

APPENDIX C

REPORT ON HYDROLOGICAL MONITORING

**By: Department of Geology, Mines
and Water Resources**

APPENDIX C-1

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FOR FEBRUARY 2005**

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SARAKATA RIVER HYDROLOGICAL MONITORING, **FEBRUARY 2005**

Introduction

On the 24th of January 2005, the Hydrology Section of the Department of Geology Mines and Water Resources began monitoring Sarakata River in Santo in preparation for the Third Phase development of the hydropower project.

The aim was to construct three water level recording stations and conduct flow measurement and water quality studies.

Locations and Site descriptions:

The study area was divided into three stations.



Figure 1

1. Fanafo: (See pictures)

The station is located at about 1.3 km upstream from the dam and about 1.5 km south of Fanafo Village.

It is consisted of:

- a. Water level recorder built in a steeling well on the left bank of the river and a staff gauge.
- b. Automatic Rain gauge and a totalizer. (See sketch plan nbr.1)
- c. Gauging and water quality monitoring station located 20 meters down stream the (WLR) Water level recorder.

2. Fanadam: (See pictures)

This station is located 250 meters downstream from the dam and just before the waterfall.

It is consisted of:

- a. Water level recorder and staff gauge built on the right back of the river.
- b. Gauging and water quality monitoring station.

3. Fanafall: (See pictures)

This station is located next to the powerhouse.

It is consisted of:

- a. Water level recorder and staff gauge built on the right back of the river.
- b. Gauging and water quality monitoring station.

Preparation

The team started the preparation two weeks in advance:

- Checking all the machines and make sure they are working normally
- Calibrated all the machines
- All batteries should be fully charged

The team designs the frame and housing of the water level recording machines, list the materials needed to build the stations and write down a break down list for the materials needed.

