

Buri Water Reticulation

Buri village is a large village on Ranongga Island with a population over 400, living in over 60 houses. In the past, some small dams and standpipes were installed.

Recently two water projects have been undertaken. The Tavaneka South Community water tank project (four water tanks) was funded under the Australian High Commission Direct Aid Program (DAP).

A second project, funded by the Japanese Embassy consisted of a partly built dam, trunk pipeline and one standpipe. Several other standpipes were not installed. Some of the material required for completion remains on site.

A study by the Solomon Islands Government (Rural Water Supply and Sanitation) was undertaken in December 2011, and is available to Partner Housing.

This project is the substantial completion of the reticulation phase of the previous scheme, with reference to the recommendations of the RSS Report.



Buri Water Reticulation - Introduction

Purpose

The purpose is to provide a secure water supply to Buri village for both drinking and washing.

Water Sources

- Existing small dams, spring boxes and stand pipes (System A) located near the playing fields used for drinking water and washing water.
- A small dam, Dam (B), provides water via a single DN90 / DN63 PE80 pipeline to a single standpipe. Available flow is in the range 0.15 to 0.30 l/s.
- A further potable water source, the Source (C), has been identified, but has not yet been exploited. Available flow is in the range 0.08 to 0.13 l/s.
- Four 3,000 litre public polyethylene tanks and several private tanks collecting roof water.
- The area has an average annual rainfall of 2,592 mm with a recorded minimum of 2,076 mm. The minimum monthly rainfall is 96 mm.

Study

The following study forms the basis of this project. *Solomon Islands Government (Rural Water Supply and Sanitation) Buri Water Supply Design Report, by Jaidev Vasudevan, December 2011*



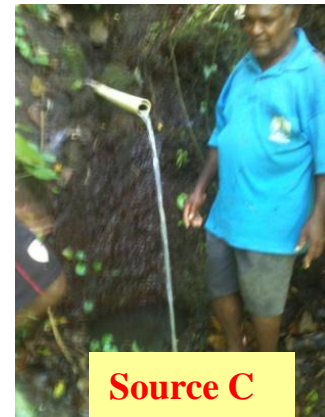
Spring Boxes



Dam B



Four Tanks



Source C

Buri Water Reticulation - Strategy

Primary Strategy

1. Connect the existing DN 63 PE80 pipeline from Dam B to the four new header tanks located at the Church via a new DN32 PN9 PE pipeline.
2. Construct six remote standpipes with concrete bases, to provide washing water at various locations throughout the village.
3. Connect six standpipes to the two header tanks via approximately 2 km of new DN32 PN9 PE pipes.
4. Install two new 3,000 litre water tanks and feed rain water from the roof of the Guest House and from the Church. Approximate ground levels are RL 30.0 and RL 37.0.

