiated by Solomon Water
229. As part of the resettlement plan and GRM, a number of public awareness and community consultations were undertaken. A key stakeholder consultation and meeting was held on 19th June 2019 in Auki to brief participants on the proposed project. The meeting centered on disclosing information about the project, discuss and document the stakeholder interest, roles and responsibilities including issues on land and easement, compensation and entitlement, environmental assessment and social issues and on relevant regulatory decisions on permits or licenses required with respect to the project.
230. A broader public awareness and consultation was held in Auki market on the 21st of June 2019 for public information disclosure and awareness which are essential for maintaining support and mitigating grievances during project period.
231. Targeted consultations were held with Affected Persons. Attached as Appendix C is the summary of these consultation and participation activities undertaken during the Project design stage and prior to tender award.
232. A major output of these consultations was the finalization and signing of MOU agreements between the affected parties and Solomon Water.
233. The resettlement plan articulates the strategy to manage catchment processes to protect the water supply for Auki.
234. Whilst preliminary discussions have been initiated in Auki with the individuals who have been offered land around the project site and users about the project, an application and agreement was reached with the Lands Board and Provincial Town and Country Planning Board to have the whole catchment land resumed for SW. Solomon Water is taking steps to enforce the protection of the designated Auki catchment area within which there are three boreholes providing approximately 45% of the production volume for Auki water supply system.
235. The challenge for Solomon Water is how to manage the limited amount of development that has already taken place on land that is legally (even if erroneously) titled.

5.10.1 Consultations during Project implementation.

236. The Project's CCP will be updated early in Project implementation. The CCP will guide the future consultation and participation activities to be facilitated and undertaken by SW. Whenever necessary, stakeholder consultations will be conducted for specific issues that may arise during the design phase. Stakeholder consultations will be continued throughout the construction phase on an area by area basis to address any potential problems.
237. These will be conducted by SW's PMU, contractors, and implementation consultants

prior to commencement of construction activities. The construction consultations will address stakeholders' specific concerns related to construction activities in their area, including the scheduling of activities and the potential nuisances to the public. Records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues will be kept by SW's PMU.

6 GRIEVANCE REDRESS MECHANISM

6.1 Purpose

238. This Grievance Redress Mechanism (GRM) is designed to deal with grievances from the general public in relation to Solomon Water managed projects at all stages of the project cycle. To date, the GRM has been delivered in English. Awareness of the GRM has been made through consultations in English and Pidgin. Documentation is currently in English but can be provided in Pidgin in future.

239. The mechanism allows for affected parties to make known grievances as the grievances arise and aims to provide a predictable, transparent, timely and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.

6.2 Process

240. The Solomon Water GRM is a three-stage process during any stage of which the grievance may be considered, by both parties, to have been resolved and closed off. The Grievance Log Information Sheet associated with the GRM is listed in Appendix D.

6.2.1 Stage 1

241. Any grievance should first be made known to Solomon Water Project Manager (PM) in charge of the project being implemented. This may initially be verbally however a monitoring form must be prepared and signed off by the party raising the grievance – support to filling in the form can be provided by Solomon Water to the aggrieved party.

242. On receipt of the Grievance Monitoring form the PM will hold a meeting with the aggrieved party in an attempt to resolve the grievance within 5 working days of the grievance being raised. Following the discussion, the grievance may either be resolved or need to be escalated to Stage 2.

243. A Stage 1 Grievance Outcome form should be prepared by the PM confirming either:

- The grievance has been resolved and the means of resolution
- The grievance has not been resolved; and outlining Solomon Water Projects Team position on the grievance.

244. The Stage 1 Grievance Outcome form should be signed by both parties and a copy provided to the party raising the grievance. This form should include next steps in the process if aggrieved party considers the issue not to be resolved.

6.2.2 Stage 2

245. If the grievance is not resolved under Stage 1, the grievance should then be referred to the General Manager of Solomon Water.

246. The General Manager will be provided with the Stage 1 Grievance Outcome form and a meeting arranged with the aggrieved party within 10 working days of issue of the form to discuss and try to resolve the grievance.

247. Based on the discussion the General Manager will issue a Stage 2 Grievance Outcome form confirming either:

- The grievance has been resolved and the means of resolution;
- The grievance has not been resolved; and outlining Solomon Water General Manager position on the grievance.

248. The Stage 2 Grievance Outcome form should be signed by both parties and a copy provided to the party raising the grievance. This should include next steps in the process if the issue has not been resolved.

6.2.3 Stage 3

249. If the grievance is not resolved under Stage 2 the grievance should then be referred to a three-member Grievance Tribunal comprised of 11:

- A member of the Board of SW;
- The PS (or designate) of the MMERE;
- independent member selected by GM SW and Board Chairman.

250. All prior Grievance Outcome reports will be made available to the Tribunal; A meeting with the aggrieved party shall be held within 10 working days of issue of the Stage 2 Grievance Outcome.

251. Within 5 working days of the Tribunal meeting a formal response will be issued to the aggrieved party outlining the Tribunal's decision on the grievance raised.

252. The Tribunal's decision will be final.

6.3 Miscellaneous

253. The GRM will be notified via the community consultation process. This includes the community consultation of identified key stakeholders via public meetings. The public at large will further be notified by an awareness stall at Auki market. Additionally, the project managers phone number shall be posted on the project signboards of which there will 2 of on site. The Solomon Water office at Auki will have a bill posted that has the Project Managers contact details on it. The SW staff will be made aware of the of the GRM process and forms will be made available at the office and lodgments of grievances will be accepted there for forwarding to the Project Manager.

