

## **List of Report**

This Final Report (F/R) has been prepared to compile the results of all the study which had been executed from the middle of May 2005 to the end of June 2006.

F/R consists of the following volumes, parts and annexes.

### **MAIN REPORT**

PART A	FRAMEWORK OF THE STUDY
PART B	HONIARA WATER SUPPLY AND SEWERAGE
PART C	PROVINCIAL CENTERS WATER SUPPLY AND SEWERAGE
PART D	CONDITIONS OF WATER SUPPLY AND SEWERAGE MANAGEMENT
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### **SUMMARY (ENGLISH)**

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## **FINAL REPORT**

### **SUMMARY REPORT**

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### PART I

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## **ABBREVIATIONS**

ADB	Asian Development Bank
AusAID	The Australian Agency for International Development
B/C Ratio	Benefit-Cost Ratio
BOD	Biochemical Oxygen Demand
CIF	Cost, Insurance and Freight
CBD	Central Business District
CBSI	Central Bank of Solomon Islands
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
EC	Electric Conductivity
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
EU	European Union
FOB	Free On Board
F/U	Follow-up
FY	Fiscal Year (1 <sup>st</sup> January – 31 <sup>st</sup> December)
GDP	Gross Domestic Product
GIS	Geographical Information System
GL	Ground Level
HCC	Honiara City Council
HRPI	Honiara Retail Price Index
IEE	Initial Environmental Examination
IRR	Internal Rate of Return
IT	Information Technology
IWA	International Water Association
JICA	Japan International Cooperation Agency
Mn	Manganese
MNR	Ministry of Natural Resources
NERRDP	National Economic Recovery, Reform and Development Plan
NGO	Non-governmental Organization
NPF	National Provident Fund
NPV	Net Present Value
NRW	Non Revenue Water
PDM	Project Design Matrix
PSP	Private Sector Participation
PER	Public Environmental Report
pH	pH value
PM	Prime Minister
PVC	Polyvinyl Chloride
RAMSI	Regional Assistance Mission to Solomon Islands
RRA	Rapid Rural Appraisal
SICHE	Solomon Islands College of Higher Education
SIDWGC	Solomon Islands Drinking Water Guideline Committee
SIG	Solomon Islands Government
SIEA	Solomon Islands Electricity Authority

SIWA	Solomon Islands Water Authority
SS	Suspended Solids
WHO	World Health Organization
WT	Water Temperature
WTP	Willingness To Pay

## UNITS

°C	Degree Celsius
h	Hour
kg/cm <sup>2</sup>	Kilogram per square meter
km	Kilometer
kWh	Kilowatt hour
L	Liter
L/s	Liter per second
LCD	Liter per capita per day
L/d/HH	Liter per day per household
m	Meter
mg/L	Milligram per liter
min	Minute
mL	Milli-liter
mm	Millimeter
m <sup>3</sup>	Cubic meter
mS/m	Milli-Siemens/meter
m <sup>3</sup> /s	Cubic meter per second
m <sup>3</sup> /day	Cubic meter per day
p.a.	Per annum
MPa	Mega Pascal
MPN	Most Probable Number
No(s).	Number(s)
NTU	Nephelometric Turbidity Units
Ω m	Ohm meter
%	Percent
SIS	Solomon Islands Dollar
US\$	U.S. (United States) Dollar

## **SYNOPSIS**

### **The Study for Rehabilitation and Improvement of Solomon Islands Water Supply and Sewerage Systems**

Study Period : May 2005 to June 2006

Recipient Agency : Solomon Islands Water Authority (SIWA)

#### **1. BACKGROUND OF THE STUDY**

In the Solomon Islands (hereinafter referred to as “Solomon”), Solomon Islands Water Authority (hereinafter referred to as “SIWA”) is responsible for the management and development for urban water supply and sewerage services.

SIWA has many difficulties in the aspects of infrastructures, financial situation and human resources. Therefore, SIWA is desirous of improving water supply and sewerage facilities, and capacity development related to management and organization.

In those circumstances, the Government of Solomon requested a development study to the Government of Japan in order to implement follow-up project for the water supply facilities damaged under the ethnic tension and formulate a facility improvement plan (target year 2010) for the water supply and sewerage systems for Honiara and other provincial centers (Noro, Auki and Tulagi).

