

Initial Environmental Examination

March 2021

Timor-Leste: Water Supply and Sanitation Investment Project – Same City Subproject (Part 2 of 5)

Prepared by the Directorate General for Water and Sanitation, Ministry of Public Works for the Asian Development Bank.

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APPENDIXES

Appendix 1. Rapid Environmental Assessment Checklist and Preliminary Climate Risk Screening Checklist

Rapid Environmental Assessment (REA) CHECKLIST - WATER SUPPLY

Instructions: <ul style="list-style-type: none"> <input type="checkbox"/> This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department. <input type="checkbox"/> This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department. <input type="checkbox"/> This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development. <input type="checkbox"/> Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project Title:	Timor-Leste / Water Supply and Sanitation Investment Project
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Sector Division	SAME
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SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
▪ Densely populated?		X	Same city holds a moderate population concentration with 86.9 persons per square kilometer.
▪ Heavy with development activities?		X	Some development (southern system near the spring sources (Merbuti, Kotalala) there is an R4D project: rural road being built) but basic infrastructure in Same is generally done (i.e. Roads)
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	✓		Merbuti and Kotalala, and Rusata are inside PA, the rest are adjacent. The TA team has identified several traditional houses close to the distribution pipe, cemeteries, areas of worship (used and not used) with a total of 4 churches, a chapel, and a mosque within the distribution area.
• Protected Area	✓		Some parts of the project 15 Km Diameter (Merbuti, Kotalala and Rusata Springs are inside the Kablaki PA and a small part of Zone B1 (in Suco Holarua)) overlaps slightly the PA border).
• Wetland		X	No wetlands are identified in literature or were assessed during inception visit, in the project area. TBC during Field visit.
• Mangrove		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
• Estuarine		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
• Buffer zone of protected area	✓		TBC with National Directorate for Protected Areas. Besides being declared under DL05/2016 – National System for Protected Areas, there hasn't been published (to date) any specific Buffer Zone limits beyond the PA border. This is particularly relevant for all the project areas that are adjacent to the PA border, namely Zone B1 [has an established neighborhood inside the PA] and Darelau and Erluli Springs (Suco Halarua) and Zone A3 (Suco Letefoho), in its Northeast corner.
• Special area for protecting biodiversity	✓		The Merbuti, Kotalala and Rusata springs and also small community area are inside the PA with high biodiversity.
• Bay		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
B. Potential Environmental Impacts			
Will the Project cause...			

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff? 	✓		<p>Yes. Construction materials and excavation works for the spring's infrastructure developments will cause sediments runoffs that also affects the surface water quality, flowing downstream.</p> <p>The Water at the spring sources already have some microbiological contamination before project proposed treatment, suggesting cattle/husbandry activities and/or lower sanitation levels upstream.</p>
<ul style="list-style-type: none"> impairment of historical/cultural monuments/areas and loss/damage to these sites? 	✓		<p>Yes. In general, the springs are considered sacred by locals for which proper handling and fulfilments in the culture ceremony before the development is required.</p> <p>The TA team has identified several traditional houses close to the distribution pipe, cemeteries, areas of worship (used and not used) with a total of 4 churches, a chapel, and a mosque within the distribution area.</p> <p>The future EMP will include measures to mitigate the impacts during the construction phase to comply with the protection measures defined in the Cultural Policy/regulations of Timor-Leste</p>
<ul style="list-style-type: none"> hazard of land subsidence caused by excessive ground water pumping? 		X	<p>Since the existing water extraction rates will be small to the also small-scale of the project, the aquifer is not expected to be overexploited. For this reason, there are no risk of land subsidence.</p>
<ul style="list-style-type: none"> social conflicts arising from displacement of communities ? 	✓		<p>Some residential and agricultural land areas of private individuals and households will be affected and compensation for the affected land will be required</p>
<ul style="list-style-type: none"> conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters? 	✓		<p>Yes. Communities currently share the benefit from the existing ground and surface. Maximum extraction rates to guarantee impact avoidance must be confirmed during borehole tests. It should be noted that the private wells in these conditions are located in urban areas included into the future supply system.</p>
<ul style="list-style-type: none"> unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)? 		X	<p>Raw water is planned to be treated prior to distribution, both for pathogens and calcium carbonate. Resulting quality of treated water will comply with the Timorese Legislation and WHO standards for drinking water, improving the already contaminated water sources.</p>
<ul style="list-style-type: none"> delivery of unsafe water to distribution system? 		X	<p>The rehabilitated network will provide treated water through the substitution of old for new pipes, preferably under the city urban alignments to prevent illegal connections and consequent leakages and contamination.</p>
<ul style="list-style-type: none"> inadequate protection of intake works or wells, leading to pollution of water supply? 	✓		<p>Contractor to establish an integrated CEMP to take care of this issue during construction. The intake will be secured and only accessible to authorized persons. It will also be regularly monitored to ensure only treated water is distributed.</p>
<ul style="list-style-type: none"> over pumping of ground water, leading to salinization and ground subsidence? 		X	<p>N/A. No groundwater pumping is considered</p>
<ul style="list-style-type: none"> excessive algal growth in storage reservoir? 	✓		<p>Not anticipated as the storage reservoirs are planned to be fully enclosed structures and the treated water will only be stored for a short period of time.</p>
<ul style="list-style-type: none"> increase in production of sewage beyond capabilities of community facilities? 		X	<p>The Project is indeed expected to increase the water consumption and, consequently the wastewater output. However, the Project scope includes pilot projects for 4 Public WC septic tank treatment within the city and the design of a decentralized Waste Water/Sludge Treatment Plant. However, the septic treatment capacity of the households and the transport of their sludge are not included.</p>
<ul style="list-style-type: none"> inadequate disposal of sludge from water treatment plants? 	✓		<p>Currently Same does not have an established Solid Waste Landfill/dumpsite and therefore possible solutions for the sludge disposal from the Decentralized WW Treatment Plant will need to be assessed in the field visit</p>
<ul style="list-style-type: none"> inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities? 		X	<p>Not applicable</p>
<ul style="list-style-type: none"> impairments associated with transmission lines and access roads? 	✓		<p>Yes. Some established road infrastructure will have to be excavated and repaired thereafter. Anticipated during construction activities but impacts are temporary and short in duration. The future EMP will include measures to mitigate the impacts.</p>

SCREENING QUESTIONS	Yes	No	REMARKS
▪ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		X	Not applicable. The DGAS storage facilities will be designed to guarantee enough space for the correct handling of the water treatment chemicals.
▪ health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		X	Not applicable. The DGAS storage facilities will be designed to guarantee enough space for the correct handling of the water treatment chemicals. Personal protective equipment will be provided to workers and training will be provided to ensure workers are aware of the potential hazards.
▪ dislocation or involuntary resettlement of people		X	The activities do not estimate any resettlement.
▪ social conflicts between construction workers from other areas and community workers?	✓		Yes. Priority/proportion in employment should be given to local residents if/when qualification requirements are reached for each work position, is in compliance with SEPFOPE regulations.
▪ noise and dust from construction activities?	✓		Anticipated during construction activities but impacts are temporary and short in duration. The future EMP will include measures to mitigate the impacts.
▪ increased road traffic due to interference of construction activities?	✓		Anticipated during construction activities but impacts are anticipated as small scale, temporary and short in duration, given Same does not have significant traffic flow in the project area. The future EMP will include measures to mitigate the impacts and the construction contractors will be required to coordinate with the local traffic police.
▪ continuing soil erosion/silt runoff from construction operations?	✓		Yes. Same has steep topography and loose soil will be eroded if no mitigation measures established. Landslide risks in spring areas. During Construction, storage of topsoil can runoff and cause sedimentation in the raw water harvested by downstream community. The EMP still includes measures to mitigate the impacts. Construction contractors will be required to include soil management guidelines and procedures where required.
▪ delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		X	Not anticipated. Chlorine Monitoring is included in the proposed methodology for Water Monitoring during the Operation Phase.
▪ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		X	Not anticipated.
▪ accidental leakage of chlorine gas?		X	Not anticipated.
▪ excessive abstraction of water affecting downstream water users?	✓		Yes. current users of surface water will be impacted due to risk of over abstraction for water supply. Will require review of downstream water use. TBC in the field visit.
▪ competing uses of water?	✓		Preliminary information is that communities are in competing use of Rusata water, when Merbuti and Kotalala are low in supply. Coloco and Cacula are also used by local communities. Several community areas with less access to water distribution tend to abstract water from alternative sources i.e rivers and several small water springs.
▪ increased sewage flow due to increased water supply	✓		The Project is expected to increase the water consumption and, consequently the wastewater output.
▪ increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		The Project is expected to increase the water consumption and, consequently the sludge output, including from kitchens.

Checklist for Preliminary Climate Risk Screening

Country/Project Title: Water Supply and Sanitation Investment Project

Sector: SAME

Subsector: Water Distribution Network

Division/Department: Directorate General for Water and Sanitation (DGAS)

Screening Questions		Score	Remarks ⁸
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	<i>The topography of the site is quite steep with risk of flash flooding and extreme weather occurrences and consequent landslides and so location and routing is considered to be a substantial problem, as the infrastructure will almost all require reinforced structure and support.</i>
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	<i>The project will require water-level metering monitoring regarding flow, as well as review of quantities variations to correlate with seasonal meteorological variations and estimate source productivity and possible climate change problems such as i.e. water supply source depletion</i>
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	<i>Given the area has 2 seasons with frequent extreme conditions, there may be a requirement to look into more climate resistant piping infrastructure and fill-in materials to guarantee the quality integrity of the distributed water quality and spring infrastructure.</i>
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	<i>Occasional extreme weather will interfere with planned maintenance schedule when/if extreme events may breakage in the established infrastructure.</i>
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	<i>No hydropower infrastructure identified</i>

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): Medium

⁸ If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Rapid Environmental Assessment (REA) CHECKLIST - SANITATION

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- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Timor-Leste / Water Supply and Sanitation Investment Project

Sector Division SAME

SCREENING QUESTIONS	Yes	No	REMARKS
B. Project Siting Is the project area...			
▪ Densely populated?		X	Same city holds a moderate population concentration with 86.9 persons per square kilometer.
▪ Heavy with development activities?		X	There is some activity in the southern system near the spring sources (Merbuti, Kotalala) there is an R4D project: rural road being built,
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		X	There is no specific or any apparent cultural assets found nearby the proposed FSTP.
• Protected Area	✓		Some parts of the project 15 Km Diameter border overlaps the Kablaki Protected Area. However, the proposed septic treatment for the 4 Public Toilet Infrastructures will have to be well chosen as there are 3 schools in Suco Halarua that are close to adjacent to the PA. Additionally, the location of the decentralized wastewater treatment plant (DFSTP), will have to be within the 15Km but at a reasonable and safe distance from the PA boundaries.
• Wetland		X	No wetlands are identified in literature or were assessed during inception visit, in the project area. TBC during Field visit.
• Mangrove		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
• Estuarine		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
• Buffer zone of protected area	✓		TBC with National Directorate for Protected Areas. Besides being declared under DL05/2016 – National System for Protected Areas, there hasn't been published (to date) any specific Buffer Zone limits beyond the PA border. This is particularly relevant for all the project areas that are adjacent to the PA border, namely Zone B1 [has an established neighborhood inside the PA] and almost all the schools within the 15 Km area.
• Special area for protecting biodiversity		X	Kablaki protected area has a high biodiversity, but the proposed FSTP is very much distant from the PA. Even if the proposed location is near from the river and surrounded with dispersed agriculture lands, there is no specific biodiversity found in that area according to site visit analysis.
• Bay		X	Project location is within the upper range of the Same Plateau, not at the coast near Betano
A. Potential Environmental Impacts Will the Project cause...			
▪ Impairment of historical/cultural monuments/areas and loss/damage to these sites?		X	There is no specific or any apparent cultural assets found nearby the proposed FSTP. Therefore, there will be no impairment or damages occur.
▪ Interference with other utilities and blocking of access to buildings; nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc.?		X	No blocking/interference with other utilities are expected, given Public Sanitation Installations will have proper septic treatment infrastructure and planned for regular emptying and maintenance. FSTP site is in a predominantly agricultural area and unused private lands with no houses nearby the proposed area. No interference is predicted.
▪ dislocation or involuntary resettlement of people		X	Public Sanitation Installations are planned to be in Government Land, as well as location of DFSTP. TBC Officially with Los Palos and or National Land and Property Services.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage? 		X	The proposed FSTP will have Solid/Liquid Separation (sludge drying bed) and Post Sludge Percolate Treatment (Anaerobic Baffled Reactor Tank and Filter [secondary treatment], Planted Gravel Filter [Tertiary Treatment] and UV Treatment or Polishing Pond. Dried Sludge and/or Residual percolate may be used for Agriculture in the area. FSTP effluent discharges shall meet the norms laid out by the Government of Timor-Leste (WHO/IFC) and can also utilized for agriculture purpose.
<ul style="list-style-type: none"> overflows and flooding of neighbouring properties with raw sewage? 		X	FSTP will be designed considering the population growth up to the project time horizon of 2040, to accommodate sludge treatment for the long term. No impact is envisaged. It should be noted that this station will only receive effluent transported by tanker trucks and therefore it is not possible flooding due to the inflow of sewage. In addition, the following measures are planned: <ul style="list-style-type: none"> During operation of the sludge/liquid separation bed, an extra margin up to the top of the earth bank would be kept to prevent overflow after a large rain storm. Furthermore, a shallow earth bank will be constructed along the perimeter of the total area to protect from the plant storm water. The earth bank is to be planted with grass and small trees to demarcate the area. The soil for construction of the earth bank comes from excavation of the ponds. Regular checking of the adequacy of the facility, particularly when beds are (nearly) full and during the rainy season. Timely heightening of the bund surrounding the facility and / or increasing the bed capacity.
<ul style="list-style-type: none"> environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers? 		X	The proposed system is based on Domestic wastewater from septic tanks, collected and transported by truck to the DFSTP. No industrial WW planned to be directed to this treatment system.
<ul style="list-style-type: none"> noise and vibration due to blasting and other civil works? 	✓		No blasting activities envisaged. Temporary nuisance/disturbance due to construction activities will be minimized with appropriate mitigation measures.
<ul style="list-style-type: none"> discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers? 		X	The proposed system is based on Domestic wastewater from septic tanks, collected and transported by truck to the DFSTP. No industrial WW planned to be directed to this treatment system.
<ul style="list-style-type: none"> inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities? 	✓		The proposed system is based on Domestic wastewater from septic tanks, collected and transported by truck to the DFSTP. Any impact from the collection is planned to be temporary. However, the DFSTP will be fenced off to protect facilities and control access and provide for space to avoid these impacts.
<ul style="list-style-type: none"> social conflicts between construction workers from other areas and community workers? 	✓		Priority in employment should be given to local residents if/when qualification requirements are reached for each work position.
<ul style="list-style-type: none"> road blocking and temporary flooding due to land excavation during the rainy season? 	✓		Road blocking and Traffic re-routing may be required during construction stage of the FSTP. However, surrounding area is agricultural and with little to no daily traffic.
<ul style="list-style-type: none"> noise and dust from construction activities? 	✓		While the impact in the Septic tanks in the Public Toilet locations will be very reduced, the DFSTP construction site may have these impacts in a larger scale and the EMP should define that all the construction activities should comply with the WHO noise standards, currently applicable for Timor-Leste. Sprinkling of water should be done along the construction area for dust suppression.
<ul style="list-style-type: none"> traffic disturbances due to construction material transport and wastes? 	✓		While the location of the DFSTP is to be remote and out of the urban area, traffic management with re-routing of traffic during construction period will be required to avoid conflict of public transport with construction material / waste transport.
<ul style="list-style-type: none"> temporary silt runoff due to construction? 	✓		During construction phase, the excavation will be planned in such a way that it is avoided during heavy rains. During construction of FSTP especially during rainy season, this aspect will be kept in mind. The work would be undertaken in small pockets to avoid any silt runoff. Furthermore earth strengthening measures would also be undertaken. All excavated spoil is expected to be reused in the construction of the FSTP and its protective measures. Any excess should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful.
<ul style="list-style-type: none"> hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system? 	✓		Regular maintenances of the FSTP have to be carried out to avoid over flow and related impact of public health due to pollution. The design may be required to provide additional bunkering for overflow collection and re-pumping back into the system, as well as emergency shutdown procedures to avoid the possibility for groundwater pollution due to malfunction of FSTP system.