254. Whenever a grievance is resolved to the satisfaction of both parties i.e. the aggrieved party and SW, at whichever Stage this is achieved a written record of the agreement must be made and signed by both parties.

255. At all stages of the process the aggrieved party has the right to be represented by a third party at their own cost. The GRM nor its final decision does not affect the legal rights of the individual.

256. Provisions can be made for persons who cannot read, may have a learning disability, and/or need the written record provided in a written language other than English e.g. having it read to them, translated to a different language etc. when there is a need recognized by local community feedback.

257. Solomon Water are responsible to maintain an accurate register of grievances and the manner in which the grievances are dealt with.

258. Solomon Water Projects Team must hold a grievance review meeting at least once

¹¹ The composition of the 3 person Grievance Tribunal should always ensure at least one female member and where the complainant is female should consist of two female members and one male member.

every 6 months to report on all grievances received and in process.

259.A Grievance Log must be maintained by the Solomon Water Projects Team and an annual report provided to the GM of Solomon Water – this should identify grievances raised (month and to date), grievances resolved (month and to date) and balance of grievances outstanding with specific actions pending. Key information to be included in the grievance log.

7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 Introduction

260. The environmental assessment has determined that the Project will have less than significant impacts on the local environment.

261. The EMP includes: (i) implementation arrangement, mitigating measures to be implemented, and (iii) required monitoring associated with the mitigating measures. It also describes institutional roles and responsibilities during pre-construction, construction, and operation phases.

7.2 Institutional Arrangements

262. The MOFT is the Project executing agency and SW is the implementing agency, operating through a PMU which will include various specialists.

7.2.1 Project Management Unit.

263. SW has established a PMU to prepare and implement the Project. The PMU will include an environment safeguards officer (ESO) who will receive training and capacity building from the international environmental specialist (IES). Together the ESO and IES will ensure that all subprojects are implemented in accordance with the Project's EARF, environmental assessments are prepared, and development consents are obtained, and compliance with each subproject EMP and development consent conditions is monitored and reported.

7.2.2 Construction contractors.

264. The contractors undertaking the works will be responsible for ensuring that their activities comply with the environmental safeguard requirements of the contract including the technical specifications. The contractor will prepare a CEMP for review and approval by the PMU. The CEMP will be activity, site and subproject-specific and detail how the contractor intends to meet the environmental management requirements identified in the EMP of the IEE. It will be designed to ensure that appropriate environmental management practices are applied throughout the construction period. The CEMP will include all of the site-specific and sub-plans necessary to meet the standards and targets set out in the EMP. The contractor will be required to employ a full-time environmental health and safety officer (EHSO) to ensure compliance with all requirements concerning environmental, health and safety, and labor regulations during construction.

7.2.3 Environment Conservation Division.

265. The ECD will review the development consent applications and issue, either with or without conditions, the consents. The ECD will be invited to participate in joint inspections and audits during construction activities.

266. A summary of the environmental management responsibilities for the Project is presented in Table 5.

Table 5: Summary of environmental management responsibilities in the Project

Project implementation agency	Roles and responsibilities
Ministry of Finance and Treasury (executing agency)	<ul style="list-style-type: none"> • Guide and monitor overall project execution Financial and procurement oversight • Ensure flow of funds to the implementing agency and the timely availability of counterpart funding • Review and coordinate bid evaluations
Project Steering Committee (PSC)	<ul style="list-style-type: none"> • Responsible for oversight and providing guidance and strategic direction to SW with respect to project implementation • Ensure that the PMU is provided with the necessary resources to effectively carry out its duties and responsibilities.
Solomon Islands Water Authority (SW) (implementing agency)	<ul style="list-style-type: none"> • Responsible for overall project implementation and monitoring at the implementing agency level • Ensure adequate funding available for the PMU • Submit semi-annual and annual monitoring reports to ADB/WB • Assist in resolving complaints brought through the GRM that have not been resolved at lower levels
SW Project Management Unit	<ul style="list-style-type: none"> • Responsible for overall construction supervision and monitoring • Responsible for overall project management, implementation and monitoring • Responsible for supervision of construction supervision consultants • Responsible for SW's application for a Development Consent • Update the IEEs and EMPs based on the detailed design and submit to ADB/WB for clearance. Assist SW in applying for development consents • Ensure environmental safeguard concerns are incorporated in the detailed engineering design • Ensure updated environmental assessments and EMP's and development consent conditions are integrated into bid documents • Disclose safeguard documents, as appropriate • Conduct awareness and consultations as per the CCP • Submit monthly, quarterly, semi-annual, and annual progress and/or monitoring report to ADB/WB