In November 2004, the scope of work (S/W) were signed between the two Governments for the implementation of the Study for Rehabilitation and Improvement of Solomon Islands Water Supply and Sewerage Systems (hereinafter referred to as “the Study”). Based upon the S/W, the Study has been conducted for about 14 months from May 2005 to June 2006.

#### **2. OBJECTIVES OF THE STUDY**

The objectives of the Study were:

- To formulate an urgent rehabilitation plan for Honiara and urgent restoration plan for Auki or Tulagi.
- To formulate a facility improvement plan for the water supply and sewerage systems of Honiara, Noro, Auki and Tulagi for the target year 2010, and
- To formulate an action plan for supporting capacity development of SIWA to strengthen its management.

#### **3. STUDY AREAS**

The Study covered Honiara, the capital of Solomon, and three provincial centers of Noro, Auki and Tulagi as shown in the map attached to the opening page of this report.

#### **4. ORGANIZATION AND STAFFING OF THE STUDY**

The Study Team consists of eleven (11) members. The Study has been implemented with the cooperation of SIWA as the counterpart, Department of Mines & Energy in the Ministry of Natural Resources, Ministry of Health and Honiara City Council. Socio-economic survey has been executed with the support of Department of Statistics, NGO, private companies and the residents of survey areas.

## 5. OUTLINE OF MID-TERM FACILITY IMPROVEMENT PLAN

### 5.1 HONIARA

#### 5.1.1 Current Situation of Water Supply and Sewerage Services by SIWA

Existing conditions of water supply and sewerage services by SIWA are described in Table-1 and Table-4 respectively.

Figure-1 shows the current situation of water supply service and Figure-2 shows the current situation of sewerage service. As shown in the figure, the service area for water supply is now extended outside the town boundary. However, the service area for sewerage is currently limited inside the town boundary.