Equipment & Material list

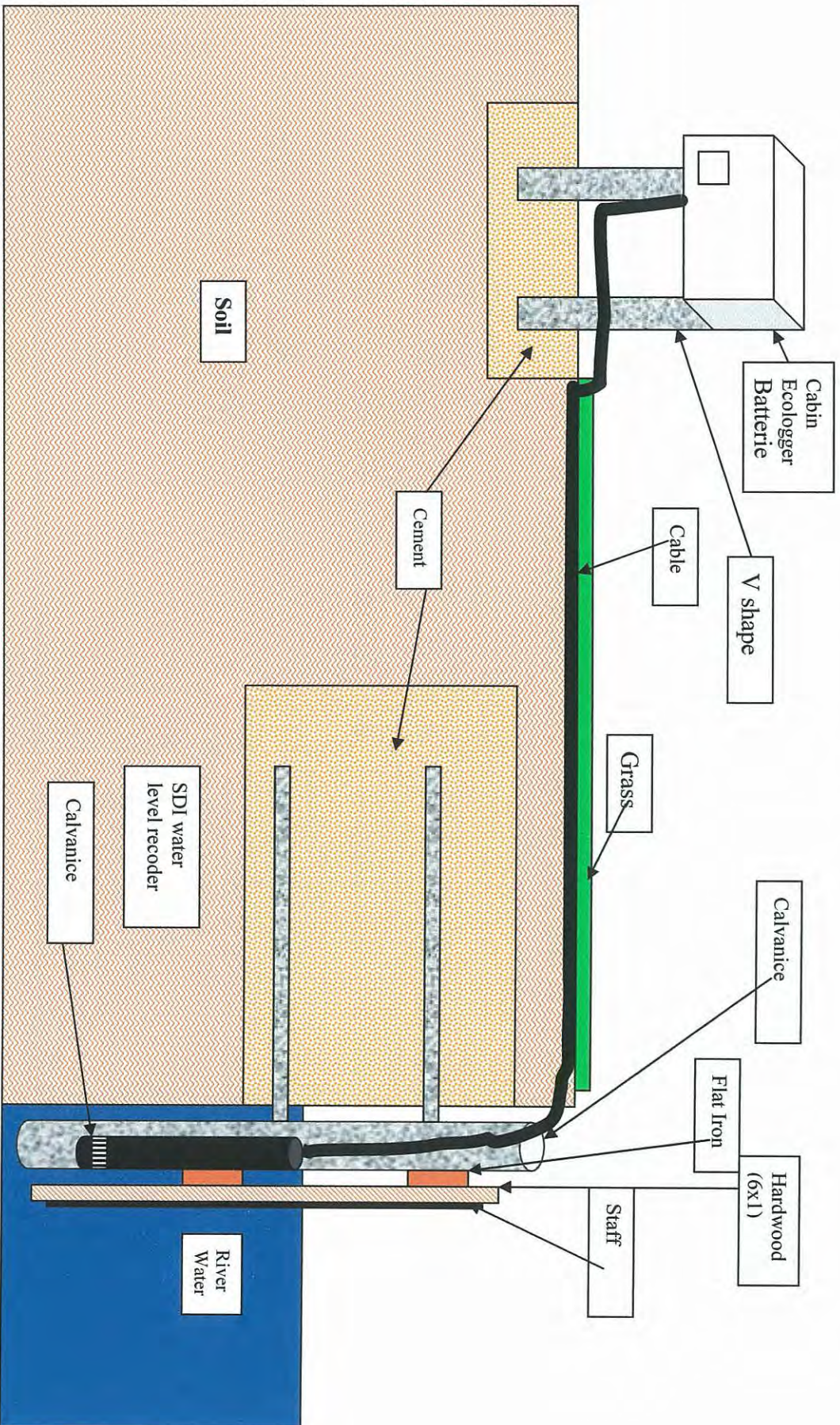
Vila

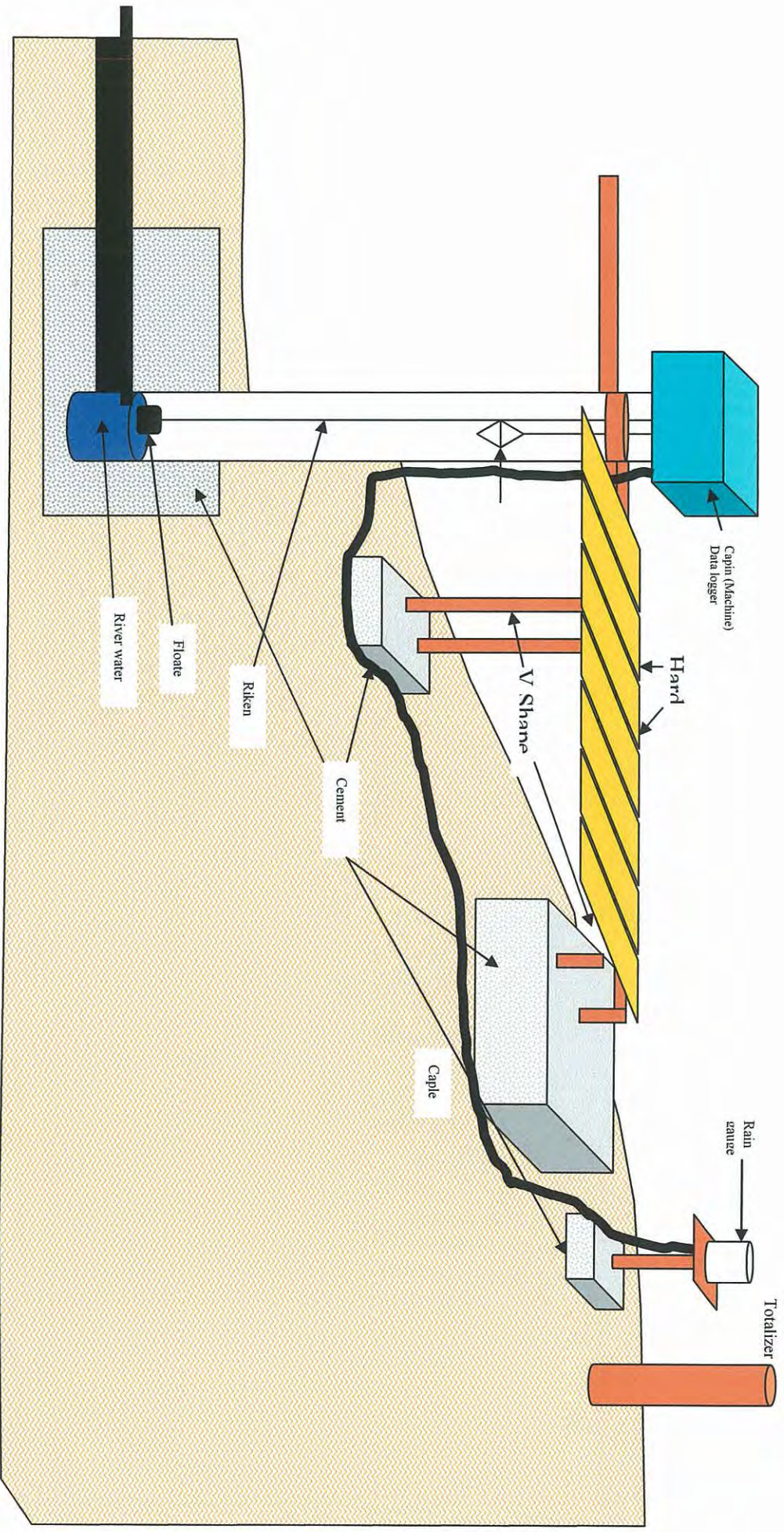
2 Ecologgers
2 Green span pressure transducers
3 12v rechargeable batteries
2 Staff gauges
Quanta probe
Palintest kit box
Hydrologger 2001
Floater and counter weight
Rain gauge
Zion Walk About
Battery cable OPW