	<ul style="list-style-type: none"> • Review and clear the of contractor's CEMP • Evaluate the contractors' overall work schedules relative to the requirements of the approved CEMPs • PMU Environmental Officer to provide training for contractors' environment and safety officers to ensure they understand the EMP requirements. • Ensure contractor's implementation of EMP/CEMP. Ensure corrective action requests/instructions to contractors for non-conformances or breaches of the contract or CEMP are undertaken. • Submit monthly, quarterly, semi-annual, and annual monitoring reports to ADB/WB • Compile project's environmental compliance performance upon completion of the construction activities monthly reports • Implement the GRM and maintain records of complaints/grievances Ensure the contractor observes the GRM requirements • Ensure contractor compliance with required resources for mitigation measures as reflected in the CEMP and prepare monitoring reports as required
Contractor	<ul style="list-style-type: none"> • Prepare and submit prior to construction the CEMP for review by PMU's environment specialist and clearance • Understand the EMP requirements and allocate necessary resources (budget and staff) for implementation • Designate and maintain a full-time Environmental Health and Safety Officer (EHSO) to ensure compliance with all requirements concerning environmental, health and safety, and labor regulations during construction • Environmental Health and Safety Officer (EHSO) also to provide capacity building and training for workers on EMP requirements as required. • Implement construction activities with the required mitigation measures • Conduct environmental monitoring as required by EMP and approved CEMP • Act promptly on complaints and grievances concerning the construction activities in accordance with the project's GRM and ensure

	<p>that the contractor's GRM register is kept up to date</p> <ul style="list-style-type: none"> • Submit monthly progress reports on CEMP/EMP implementation to PMU
ECD-MECDM	<ul style="list-style-type: none"> • Processing SW's application for development consent • Monitors construction progress for compliance with the terms of the issued development consent • Monitors implementation of the mitigation measures, EMP and approved CEMP in general
MMERE	<ul style="list-style-type: none"> • Responsible for processing of contractor's application for a building material permits (BMP) in regard to mining and extraction of aggregates or gravel from rivers or land • Monitors contractor's compliance with the terms of the issued BMP
Asian Development Bank & The World Bank	<ul style="list-style-type: none"> • Review and clear IEEs/EMPs • Review bidding documents and CEMPs • Review executing agency and implementing agency's submissions for procurement of goods, equipment, works and services • Provide environmental and social safeguards capacity building to the PMU during missions and remotely. • Conducts project review missions, midterm review mission and project completion review mission to assess project implementation progress of all outputs, compliance of project to covenants including safeguards requirements • Review and disclose semi-annual monitoring reports

7.3 Environmental Mitigations and Monitoring Matrices

267. The EMP (including monitoring requirements) are presented below for the Auki Water Supply Project

Table 6: Environmental Mitigation and Monitoring Plan

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
PRE-CONSTRUCTION							
Climate change vulnerability	Climate change adaptation measures are: (i) results of engineering assessment on potential site erosion of the routes of the tank and pipework; and (ii) appropriate erosion protection for the pipework will be determined to avoid structural failures of the pipeline when unprotected against soil erosion.	Part of detailed design cost	Contractor	SW's PMU	engineering drawings and specifications considered climate change adaptation features	Verify engineering drawings and specifications	To be undertaken as per contractor's contract
Implementation of the project's EMP	Tender documents and construction contract of the for the project will include provisions that will: (i) require the contractors to prepare their respective Contractor's Environmental Management Plan (CEMP) prior to the start of the construction activities with details of staff, resources, implementation schedules, as well as monitoring and reporting procedures; (ii) issue a CEMP framework as guidance for the contractor in preparing a CEMP as part of his bid proposal; and (iii) require the PMU to review and approve the CEMP prior to site mobilization.	Part of contractors' bid cost	Contractor	SW's PMU	CEMP prepared by contractors	CEMP submittal by contractors to PMU/ prior to commencement of site works	To be undertaken as per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Compensation for lost assets	<p>The Entitlement Matrix (EM) provides for relocation cost, compensation for loss of crops and fruit trees with AP's and a negotiated MOU for access and trenching. Design considerations and realignment of piping route will be carried out to minimize impact on any registered land and piping route.</p> <p>All compensation as per the EM will be paid out prior to the start of works and is detailed in RP.</p>	Part of SW's operational cost	SW's operations personnel	SW's Operations Dept. Mgt.	GRM complaints and reconciliation with compensation	GRM will highlight any discrepancies in the agreement between SW and AP's.	As part of S management
Complaints due to project- related impacts	SW's PMU and the contractors will: (i) establish the approved project's grievance redress mechanism (GRM); (ii) publicize the existence of the project's GRM through public awareness campaigns, website, billboards, public notifications, etc.; (iii) ensure that the names and contact numbers of representatives of the contractors and SW's PMU are placed on notice boards at agreed locations and/or website.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	Consultation meetings; specific provisions in tender documents on nuisance & problems to public;	Verify meetings documentation; Verify tender documents; verify the in-placed CACs/ after completion of meetings; once after tender documents prepared	To be undertaken as per contractor's contract
Disruption of utilities and services	SW and the contractors will: (i) coordinate with the other utilities companies regarding the potential disruptions; (ii) make provisions to preserve the operation of current facilities, and (iii) affected households and establishments will be notified well in advance of such disruptions.	Part of contractors' bid cost	Contractor and SW's PMU	SW's PMU	contractor's coordination with the other utility companies; notification of affected households and establishments	verify contractor's coordination meetings and notifications/ after completion of meetings and notifications	To be undertaken as per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Disposal of excavation spoils	The PMU will: (i) require the contractors to submit a plan for the disposal of excess excavation spoils, and (ii) undertake inspection and approval of the contractors' suggested disposal sites prior to actual construction	Part of PMU function	PMU	SW PMU	contractor's disposal plan for excess excavation spoils	PMU disposal sites' inspection/ after contractor's submittal	As per contractor' contract;
Potential damage to unknown archaeological and cultural assets	Tender documents and construction contract will include a provision that will: (i) require construction activities to be stopped immediately upon discovery of any unknown archaeological and cultural assets; and (ii) the contractor will promptly inform the local authorities and the Solomon Island National Museum about the presence	Part of specs preparation cost	Contractor	SW PMU	Specific provision in tender documents on archeological/ cultural relics	Verify tender documents/ once after tender documents prepared	As per contractor' contract;
Environmental Capacity Development	The PMU will employ an Environmental Officer. On the job training for inspections and auditing of Contractor's CEMP, review of tender documents for environmental aspects, review of mid-term reports, aspects of water quality monitoring and laboratory methodology and any other aspects of the operation of SW will be facilitated by the International Environmental Specialist and others members of SW and external agents.	Part of SW's operational cost	SW's operations personnel	SW's Operations Dept. Mgt.	Number of inspections and review of contractors' mid-term reports/bid documents.	Visual inspection of sites; plans verification.	As part of S management
Biosecurity of Imported Plants on Machinery	Where possible, all construction equipment i.e. bulldozers, excavators, backhoes will be sourced locally i.e. from Honiara or nearby areas and as such will limit any bio-security concerns focusing on plant invasive species control. International bio-security controls for shipping of machinery is required to meet the acceptable cleanliness standards of the relevant countries' Department of Agriculture or be refused entry into that country. It is the importer's responsibility to ensure all machinery that arrives in the	Part of specs preparation cost	Contractor	SW PMU	Specific provision in tender documents	Verify tender documents/ once after tender documents prepared	As per contractor' contract;