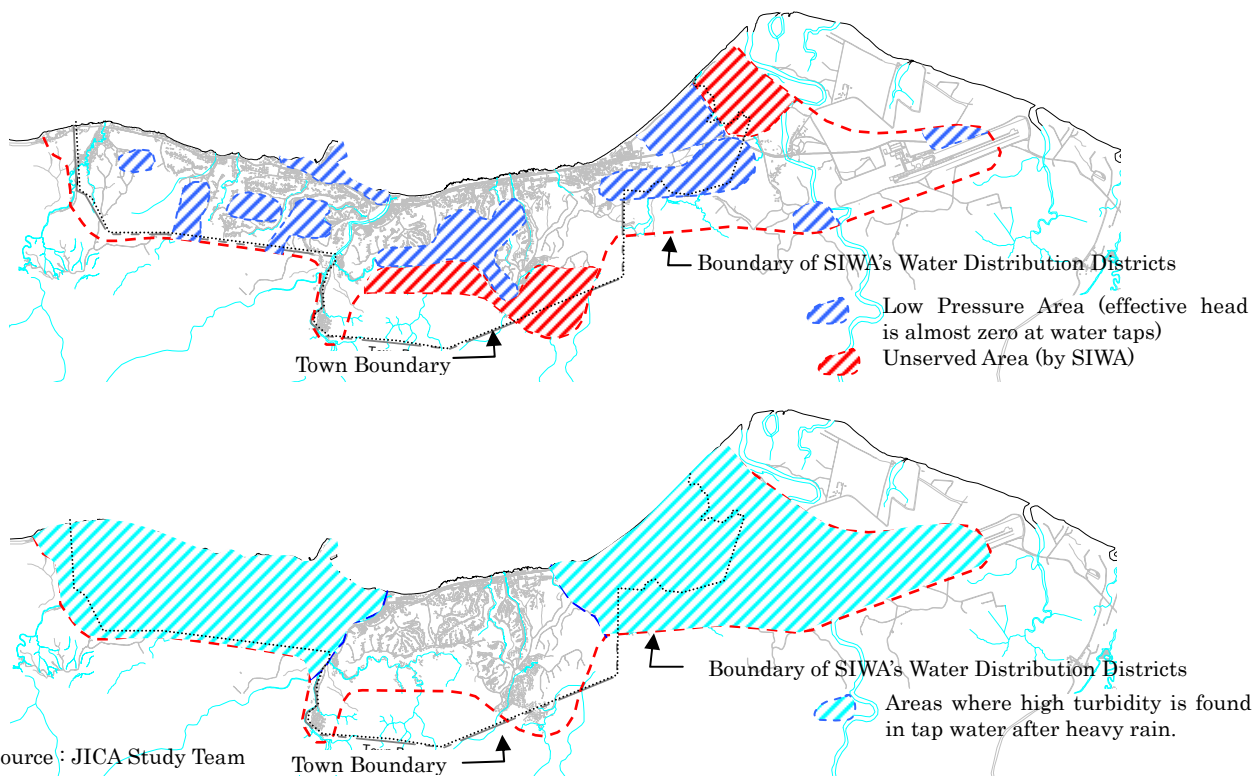


Figure-1 Current Situation of Water Supply Service by SIWA

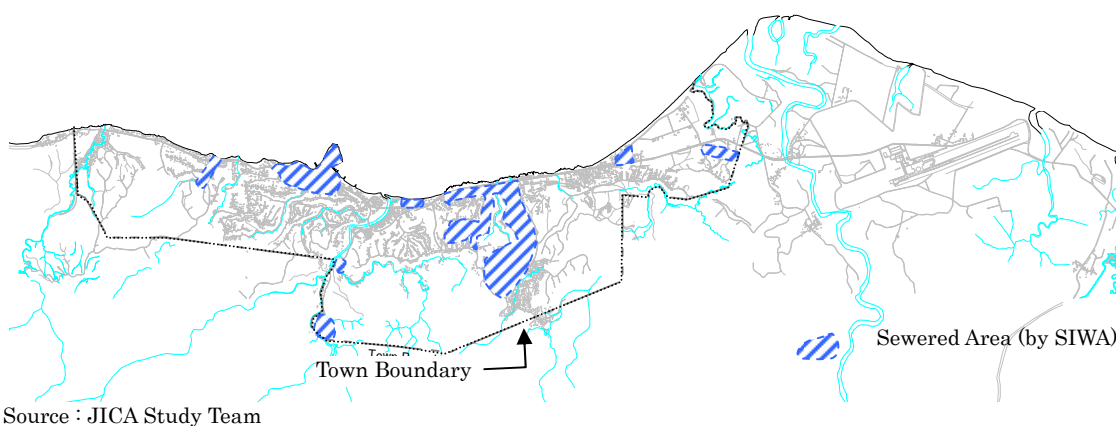


Figure-2 Current Situation of Sewerage Service by SIWA

## 5.1.2 Plan for Water Supply Facility Improvement

### (1) Basic Policy

In the Study, in consideration of SIWA's policy for shifting water sources from the sources in the customary land to those in the land inside the town boundary and based on the results of field surveys including socio-economic survey, mid-term facility plan for improving the existing water supply system (hereinafter referred to as "the Plan") has been formulated.

Problems facing SIWA and countermeasures to be taken in the Plan are mentioned in Table-1.

**Table-1 Problems in Existing Water Supply Facilities and Countermeasures in the Plan**

No.	Item	Problems	Countermeasures in the Plan
1	Main Water Sources	<p>About 50% of water distribution volume in Honiara depends on Konglai Spring. Water intake volume from the spring is not stable due to the frequent blockage.</p> <p>The blockage occurred in October 2005 has not been recovered at present (as of May 2006) and it will not be recovered in the future. It is estimated that daily per capita water supply (excluding leakage) is reduced to 115LCD.</p> <p>Moreover, Konglai Spring is located in customary land in which SIWA faces problems in the maintenance work. Therefore, SIWA is desirous of shifting to groundwater inside the town boundary.</p>	<p>Three (3) options are examined in terms of water intake volume from Konglai Spring.</p> <p><b>Option J-1</b> White River high lift pumping system is cancelled. This system is now distributing 65% of water from the spring to water distribution districts.</p> <p><b>Option J-2</b> Current pumping system is maintained in this option.</p> <p><b>Option J-3</b> Capacity of the current pumping system is much reduced. Reduced amount of water and additional water by population increase will be secured by developing new groundwater sources inside the town boundary.</p>
2	Water Pressure	About 25% of the residents in the water distribution districts in Honiara are suffering from low water pressure. Some of the residents can not get any water during the peak demand hours in daytime.	Water distribution system with pipe diameters sufficient for meeting water demand up to the year 2010 is planned to eliminate low water pressure areas.
3	Water Distribution System	Water transmission pipeline and distribution pipeline are not separated so that water distribution reservoir can not work with its original functions.	Independent water distribution system is established allocating one water source and one water reservoir in each water district.
4	Pipe Diameter	Pipe diameters are too small to secure the required water with enough water pressure to customers.	Pipe diameters for serving water demand up to 2010 are planned.
5	Capacity of Water Distribution Reservoir	Existing reservoirs have only 5 hour-volume of daily maximum water demand so that they can not serve enough water during the peak demand hours and in an emergency case.	Each water reservoir is planned so as to have a capacity of 12 hour-volume of daily maximum water demand.
6	Turbidity of Spring Water	Tap water often shows high turbidity after heavy rain and becomes unsuitable for domestic water use.	Water treatment facility for removing turbidity is installed in each spring water source.
7	Water Supply to the unserved areas	Unserved water supply area accounts for 30% of water distribution districts of SIWA.	Water distribution mains are expanded to the unserved areas.