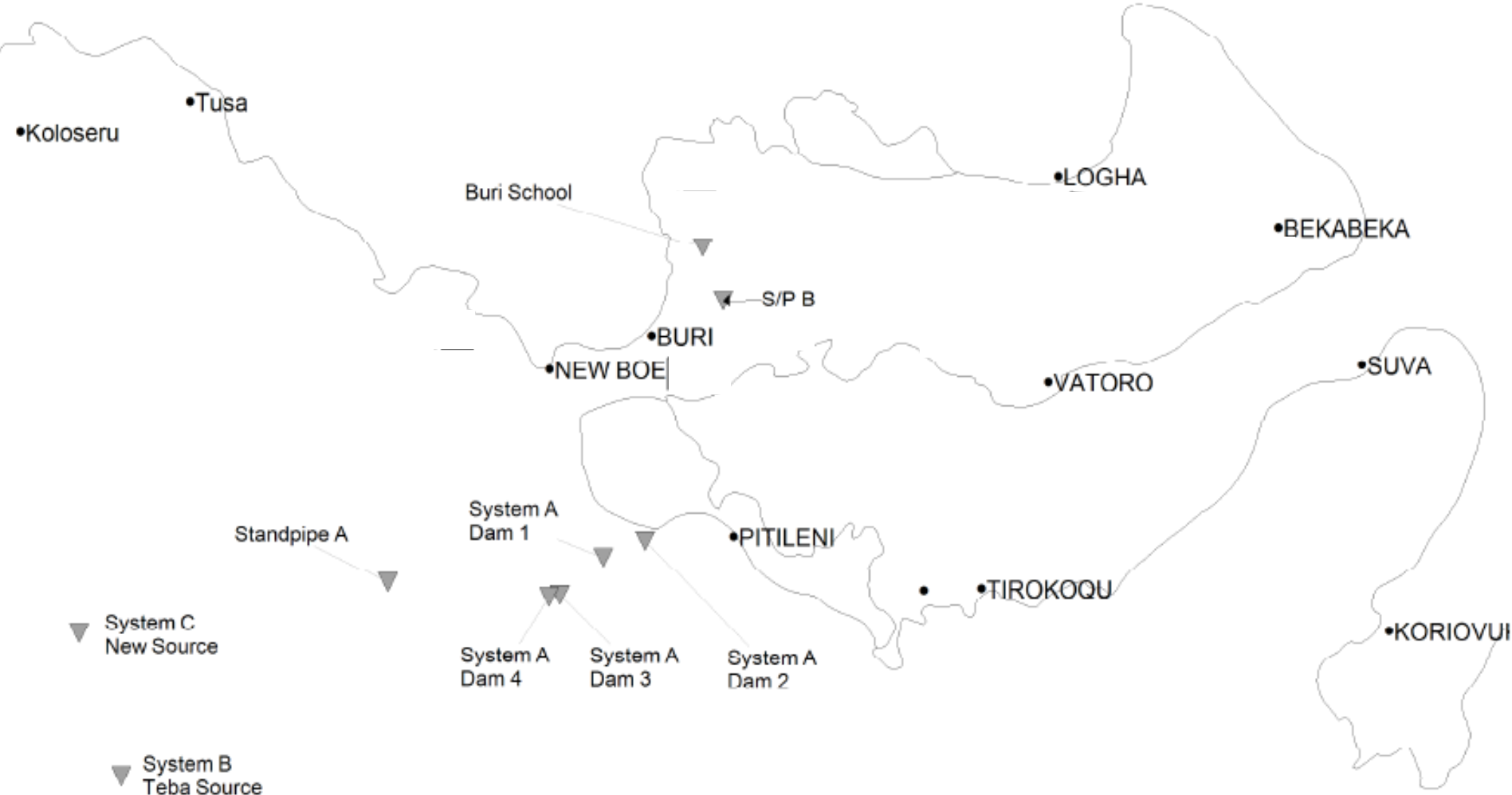
Future Strategy

Further work to improve the water system includes the following.

1. North Ranongga Community Association should implement a water infrastructure management and maintenance program, to ensure the long-term viability of the system. This includes the following.
2. Clean and stabilise the banks of Dam B, and consider installing a filter system.
3. Clean and cover the existing spring boxes and drinking water sources.
4. Install a Ram Pump and rising main to pump drinking water to existing tanks.
5. Install two new 3,000 litre dam water header tanks on a concrete base. Approximate ground level is RL 37.0 and connect to the system and to a supplementary source.