	Solomon Islands to be free from biosecurity risk material, such as soil, seeds, plant and animal materials.						
Vegetation clearing during design phase	No vegetation clearance is required during the design phase. Surveying and geotechnical investigations can be conducted with no significant impact to vegetation.	Part of specs preparation cost	Contractor	SW PMU	Specific provision in tender documents	Verify tender documents/ once after tender documents prepared	As per contractor' contract;

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
CONSTRUCTION							
Soil erosion and sediment of construction sites	The contractor will divert surface runoffs away from the exposed areas and prevent sediments from moving offsite. Measures may include, as appropriate for site conditions: (i) small interceptor dikes, (ii) pipe slope drains, (iii) grass bale barriers, (iv) silt fence, (v) sediment traps, and (vi) temporary sediment basins; total exposed area will be minimized as the conditions allow.	Part of contractors' bid cost	Contractor	SW PMU	Disturbed sites; use of appropriate sediment controls	Visual inspection of sites; plans verification/ daily during rainy periods	As per contractor' contract;
Extraction of local construction materials	The contractor will provide sufficient information on the quarries and borrow pits to be used including commercial sources; The following will be required for quarries and borrow pits: (i) only licensed quarries will be used or the contractor will obtain its own licenses (ii) borrow pits will be covered by required government permits or approvals, (iii) will not be located within 300 meters of any urban area sensitive receptors, (iv) topsoil will be saved for rehabilitation during closure of the quarries and borrow pits, (v) will be provided with drainage and sediment flow controls, and (vi) closure will include fencing and placement of warning sign to the public.	Part of contractors' bid cost	Contractor	SW PMU	government permits or approvals of quarries and borrow pits; operational plan; drainage and sediment flow controls; tops soil management	visual inspection of sites; plans verification/ weekly	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Oil and other hazardous materials releases.	To prevent accidental releases, where required, the contractors will implement the following: (i) provide, if required, maintenance shops, fuel and oil depot with impermeable flooring with sump where wash water and sludge can be collected for proper disposal; (ii) refueling and servicing of equipment should only be carried out in specified areas adequately equipped to avoid leaks and spills that could contaminate soil and water resources; (iii) chemicals, hazardous substances and fuel will be stored on-site within an enclosed and covered secure area that has an impervious floor and impervious bund around it, (iv) storage area will be located away from water-courses, flood-prone areas and danger areas, (v) equipment maintenance areas and fuel storage areas will be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency; (vi) regularly check containers for leakage and undertake necessary repair or replacement; (vii) store	Part of contractors' bid cost	Contractor	SW PMU	measures required to prevent accidental releases; measures for clean-up and handling of contaminated materials; training records of personnel for hazardous materials; records of accidental releases	visual inspection of sites; records verification/ daily	As per contractor contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	<p>hazardous materials above flood level; (viii) ensure all storage containers are in good condition with proper labeling; and (ix) store waste oil, used lubricant and other hazardous wastes in tightly sealed containers to avoid contamination of soil and water resources; Measures for clean-up and handling of contaminated materials include: (i) undertake immediate clean-up of spills, (ii) oil stained wastes and used oil should be collected and disposed of through recyclers / authorized waste handlers and disposal in authorized waste facilities; (iii) ensure availability of spill cleanup materials such as absorbent pads, (iv) restoration of temporary work sites will include removal, treatment, and proper disposal of oil contaminated soils, (v) discharge of oil contaminated water into the environment will be prohibited; and (vi) construction personnel designated to handle of fuels/hazardous substances will be trained particularly in spill control procedures.</p>						