Source : JICA Study Team



## (2) Components of the Plan

The Plan consists of the following components;

- Development of new boreholes
- Construction of water transmission pump stations
- Expansion of water distribution reservoirs
- Replacement of main water distribution pipelines with larger diameter pipes
- Expansion of main water distribution pipelines for the unserved areas
- Construction of water treatment facility for reducing turbidity of spring water
- Construction of disinfection facility

Three (3) options for the plan have been proposed in consideration of the utilization of the existing Konglai Spring as follows;

**Table-2 Outline of 3 Options in Water Supply Facility Improvement Plan**

Option	Contents of Facility		Concept for the Plan
J-1	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 16 nos.</li> <li>● 4 nos./each borefield</li> <li>● 6 nos. with capacity of 7,005m<sup>3</sup> in total</li> <li>● Diameter 50 to 300mm x 25.5km</li> <li>● 3 nos./each spring</li> <li>● 7 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ 35% of water intake volume from Konglai Spring (accounting for 14% of the total water distribution volume for 2010 in Honiara)</li> <li>◆ In order to shift the water source from unstable Konglai Spring to stable groundwater inside the city boundary, the high lift pumping station consuming much electricity is cancelled.</li> </ul>
J-2	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 6 nos.</li> <li>● 2 nos./each borefield</li> <li>● 6 nos. with capacity of 7,005m<sup>3</sup> in total</li> <li>● Diameter 50 to 400mm x 25.8km</li> <li>● 3 nos./each spring</li> <li>● 5 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ 100% of water intake volume from Konglai Spring (accounting for 40 percent of the total water distribution volume for 2010 in Honiara).</li> <li>◆ Increment of water demand for 2010 is for the population increase.</li> </ul>
J-3	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 12 nos.</li> <li>● 3nos./each borefield</li> <li>● 6 nos. with capacity of 7,405m<sup>3</sup> in total</li> <li>● Diameter 50 to 300mm x 23.0km</li> <li>● 3 nos./each spring</li> <li>● 6 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ This option is similar in principle to Option J-1.</li> <li>◆ 43% of water intake volume from Konglai Spring (accounting for 17% of the total water distribution volume for 2010 in Honiara).</li> <li>◆ White River Boreholes shall be utilized to cover the water demand in 2010.</li> <li>◆ The distributed water amount from White River high lift pumping system is reduced to 1/8.</li> </ul>

Source : JICA Study Team

### [Project Evaluation]

Three options of J-1, J-2 and J-3 were examined by financial evaluation, technical evaluation and risk analysis. As a result, Option J-1 was evaluated as the most viable project.

### (3) Cost Estimation

Cost estimation of each option for mid-term water facility improvement plan is as shown in Table-3.

**Table-3 Cost Estimation for Mid-term Facility Improvement Plan**

Option	Estimated Cost (US\$)
J-1	7,236,000
J-2	6,098,000
J-3	6,514,000

Source : JICA Study Team

### (4) Effects by Implementation of Mid-term Water Supply Facility Improvement Plan

The following are the effects to be expected from the implementation of mid-term water supply facility improvement plan for the target year of 2010(refer to Figure-3);

- Stable water supply is secured even if blockage of Konglai Spring is not recovered. While it is estimated as 115LCD (excluding water leakage) for the daily per capita water supply during the blockage, 164LCD of the water supply will be secured after the implementation of the Plan.
- Stable water pressure and water supply are secured and low pressure area will be eliminated.
- High turbidity of the drinking water after heavy rain will be eliminated.
- Served ratio of 70% (served population of 46,221 in 2005) will be increased to 78% (served population of 61,520 in 2010) and the unserved area of 30% will be reduced to 22%.