Santo

- | | | | |
|----|--|---|-------------------------------------|
| 1 | 60 m poly pipe (1 ½ inches) | } | SDI protection |
| 2 | 10 mm treaded rod (2 m) | | |
| 3 | 10 mm Nuts (1 box) | | |
| 4 | 4 mm nuts (1 box) | | |
| 5 | 4 mm treaded rod (2 m) | } | Modify housing |
| 6 | 2 pieces 1 m Flat iron sheet (boxing) | | |
| 7 | 1 Jig saw | | |
| 8 | Jig saw plate for aluminum | | |
| 9 | 2 m 6x 1/2 inch timber for staff gauges | | |
| 10 | 1 ton cement | | |
| 11 | 1 tape measure | | |
| 12 | 5 mm x 100 mm x 1 m flat iron | } | Anchor & platform |
| 13 | 100 mm x 5 m V shape (corniere) iron x 2 | | |
| 14 | 1 Box 10 mm timber screw & nut | } | Stand posts for cabin
ECO LOGGER |
| 15 | 6 x ½ inch x 60 cm hard wood (40 pieces) | | |
| 16 | 2 V shape iron x 50 cm | | |
| 17 | 60 mm x 2 m V shape (corniere) iron x 4 | | |
| 18 | Box screw & plastic fitting | | |

Fanafall and Fanadam Typical SDI Water level
Recording Station (Construction Plan)





Fanafo Typical SDI Water level Recording Station (Construction Plan).

SUMMARY OF ACTIVITIES UNDERTAKEN

Fanafo station

- Complete housing, frame, platform and anchor structures
- Hydrollogger was installed, programmed and began recording
- Automatic Rain Gauge Installed
- Totalizer installed
- Staff Gauge yet to be install

Fanadam Station

- Complete frame but no housing
- Staff gauge install
- SDI yet to be install

Fanafall Station

- Complete frame
- Staff gauge install
- SDI install but due to technical faults the Ecollogger was not able to record and store data, an will be installed once it is fixed.

WATER QUALITY TEST RESULTS

The Water Quality test was done using the quanta probe and palintest kid.

1. Fanafo Station

Date	05/02/2005
Time	
Depth	0.30 m
Water Temperature	24.17°C
PH	8.62
Dissolved Oxygen	6.56
SPC	0.266
TDS	0.2
DO%	77.1
ORP	198
Alkalinity	180
Calcium Hardness	140

2. Fanafall Station (Power house)

Date	05/02/2005
Time	
Depth	0.30 m
Water Temperature	24.81
PH	8.85
Dissolved Oxygen	6.09
SPC	0.263
TDS	0.2
DO%	71.8
ORP	216
Alkalinity	180
Calcium Hardness	140

WATER FLOW MEASUREMENTS

Gauging Calculation Results

Site number 22301102 (FANAFO STATION)

Area	114085
Slope	-1
Wet perim	16011
Stage chg	0
Agency & gauging number	1
Date	050205
Time	110000
Stage	0.5
Mean vel	591
Width	15600
Sed conc	-1
Mtd.No.vert	0612
Discharge	6743 L/s
Max depth	1m 12cm
Hyd radius	713
Temp	24200

Discharge = 6743 Liters per seconds

Uncertainty (combined random & systematic) = +/- 9.6%

Random uncertainty (95% confidence level) = +/- 9.6%

Flow range between the 95% confidence limits is 6096 to 7390 L/s

Uncertainty calculated in accordance with ISO 5168

WATER LEVEL RECORDING

Staff Gauge Readings

- Fanafo 05/02/2005 H = 560 mm 12:30hrs
- Fanadam 05/02/2005 H = 780 mm 14:30hrs
- Fanafall 05/02/2005 H = 410 mm 13:30hrs



Fanafall
SDI and staff gauge
site



Fanafall
Ecologger and batterie

Fanafo
Constructing Fanafo platform



Fanafo platform complete





Fanafo
Hydrologger and
batterie to record
waterlevel and rain
fall. (Working)



Fanafo
Raingauge



**Fanadam
Staff gauge
and SDI site**



**Fanadam
Frame
complete**

95



Flow study

**Gauging in
Fanafo**

Water Quality Test (Palintest)