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
On-site air pollution due to construction activities	The contractor will be required to do the following: (i) regular water spraying of roads, work areas and other construction-related facilities to minimize dust generation; (ii) construction materials stockpiles and spoils with potential for significant dust generation to be covered or sprayed with water, as appropriate, to prevent fine materials from being blown; (iii) prohibit use of equipment and vehicles that emit dark sooty emissions; (iv) hauling trucks transporting loose construction materials such as sand, gravel, and spoils to be provided with tight tarpaulin cover or other suitable materials to avoid spills and dust emission; and (v) prohibit burning of all types of wastes generated at the construction sites, as well as other project-related facilities and activities.	Part of contractors' bid cost	Contractor	SW PMU	dust generation, water spraying, cover of stockpiles, smoke emitting equipment, open burning of materials	Visual inspection of sites/ daily	As per contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Solid waste management	<p>The contractor will be required to: (i) provide garbage bins and facilities within the project site for temporary storage of construction waste and domestic solid waste; (ii) separate solid waste into hazardous, non-hazardous and reusable waste streams and store temporarily on-site in secure facilities with weatherproof flooring and roofing; (iii) ensure that wastes are not haphazardly dumped within the project site and adjacent areas; (iv) regular disposal of wastes to Landfill; (v) prohibit burning of all types of wastes; (vi) remove the construction wastes from the sites after work completion, and (vii) implement the required restoration of disturbed sites.</p> <p>The CEMP, where appropriate, shall contain a subproject specific waste management plan and describing all waste types, amounts, disposal method, transport documentation requirements, and details of licensed waste treatment/recycling facilities for each waste stream.</p>	Part of contractors' bid cost	Contractor	SW's PMU	construction wastes; waste separation, temporary on-site waste storage, regular disposal records, surplus materials not removed upon completion	Visual inspection of sites/ daily	As per contractor contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Construction noise and vibration	The contractor will exert extra efforts in reducing the noise generation from his activities near residential areas. The contractor will: (i) provide prior notification to the community on schedule of construction activities; (ii) provide noisy equipment with noise reduction covers whenever applicable; (iii) position stationary equipment that produce elevated noise levels, such as diesel generators and air compressors, as far as practicable from houses and other receptors; (iv) prohibit operation of noisy equipment and construction works in populated areas and where sensitive receptors are found during nighttime (19:00 – 06:00); (v) make prior notification and consultation with the affected people and local officials for necessary nighttime	Part of contractors' bid cost	Contractor	SW's PMU	Noise levels not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime; noisy equipment not to be operated between 19:00 – 06:00hrs; regular noise level monitoring by contractor	Use of sound levels meter; visual inspection of sites/ daily	As per contractor contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
	operation; (vi) locate concrete batching plant, and rock crushing plant at a reasonable distance away from inhabited areas and sensitive receptors; and (vii) conduct regular noise level monitoring to determine compliance with WHO guidelines for noise which should not to exceed 55 dB(A) near residential areas during daytime and 45 dB(A) for nighttime						
Vehicular traffic congestion and hindrance to public access	The contractor to: (i) prepare a traffic plan and provide traffic management personnel to direct the flow of traffic in the vicinity of the construction sites and construction-related facilities; (ii) closely coordinate with local authorities for any closure of roads or rerouting of vehicular traffic; (iii) provide traffic signs in the vicinity of the construction sites to direct motorists and pedestrians; and (iv) minimize disruption to local activities by timing the construction activities with consideration to the schedules of festivities, processions, parades, etc.	Part of contractors' bid cost	Contractor	SW's PMU	contractor's traffic plan and traffic management personnel; traffic signs in vicinity of construction sites; contractor's work schedule related to festivities, processions, parades, etc.	traffic plans verification; visual inspection of sites/ daily	As per contractor's contract

Vegetation clearing during construction and revegetation	The areas that are cleared but not incorporated into the final operational areas will be minimal and consist only of trenches outside of hard stands and access ways. This consists of strips no greater than 1m in width that is expected to regenerate without intervention. No plan has been set aside for planting and revegetation based on the small amount of disturbance and the highly modified nature of the site flora.	Part of contractors' bid cost	Contractor	SW's PMU	Vegetation clearance during works is restricted to demarcated areas	Visual inspection of sites/ daily	As per contractor's contract
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Community health and safety	The contractor to: (i) use barriers and install signage to keep the public away from constructions sites and excavation sites; (ii) provide security personnel in hazardous areas to restrict public access; (iii) operate construction night light at the vicinity of construction sites; and (iv) whenever necessary, provide adequate safe passageways for the public crossing the construction sites whose access to properties, establishments, etc. has been disrupted or blocked by the ongoing construction activities	Part of contractors' bid cost	Contractor	SW's PMU	work sites safety plan; warning signs, barricades, and night lamps for open excavations, lighting system for nighttime operations; adequate safe passageways for the public crossing the construction sites	work sites safety plan verification; visual inspection of sites/ daily	As per contractor's contract

Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
Occupational health and safety at work sites	The contractor to implement good practices on occupational health and safety at the construction sites by: (i) implementing a construction site health and safety management plan (CSHSMP), (ii) ensuring that an equipped first aid station is available at all times, (iii) providing the workers with potable water and adequate sanitation facilities, (iv) providing the workers with personal protective equipment (PPE) to minimize exposure to a variety of hazards, and (v) providing firefighting equipment and fire extinguishers in workshops, fuel storage facilities, and any sites where fire hazard and risk are present.	Part of contractors bid cost	tractor	SW's PMU	Health and safety plan; first aid station; PPE, sanitation, facilities; firefighting equipment and fire extinguishers	Health and safety, plan verification; visual inspection of sites/ daily	As per contractor's contract
Potential social issues due to influx of imported workers	Measures include: (i) induction of the workers on requirements of the project's regarding community health and safety, grievance redress mechanism, and consultation and communications plan; (ii) implementation of protocols concerning the workers contact	Part of contractors' bid cost	Contractor	SW's PMU	Check implementation of worker's induction, required protocol, awareness and prevention	Records verification and visual inspection at start of work and monthly	As per contractor's contract

	<p>between the local communities; (iii) implementation of a communicable disease awareness and prevention program on the risk of disease spreading including sexually transmitted diseases and HIV and (iv) contractor's yard will be secured by a fence and provided with warning signs to control unauthorized access and prevent entry of the public.</p>				<p>program on the risk of disease spreading</p>		
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Environmental Issues/ Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Mitigation Cost	Implementation	Supervision/ Monitoring	Aspects/ Parameters to be monitored	Means of Monitoring/ Frequency	Monitoring Cost
OPERATIONS							
Public health risk due to unplanned outages and emergencies of the water supply system	Mitigations include: (i) identification of potential causes of unplanned outages and emergencies shall be conducted during operation of the water supply system and updated as necessary; (ii) written management procedures for unplanned outages and emergencies as required by the water safety plan implementation (advocated by WHO); (iii) regular inspection and maintenance of the backup power supplies and the associated Automatic Transfer Switch (ATS) of the backup power supplies at the water pumping stations to ensure uninterrupted operation during power failure; (iv) regular inspection and maintenance of pumping systems and emergency backup systems to ensure that these are in good working conditions; (v) implement flushing and disinfection, as necessary, during unplanned outages and emergencies to prevent microbial contamination of the water supply system; (vi) written standard operating procedures manual to be available at the facilities to provide guidance to the water supply system's staff on how to handle unplanned outages and emergencies; (vii) regular training of water supply system's staff on how to handle unplanned outages and emergencies	Part of SW's operational cost	SW's operations personnel	SW's Operations Dept. Mgt.	Written management procedures for unplanned outages and emergencies (per water safety plan); schedule of inspection and maintenance of pumping systems, emergency backup systems and automatic transfer switch of the backup power supplies at the water pumping stations; standard operating procedures manual for unplanned outages and emergencies; flushing and disinfection plan for unplanned outages and	Verify regular inspection and maintenance/ weekly; verify implementation of operating procedures manual/ weekly; verify implementation of water supply flushing and disinfection plant/ after incidents.	Visual inspection

					emergencies; training of water supply system's staff; unplanned outages and emergencies		
Upgrade operational risk and safety	<p>Measures to reduce the operational risk and safety to upgrades include: (i) workers will be trained on health and safety aspects of operating a WTP; (ii) a facility health and safety manual will be prepared to address the prevention, reduction and control of occupational injury and illness. The manual will among others: clearly identify conditions that may cause acute worker's health and safety problems, specify requirements that all workers should comply during normal operations and emergency situations, and specify training requirements for health and safety; (iii) reduce the risks associated with the use of chlorine gas as disinfectant by observing the following: establish a system for the safe use and handling of chlorine materials in the work place, and provide the workers with the appropriate PPE for chlorine use and handling; and (iv) provide the facility with a five-foot- high fence to control access and avoid exposing the public to any hazard due to the presence of the water supply tank.</p> <p>A sampling program to confirm the presence /absence of hydrocarbons in deep ground water sources is to be implemented. The risk is considered</p>	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt	<p>use of facility health and safety manual, chlorine handling procedures, workers' PPE for chlorine use</p> <p>groundwater sampling program for hydrocarbons</p>	<p>visual inspection, records verification/ weekly</p> <p>laboratory results for groundwater</p>	<p>visual inspection</p> <p>Laboratory costs</p>

	<p>low and will be confirmed by an initial sampling program.</p> <p>SW will fence hazardous areas in addition to posting signs highlighting the dangers of these areas.</p> <p>Consult with SIEA for the need to undertake a land contamination survey at the power station site.</p>						
Operational phase impacts for risks to employee and public safety; health hazards due to poor water quality.	<p>Operational phase impacts will include risks to employee and public safety; health hazards due to poor water quality. Operators will prepare health and safety maintenance manuals that include Health and Safety considerations to address the prevention, reduction and control of occupational injury and illness in operating water supply and sanitation facilities. The manuals will include information on: (i) clearly identifying conditions that may cause acute worker health and safety problems, (ii) requirements that all workers should comply during normal operations and emergency situations, and (iii) training requirements for health and safety in operating the facility.</p> <p>As described in Section 4.6, the proposed assets are on government owned land with the CoL as the PE holder; as such there are no customary land issues. Several plots adjacent to the site have been leased as FTE to individuals.</p> <p>Solomon Water has submitted an application to the MoLHS through the Lands Trust Board to formally acquire</p>	Part of SW's operational cost	SW's Operations Dept.	SW's Operations Dept. Mgt	<p>use of facility health and safety manual, chlorine handling procedures, workers' PPE for chlorine use</p> <p>groundwater sampling program for hydrocarbons</p>	visual inspection, records verification/ weekly	visual inspection