#### 5.1.3 Plan for Sewerage Facility Improvement

##### (1) Basic Policy

It is difficult for SIWA to expand its business in sewerage system for the time being because SIWA has small investment budget and many problems in water supply business. In consideration of this situation, facility improvement plan for sewerage system in Honiara has been formulated for targeting on rehabilitation of the existing sewerage facilities.

##### (2) Components of the Plan

Based on the results of the field surveys, mid-term facility plan for improving the existing sewerage system (hereinafter referred to as “the Plan”) has been formulated.

**Table- 4 Outline of Sewerage Facility Improvement Plan**

Component	Contents of Facility or Equipment		Outline of Plan
Upgrading sewage outfall facility	● Outfall facility	● 3 nos.	There are 14 sewage outfalls and most of them are damaged, so that sewage is discharged along the seashore. In order to reduce maintenance difficulty and decrease sewage diffusion area, the existing outfalls are rearranged to new outfalls.
Construction of sludge treatment facility	● Sludge drying bed ● Sewage settling tank	● 1 no. ● 1 no.	Sludge from domestic septic tanks is treated to reduce the environmental pollutants into the public water bodies.
Improvement of operation and maintenance system of household septic tanks	● Vacuum truck ● Sewage cleaning vehicle ● Wheel loader	● 4 nos. ● 1 no. ● 1 no.	SIWA will take responsibility for maintenance and operation of household septic tanks so that the sewage drainage service will be able to be provided regularly and effectively. Another advantage is that SIWA can obtain additional revenue from carrying out this service. In order to do the above work, operation equipment is required.

Source : JICA Study Team

### **(3) Cost Estimation**

Estimated cost for mid-term sewerage facility improvement plan is US\$2,808,000.

### **(4) Effects by Implementation of Mid-term Sewerage Facility Improvement Plan**

The following are the effects to be expected from the implementation of mid-term sewerage facility improvement plan for the target year of 2010.

- Sewage is discharged offshore so that sewage diffusion at the seashore can be eliminated. Consequently, fear for environmental pollution by sewage at the seashore will be dissolved.
- Sludge is discharged from domestic septic tanks regularly so that effluent of sewage into public water bodies from the septic tanks can be eliminated. Consequently, environmental pollutants into the public water bodies will be reduced.
- Sludge is treated properly so that environmental pollutants can be reduced.

## **5.2 Provincial Centers (Noro, Auki and Tulagi)**

### **(1) Water Supply System**

In Auki, ADB project consisting of water transmission and distribution facilities except water source facility is now under construction with the target of the completion in 2006. Therefore, the Study covers only development of new groundwater source as a mid-term facility improvement for Auki.

For other provincial centers of Noro and Tulagi, a mid-term facility improvement plan was not formulated under the Study since it is considered that the existing water supply facility in these areas meet the water demand up to the year 2010.

Content and estimated cost for mid-term water supply facility improvement plan for Auki is as shown in Table-5.

**Table-5 Content and Estimated Cost for Mid-term Facility Improvement Plan for Auki**

Project Content	Concept for the Plan	Estimated Cost (US\$)
Development of new borehole : 2 nos. (600m <sup>3</sup> /day/each)	Development of new groundwater source is required for the demand for 2010.	332,000

### **(2) Sewerage System**

There are no sewerage facilities in three provincial centers which are the target areas in the Study. Meanwhile, environmental pollution has not been found because the population in each town is small and consequently the sewage amount is small. Therefore, the mid-term facility improvement plan for sewerage system was not formulated under the Study taking into account the financial situation of SIWA as well.

## **6. CAPACITY DEVELOPMENT ACTIVITIES IN THE STUDY**

In order to solve the problems facing SIWA in technical and management aspects, following capacity development activities were conducted during the Study.

**Table-6 Capacity Development Activities in the Study**

Expertise to be Developed	Contents of Activity
Leakage surveying method	Participation in the counterpart training in Japan and pilot project
Water resources management method – Monitoring river discharge, groundwater level and water quality – Geophysical survey	Participation in the counterpart training in Japan and technical transfer to SIWA staff by the Study member
Improvement method for tariff collection system	Participation in the pilot project
Methods for reduction of water leakage and wastage in the customers' premises.	Participation in the pilot project
Method for expanding water supply to the unserved areas	Participation in the pilot project

Source : JICA Study Team

## 7. PILOT PROJECTS OF THE STUDY

Pilot projects were carried out with the following purposes;

- To lead to capacity development for management and financial aspect of SIWA.
- To lead to strengthening the relation between SIWA and residents.
- To utilize the outcomes of the pilot project for action plan.