SCREENING QUESTIONS	Yes	No	REMARKS																																																																																														
			<ul style="list-style-type: none">Treatment units would be raised sufficiently to keep them clear of the highest predicted flooding level.There are two concerns for ground water protection, these are the potential pathogen movement in the groundwater and the infiltration of soluble nutrients. Due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance.The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines. <p>Close monitoring of the facility to ensure it functions as planned, this involves monitoring of ground and surface waters in the surroundings of the FSTP.</p>																																																																																														
<ul style="list-style-type: none">deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	✓		<p>Currently Los Palos does not have an established Solid Waste Landfill/dumpsite (only an uncontrolled dumpsite next to the proposed FSTP site). Given the sensitivity of the National Park area downstream, the sludge treatment will be as complete as possible and dewatering of the sludge will be priority for further safe reuse of dry sludge in agricultural activities.</p> <p>Adequate measure of sludge disposal and prohibit discharge of untreated sludge from septic tanks need to be taken.</p> <p>In no way will sludge be allowed to be discharged from FSTP without complete & proposed treatment. Treated effluent will meet the WHO Standards as well as DL 236/98 (Portugal) as given below:-</p> <table><tr><th></th><th colspan="2">BOD (mg/L)</th><th>NH₄-N (mg/L)</th><th>Helminth eggs (No./filter)</th><th>FC (N^o/100 ml)</th></tr><tr><th></th><th>Total</th><th>Filtered</th><th></th><th></th><th></th></tr><tr><td colspan="6">A. LIQUID EFFLUENT (WHO Standards)</td></tr><tr><td colspan="6">A.1 - Discharge into receiving waters:</td></tr><tr><td>Seasonal stream estuary</td><td>100-200</td><td>30-60</td><td>Oct-30</td><td>≤2-5</td><td>≤10⁴</td></tr><tr><td>Perennial river or sea</td><td>200-300</td><td>60-90</td><td>20-50</td><td>≤10</td><td>≤10⁵</td></tr><tr><td colspan="6">A.2 - Reuse</td></tr><tr><td>Restricted irrigation</td><td colspan="2">n.c.</td><td>1)</td><td>≤1</td><td>≤10⁵</td></tr><tr><td>Unrestricted irrigation</td><td colspan="2">n.c.</td><td>1)</td><td>≤1</td><td>≤10³</td></tr><tr><td colspan="6">B: TREATED PLANT SLUDGE (WHO Standards)</td></tr><tr><td>Use in agriculture</td><td colspan="2">n.c.</td><td>n.c</td><td>≤3-8 g TS₂</td><td>3)</td></tr></table> <p>1) ≤ crop's nitrogen requirement (100-200 kg N/ ha-year)</p> <p>2) Based on the nematode egg load per unit surface area derived from WHO guidelines for wastewater irrigation (WHO 1989) and on manuring rate of 2-3 tons of dry matter /ha -year</p> <p>3) Safe level if egg standard is met.</p> <p>n.c----not critical</p> <table><tr><th></th><th>BOD (mg/L)</th><th>TSS (mg/L)</th><th>N total (mg/L)</th><th>p total (mg/L)</th><th>TC (N^o./100 ml)</th><th>FC (N^o./100 ml)</th></tr><tr><td colspan="7">A. LIQUID EFFLUENT (DL 236/98)</td></tr><tr><td colspan="7">A.1 - Discharge into receiving waters:</td></tr><tr><td>Emission limit values (ELV) for wastewater discharge (Attachment XVIII)</td><td>40</td><td>60</td><td>15</td><td>10 (1)</td><td>n.c</td><td>n.c</td></tr></table>		BOD (mg/L)		NH ₄ -N (mg/L)	Helminth eggs (No./filter)	FC (N ^o /100 ml)		Total	Filtered				A. LIQUID EFFLUENT (WHO Standards)						A.1 - Discharge into receiving waters:						Seasonal stream estuary	100-200	30-60	Oct-30	≤2-5	≤10 ⁴	Perennial river or sea	200-300	60-90	20-50	≤10	≤10 ⁵	A.2 - Reuse						Restricted irrigation	n.c.		1)	≤1	≤10 ⁵	Unrestricted irrigation	n.c.		1)	≤1	≤10 ³	B: TREATED PLANT SLUDGE (WHO Standards)						Use in agriculture	n.c.		n.c	≤3-8 g TS ₂	3)		BOD (mg/L)	TSS (mg/L)	N total (mg/L)	p total (mg/L)	TC (N ^o ./100 ml)	FC (N ^o ./100 ml)	A. LIQUID EFFLUENT (DL 236/98)							A.1 - Discharge into receiving waters:							Emission limit values (ELV) for wastewater discharge (Attachment XVIII)	40	60	15	10 (1)	n.c	n.c
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Emission limit values (ELV) for wastewater discharge (Attachment XVIII)	40	60	15	10 (1)	n.c	n.c																																																																																											

SCREENING QUESTIONS	Yes	No	REMARKS
			<p>Quality of surface fresh water for the production of water for human consumption (Attachment I)</p> <p>200-300 60-90 20-50 n.c 2*10⁵ 2*10⁴</p> <p>A.2 - Reuse (DL 236/98)</p> <p>Quality of water for irrigation (Attachment XVI)</p> <p>n.c. 60 50 (2) n.c n.c 100</p> <p>1) ≤ 3 mg/L in waters that feed ponds or reservoirs 2) nitrates (NO₃)</p> <p>It should be noted that to fulfill an irrigation water quality, bacteriological removal must be by UV</p>
<ul style="list-style-type: none"> contamination of surface and ground waters due to sludge disposal on land? 	✓		<p>Sludge reuse for agricultural activities will follow strict guidelines and information on best-use/restrictions of use will be given to potential re-users of the dried sludge.</p> <ul style="list-style-type: none"> Inadequate sludge disposal on land can contaminate ground water and surface water and measures of adequate sludge disposal would be taken to avoid any environmental impact. <p>For reuse of the dried faecal sludge from the facility, the operation will secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years, the infection risk of Ascariasis is minimal.</p>
<ul style="list-style-type: none"> health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in sewage flow and exposure to pathogens in sewage and sludge? 	✓		<p>No significant impacts are expected from the septic tank systems in the 4 proposed Public WCs maintenance as their scale is much smaller and less dangerous than a fully reticulated sewer collection system. However, especially for the FSTP site operation, personal protective equipment and training will be provided to workers to ensure they are protected and aware of the potential hazards.</p>

Checklist for Preliminary Climate Risk Screening

Country/Project Title: Timor-Leste / Water Supply and Sanitation Investment Project

Sector: SAME

Subsector: Sanitation

Division/Department: Directorate General for Water and Sanitation (DGAS)

Screening Questions	Score	Remarks ⁹
<p>Location and Design of project</p> <p>Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?</p>	0	<p>Regarding the FSTP, the choice of the site will have to be done in a location that is deprived of these hazardous conditions.</p> <p>The topography of the project site is quite flat and landslide risk free and is outside the flood plain risk area so location of the FSTP is not considered to be a substantial problem.</p> <p>The access road from the public road to the treatment plant site needs to be paved, without steep gradients. It should preferably have sufficient width to allow tankers to pass. Where this is not possible, frequent passing places should be provided.</p> <p>In addition, capacity of the proposed facility can be increased by shortening the time of each cycle for</p>

⁹ If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Screening Questions		Score	Remarks ⁹
			removal of semi-dried faecal sludge from the ponds to the drying beds, while still providing the secure storage time for a safe Ascaris egg-free waste product. The planning of the operation of the faecal sludge treatment facility would take the weather into account when estimating the reasonable maximum capacity with regards to the number of cycles per year for emptying the sludge/liquid separation bed. The emptying should then be completed by the end of the dry and wet seasons.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	May require reliable knowledge on peak river flow and water level. The existing river is constructed sufficiently high to avoid flood occurrences and interruption of faecal sludge collection services. There is no existing bridge where trucks have to cross for the WW to be transported from Households to the DFSTP since the proposed location is 2 kilometres away from the national road.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	Given the project area has 2 seasons with frequent extreme conditions and one is predominantly drought prone, there may be a requirement to look into guaranteeing water or wastewater constant supply to maintain optimum conditions for WW treatment and avoid lagoons to dry out. Construction material will be selected keeping in mind the climatic conditions existing in the area.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	The proposed FSTP location is above floodplain levels but strong rain occurrences may require temporary delays. Infrastructure maintenance and contingency measures must be in place for i.e. extreme rainfall and possible overflowing of FSTP. The civil construction design would be undertaken so that structures can be maintained well without incurring unduly high expenditure.
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	Infrastructure maintenance and contingency measures must be in place for i.e. extreme rainfall and possible overflowing of FSTP. Possible options may be additional Bunding Areas with recirculation after extreme event occurrence. Under evaluation by the technical team. FSTP is going to produce dry solids in the form of compost which can be utilised by farmers having agricultural fields in the vicinity of FSTP. For reuse of the dried faecal sludge from the faecal sludge treatment facility, the operation must secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years the infection risk of Ascariasis is minimal. Yes the storage for the compost needs to be adequately provided keeping in mind the very long rainy season of approx. 06 months. FSTP is going to produce liquid effluent which would meet the WHO standards for it to be used for agriculture purpose. Excessive rainfall effect on the

Screening Questions		Score	Remarks ⁹
			design of FSTP has to be taken into account t as it would not only dilute the influent sludge but would also lead provision of higher volumetric capacities of the treatment units.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Appendix 2. Sample Grievance Redress Form



Democratic Republic of Timor-Leste
Project RFP039- Consultancy Services for Detailed Engineering Design of Timor-Leste
Four Municipal Capitals Water Supply and Sanitation



COMPLAINT REGISTRY FORM

DATE: ____/____/____ (dd/mm/yy)