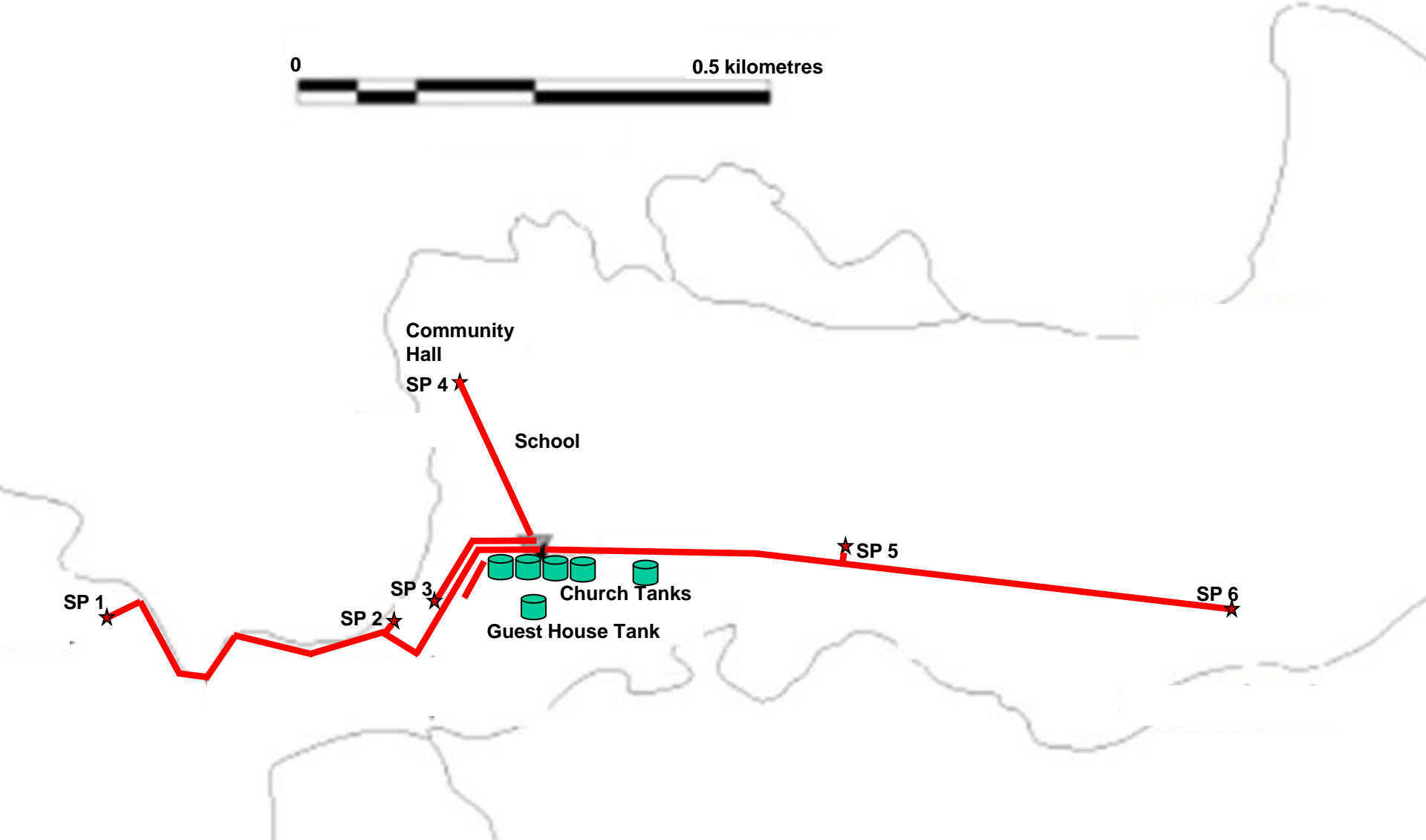
Buri Water Reticulation

Buri Area Map



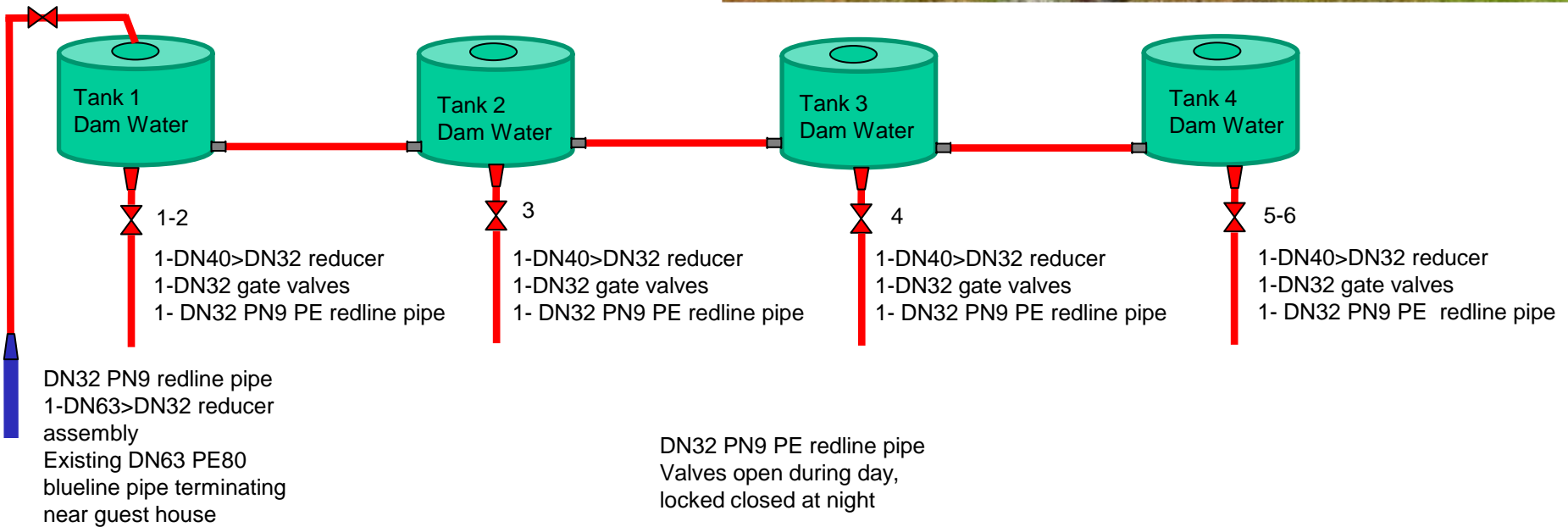
Buri Water Reticulation – Locations of Tanks and Standpipes