Purposes and outputs for the pilot project are shown below;

**Table-7 Outline of Pilot Projects**

Pilot Project	Purpose	Outputs
1. Formulation of tariff collection improvement method	Improvement plan for tariff ratio by SIWA is formulated.	1-1 Practical method for collection efficiency is formulated. 1-2 Tariff collection improvement method is acquired by SIWA staff.
2. Establishment of leakage reduction indicator	Leakage reduction indicator through the replacement of pipes with large leakage is established.	2-1 Leakage volume per km is obtained. 2-2 Leakage survey skills are transferred to SIWA staff.
3. Water conservation campaign	Consciousness for water conservation is enhanced.	3-1 Residents learn leakage protection method. 3-2 Leakage in the premises of the targeted public facilities (school and hospital) and the customers is reduced.
4. Installation of shared standing pipe	Water supply condition of model areas is improved.	4-1 Shared standing pipe is installed in the area. 4-2 Operation and management of shared standing pipe is done by the community members. 4-3 Cost sharing system for construction of shared standing pipe is proposed.

Source : JICA Study Team

## 8. ACTION PLAN FOR SIWA'S MANAGEMENT IMPROVEMENT

### 8.1 Future Frame

#### (1) Population Projection

Action plan has been formulated for short-term (2006 to 2007), mid-term (2008 to 2010) and long-term (2011 to 2016). The population for each plan was set based upon the 1999 census and AusAID report.

**Table-8 Population Projection for Study Areas**

Study Area	Population inside the town boundary in 1999 census	Annual population growth rate (%)	Population Projection		
			2007 (Short-term)	2010 (Mid-term)	2016 (Long-term)
Honiara	49,107	3.5	64,664 (71,131)	71,695 (78,865)	88,131 (96,945)
Noro	3,482	2.8	4,342	4,718	5,568
Auki	4,022	2.8	5,017	5,450	6,432
Tulagi	1,333	2.8	1,662	1,806	2,131

Note : Figures in blanket show the population including the served population outside town boundary.  
Source : JICA Study Team

## (2) Management Indicators and Targets for SIWA's Management Improvement

Management indicators and targets for SIWA's management improvement were set based on the actual record of water supply services in 2005.

**Table-9 Management Indicators and Targets for SIWA's Water Supply Services**

No.	Management Indicator	Area	Target (%)		
			Short-term (2007)	Mid-term (2010)	Long-term (2016)
1	Revenue water	Honiara	57	57	70
		Noro	53	53	60
		Auki	50	50	60
		Tulagi	39	39	55
2	Water charge collection ratio	Honiara	90	95	98
3	Leakage ratio	Honiara	40	40	27
		Noro	40	40	35
		Auki	40	40	35
		Tulagi	50	50	40
4	Effective water ratio	Honiara	60	60	73
		Noro	60	60	65
		Auki	60	60	65
		Tulagi	50	50	60
5	Served ratio	Honiara	70	78	90
		Noro	63	67	75
		Auki	60	67	75
		Tulagi	70	74	80

Source : JICA Study Team

## 8.2 Action Plan for SIWA's Capacity Development

Action plan for capacity development for managerial and institutional strengthening of SIWA has been set based on the evaluation of management issues facing SIWA.

**Table-10 Action Plan for Capacity Development of SIWA**

Issue for Management	Activity	Short-term ('06 to '07)	Mid-term ('08 to '10)	Long-term ('11 to '16)
Tariff Collection Improvement	Improvement of revenue collection from domestic customers			
	Reduction of wrong meter reading and miss calculation			
	Improvement of revenue collection for shared standing pipes			
Introduction of New Tariff Structure	Study of new tariff structure			
New Staff Reinforcement for Service Improvement	Construction of SIWA headquarters and workshop			
	Reinforcement of staff			
Establishment of Assets Management	Establishment of assets management and inventory control			
Efficient Water Distribution	Introduction of SCADA system			
Human Resources Development for Existing Staff	Preparation of human resources development plan			
	Training of meter readers			
	Training of accounting staff			
	Development of international accounting system			
	Training of inventory control and assets management staff			
	Training of SCADA system engineer			
	Training of GIS engineer			
	Training of laboratory staff			
	Training of IT engineer			

Source : JICA Study Team

### 8.3 Action Plan for Water Supply and Sewerage Facility Improvement

Action plan for water supply and sewerage facility improvement was formulated incorporating the mid-term water supply and sewerage facilities improvement plan with “Water Supply Capital Works Plan (2006 to 2016)” prepared by SIWA in 2004.