	<p>the land and be registered with SW. The Malaita Town and Country Planning Board and Executive supports SW's endeavor to formally acquire and declare the site as water catchment area. This will give SW exclusive rights over the land to:</p> <ul style="list-style-type: none"> protect the water catchment of the boreholes, water well and aquifer ensure good quality of water for all Auki residents prohibit any further development except for SW whenever there is a need for maintenance or any development to preserve water quality. <p>Plans are in progress with the MoLHS to acquire the land for registration with SW for water security purposes. Approval has been granted by the Land Board for SW to progress the development as per its development plans on the proposed site(s) subject to relevant permits from the Provincial Town and Country Planning Board. This is documented in the Auki RP.</p>						
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8 MONITORING AND REPORTING

268. Environmental monitoring is required across all phases of subproject implementation. The monitoring meets two objectives to ensure: (i) that mitigation measures are effective in reducing/managing impacts, and identify corrective actions as required; and (ii) that safeguard requirements are being complied with by the contractor and the implementing agency (on behalf of government).
269. **Pre-construction monitoring.** During the pre-construction phase any gaps in the baseline will be filled. It is in the pre-construction phase where requirements for environmental monitoring in the construction phase can be legally required by placing specific provisions on environmental monitoring in the: (i) subproject specifications, (ii) bidding documents, and (iii) construction contracts. Relevant aspects of each subproject's EMP shall be incorporated in these documents. The PMU shall verify if these aspects are incorporated in the said documents first during submission of the draft documents and later during submission of the draft final documents.
270. **Construction monitoring.** Contractors are expected to implement the relevant aspects of each subproject's EMP as per their approved CEMP during execution of the construction activities as stipulated in their contracts. The contractors' CEMP will detail the monitoring plan (based on the subproject EMP) with details on staff, resources, implementation schedules, and monitoring procedures (parameters, frequency etc.).
271. Compliance with the approved CEMP will be the basis for inspections and audits by PMU and the WB and ADB. The BCD will include provisions requiring the contractor to submit their CEMP which will include a section on monitoring which should be linked to allocation of budget and staff for implementation.
272. **Reporting.** Overall the Project will establish a system of reporting. The contractor will prepare monthly reports which will include a section on compliance with the approved CEMP, corrective actions, training and the like. This will also record any grievances lodged and project communications undertaken by the contractor. The PMU will review and consolidate information from the monthly reports of all subprojects. The quarterly progress report (QPR) prepared by the PMU will include a section on safeguards implementation summarizing the monthly reports (including training and capacity development activities).
273. A semi-annual safeguard monitoring report will be submitted to ADB and WB. This report will be based on the QPR and will include the environmental performance of each subproject/component.
274. **Institutional arrangements.** The Ministry of Finance and Treasury (MOFT) is the executing agency, while SW is the implementing agency for the Project. The project steering committee (PSC), with 11 members, is responsible for oversight and providing guidance and strategic direction to SW with respect to project implementation. SW has established a project management unit (PMU) to prepare and implement the project. The PMU is responsible for overall project management, project delivery, safeguards implementation, and monitoring.

9 CONCLUSION AND RECOMMENDATIONS

275. The project covered in this assessment offer benefits to Auki by ensuring adequate supply of potable water, by delivering high priority elements of SW's 30-Year Strategic Plan and 5-Year Action Plan.
276. The environmental screening process has identified and addressed the minor nature of the environmental and social issues of the proposed projects.
277. Based on the potential environmental impacts and risks of the proposed projects, there are no significant negative environmental impacts or risks that cannot be mitigated or managed. The EMP prepared was used as the basis for preparation of the CEMP prepared by the contractor. Monitoring and reporting of the approved CEMP ensured that the project was and is being implemented in an environmentally acceptable manner.
278. A detailed Resettlement Plan has been completed and consultation program has been undertaken with the affected community. This program is ongoing.

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APPENDIX A – Solomon Islands International Agreements

Solomon Island has been a party to some international agreements on the principles and actions necessary for sustainable development and environmental protection. This include international agreements with environmental and conservation implications as well as for the protection, promotion and safeguarding of cultural heritage and traditional knowledge.

Regional agreements include: (i) Pollution Protocol for Dumping. Ratified 1998. Prevention of pollution of the South Pacific region by dumping, (ii) Pollution Protocol for Emergencies. Ratified 1998. Co-operation in combating pollution emergencies in the South Pacific region, (iii) Natural Resources & Environment of South Pacific Region (SPREP Convention). Ratified 1998, and (iv) Waigani Convention on Hazardous & Radioactive Wastes 1995. Ratified 1998. Bans the importation and the trans-boundary movement and management of hazardous wastes within the South Pacific region.

International agreements on chemicals, wastes, and pollution include: (i) Liability for Oil Pollution Damage. Ratified. Liability of ship owner for pollution damage, (ii) (Marine Pollution Convention (London). Ratified. Prevention of marine pollution by dumping of wastes, (iii) POPs Convention (Stockholm). 2004. Bans use of persistent organic pollutants.

International agreements on biodiversity include: (i) CITES, ratified 1998. Regulates trade in wild animals and plants, (ii) World Heritage Convention. Acceded 1992. Protection of sites of Outstanding Universal Values, (ii) Desertification (UNCCD). Acceded 1999. Agreement to combat desertification and drought, (iii) Convention on Biological Diversity (UNCBD). Ratified 1995, and (iv) Cartagena Protocol on Biosafety. Acceded 2004. Protection of human health and the environment from possible adverse effects of modern biotechnology.