Six standpipes, marked SP1 to SP6 are fed with dam water from Tanks 1, 2, 3 and 4 at the Church. Tank 5(at the Church) and Tank 6 (at the Guest House) provide rainwater collected from roof gutters.



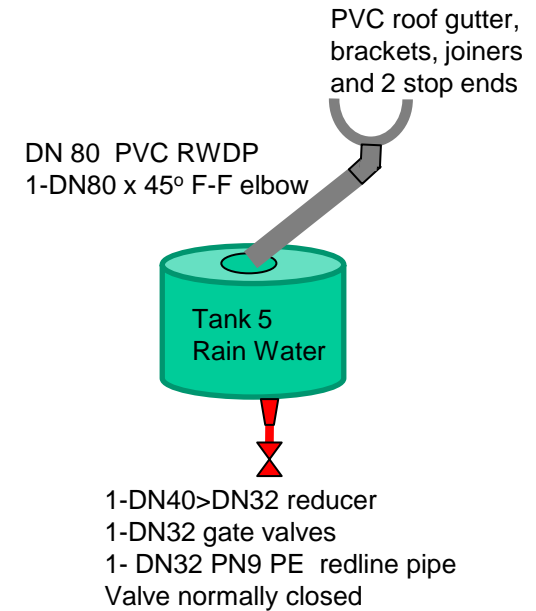
Buri Water Reticulation Church Tank Arrangement

Dam water flows continually into Tanks 1, 2, 3 and 4 (connected at the bottom). The valves feeding standpipes 1-2, 3, 4 and 5-6 are kept closed at night (allowing the tanks to recharge), and open during the day to feed the six connected standpipes.