**Table-11 Outline of Action Plan for Water Supply and Sewerage Facilities Improvement**

Area	Implementation	Short-term	Mid-term	Long-term
		2006~2007	2008~2010	2011~2016
Honiara	[Water Supply System]			
	• Implementation of mid-term facility improvement plan			
	• Replacement of existing pumps			
	• Expansion of distribution network			
	• Replacement of meters			
	[Sewerage System]			
Noro	• Implementation of mid-term facility improvement plan			
	• Expansion of distribution network			
	• Replacement of filters in the treatment plant			
	• Replacement of pumps			
	• Replacement of motors			
Auki	• Replacement of meters			
	• Implementation of mid-term facility improvement plan			
	• Expansion of distribution reservoir		(ADB project)	
	• Replacement of transmission pipelines		(ADB project)	
	• Replacement of booster pump		(ADB project)	
Tulagi	• Expansion of distribution networks			
	• Installation of disinfection facility			
	• Replacement of pumps			
	• Expansion of distribution reservoir			
	• Expansion of distribution networks			
Expected Project Cost (x 1,000 SIS)		16,746	77,226	20,791

Source : JICA Study Team

#### 8.4 Action Plan for Leakage Reduction

Leakage (or real loss) in the water supply system is one of the most important factors affecting the management of water supply utility. Reduction of the leakage will bring the following improvement;

- Reduction of water distribution volume
- Reduction of operation cost (electricity cost, disinfection cost, etc.)
- Elimination of the necessity of new water source development in the future

Therefore, it is advisable that SIWA should carry out replacement of pipes with large leakage to achieve the target of leakage reduction.

On condition that the mid-term facility implementation plan is implemented by the year 2010 and SIWA executes regularly the replacement of pipelines for leakage reduction, leakage will be reduced to 27% at the final year 2016 of the long-term plan, which will enable SIWA to postpone a development of new groundwater (16,000m<sup>3</sup>/day).

**Table-12 Action Plan for Leakage Reduction**

Item	Unit	Short-term Plan	Mid-term Plan	Long-term Plan		
		2007	2010	2011	2012~2015	2016
Length of Pipe Replacement	km/year	1.0	1.0	2.0	2.0	2.0
Leakage Ratio	%	40	40	38	36~29	27

Source : JICA Study Team

## 9. URGENT REHABILITATION PLAN

Water supply facilities constructed in 1998 under Japan's Grant Aid project, called as "the Project for

Improvement of Water Supply System in Honiara”, were seriously damaged during the ethnic tension from 2000 to 2003 and some part of the facilities have not been operative since then.

In order to rehabilitate the damaged facilities, the Government of Solomon Islands requested a supplemental assistance called as “follow-up cooperation” (hereinafter referred to as “F/U”) to the Japanese Government. In this connection, the Study Team conducted field survey for the conditions of the damaged facilities in view of appropriateness as F/U.

As a result of the field survey, it was found that some of borehole pumps and water transmission system were sabotaged. For the restoration of the damaged facilities, it was confirmed that not only replacement of the equipment but also system restructuring are needed.

The facilities which require rehabilitation are listed as follows;

**Table-13 Contents of Rehabilitation by Follow-up Cooperation**

System	Contents of Rehabilitation
White River Bores System	Pumping system for bores
	Water transmission system to White River Tank
	Disinfection system
	Electric receiving and distributing system
Mataniko Bores System	Replacement of riser pipe
Kombito Bores System	Replacement of riser pipe