CRF: 001

Capital (please check) : ☐ Lospalos ☐ Viqueque ☐ Same

Complainant Profile

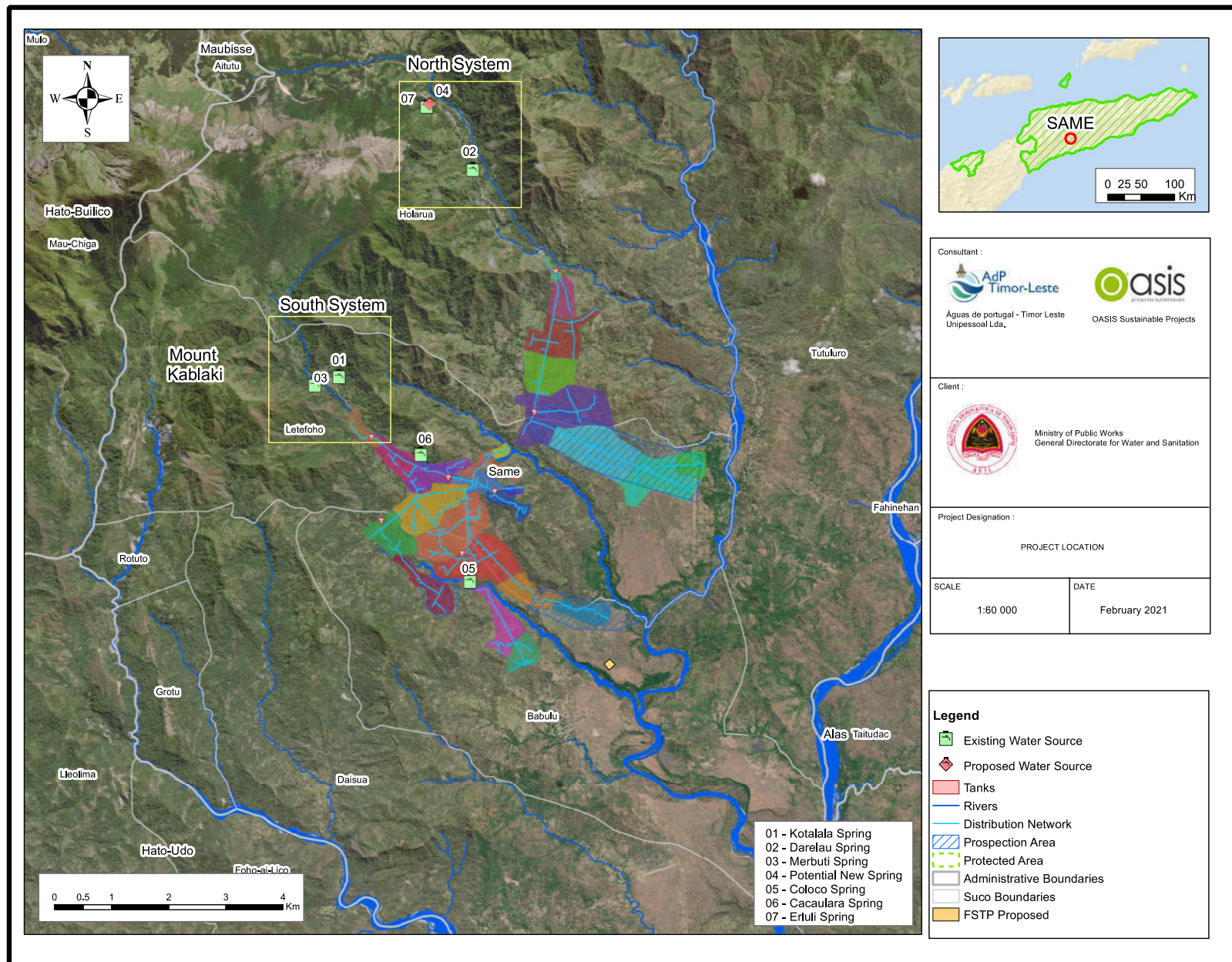
Name	:			Age	:	
Gender	:	<input type="checkbox"/> Male	Civil Status	:	<input type="checkbox"/> Single	
		<input type="checkbox"/> Female			<input type="checkbox"/> Married	
					<input type="checkbox"/> Widow/er	
Address		Aldeia				
		Suco				
		Administrative Post				

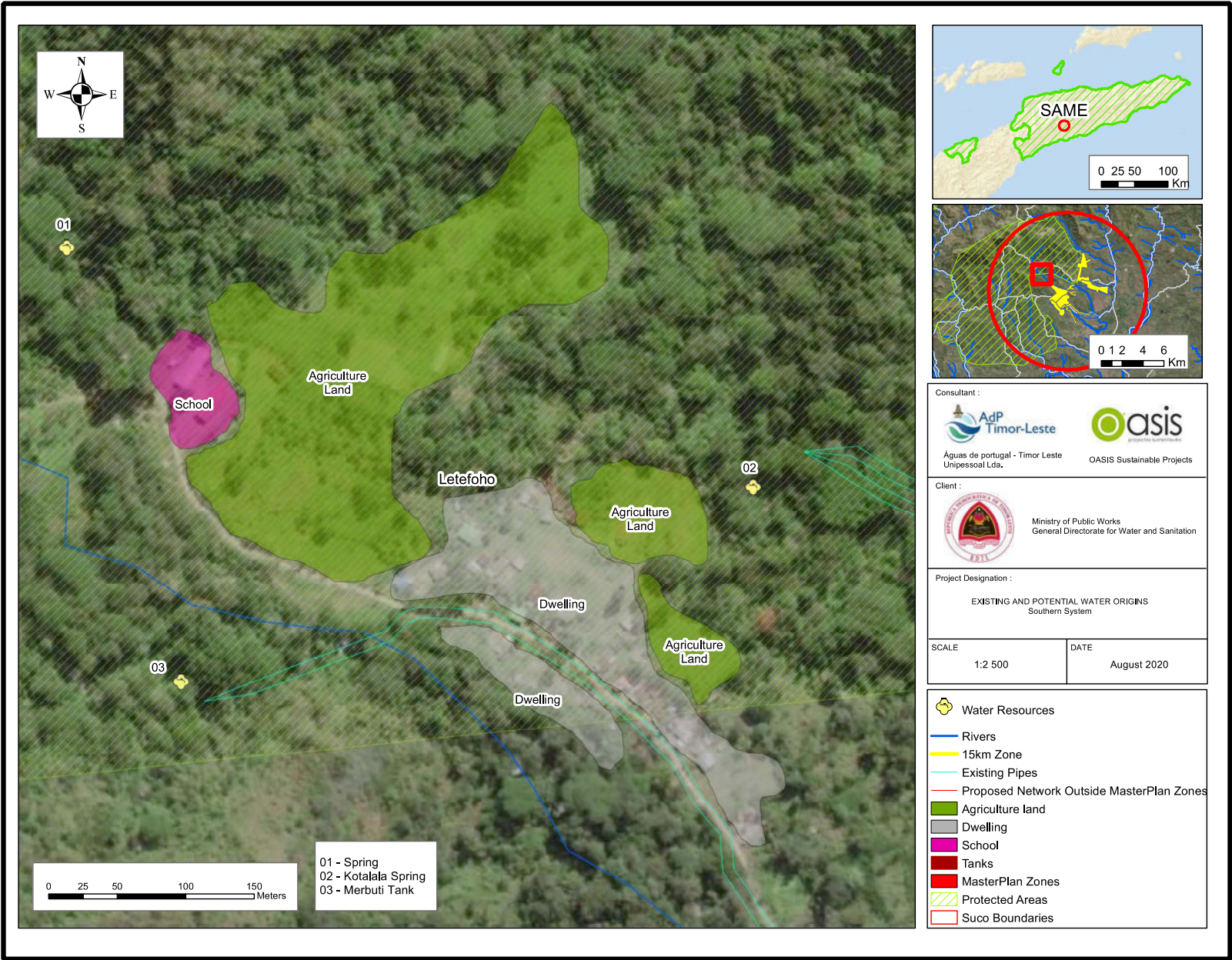
Complaint Details

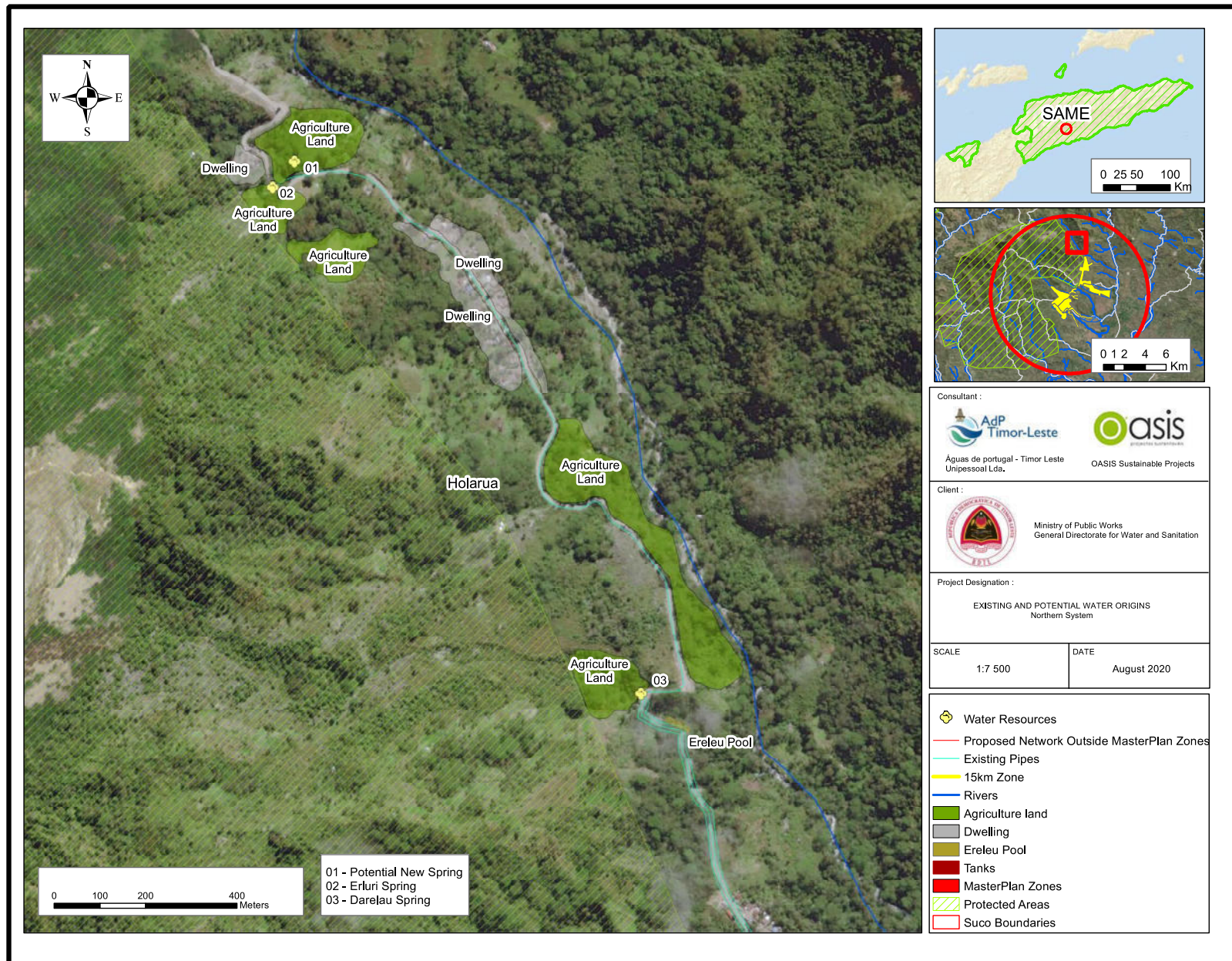
Attending Officer:	
Name/Designation	Complainant Signature

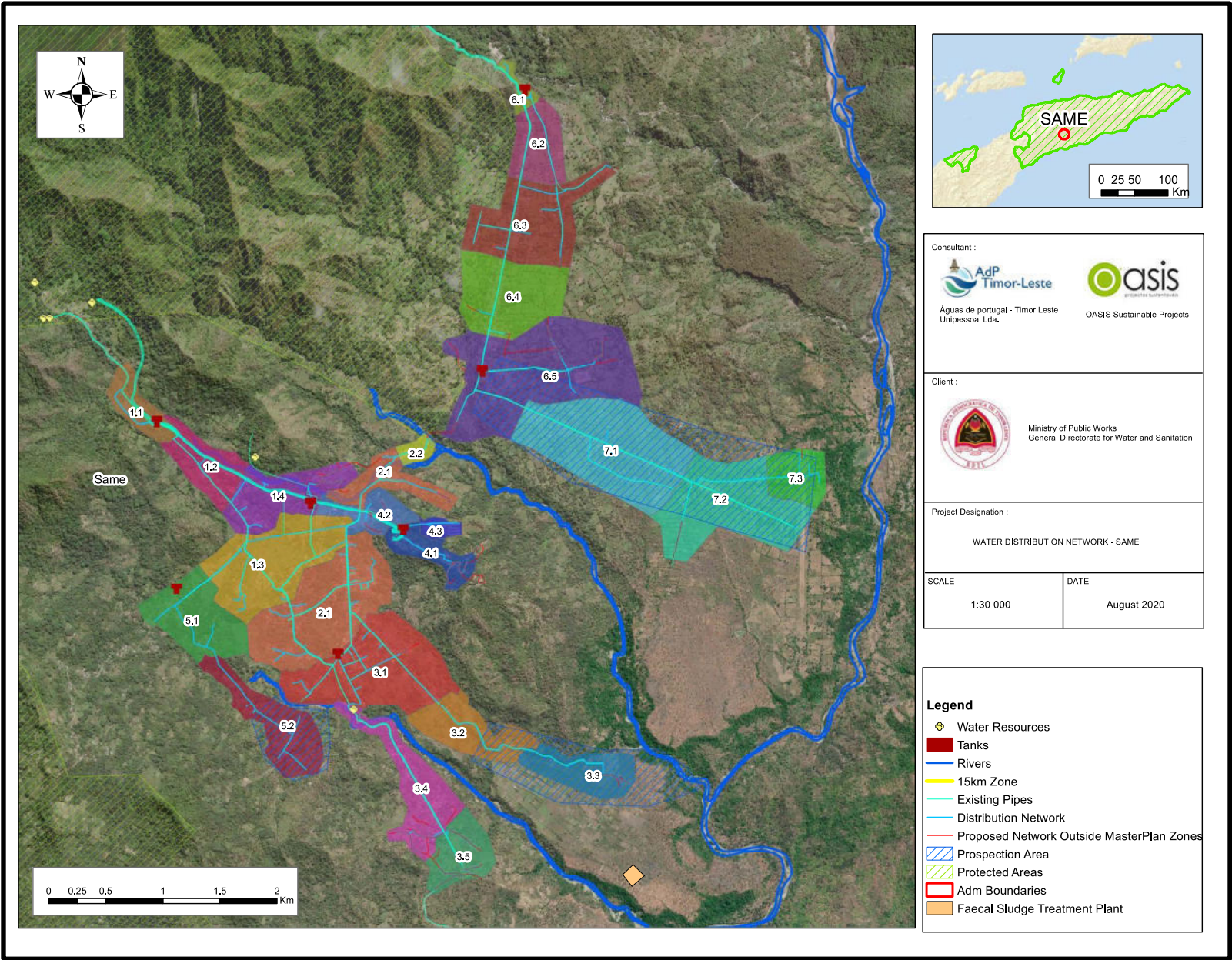
Appendix 3. Maps for WSSIP – Same City

- 3.1 Location of the Project Components**
- 3.2 Water Sources in the South System**
- 3.3. Water Sources in the North System**
- 3.4. Water Distribution Components**