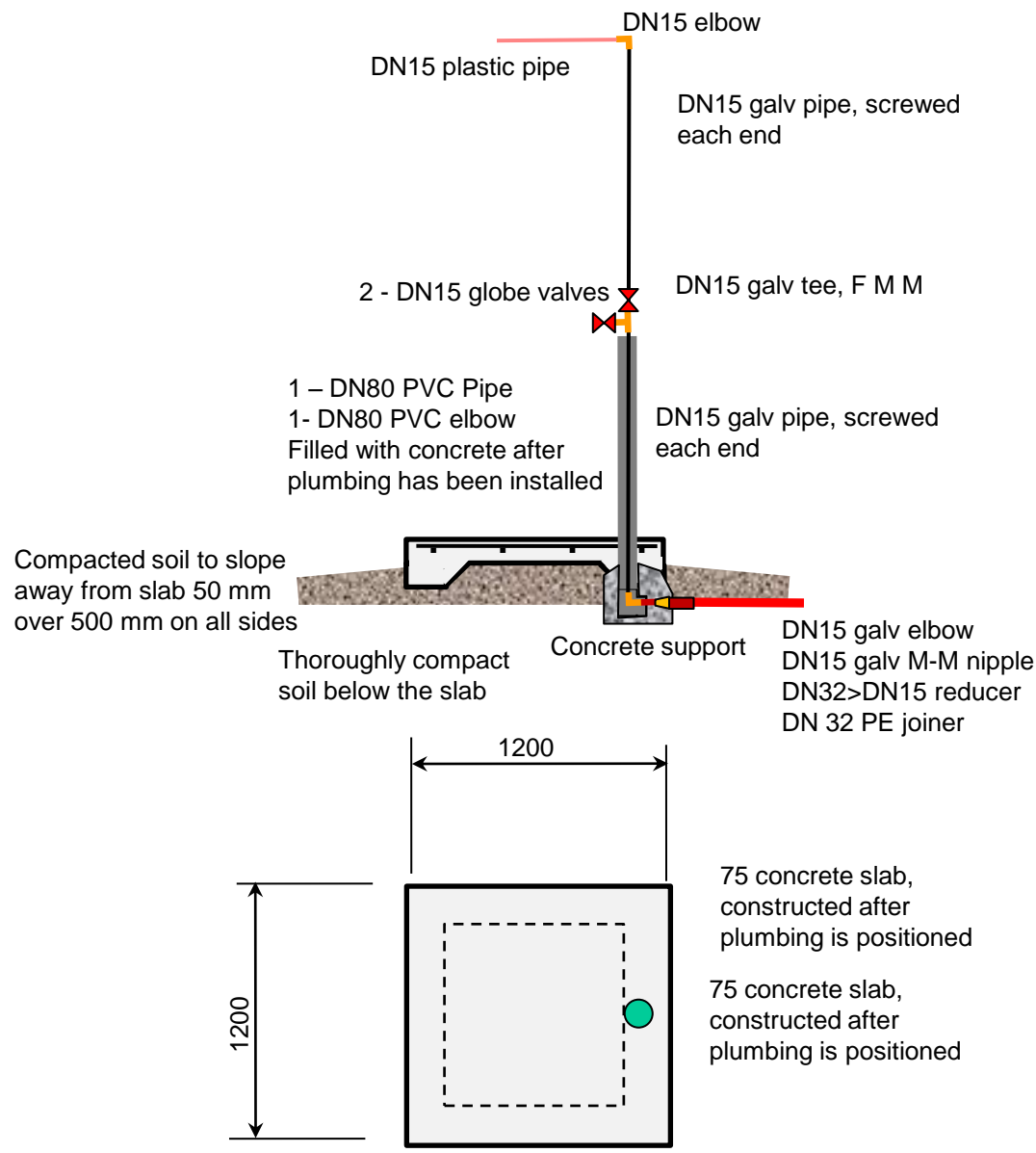


Buri Water Reticulation – Guest House Tank Arrangement

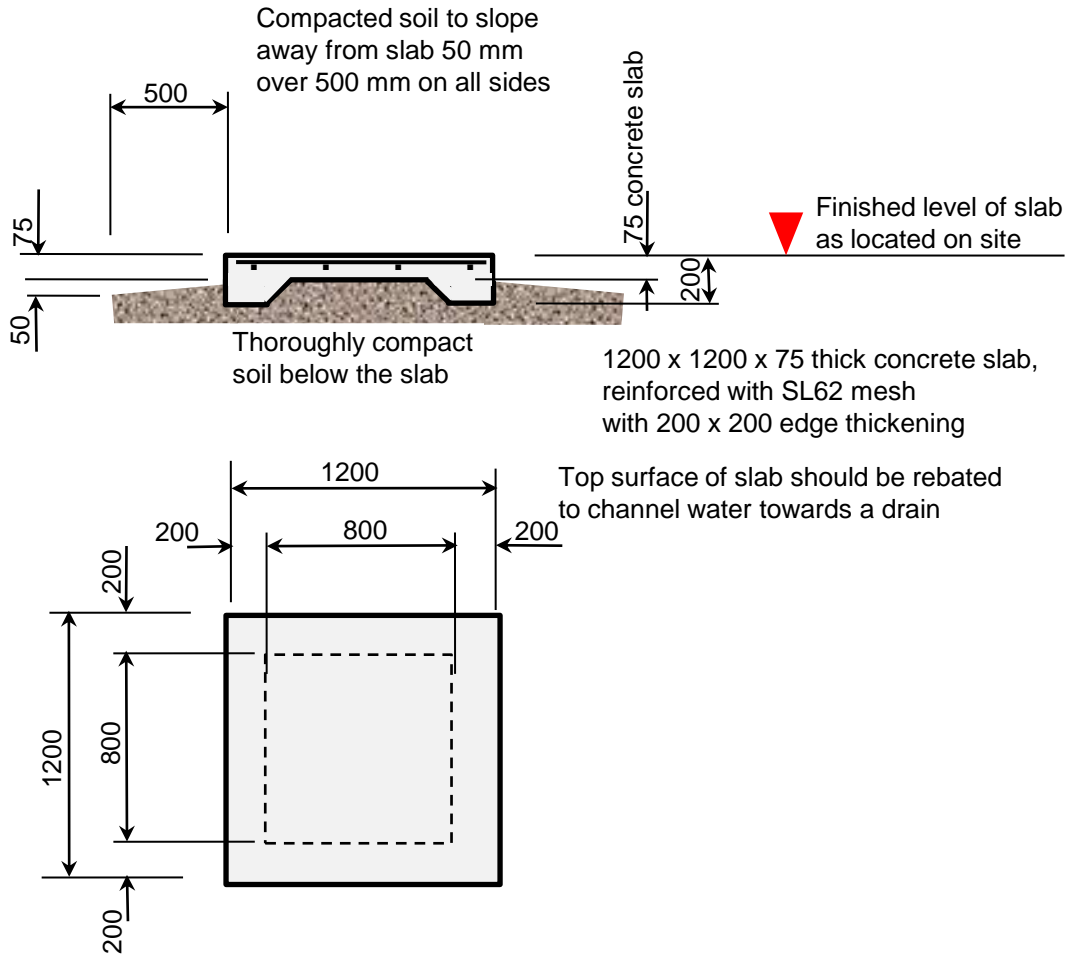
Rainwater from the guest house roof is collected and discharged into Tanks 5 and 6 (connected at the bottom). Drinking water may be drawn off from either tank as required.