Source : JICA Study Team

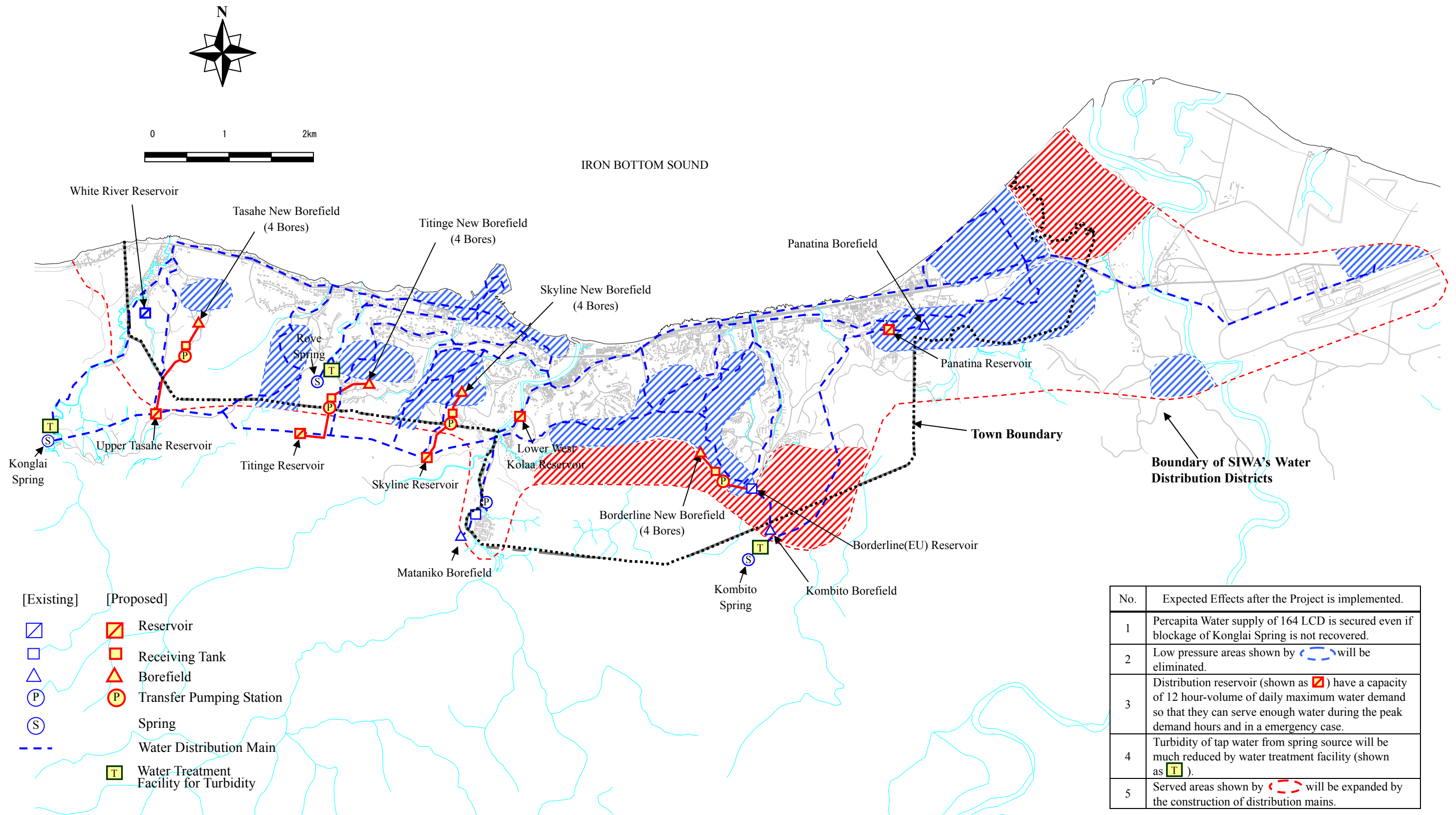
F/U is now under procurement stage and it is expected that the installation of the equipment will be completed by May 2006.

## 10. RECOMMENDATIONS

In order to push forward with capacity development of SIWA, the Study Team recommends the following;

- ◆ To establish a leakage reduction unit to conduct leakage detection survey and replace pipelines with large leakage on a regular basis.
- ◆ To do monitoring of water quantity (river discharge and groundwater level) and water quality of the water sources regularly before and after the water sources development.
- ◆ To take countermeasures against contamination of water source and tap water.
- ◆ To do monitoring of the expected issues/impacts of social and natural environment during and after implementation of the proposed projects under the Study.
- ◆ To appoint a person-in-charge for public relations and community education and review the strategic plan including SIWA staff involvement in public relations/participation activities, regular issue of newsletters/publications and water talks for school children and housewives in line with the current business environment.
- ◆ To propose some options to alleviate the cost burdens on new connection to the low income households.
- ◆ To propose some options to do repair of leaking taps and/or pipes affordable or easy for installation for enhancing water conservation.





**Figure-3 Effects by Implementation of Mid-term Water Supply Facility Improvement Project (for Option J-1)**