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Appendix 4. Water Quality Test Report (JICA & Masterplan)

District : Manufahi

Town : Same

Sampled and tested by: Mario Soares, WSS laboratory and T.ISHIHARA, JICA Study Team

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkali.	Hard.	Ca-Hard	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Fluoride	Mn	SO ₄ ²⁻	R.Cl ₂	T.Coli	G.Bac
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	5	0	0
SM-1	Carbulau, intake 1	27/mar/00	29/mar/00	7.9	18.9	257	123	0.1	0.2	131	135	NT	ND	0.1	0.007	ND	0.28	0.1	NT	NT	+	+
SM-2	Mibuteluli, intake 2	27/mar/00	29/mar/00	7.2	21.7	262	126	0.1	0.3	139	139	NT	ND	0.1	0.006	ND	0.11	ND	NT	NT	+	+
SM-3	Break Pressure Tank, Market	27/mar/00	29/mar/00	7.9	21.9	346	166	0.2	0.4	NT	NT	NT	ND	NT	NT	NT	0.11	NT	NT	NT	+	+
SM-4	Kamilaran, PT	27/mar/00	29/mar/00	7.6	23.2	267	128	0.1	0.5	NT	NT	NT	ND	NT	NT	NT	0.13	NT	NT	NT	+	+
SM-5	Babulu	27/mar/00	29/mar/00	7.7	23.1	347	167	0.2	1.0	186	185	NT	ND	0.1	0.007	0.01	0.14	0.1	NT	NT	++	+
SM-6	Raimerak	27/mar/00	29/mar/00	7.9	26.0	345	166	Salinity	2.3	NT	NT	NT	ND	NT	NT	NT	0.13	NT	NT	NT	++	++
SM-7*	Rai Upun	27/mar/00	29/mar/00	7.8	23.1	347	167	0.2	0.5	NT	NT	NT	ND	NT	NT	NT	0.14	NT	NT	NT	++	+
SM-8*	Nenu Aha	27/mar/00	29/mar/00	7.9	20.2	260	125	0.1	0.3	NT	NT	NT	ND	NT	NT	NT	0.39	NT	NT	NT	++	+

Legend:

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit

-: 0-3

±: 3-10

+: 10-20

++: 20-30

+++: more than 30

*Sample points of SM-7 and SM-8 would be abolished after this sampling.

District : Manufahi

Town : Same

Tested by: Alvaro Godinho, technician, OWS laboratory

No.	Sampling Point	Date		pH	Temp.	R.Cl ₂	Cond.	TDS	Salinity	Turbidity	NH ₃ -N	Fluoride	Alkalinity	Hardness	NO ₃ -N	NO ₂ -N	Fe	Mn	T.Coli	G. Bacteria
		sample	test		(°C)	(mg/L)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
WHO Guideline Value				6.5-8.5	NS	0.5	NS	1000	NS	5.00	NS	1.50	NS	200	10.00	0.913	0.30	0.3	0	0
1	Carbulau, intake	15/mai/00	16/mai/00	7.7	17.6	NT	261	127	0.1	0.20	0.4	0.16	128.0	NT	0.1	0.002	0.02	ND	+	+++
2	Mibuteluli, intake	15/mai/00	16/mai/00	7.1	20.9	NT	265	124	0.1	0.29	ND	0.09	183.0	NT	0.2	0.015	ND	0.1	+	+
3	Kamilaran, PT	15/mai/00	16/mai/00	7.4	21.5	NT	268	130	0.2	0.55	0.1	ND	NT	NT	0.1	0.006	0.01	0.1	-	-
4	Break Pressure Tank, Market	15/mai/00	16/mai/00	7.8	22.0	NT	318	160	0.1	0.27	0.4	ND	NT	NT	ND	0.003	0.04	ND	+	++
5	Babulu	15/mai/00	16/mai/00	7.6	25.1	NT	330	162	0.1	1.03	0.0	ND	190.0	NT	ND	0.003	0.03	ND	++	+++
6	Raimerak	15/mai/00	16/mai/00	7.5	22.1	NT	346	167	0.2	1.20	0.3	ND	292.0	NT	0.2	0.001	0.02	ND	++	+++

Legend:

ND: not detectable;

NT: not tested;

NS: not set;

CFU: colony formed unit;

-: 0-3

±: 3-10

+: 10-20

++: 20-30

+++: more than 30

Suggestions

Boiling water before drinking

District: Manufahi**Town: Same**

Sample and testing by Mario Soares and ISHIHARA JICA Study Team

No.	Sampling Point	Date		pH	Temp.	R.Cl ₂	Cond.	TDS	Salinity	Turbidity	Alkalinity	Hardness	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli
		sample	test		(°C)	(mg/L)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guideline Value				6.5-8.5	NS	0.5	NS	1000	NS	5	NS	200	1.5	10	1	0.30	0.5	1.50	250	-	-
1	Daraleo intake 1	02/out/00	03/out/00	7.8	18.7	NT	294	141	0.1	0.23	139	165	0.8	0.1	0.140	ND	0.5	0.42	27	-	-
2	Hatunifa reservoir	02/out/00	03/out/00	7.8	21.3	NT	299	144	0.1	0.49	NT	NT	ND	0.1	0.004	NT	NT	NT	NT	+++	+++
3	Borlala	02/out/00	03/out/00	8.0	22.2	NT	299	144	0.1	0.26	NT	NT	0.4	0.1	0.015	0.01	0.6	NT	NT	+++	++
4	Mibuteluli, intake 2	02/out/00	03/out/00	7.8	20.7	NT	3.7	152	0.1	0.38	142	214	0.6	0.1	0.005	ND	0.3	ND	7	-	±
5	BPT, Market	02/out/00	03/out/00	8.2	23.2	NT	315	151	0.1	0.26	NT	NT	ND	0.1	0.008	NT	NT	NT	NT	+++	++
6	Clinic, Oikos	02/out/00	03/out/00	8.0	23.3	NT	317	153	0.1	0.79	NT	NT	ND	0.1	0.004	NT	NT	NT	NT	+	+
7	UNTAET office	02/out/00	03/out/00	8.0	28.1	NT	316	152	0.1	0.95	NT	NT	1.3	ND	0.010	0.01	0.3	NT	NT	-	±
8	Kotalala intake 3	02/out/00	03/out/00	7.4	21.5	NT	332	160	0.2	0.85	NT	198	ND	0.1	0.004	0.01	ND	0.06	NT	++	+++
9	Kamiraran PT	02/out/00	03/out/00	7.8	22.8	NT	329	158	0.2	0.47	166	NT	ND	0.1	0.013	NT	NT	NT	6	+++	+++
10	Save Heaven civpol	02/out/00	03/out/00	7.8	25.7	NT	330	159	0.2	5.14	NT	NT	ND	0.1	0.006	0.02	0.3	NT	NT	+++	++

Legend:

ND: not detectable;

NT: not tested;

NS: not set;

CFU: colony formed unit;

-: 0-3

±: 3-10

+: 10-20

++: 20-30

+++: more than 30

T.Coli: total coliform

G.Bact.: general bacteria

Suggestions

Boiling water before drinking

District: Manufahi**Town: Same**

Sampled and tested by: Mario Soares, WSS laboratory and T.ISHIHARA, JICA Study Team

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkali.	Hdns.	Ca-Hdns	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Fluoride	Mn	SO ₄ ²⁻	R.Cl ₂	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	5	0	0
SM-1	Carbulau, intake 1	06/nov/00	07/nov/00	8.2	18.8	301	145	0.1	0.2	138	153	NT	0.3	ND	0.004	ND	0.48	0.3	29	NT	75	0
SM-2	Mibutelulij, intake 2	06/nov/00	07/nov/00	8.0	20.9	311	149	0.1	0.9	164	162	NT	ND	ND	0.005	ND	0.33	0.5	14	NT	TNC	414
SM-3	Break Pressure Tank, Market	06/nov/00	07/nov/00	8.3	24.8	315	152	0.1	0.3	NT	NT	NT	ND	NT	NT	NT	0.31	NT	NT	NT	160	18
SM-4	Kamilaran, PT	06/nov/00	07/nov/00	8.2	24.7	328	158	0.2	6.3	168	170	150	ND	ND	0.005	0.01	0.34	0.3	14	NT	TNC	TNC
SM-5	SAVE HAVEN, CIVPOL	06/nov/00	07/nov/00	7.8	28.5	335	161	0.2	5.6	NT	176	151	ND	NT	NT	NT	0.39	NT	NT	NT	TNC	TNC
SM-6	UNTAET Office	06/nov/00	07/nov/00	8.1	32.5	322	155	0.2	0.2	NT	167	147	ND	ND	0.005	0.03	0.30	0.3	15	NT	60	8
SM-7	Kotalala Intake 3	06/nov/00	07/nov/00	7.7	21.6	346	166	0.2	0.2	179	179	NT	0.5	0.1	0.004	ND	0.36	0.2	12	NT	265	108
SM-8	Borlala	06/nov/00	07/nov/00	8.1	26.2	303	146	0.1	0.2	NT	154	120	0.5	ND	0.004	ND	0.68	0.3	29	NT	420	30
SM-9	Hatunifa Reservoir	06/nov/00	07/nov/00	8.1	23.8	300	144	0.1	0.3	NT	NT	NT	0.5	NT	NT	NT	0.49	NT	NT	NT	420	12
SM-10	Clinic OIKOS	06/nov/00	07/nov/00	8.1	26.2	320	154	0.2	0.1	160	165	145	1.5	ND	0.004	ND	0.29	0.3	14	NT	128	0

Legend:

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

TNC: too numerous to count

Suggestions

Boiling water before drinking

District: Manufahi**Town: Same**

Sampled by Armando Tilman, DWSS Manufahi; tested by Mario Soares, WSS Laboratory

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	0	0
SM-1	Carbulau, intake 1	18/dez/00	20/dez/00	8.3	20.6	298	143	0.1	0.4	0	0
SM-2	Mibuteluli, intake 2	18/dez/00	20/dez/00	8.2	21.0	32	150	0.1	0.3	230	26
SM-3	Break Pressure Tank, Market	18/dez/00	20/dez/00	8.1	21.1	293	141	0.1	0.4	275	50
SM-4	Kamilaran, PT	18/dez/00	20/dez/00	8.1	21.2	293	141	0.1	0.9	265	72
SM-5	SAVE HAVEN, CIVPOL	18/dez/00	20/dez/00	8.0	21.2	295	142	0.1	0.5	190	60
SM-6	UNTAET Office	18/dez/00	20/dez/00	8.2	21.2	312	152	0.1	0.4	230	46
SM-7	Kotalala Intake 3	No sample		NT	NT	NT	NT	NT	NT	NT	NT
SM-8	Borlala	18/dez/00	20/dez/00	8.2	21.3	293	141	0.1	0.3	60	2
SM-9	Hatunifa Reservoir	18/dez/00	20/dez/00	8.3	22.0	293	141	0.1	0.4	205	6
SM-10	Clinic OIKOS	18/dez/00	20/dez/00	8.3	22.9	316	152	0.1	0.4	180	60

Legend:

ND: not detectable; NT: not tested; NS: not set; CFU: colony formed unit; TNC: Too numerous to count; FAC: free available chlorine

Suggestions

Boil water before drinking

District : Manufahi**Town : Same**

Sample by Armando Tilman,.DWSS Manufahi Tested by Alvaro Godinho, Mario Soares WSS Laboratory

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	0	0
SM-1	Carbulau, intake 1	16/fev/01	19/fev/01	8.0	26.2	265	123	0.1	0.5	70	0
SM-2	Mibuteluli, intake 2	16/fev/01	19/fev/01	8.3	25.4	143	68	0.1	0.4	35	0
SM-3	Break Pressure Tank, Market	16/fev/01	19/fev/01	8.1	25.8	260	125	0.1	0.3	0	0
SM-4	Kamilaran, PT	16/fev/01	19/fev/01	8.1	25.6	333	160	0.2	0.5	405	0
SM-5	SAVE HAVEN, CIVPOL	16/fev/01	19/fev/01	8.1	25.7	252	121	0.1	0.9	370	0
SM-6	UNTAET Office	16/fev/01	19/fev/01	8.1	25.8	330	159	0.2	0.5	135	8
SM-7	Kotalala Intake 3	16/fev/01	19/fev/01	8.1	25.7	505	245	0.2	0.5	105	0
SM-8	Borlala	16/fev/01	19/fev/01	8.0	25.8	442	314	0.2	0.5	30	2
SM-9	Hatunifa Reservoir	16/fev/01	19/fev/01	8.1	25.6	259	124	0.1	0.5	155	0
SM-10	Clinic OIKOS	16/fev/01	19/fev/01	8.0	25.9	246	118	0.1	0.7	10	2
SM-11	Cacaularan intake-4	16/fev/01	19/fev/01	7.6	25.6	310.0	145	0	0.8	320.0	0
SM-12	Maitimer Intake -5	16/fev/01	19/fev/01	7.7	25.8	552	268	0	0.7	65.0	0
SM-13	Babulo Intake-6	16/fev/01	19/fev/01	7.9	25.2	513.0	248	0	0.5	280.0	0

Legend

ND;not detectable; NT: not tested NS not Set CFU: colony Formed unit TNC: too numerous to count, FAC Free Availabel Chlorine

Suggestions

Boil water befor drinking

District : Manufahi

Sampling Date : 27-April-2001

Sampled by : Armando Tilman.DWSS Manufahi

Town : Same

Testing Date : 30-April-2001. Received by : Mario Soares.