Plumbing for Standpipes



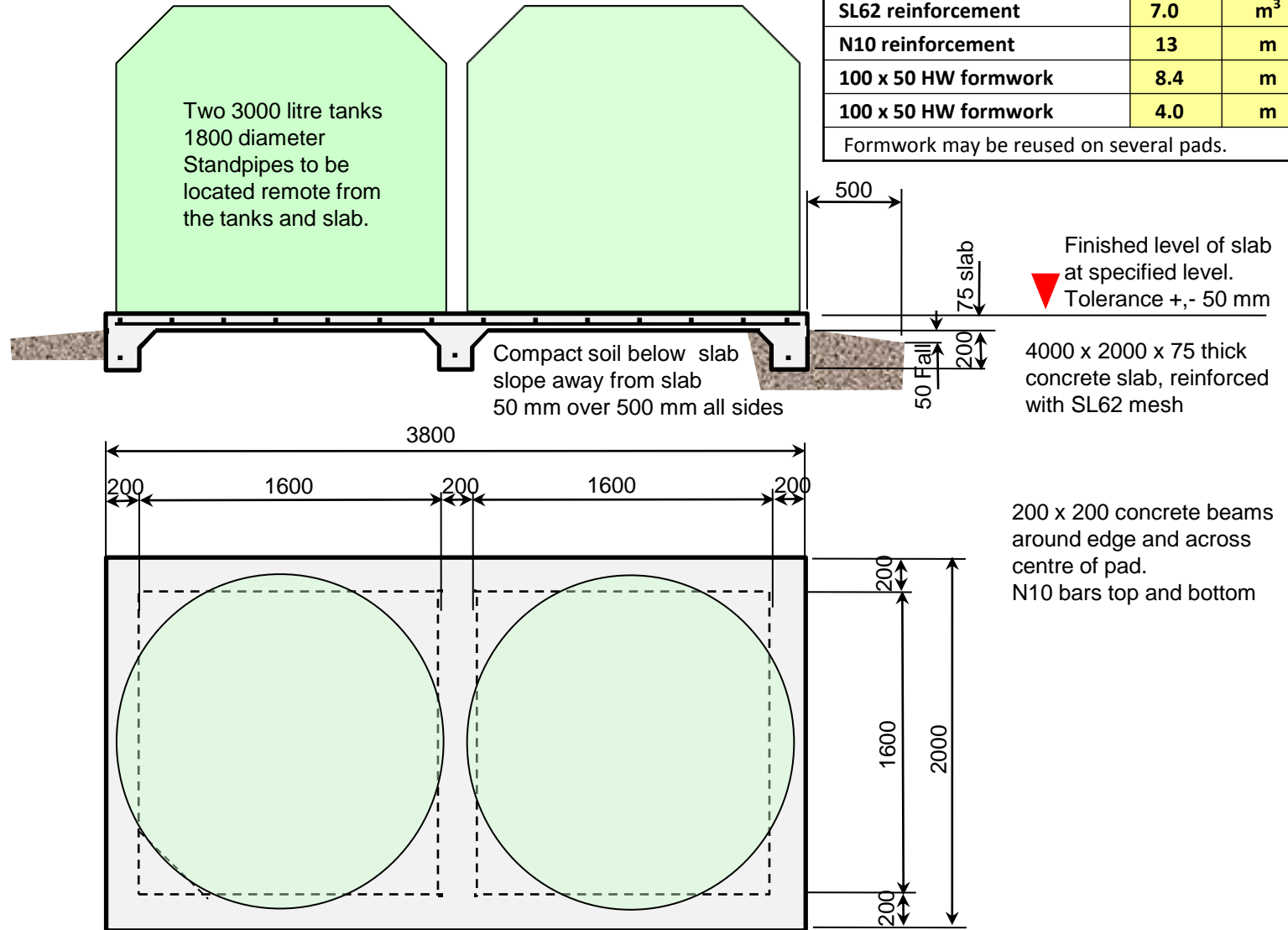
Concrete Standpipe Pads



Concrete Standpipe Pads		
Number of pads	1	
Description	Q'ty	Unit
Concrete	0.2	m ³
40 kg bags of cement	2	bags
Sand	0.1	m ³
20 mm aggregate	0.2	m ³
SL62 reinforcement	1.4	m ²
100 x 50 HW formwork	5.6	m
Formwork may be reused on several pads.		

Double Light Duty Tank Pad

For a quadruple light duty tank pad (for four tanks), use twice the quantities.



Double Light Duty Tank Pads		
Number of pads	1	
Description	Q'ty	Unit
Concrete	1.2	m ³
40 kg bags of cement	11	bags
Sand	0.7	m ³
20 mm aggregate	1.3	m ³
SL62 reinforcement	7.0	m ³
N10 reinforcement	13	m
100 x 50 HW formwork	8.4	m
100 x 50 HW formwork	4.0	m

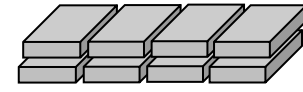
Formwork may be reused on several pads.

20 MPa Concrete Specification

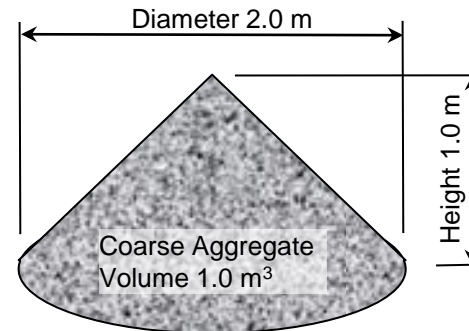
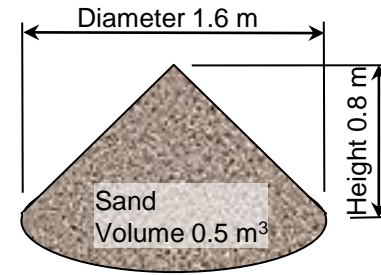
Approximate mix (by volume) 1 : 2 : 4

For 1 cubic metre of 20 MPa concrete, the mix should be:

- **8 bags (40 kg each) of GP or GB portland cement**
OR 16 bags (20 kg each)
- **0.5 m³ of sand** - Sand should be clean sharp sand, NOT brickies sand or plasters sand.
- **1.0 m³ of 20 mm coarse aggregate** - Aggregate should be clean 20 mm river gravel, crushed aggregate or similar.