International agreements on climate change include: (i) Montreal Protocol. Acceded 1993. Phase out of substances that deplete the ozone layer, (ii) Ozone Layer Convention (Vienna). Acceded 1993. Protection of the ozone layer, and (iii) Climate Change (UNFCCC). Ratified 1994, and (iv) Kyoto Protocol. Ratified 2003. Reduce greenhouse gases especially CO₂ by an average of 5.2% by 2012.

International agreements on culture and cultural heritage include: (i) World Heritage Convention. Acceded 1992. Protection of sites of Outstanding Universal Values. (East Rennell Island is listed as a World Heritage site), (ii) The Convention for the Safeguarding of the Intangible Cultural Heritage 2003, and (iv) The Convention of the Protection and

APPENDIX B – Site Photos



Plate 1- Existing Gallery Tanks, Well and Pump station (Note the power station and storage of fuel and oil from Solomon Power)



Plate 2 - Kwaibala Spring Source with Intake and Pump House



Plate 3 - Borehole 2 site looking back towards Gallery site



Plate 4 - Borehole 2 site during construction



Plate 5- Borehole 3 site looking up towards ADB Tank



Plate 6 - New 1ML tank at Borehole 3 site



Plate 7 - High Ridge Tank site looking back to Gallery site

APPENDIX C – Auki Consultation Meetings
Summary of consultation and participation activities

Methodology	Date	Venue	Participants	Discussion and outcome
Face to face meeting with SIEA	18/06/18	Auki	<ul style="list-style-type: none"> OIC Auki – SP SW PMU Team 	<ul style="list-style-type: none"> Provision of power to project site Location of underground cables on site
	17/04/19	Auki	<ul style="list-style-type: none"> OIC – SIEA SW Project Engineer 	<ul style="list-style-type: none"> Current operations on site Fuel and oil storage on site
	29/05/19	SIEA Meeting Room 1, Honiara	<ul style="list-style-type: none"> SP Chief Engineer SP Generation Manager SW Project Manager SW Lands Manager SW Project Engineer 	<ul style="list-style-type: none"> Access through SIEA site Staging/Lay down area Compensation for trenching through property Future SIEA and SW plans for the Gallery site and likely impacts MOU
Face to Face and phone conversation with Ruth Futai including correspondence through email (SW Auki Office)	2/05/19	Phone	<ul style="list-style-type: none"> Garden Owner (Ruth Futai) SW PMU 	<ul style="list-style-type: none"> SW upgrading Project Catchment development Garden planting, assessment and compensation MOU
	06/05/19	SIWA Office	<ul style="list-style-type: none"> Garden Owner (Ruth Futai) Garden Owner brother (David) SW PMU 	<ul style="list-style-type: none"> MOU content MOU signing date
	22/05/19	Phone SIWA Office-Auki	<ul style="list-style-type: none"> Garden Owner (Ruth Futai) SW PMU SW-Auki 	<ul style="list-style-type: none"> MOU signing MOU signed -23/05/19
Face to Face and phone conversation with Gregson including correspondence through email	26/04/19, 3/05/19, 6/05/19, 7/05/19	Honiara/Auki	<ul style="list-style-type: none"> Gregson Angisia - Lot 841 allocatee SW PMU 	<ul style="list-style-type: none"> SW upgrading Project Pipeline encroachment MOU Draft MOU signed-7/05/19
Face to face and phone conversation with David Fiumae including correspondence	8/05/19, 13/05/19	Phone SIWA Office - Auki	<ul style="list-style-type: none"> David Fiumae - Green House Owner SW PMU 	<ul style="list-style-type: none"> SW upgrading Project Pipeline encroachment MOU Draft MOU signed-13/05/19

Methodology	Date	Venue	Participants	Discussion and outcome
e through email (SW Auki Office)				

APPENDIX D – Grievance Log Information

Complainant Information (Person Reporting)

1. Name:
2. Address:
3. National ID:
4. Gender:
5. Contact Details - Telephone, Email
6. Type of complainant:
 - Affected person/s
 - Intermediary (on behalf of the AP)
 - Civil organization
 - Service organization (e.g., local government institution)
 - Other (specify)
7. Registration Number: - assigned by Projects Team

Complaint Details

8. Mode of receiving the grievance:
 - Letter
 - Phone call
 - Fax
 - Email
 - Verbal complaint (walk-in)
 - Other (specify)
9. Location of the problem/issue specified in the complaint:
 - Town:
 - Province:
10. Type of problem/grievance:
 - Land related
 - Compensation
 - Construction
 - Resettlement site
 - Other (specify)
11. Short description of the problem:
12. Short description of the factors causing the problem:
13. Person/agency responsible for causing the problem:
14. Past action/s taken by the complainant (if any):
15. Details of the focal point that received the complaint:

Name of the person who received the complaint:

Position:

Name of the receiving office:

Date:

16. Actions taken by the Receiving Office

- I. Stage 1: Action taken; SW Responsible person; Outcome
- II. Stage 2: Action taken; SW Responsible person; Outcome
- III. Stage 3: Action taken; Tribunal Members; Outcome

17. Summary of Final Resolution