Tested by : Alvaro Godinho.Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Ca.Hardness	T.Coliform	G.Bacteria
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	0	0
SM-1	Carbulau, intake 1	07:15	14:10	8.4	26.4	281	135	0.1	0.5	172	NT	—	+
SM-2	Mibuteluli, intake 2	08:01	14:12	8.3	25.5	304	146	0.1	1.0	162	NT	±	++
SM-3	BPT.Market	08:42	14:16	8.3	24.8	323	155	0.2	0.5	NT	NT	—	±
SM-4	Kamilaran, PT	08:25	14:18	8.3	24.8	255	122	0.1	0.6	NT	NT	++	—
SM-5	SAVE HAVEN, CIVPOL	08:50	14:20	8.0	24.8	254	122	0.1	0.8	NT	NT	—	—
SM-6	UNTAET Office	09:05	14:22	8.2	24.6	322	155	0.2	1.5	NT	NT	—	—
SM-7	Kotalala Intake 3	08:10	14:24	8.2	24.9	249	119	0.1	0.8	142	NT	±	++
SM-8	Borlala	07:30	14:26	8.3	24.6	269	129	0.1	1.1	NT	NT	±	++
SM-9	Hatunifa Reservoir	07:25	14:28	8.3	25.1	270	130	0.1	0.4	NT	NT	+	++
SM-10	Clinic OIKOS	09:00	14:30	8.3	25.0	322	155	0.2	0.8	NT	NT	—	—
SM-11	Cacaularan intake-4	08:37	14:32	8.2	25.5	446.0	216	0.2	0.4	236	NT	+++	+++
SM-12	Maitimer Intake -5	09:40	14:34	8.1	25.5	577	280	0.3	0.3	298	NT	++	+++
SM-13	Babulo Intake-6	09:29	14:36	8.2	26.3	448.0	216	0.2	2.4	242	NT	++	+++

Legend

ND :Not Detectable

NT : Not Tested

CFU : Colony Formed Unit

TNC : Too Numerous to Count

FAC : Free Availabel Chlorine

For Paper Slip (-) : 0 - 3

(±) : 3 - 10

(+) : 10 - 20

(++) : 20 - 30

(+++) : More than 30

Suggestions

Boil water befor drinking

District : Manufahi

Sampling Date :01-June-2001

Sampled by :Armando Tilman.DWSS Manufahi

Town : Same

Testing Date :04-June-2001

Tested by :.Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	0	0
SM-1	Carbulau, intake 1	09:38	10:10	8.3	21.1	295	142	0.1	2.2	160	152	+	+
SM-2	Mibuteluli, intake 2	07:26	10:13	8.0	24.3	346	167	0.2	2.8	192	166	+++	+++
SM-3	Break Pressure Tank, Market	08:24	10:19	8.1	24.4	326	157	0.2	0.6	NT	NT	-	-
SM-4	Kamilaran, PT	07:57	10:22	8.2	24.0	279	134	0.1	0.8	NT	NT	-	-
SM-5	SAVE HAVEN, CIVPOL	08:18	10:27	7.9	23.9	282	135	0.1	0.8	NT	NT	-	-
SM-6	UNTAET Office	08:36	10:30	8.0	23.8	282	135	0.1	1.1	NT	NT	-	-
SM-7	Kotalala Intake 3	07:40	10:34	8.0	23.8	274	132	0.1	0.8	158	134	+	+
SM-8	Borlala	09:20	10:36	8.1	24.2	282	136	0.1	0.7	NT	NT	-	-
SM-9	Hatunifa Reservoir	09:26	10:39	8.1	24.0	283	136	0.1	0.6	NT	NT	±	-
SM-10	Clinic OIKOS	08:49	10:40	8.1	23.9	326	157	0.2	0.7	NT	NT	-	-
SM-11	Cacaularan Intake-4	08:10	10:42	7.9	23.9	326.0	157	0.2	0.6	234	218	+++	+
SM-12	Maitimer Intake-5	08:29	10:43	7.6	23.9	326	157	0.2	0.5	294	310	±	±
SM-13	Babulo Intake-6	08:43	10:46	7.9	24.8	459	222	0.2	0.7	228	216	+	±

Legend

ND;not detectable; NT: not tested NS not Set CFU: colony Formed unit TNC: too numerous to count, FAC Free Availabel Chlorine

For Paper Slip

(-) : 0 - 3

(±) : 3 - 10

(+) : 10 - 20

(++) : 20 - 30

(+++) : More than 30

Weather Report :

Sunny

Cloudy

Rain

Suggestions

Boil water befor drinking

District : Manufahi

Sampling Date :23/07/2001

Sampled by :Natalino Corte Real Laranjeira,DWSS Manufahi

Town : Same

Testing Date :23/07/2001

Tested by : Miguel Quintao & Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Ca.Hard	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Fluoride	Mn	SO ₄ ²⁻	R.Cl ₂	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	NS	10	1.0	0.3	1.5	0.5	250	0.5	0	0
SM-1	Carbulau, intake 1	06:52	09:22	8.6	8.1	140	67	0.1	6.7	115	NT	ND	ND	0.005	ND	ND	0.2	23	NT	NT	NT
SM-2	Mibuteluli, intake 2	07:27	09:26	8.3	12.7	118	56	0.1	9.8	115	NT	ND	ND	0.006	0.04	ND	0.3	10	NT	NT	NT
SM-3	Break Pressure Tank, Market	08:24	09:29	8.0	8.3	216	104	0.1	5.2	NT	NT	ND	ND	0.005	0.01	ND	NT	10	NT	NT	NT
SM-4	Kamilaran, PT	07:53	16:39	8.5	7.8	263	126	0.1	2.9	NT	NT	ND	ND	0.005	ND	ND	NT	2	NT	NT	NT
SM-5	SAVE HAVEN, CIVPOL	08:18	16:43	8.4	5.3	277	133	0.1	2.3	NT	NT	ND	ND	0.005	ND	ND	NT	1	NT	NT	NT
SM-6	UNTAET Office	08:35	16:51	8.4	7.2	321	155	0.2	1.8	NT	NT	ND	0,1	0.007	ND	ND	NT	11	NT	NT	NT
SM-7	Kotalala Intake 3	07:40	16:47	8.4	6.0	276	133	0.1	2.0	NT	NT	ND	ND	0.005	ND	ND	NT	1	NT	NT	NT
SM-8	Borlala	07:07	09:31	8.1	6.3	166	79	0.1	5.8	NT	NT	ND	ND	0.002	ND	ND	NT	24	NT	NT	NT
SM-9	Hatunifa Reservoir	07:03	16:45	8.4	5.0	267	128	0.1	2.3	NT	NT	ND	ND	ND	ND	ND	NT	24	NT	NT	NT
SM-10	Clinic OIKOS	08:48	17:07	8.2	13.4	0.70	ND	ND	18.0	NT	NT	ND	ND	0.011	ND	ND	NT	11	NT	NT	NT
SM-11	Cacaularan intake-4	08:05	09:38	7.9	8.8	180	86	0.1	6.6	235	NT	ND	ND	0.009	ND	ND	0.3	7	NT	NT	NT
SM-12	Maitimer Intake -5	08:30	17:05	8.1	11.7	309	148	0.1	7.8	315	NT	ND	ND	0.001	ND	ND	0.2	ND	NT	NT	NT
SM-13	Babulo Intake-6	08:43	09:35	7.9	8.5	165.4	79	0.1	4.3	255	NT	ND	ND	0.001	ND	ND	0.2	9	NT	NT	NT

Legend

(ND) : Not Detectable

(NT) : Not Tested

(NS) : Not Set

(CFU) : Colony Formed Unit

(TNC) : Too Numerous to Count

(FAC) : Free Availabel Chlorine

For Paper Slip

(-) : 0 - 3 (±) : 3 - 10

(+) : 10 - 20

(++) : 20 - 30

(+++) : More than 30

Suggestions

Boil water befor drinking

District : Manufahi

Sampling Date : 24/August/ 2001

Sampled by : Natalino Corte Real Laranjeira DWSS Same

Town : Same

Testing Date : 27/August/2001

Tested by : Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Ca.Hardness	T.Coliform	G.Bacteria
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	0	0
SM-1	Carbulau, intake 1	09:27	10:58	8.4	26.4	269	129	0.1	0.7	150	122	94	2
SM-2	Mibuteluli, intake 2	08:32	10:59	8.3	26.4	306	147	0.1	0.5	188	156	TNC	8
SM-3	BPT.Market	09:42	11:00	8.3	26.3	288	139	0.1	0.6	NT	NT	TNC	8
SM-4	Kamilaran, PT	09:49	11:11	8.4	26.2	272	131	0.1	0.6	NT	NT	408	66
SM-5	SAVE HAVEN, CIVPOL	09:08	11:13	8.3	26.2	274	131	0.1	0.6	NT	NT	146	30
SM-6	UNTAET Office	08:05	11:14	8.3	26.2	289	139	0.1	0.7	NT	NT	26	0
SM-7	Kotalala Intake 3	08:40	11:25	8.3	26.2	274	132	0.1	0.8	162	154	192	8
SM-8	Borlala	09:17	11:26	8.3	26.1	258	124	0.1	0.6	NT	NT	260	8
SM-9	Hatunifa Reservoir	09:20	11:27	8.3	26.1	258	124	0.1	0.7	NT	NT	TNC	0
SM-10	Clinic OIKOS	07:55	11:37	8.3	26.1	288	138	0.1	1.0	NT	NT	56	0
SM-11	Cacaularan intake-4	09:00	11:38	8.2	26.1	407	196	0.2	0.5	224	214	TNC	14
SM-12	Maitimer Intake -5	08:18	11:39	8.1	26.1	517	250	0.2	0.7	266	336	TNC	28
SM-13	Babulo Intake-6	08:00	11:49	8.1	26.1	401	194	0.2	0.5	206	250	298	60

Legend

401

ND :Not Detectable

NT : Not Tested

CFU : Colony Formed Unit

TNC : Too Numerous to Count

FAC : Free Availabel Chlorine

For Paper Slip (-) : 0 - 3

(±) : 3 - 10

(+) : 10 - 20

(++) : 20 - 30

(+++) : More than 30

Weather Report:

Sunny

Cloudy

Rain

Suggestion : Boiling Water Before Drink

District : Manufahi

Sampling Date : 19 / September / 2001

Sampled by : Natalino Laranjeira, DWSS Same

Town : Same

Testing Date : 21 / September / 2001

Tested by : EHA and Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	0	0
SM-1	Carbulau, intake 1	09:27	10:58	7.2	21.3	279	134	0.1	0.8	185	175	6	0
SM-2	Mibuteluli, intake 2	08:20	10:59	7.4	21.2	326	157	0.2	0.6	175	135	TNC	6
SM-3	BPT.Market	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-4	Kamilaran, PT	08:30	10:59	7.8	21.8	304	146	0.1	0.4	NT	NT	84	8
SM-5	SAVE HAVEN, CIVPOL	08:26	11:11	7.9	22.3	308	148	0.1	0.8	NT	NT	22	6
SM-6	UNTAET Office	08:14	11:12	7.9	21.9	301	145	0.1	1.1	NT	NT	TNC	16
SM-7	Kotalala Intake 3	08:49	11:13	7.9	24.9	310	149	0.1	0.5	155	215	TNC	16
SM-8	Borlala	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-9	Hatunifa Reservoir	09:38	11:28	8.0	25.3	310	149	0.1	1.0	NT	NT	TNC	0
SM-10	Clinic OIKOS	08:03	11:29	8.3	25.6	303	146	0.1	0.5	NT	NT	TNC	18
SM-11	Cacaularan intake-4	09:05	11:30	8.0	25.3	431	208	0.2	0.5	215	260	TNC	14
SM-12	Maitimer Intake -5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-13	Babulo Intake-6	08:09	11:40	8.1	25.4	424	205	0.2	0.5	240	220	222	0

Legend

ND :Not Detectable

NT : Not Tested

CFU : Colony Formed Unit

TNC : Too Numerous to Count

FAC : Free Availabel Chlorine

For Paper Slip (-) : 0 - 3

(±) : 3 - 10

(+) : 10 - 20

(++) : 20 - 30

(+++) : More than 30

Weather Report :