- **200 – 220 litres of water** – Approximately 12 20 litre buckets (300 mm diameter x 290 mm deep). Less water should be used if sand or aggregate are damp.



Cement 8 – 40 kg bags



Water 11 – 20 litre buckets



Basis of calculation:

Density of cement , dry sand and dry aggregate 1,500 kg/m³

Includes approximately 5% allowance for wastage.

Buri Water Reticulation – Water Supply from Dam

Water Supply from Rural Dams to Community Standpipes

This worksheet can be used to check the sizing of small dams, holding tanks and water reticulation systems.

Water Demand

Number people serviced by community standpipes	196 people
Water demand from community standpipes	80 l/person/day
Total water demand from community standpipes	15,680 l/day

Water Supply Available

Water supply from existing dams	0.20 l/sec
Water supply from existing dams	17,280 l/day
Does the water supply exceed water demand	OK
Does the water supply exceed water demand	1.10

Retention Tank

Number of hours of use	10 hours/day
Volume consumed during hours of use	15,680 litres
Volume delivered during hours of use	7,200 litres
Required volume	8,480 litres
Required volume	8.48 m ³
Number of tanks	3
Nominal volume of each tank	3,000 litres
Calculated total capacity	9.02 m ³
Is the volume sufficient?	OK
Overcapacity	1.06