Sunny

Cloudy Rain

Suggestion : Boiling Water Before Drink

District : Manufahi

Sampling Date : 04/November/2001

Sampled by : Natalino Corte Real Laranjeira.DWSS Same

Town : Same

Testing Date : 05/November/2001

Tested by : Mario Soares WSS Laboratory

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Ca.Hard	Alkalinity	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	NS	1.5	10	1	0.3	0.5	1.50	250	0	0
SM-1	Carbulau, intake 1	08:53	10:03	8.3	26.3	330	159	0.2	1.2	205	NT	250	NT	NT	NT	NT	NT	NT	NT	TNC	304
SM-2	Mibuteluli, intake 2	07:30	10:04	8.2	28.6	404	195	0.2	1.1	160	NT	240	NT	NT	NT	NT	NT	NT	NT	TNC	18
SM-3	BPT.Market	10:40	10:05	8.3	29	392	189	0.2	1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	332	0
SM-4	Kamilaran, PT	08:09	10:17	8.3	22.7	356	171	0.2	1.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	246
SM-5	SAVE HAVEN, CIVPOL	10:45	10:18	8.3	22.1	358	173	0.2	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	126
SM-6	UNTAET Office	10:25	10:19	8.2	22.3	356	172	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	428	8
SM-7	Kotalala Intake 3	07:55	10:34	8.2	28.1	332	160	0.2	0.6	205	NT	280	NT	NT	NT	NT	NT	NT	NT	TNC	0
SM-8	Borlala	09:05	10:35	8.2	28	312	150	0.2	0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	28
SM-9	Hatunifa Reservoir	09:40	10:36	8.3	23.4	317	153	0.2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	4
SM-10	Clinic OIKOS	10:35	10:48	8.2	23.8	330	159	0.2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	322	14
SM-11	Cacaularan intake-4	08:20	10:49	8.1	24.2	387	187	0.2	0.5	265	NT	220	NT	NT	NT	NT	NT	NT	NT	TNC	82
SM-12	Maitimer Intake -5	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-13	Babulo Intake-6	10:00	10:50	8.1	21.2	513	248	0.2	0.5	240	NT	285	NT	NT	NT	NT	NT	NT	NT	384	4

Legend

ND :Not Detectable

NT : Not Tested

CFU : Colony Formed Unit NC : Too Numerous to Count FAC : Free Available Chlorine

Inspected by :

Weather Report :

Sunny Cloudy Rain

Recommendation : - Bacteriologi is problem

- Boiling Water Before Drink

Mario Soares Laboratory Manager

District : Manufahi

Sampling Date : 28/11/2001

Sampled by : Natalino Corte Real Laranjeira DWSS Same

Town : Same

Testing Date : 29/11/2001

Tested by : Mario Soares WSS Laboratory

Received by : Mario Soares

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli		
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU		
East Timor Guidelines				Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	0.5	1.5	250	0	0
SM-1	Carbulau, intake 1	14:32	10:18	7.8	26.6	281	135	0.1	2.3	150	146	ND	ND	0.006	0.01	NT	0.43	27	84	0		
SM-2	Mibuteluli, intake 2	13:15	10:19	7.9	26.3	323	155	0.2	1.7	160	188	0.2	ND	0.003	0.01	NT	0.27	27	TNC	242		
SM-3	BPT.Market	13:35	10:20	7.9	26.3	323	155	0.2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	236		
SM-4	Kamilaran, PT	13:22	11:06	8.0	26.1	291	140	0.1	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	306	20		
SM-5	SAVE HAVEN, CIVPOL	13:40	11:07	8.0	26.3	323	156	0.2	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	202		
SM-6	UNTAET Office	13:45	11:08	8.0	26.3	326	157	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	298	38		
SM-7	Kotalala Intake 3	14:01	11:18	8.0	26.3	292	140	0.1	0.8	150	188	0.2	ND	0.004	ND	NT	0.28	27	244	30		
SM-8	Borlala	14:15	11:19	8.0	26.3	283	136	0.1	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	166	0		
SM-9	Hatunifa Reservoir	14:20	11:20	8.0	26.3	283	136	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	154	2		
SM-10	Clinic OIKOS	13:43	11:32	8.0	26.4	326	158	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	340	32		
SM-11	Cacaularan intake-4	13:38	11:33	7.9	26.5	436	211	0.2	0.7	214	232	0.4	0.1	0.003	0.01	NT	0.30	8	TNC	5		
SM-12	Maitimer Intake -5	13:42	11:34	8	26.6	283	136	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	272	0		
SM-13	Babulo Intake-6	13:53	11:45	7.9	26.6	456	220	0.2	0.7	216	246	0.4	ND	0.004	0.01	NT	0.30	13	TNC	0		

Legend

NT : Not Tested

CFU:colony formed unit

TNC: Too umberous to Count

FAC:Free Available Chlorine

ND :Not Detectable

Sunny Cloudy Rain

Inspected by :

Weather Report :

Recommendation : - Bacteriologi is Problem

- Boiling Water Before Drink

Mario Soares Laboratory Manager

District : Manufahi

Sampling Date : 04 / 02 / 2002

Sampled by : Natalino Corte Real Laranjeira DWSS Same

Town : Same

Testing Date : 06 / 02 / 2002

Tested by : Miguel Quintao & Mario Soares WSS Laboratory

Received by : Mario Soares

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	0.5	1.5	250	0	0
SM-1	Carbulau, intake 1	08:15	10:05	8.0	24.0	261	125	0.1	0.2	120	140	NT	NT	NT	NT	NT	NT	NT	42	4
SM-2	Mibuteluli, intake 2	08:20	10:06	8.0	25.8	292	140	0.1	0.4	160	180	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
SM-3	BPT.Market	08:30	10:13	8.0	26.4	280	134	0.1	0.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
SM-4	Kamilaran, PT	09:40	10:14	8.1	26.4	267	128	0.1	0.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	168	66
SM-5	SAVE HAVEN, CIVPOL	09:50	10:15	8.2	26.4	266	128	0.1	0.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	242	42
SM-6	UNTAET Office	10:40	10:21	7.9	26.2	308	148	0.1	0.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	556	6
SM-7	Kotalala Intake 3	09:55	10:22	8.0	26.3	266	128	0.1	0.3	170	185	NT	NT	NT	NT	NT	NT	NT	150	70
SM-8	Borlala	10:50	10:23	8.1	12.3	418	202	0.2	0.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	486	30
SM-9	Hatunifa Reservoir	09:20	10:30	7.9	13.9	319	154	0.2	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	256	12
SM-10	Clinic OIKOS	10:30	10:31	8.1	13.9	401	193	0.2	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	480	8
SM-11	Cacaularan intake-4	10:11	10:32	8.1	14.2	429	207	0.2	0.5	295	190	NT	NT	NT	NT	NT	NT	NT	TNC	26
SM-12	Maitimer Intake -5	10:16	10:41	8.1	14.2	534	259	0.3	0.5	270	210	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
SM-13	Babulo Intake-6	10:20	10:45	7.9	14.3	536	259	0.3	0.3	320	285	NT	NT	NT	NT	NT	NT	NT	394	40

Legend

NT : Not Tested

CFU:colony formed unit

TNC: Too umberous to Count

FAC:Free Available Chlorine

WD :Not Detectable

Sunny Cloudy Rain

Inspected by :

Weather Report :

Recommendation :

1. Bacteriological is Problem
2. Boil Water before drink

Mario Soares Laboratory Manager

District : Manufahi

Sampling Date : 24/June/2002

Sampled by : Natalino Corte Real Laranjeira DWSS Manufahi

Town : Same

Testing Date : 25/June/2002

Tested by : Mario Soares WSS Laboratory

Received by : Mario Soares

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	0.5	1.5	250	0	0
SM-1	Carbulau, intake 1	05:00	10:36	8.3	25.4	309	149	0.1	0.5	210	195	4.8	0.2	0.012	0.01	NT	0.57	NT	TNC	22
SM-2	Mibuteluli, intake 2	05:30	10:37	8.2	25.3	301	145	0.1	0.5	175	205	0.5	0.2	0.024	0.01	NT	0.73	NT	TNC	22
SM-3	BPT.Market	05:40	10:49	8.2	25.3	302	145	0.1	0.5	NT	NT	0.5	0.3	0.022	0.01	NT	0.67	NT	TNC	50
SM-4	Kamilaran, PT	05:55	10:50	8.4	25.4	303	146	0.1	0.6	NT	NT	0.4	0.2	0.026	0.02	NT	0.64	NT	TNC	18
SM-5	SAVE HAVEN, CIVPOL	06:11	10:59	8.2	25.5	302	145	0.1	0.5	NT	NT	0.2	0.2	0.006	0.01	NT	0.64	NT	TNC	36
SM-6	UNTAET Office	06:15	11:00	8.4	25.6	303	146	0.1	0.6	NT	NT	0.2	0.2	0.011	0.02	NT	0.77	NT	34	28
SM-7	Kotalala Intake 3	06:20	11:05	8.2	25.7	302	145	0.1	0.4	NT	NT	ND	0.2	0.011	0.01	NT	0.64	NT	TNC	162
SM-8	Borlala	06:40	11:06	8.4	25.4	304	146	0.1	0.5	NT	NT	1.9	0.3	0.015	0.04	NT	0.30	NT	TNC	26
SM-9	Hatunifa Reservoir	06:51	11:15	8.2	26.0	303	145	0.1	0.5	NT	NT	0.6	0.2	0.021	0.03	NT	0.26	NT	TNC	34
SM-10	Clinic OIKOS	07:01	11:16	8.4	26.0	303	146	0.1	0.5	NT	NT	0.1	0.3	0.014	0.01	NT	0.54	NT	0	18
SM-11	Cacaularan intake-4	07:15	11:19	8.2	26.4	302	145	0.1	0.7	160	155	0.2	0.2	0.015	0.02	NT	0.80	NT	TNC	28
SM-12	Maitimer Intake -5	07:21	11:20	8.2	26.5	304	146	0.1	0.9	170	180	0.1	0.4	0.011	0.05	NT	0.83	NT	TNC	50
SM-13	Babulo Intake-6	07:30	11:30	8.2	26.3	302	145	0.0	0.6	180	165	0.2	0.3	0.014	0.03	NT	0.71	NT	TNC	30

Legend

ND :Not Detectable

NT : Not Tested

CFU:colony formed unit

TNC: Too umberous to Count

FAC:Free Available Chlorine

):Not Detectable

Sunny Cloudy Rain

Inspected by :

Weather Report :

Recommendation :

1. Bacteriological is Problem

2. Boil Water before drink

Mario Soares Laboratory Manager

District : Manufahi

Sampling Date : 27 - 3 - 2003

Sampled by : Natalino Corte Real L.

Town : Same

Testing Date : 28 - 3 - 2003

Tested by : Miguel Quintao

Received by : Miguel Quintao

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Alkalinity	NH ₃ -N	NO ₃ -N	NO ₂ -N	Fe	Mn	Fluoride	SO ₄ ²⁻	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	0.5	1.5	250	0	0
SM-1	Carbulau, intake 1	05:10	10:55	8.5	29.1	345	195	0.1	0.6	115	130	NT	NT	NT	NT	NT	NT	NT	34	2
SM-2	Mibuteluli, intake 2	08:35	10:56	8.4	29.0	400	210	0.1	0.5	145	165	NT	NT	NT	NT	NT	NT	NT	38	2
SM-3	BPT.Market	08:20	11:01	8.4	28.9	415	205	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	68	2
SM-4	Kamilaran, PT	08:05	11:02	8.5	29.1	407	200	0.1	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	76	0
SM-5	SAVE HAVEN, CIVPOL	07:54	11:03	8.3	29.1	405	210	0.1	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	42	0
SM-6	UNTAET Office	08:46	11:09	8.6	29.1	400	202	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	132	0
SM-7	Kotalala Intake 3	07:30	11:10	8.5	29.0	400	208	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	106	0
SM-8	Borlala	05:51	11:11	8.5	29.2	407	209	0.1	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	48	4
SM-9	Hatunifa Reservoir	05:59	11:16	8.5	29.1	406	210	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	42	0
SM-10	Clinic OIKOS	08:52	11:17	8.5	29.1	400	207	0.1	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	102	0
SM-11	Cacaularan intake-4	06:25	11:18	8.5	29.1	400	206	0.1	0.8	300	245	NT	NT	NT	NT	NT	NT	NT	30	0
SM-12	Maitimer Intake -5	06:40	11:23	8.5	29.1	400	203	0.1	0.9	250	210	NT	NT	NT	NT	NT	NT	NT	24	0
SM-13	Babulo Intake-6	07:01	11:24	8.5	29.1	400	210	0.1	0.5	305	220	NT	NT	NT	NT	NT	NT	NT	46	2

Legend

ND :Not Detectable

ND :Not Detectable

NT : Not Tested

CFU:colony formed unit

TNC: Too umberous to Count

FAC:Free Available Chlorine

Weather Report:

Sunny Cloudy Rain

Inspected by :

Recommendation :

1. Bacteriological is Problem

2. Boil Water before drink

Mario Soares Laboratory Manager

District : Manufahi

Sampling Date : 15/11/2004

Sampled by : Natalino Corte Real Laranjeira DWSS Same

Town : Same

Testing Date : 16/11/2004

Tested by : Rui Manuel Pinto Belo & Mario Soares SAS Laboratory

Received by : Mario Soares

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hardness	Ca.Hard	Alkalinity	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/l)	CFU	CFU
East Timor Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	200	NS	NS	0	0
SM-1	Carbulau, intake 1	6.20	9.58	9.1	22.5	30.7	155	0.2	0.5	160	175	210	TNC	0
SM-2	Mibuteluli, intake 2	7.42	9.59	9.2	21.8	295	151	0.1	0.4	180	180	210	TNC	2
SM-3	BPT.Market	6.40	10.00	9.0	22.1	298	152	0.1	0.4	180	185	205	TNC	8
SM-4	Kamilaran, PT	7.00	10.15	9.2	21.9	295	152	0.1	0.5	165	180	250	TNC	0
SM-5	SAVE HAVEN, CIVPOL	No Water		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-6	UNTAET Office	8.40	10.17	9.2	21.9	297	152	0.1	0.4	200	190	250	TNC	0
SM-7	Kotalala Intake 3	8.10	10.42	9.2	21.9	294	151	0.1	0.4	135	190	130	TNC	0
SM-8	Borlala	No Water		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-9	Hatunifa Reservoir	6.01	10.44	9.2	22.1	299	153	0.1	0.4	180	175	200	TNC	0
SM-10	Clinic OIKOS	7.55	10.46	9.2	22.0	296	152	0.1	0.4	240	140	245	TNC	0
SM-11	Cacaularan intake-4	9.00	10.16	9.1	22.1	297	152	0.1	0.4	150	205	170	TNC	0
SM-12	Maitimer Intake -5	No Water		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SM-13	Babulo Intake-6	9.40	10.43	9.1	22.1	298	152	0.1	0.4	190	180	205	TNC	4

Legend**ND** :Not Detectable**NT** : Not Tested**CFU**:colony formed unit**TNC** : Too Numerous to Count**FAC** :FreeAvailable Chlorine

Weather Report :

Sunny

Cloudy

Rain

Recommendation :

Inspected by

1. Bacteriological is Problem

2. Boil Water before drink

Laboratory Supervisor SAS

District : Manufahi

Sampling Date : 28/07/2005

Sample by : Natalino Corte Real Laranjeira

Town : Same

Testing Date : 28/07/2005

Sample Tested by : Rui Manuel Pinto Belo

Received by : Mario Soares

No.	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	CFU	CFU
East Timor Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	0	0
SM-1	Carbulau, intake 1	16.48	14.00	7.9	28.0	312	156	0.1	1.7	TNC	70
SM-2	Mibuteluli, intake 2	16.51	14.01	7.7	26.7	307	153	0.1	2.0	TNC	76
SM-3	BPT.Market	16.54	14.02	7.7	27.3	308	154	0.1	1.3	TNC	94
SM-4	Kamilaran, PT	16.58	14.20	7.9	26.6	305	153	0.1	1.4	TNC	76
SM-5	SAVE HAVEN, CIVPOL	17.01	14.21	7.8	27.3	308	154	0.1	1.3	TNC	TNC
SM-6	UNTAET Office	17.06	14.22	7.8	27.4	309	154	0.1	1.1	TNC	112
SM-7	Kotalala Intake 3	17.09	14.30	7.8	27.5	334	167	0.1	1.8	TNC	TNC
SM-8	Borlala	No Water		NT	NT	NT	NT	NT	NT	NT	NT
SM-9	Hatunifa Reservoir	17.12	14.31	7.7	27.6	334	167	0.1	1.4	TNC	96
SM-10	Clinic OIKOS	No Water		NT	NT	NT	NT	NT	NT	NT	NT
SM-11	Cacaularan intake-4	No Water		NT	NT	NT	NT	NT	NT	NT	NT
SM-12	Maitimer Intake -5	17.16	14.32	7.8	28.2	333	167	0.1	1.5	TNC	TNC
SM-13	Babulo Intake-6	No Water		NT	NT	NT	NT	NT	NT	NT	NT

Legend

ND :Not Detecta NS: not set

NT : Not Tested

CFU; Colony formed unit

TNC: too numerous to count

FAC: free Available Chlorine

Weather Report :

Sunny Cloudy

Rain

Recommendation :

1. Bacteriological is Problem

2. Boil Water before drink

Inspected by

Laboratory Supervisor SAS

District : MANUFAHI

Sampling Date : 26/12 /2019

Sampled by : SMASA MANUFAHI

Town : SAME

Testing Date : 27/12/2019

Tested by : Estela Saldanha

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Sal	Turb.	Ca.Hard.	T.Hard	Alk.	NH ₃ -N	NO3-N	NO ₂ -N	Fe	Flu	Mn	SO ₄ ²⁻	T.Coli	E.Coli
		Samp	Test		(°C)	(μS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours & Mint		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
SM-1	Carbulau, intake 1			7.2	23.3	334	167.0	0.2	0.7	155	165	175	0.2	0.0	0.005	0.03	0.79	0.0	10	4	1
SM-2	Betululi intake			7.8	23.1	291	146	0.1	0.6	125	165	170	0.2	0.0	0.002	0.0	0.27	0.1	10	4	0
SM-3	BPT.Market			7.7	22.0	333	166	0.2	0.4	125	145	155	0.3	0.0	0.001	0.0	0.25	0.1	11	12	4
SM-4	Kamilaran, PT			7.8	22.5	263	131	0.1	0.8	125	160	170	0.3	0.0	0.003	0.0	0.20	0.1	9	TNC	12
SM-5	SAVE HAVEN, CIVPOL																				
SM-6	UNTAET Office																				
SM-7	Kotalala Intake 3																				
SM-8	Borlala																				
SM-9	Hatunifa Reservoir																				
SM-10	Clinic OIKOS																				
SM-11	Cacaularan intake-4			7.7	22.4	365	183	0.2	0.6	130	140	150	0.3	0.0	0.004	0.0	0.20	0.1	10	TNC	TNC
SM-12	Maitimer Intake -5																				
SM-13	Babulo Intake-6			7.6	22.3	425	212	0.2	0.7	135	145	155	0.2	0.0	0.002	0.0	0.31	0.1	15	TNC	TNC

Legend:

ND: not detectable; **NT:** not tested; **NS:** not set; **CFU:** colony formed unit; **TNC:** Too numerous to count; **FAC:** free available chlorine

Weather Report : Sunny Cloudy Rain

Suggestions

1. Persiza Funsiona fila fali Sistema Chlorinasi !
2. Persiza hadia sistema distribuisaun tamba iha contaminasaun !
3. Nono be'e molok atu hemu !

Inspected by :

Chief of DNSA Laboratory

District : MANUFAHI
Town : SAME

Sampling Date : 28 / 01 / 2020

Testing Date : 29-30 / 01 / 2020

Sampled by : SMASA MANUFAHI

Tested by : Estela & Sidonio

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Sal	Turb.	Ca.Har.	T.Hard	Alk.	NH ₃ -N	NO3-N	NO ₂ -N	Fe	Flu	Mn	SO ₄ ²⁻	T.Coli	E.Coli
		Samp	Test		(°C)	(μS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours & Mint		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
SM-1	Carbulau, intake 1			7.3	27.6	330	165.2	0.2	0.3	145	155	165	0.6	0.4	0.004	0.07	0.06	0.1	12	2	0
SM-2	Betululi intake			7.3	26.9	405	202	0.2	0.3	140	150	160	0.6	0.4	0.004	0.05	0.05	0.1	6	8	0
SM-3	BPT.Market																				
SM-4	Kamilaran, PT																				
SM-5	SAVE HAVEN, CIVPOL																				
SM-6	UNTAET Office			7.0	26.8	657	329	0.3	0.3	150	160	170	0.5	0.4	0.005	0.1	0.03	0.1	17	10	3
SM-7	Kotalala Intake 3			7.3	26.8	473	236	0.2	0.4	155	165	175	0.9	0.8	0.003	0.01	0.02	0.1	13	4	0
SM-8	Borlala																				
SM-9	Hatunifa Reservoir			7.4	27.0	347	174	0.2	0.5	140	150	160	0.2	0.0	0.004	0.04	0.1	0.1	15	24	1
SM-10	Clinic OIKOS																				
SM-11	Cacaularan intake-4			7.3	26.7	552	276	0.3	0.3	165	175	185	0.3	0.6	0.003	0.0	0.08	0.0	10	1	0
SM-12	Maitimer Intake -5																				
SM-13	Babulo Intake-6																				

Legend:

ND: not detectable; **NT:** not tested; **NS:** not set; **CFU:** colony formed unit; **TNC:** Too numerous to count; **FAC:** free available chlorine

Weather Report: Sunny Cloudy Rain

Suggestions

1. Persiza Funsiona fila fali Sistema Chlorinasi !
2. Persiza hadia sistema distribuisaun tamba iha contaminasaun !
3. Nono be'e molok atu hemu !

Inspected by :

Chief of DNSA Laboratory

Source - District Capitals Water Supply and Sanitation Master Plan - Baucau, Lospalos, Same and Viqueque

Appendix C

Water quality test results

Cycle 1 tests May 2014

References and parameters	Units	Town	SAME	SAME	SAME	SAME	SAME	SAME
		Date	12-May-14	12-May-14	12-May-14	12-May-14	12-May-14	12-May-14
		Location	CARBULAU INTAKE	SAS OFFICE	MDG	HOSPITAL	MERBUTY INTAKE	KOTALALA INTAKE
WHO/TL Guideline		Sample Reference	Sample Reference	Sample Reference	Sample Reference	Sample Reference	Sample Reference	Sample Reference
Physical tests								
pH	-	6.5 - 8.5	8.3	7.6	8.1	8.1	8.5	8.5
E. Conductivity	µs/cm	NS	293	294	326	360	362	322
TSS	mg/L	NS	0.01	0.01	0.01	0.01	0.01	0.01
TDS	mg/L	1000	147	147	163	180	181	161
Salinity	%	NS	0.1	0.1	0.2	0.2	0.2	0.2
Temperature	°C	NS	21.2	24.6	24.5	25.7	22.3	26.6
Turbidity	NTU	5	3.2	0.6	2.9	0.6	0.3	0.2
Chemical tests								
NH3-N	mg/L	1.5	0.3	0.3	0.5	0.3	0.2	0.3
NO3-N	mg/L	10 (as NO3-N)	ND	ND	0.1	ND	ND	ND
NO2-N	mg/L	1 (as NO2-N)	0.001	0.004	0.003	0.003	0.002	0.004
Iron (Fe)	mg/L	0.3	0.1	0.1	0.1	ND	ND	ND
Manganese (Mn)	mg/L	0.5	ND	ND	ND	ND	ND	ND
Fluoride	mg/L	1.5	0.11	0.24	0.06	0.17	0.11	0.11
Free chlorine	mg/L	0.5	ND	ND	ND	ND	ND	ND
Ca hardness	mg/L	NS	160	130	125	140	145	140
Arsenic	mg/L	0.01	ND	ND	ND	ND	ND	ND
T. Hardness	mg/L	200	165	170	190	190	180	150
Total alkalinity	mg/L	NS	150	150	130	150	150	130
Sulphate (SO4 2-)	mg/L	250	18	15	9	9	10	8
Bacteriological test								
Total coliform	CFU/100 mL	0	0	0	15	TNC	26	0
E. Coli	CFU/100 mL	0	0	0	0	0	0	0

Legend:

ND: not detectable; NT: not tested; NS: not set; CFU: colony formed unit; TNC: Too numerous to count; FAC: free available chlorine

Non compliant

Serious non compliance/health risk



Appendix 5. Same Public Consultation Meeting Notes (12th October 2020)

1. Introduction

Meeting Details

Detail : 12th October 2020

Time : 09.00 AM to 12.00 PM

Location : Meeting Room, Manufahi Municipality Administration Office, Suco Holarua

The public consultation was led by the Administrator of Manufahi Municipality, accompanied by the National Director for Basic Sanitation, and lastly attendees coming from local authorities, representatives from the PNDS, Ministry of Public Works and ADB, with a total of 36 participants (Attendance Sheet provided in the subsequent Appendix).

The agenda was comprised of several sessions, as described below:

- a. Registry and video presentation
- b. Introduction: opening remarks from Aguas de Portugal Project Manager, National Director for Basic Sanitation and Manufahi Municipality Administrator, and at the same time officially opened the meeting
- c. Technical presentation from the Consultant team, composed of:
 - i. General Vision of the Urban Water Cycle (Presented by Gaudencia, AdP Technical Engineer)
 - ii. General Vision of the Work for the Project (Presented by Gaudencia, AdP Technical Engineer)
 - iii. Water Component (Presented by Agostinho, AdP Technical Engineer)
 - iv. Sanitation Component (Presented by Agostinho, AdP Technical Engineer)
 - v. Environmental Component (Presented by Maria Helena, OASIS National Environmental Technician)
 - vi. Social Component (Presented by Mario, AdP Project Manager)
- d. Coffee Break
- e. Discussion session (Q&A)
- f. Conclusion and Closure

Questions and recommendations during the Discussion session which were raised by the participants are accumulated and are described below.

2. Questions, Recommendation, Reclamations, Responds and Discussion (Q&A session)

2.1. Armando Silva – Local Community

➤ Recommendation: Land & Property

Concern about the drilling location at Suco Letefoho located in the community land nearby the dwellings, with no positive result from the drilling activity and considered inefficient in terms of costs. He suggested that the Project Proponent should collaborate in maximum to identify the best location, preferred to be in the Government land for the upcoming drilling activity, if required.

➤ Consultant's Clarification:

Aguas de Portugal – Mario Santos: The Water Resources team from ADP have done the survey for water Sources/ aquifer drilling and they identified several locations including the mentioned above.

The activity is part of an initial phase conducted by the Water Resources engineer/team to find out the potential water sources to be included in this project for the next phase (implementation phase) to support distribution system network

Recently water resources team still continues to look for potential sources and potential locations for drilling in order to support the upcoming water distribution network. Based on the Calculation for in 2040 water demand will be 5,327m³/day in parallel with the increase in the number of Population.

We also have to examine the environmental and social aspects prior implementing the canalization process from the intake to the distribution tanks and to fulfill the water usage by identifying good water sources (referred to underground water) for perforation in supporting the referred system. There won't be any sustainability if the system only depends on the Merbuti spring.

2.2 Fransisco Tilman and Ms. Anita dos Reis Fernandes – Local Community from Suco Holarua

➤ Recommendation: Acceleration of the Project Implementation

Common recommendation to the Project Proponent in order to be carried out as soon as possible. Based on their perspective, this project will provide a long-term need but the implementation will take some time before reaching to operational phase. As older generation, they are hoping that they could also have the opportunity to enjoy the benefit of this project. As community, they are fully supporting all the trusted consultant and future contractor, and they declared that they are very eager and ready to cooperate anytime with the project proponent.

➤ Consultant's Clarification: Noted

2.3 Mendes – Local Community

➤ Questions: Guarantee of the Project

Mr. Mendes stated that this is such an important project for a developing country it will bring huge benefits to the local community. How will this Project guarantee that all local communities will access clean water both for those who already have access to and who have not since the past few years ago?

2.4 Jenico Marcal – Local Community

➤ Recommendation: Project Area

Concern regarding the Project area in Suco Babulu that some of the Aldeia of Suco Babulo are out of the Project zone whether or not this project will cover all of Aldeia at Suco Babulo? Because most of Suco Babulu Community live in remotes areas, far from the city, there is an existing distribution pipe of clean water with less water volume that could not support enough community's needs.

➤ Consultant's Clarification: Noted

2.5 João Corte Real – Holarua Suco Chief

➤ Recommendation: Storage tank Location (Land & property)

Stated that Suco Holarua comprises of two springs with potential sources namely; Erluli and Darelau Springs, from Aldeia Atara to Fatuku and Aldeia Urufu will establish two storage tanks for water distribution, he recommends to identify location for storage tank as soon as possible to minimize unwanted social impact during Project implementation.

➤ Consultant's Clarification: Noted

2.6 Ricardo de Araujo – Tomonamo Aldeia Chief, Suco Letefoho

➤ Recommendation and Concern: Water Sources & Water Quantity

Concern regarding the quantity of water of Merbuti Springs that declines by time while the number of the population increases, Mr. Ricardo stated that there is an existing wallow/small lagoon at Aldeia Aileu Suco Letefoho since Portuguese time that might be utilized as rain catchment, as he suggested to the project proponent. This aims at supporting water availability for a longer-term consumption.

He is also concerned that the community have been neglecting the Tara Bandu, sabotaging biodiversity, and eventually diminish the water availability. There's also an additional water spring used for consumption since the Portuguese time until the Japanese time, and dried in the end because the community did not follow the Tara Bandu and other traditional rules for particular sacred areas. That spring was supposed to sustain the community for a longer-term, but given the condition, the project proponent should be able to find other alternative sources, to satisfy the community's needs.

This is a long-term project that would take time. As older generation, they would like to recommend to the project proponent to find another alternative for a more sustained water flow.

➤ Consultant's Clarification: Noted

2.7 Alfredo Rego – Local Community

➤ **Questions: Project area**

Mr. Alfredo Rego has the same concerns as Mr. Jenico Marsal (see question 2.4. regarding the project area in Suco Babulo in Aldeia Umaluli, he is requesting if possible, to include his Aldeia in this scope of the Project. In previous years, JICA has established water distribution channels in Aldeia Umaluli nevertheless there is no sufficient water volume due to lack of monitoring of water used

2.8 Amandio de Jesus – Aldeia Chief, Suco Babulo

➤ **Questions: Water Drilling Location & Environmental Impact**

He questioned about the Environmental Impact in regards to the 3-borehole tests for water drilling at Suco Babulo namely; Suco Searema, Lapuro, and Raimera. what is the Environmental Impact of this? How can this drilling guarantee distribute water for all of Aldeia at Suco Babulo?

2.9 Bernardino Lobato – Aldeia Chief of Lapuro, Suco Babulo

➤ Question: Project Location – Suco Babulo

He mentioned that Suco Babulo has 2 Aldeia Lapuro, which Lapuro 1 (near by the city) and Lapuro 2 far from city or nearby Suco Daisua – out of the Project Zone. Which Aldeia that would be included in the project area?

➤ Consultant's Clarification to Respond sub-section 2.2 to 2.9:

Aguas de Portugas - Mario Santos : As mentioned from the beginning of this meeting, water sources and springs are identified, local entities well collaborate all information regarding water resources are in place, the only information that needs to identify at the moment is; water quantity of water, shortly the Water Resources team will conduct a survey for each spring to calculate the volume of water in order to know how much volume that need for distribution for the project area according to the map in the red line (project zone).

The government of Timor Leste has invested in this project to cover Urban area only as of the Government also has a specific program for rural area development (PNDS) which will respond to those issue in the rural area. The project proponent has cooperated with local authority such as DGAS, Land and Property, Chief of Sucos and Aldeias, and other related

entities, and the project proponent also confirming (ongoing follow up) the identified locations point of the storage tank waiting for the confirmation at the moment.

In regards to Mr. Bernardino concerns about Aldeia Lapuro 1 and 2, the technical team should conduct a more detailed study particularly to know the exact the Aldeia boundary between Lapuro 1 and 2 with the rest of the Aldeias within the supply zone, therefore it still needs to be confirmed.

2.10 Filomeno Tilman – Former Administrator of Manufahi Municipality

➤ Question & Recommendation: Monitoring, Management Plan & Legislation for Water Usage

Appreciated the presentation and the project plan that have been presented by the project proponent, one of the main concerns from the community according to our opinion in regards to the water consumption and distribution was lack of monitorization and strict law that can regulate communities to use water in manner ways. What is the Management Plan for this system in the future? How can project proponent do a monitorization for the system?

I would like to suggest, in the meantime, water meter installation should be implemented in every household, in order to control the water usage and to avoid wasting on water.

2.11 Alice de Jesus – Suco Chief of Babulo

➤ Recommendation and Concern

Ms. Alice has a common concern as Mr. Filomeno stated above regarding establishing a more stringent law.

In conclusion, the most relevant issue regards to the water consumption and distribution was the lack of control, we might establish a system with high technology even so no law is necessarily established. It will be the same, local community that live in a rural area will not be able to access for clean water even though in the urban area will be face the same issue, according to my observation 56% of local community have a fishpond nearby the house which will minimize water volume to the other household, there is no maintenance program. Other issues are the leaked pipes and public water taps that are always open carelessly by the community.

Nevertheless, she also expressed her gratitude to the ADB and the whole team for providing this kind of program, and hoping that this project will give positive impacts to the community.

➤ Consultant's Clarification: Noted

2.12 Fransisco Tilman – Local Community

➤ Suggestion: Commitment from the Government and the technical team

Mr. Fransisco expressed his gratitude and suggested that the Government and Consultant team should be committed with less talk and implementation more on the project. The community does not want promises and does not want to attend to many meetings regarding with this project, but they want concrete results. The community is ready to support and collaborate with the project proponent, Consultant and related Contractor whenever there's an action to be done.

➤ Consultant's Clarification to Respond Sub-section 2.10 to 2.12:

Before reaching the Operational Phase, water meter will be installed in the registered households within the water supply system during Construction phase. Every households with water meter will then have access to water and will have to pay for monthly consumption fee. With this system, the consumers will be able to control water usage.

The mechanism during operational phase, I have discussed this with the Director of SMASA (Mr. Domingos), that SMASA should provide more workers and build their

capacity, especially the youths to take part in this project. Based on our experience, there should also be a team for proper maintenance with 24/7 service, to take immediate action in case the consumers have urgent problems with leakages and etc. Water meters that are being installed in the community's households will have to be the owners' responsibility himself/herself, while water meters located in the road and other public places will be SMASA's responsibility.

Related to the Chief of Suco, Ms. Alice, we will make sure relevant regulations to be established e.g. workers are in compliance with PPE usage while operating the water treatment (exposure to the chemical substances), and well-protection to the water springs in order to avoid contamination.

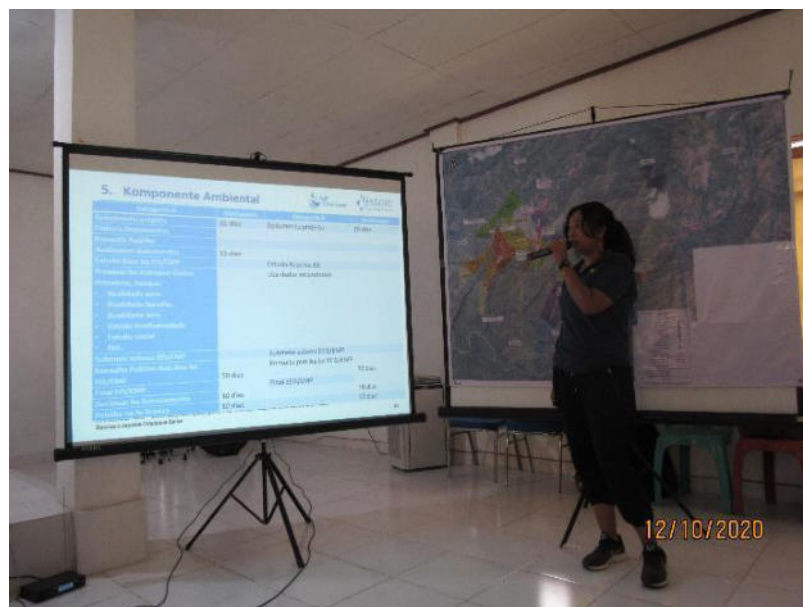
3. Conclusion

- This project should be able to consider on supplying water not just to the community's households, but also for other activities outside the households' scope to avoid water deficits.
- Most of the community is expecting for this project to be implemented as soon as possible, since they are facing crucial issues on water for daily consumption and don't want to repeat uncertain schedule for water delivery into the households in the future, which means 24/7 on water service.
- Positive responds and inputs from the local community.
- Community's most concern is that certain areas (Aldeias) are not covered in the project, while some of those areas are considered remote and are in need for water.
- Regulations need to be established and well-implemented in order to enforce the protection of water sources, delivery to the consumers and its sustainability.

Appendix 6. Selected Photographs of the Public Consultation for Same City



Participation of the Local Community and Other Stakeholders Before Commencing



Environmental Component Presentation by Maria Helena (OASIS National Environmental Technician)



Environmental CPresentation (Sanitation Sector) by Vasco Leitão
(Environmental Specialist)



Manufahi Municipality Administrator, Abrantes Isaac as the
Chairman for Public Consultation Meeting, along accompanied by
AdP Project Manager, Mario Santos and SMASA Director,
Domingos Soares

Appendix 7. Attendance Sheet of the Stakeholders during Public Consultation



MINISTÉRIO DAS OBRAS PÚBLICAS
DIRECÇÃO GERAL AGUA E SANEAMENTO (DGAS)
Rua: Avenida 20 de Maio – Calcoi, Caixa postal No 17, Tel. 3317157, 3317156 - Díli

“Consulta Pública ba Desenvolvimento Projeto Abastecimento Be'e Mos no Saneamento Iha Capital Município”
Dia: 12 de Outubro de 2020

LISTA PREZENZA

MUNICIPIO MANUFAHI

NO	NARAN	SEXO		INSTITUISAUN/POZISAUN	SUÇO/ALDEIA	NO CONTACTO	ASSINATURA
		F	M				
1	Arantes Isaac S		✓	KSM M F	Uhytoho	77304029	
2	Domingos Soares		✓	8as	holoana	773266875	
3	Anor Sihombing		✓	SPMU-DCAS	Dili	7725541	
4	Jorio Ode Ruel		✓	chefe Suro	Hila Rua	78066859	
5	Antonio Miranda		✓	Chefe Aldeia kotalala	/Jeterdno	772978495	
6	Ricardo do Arago		✓	Chefe Aldeia Tomonano	/Jeterdno	77370093	
7	Andre Barreto M.		✓	delc gado	late foho	7642586	

8	Domais da c. M. Perwenfo	M	Xefe Addeia muisa	Leto-folho	77634760	
9	Alfredo Prego	M	Chefe Addeia kumuloti Babulu		774140422	
10	Ismael Figueira d.c. wassa	M	Delegado	Leto-folio	-	
11	Jose Ferveira	M	X.F. Addeia ricalau tetepoko		76348500	
12	Matinho da Gisa M.	M	Chefe Addeia	Leto-folho	77776079	
13	Bernadino Lobato	M	Chefe Addeia	Babulu/Baporo	77071869	
14	Alice de Jesus Alves	F	Xefe Suco	Babulu	70066849	
15	Amadio de Jesus	M	Chefe Addeia	Raimera	75845801	
16	Jaunico da e massa	M	Komunidade	Raimera	75723483	
17	Juica de Jesus da Costa	F	Komunidade	Raimera	76455521	
18	Siti Marbatiya	F	Komunidade	Deidera	75201024	
19	Deuísio Tífua	M	FPA	Sare	76791591	
20	Alarico da Costa paraim	M	FPA	Same	75424416	
21	Taine Prego Munet	M	Oficial Saneamento	Same	75716077	
22	THAYTO YEADRA	M	X.F. ALDEIA	SATINÉ	77172719	

23	Benedito Mendes da Costa	M	Comunidade	Holarna	75672546	Bick
24	Jaime da Costa S.	M	— " —	— " —	77485491	PP
25	Bembaio da Costa			Holarna	77392916	PP
26	Francisco Filipe	M	Chape Aldeia	Orupia	779607	PP
27	Amato das Reis Fernandes	F	Comunidade	— " —		Amato
28	Luís M.C. Soares	M	PNDs / DIR. DATA.	Letefoho	78993099	Amato
29	TONI DA COSTA M.	M	PPM Posto	Letefoho	752267	Amato
30	Leopoldino da Costa	M	SAS	Letefoho	75067332	Amato
31	Henriqueta T. Lourenço	M	SAS	Letefoho	76141338	Amato
32	Angelina P. Doloroso	M	SAS	Babula	75615579	Amato
33	Procurador da Costa Lopes	M	SAS	Holarna	-	Amato
34	Francisco Pinto	M	Limpeza Atm.	Mauico	-	Amato
35	Silvestre da Costa	M	Comunidade	Faluta	-	Amato
36	Cylos da Costa Nasser	M	Amato	Holarna		Amato
37						Amato
38						Amato