

## **APPENDIX 6**

### **LETTER ON RELOCATION OF NDB AND DME**



**TUVALU GOVERNMENT  
OFFICE OF THE PRIME MINISTER**

VAIAKU, FUNAFUTI, TUVALU  
Phone: (688) 20815 Fax: (688) 20113

April 15, 2009

Mr. Juichiro Sasaki  
JICA Resident Representative  
JICA Fiji Office

Subject: AM Radio Project

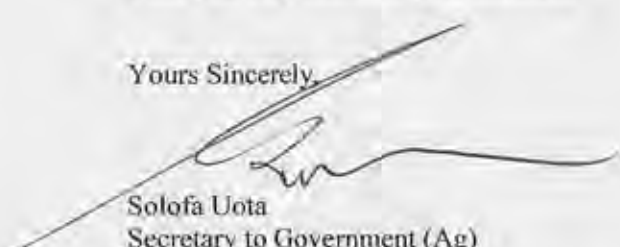
Dear Mr. Sasaki,

As agreed on Attachment 7-1, in the Minutes of Discussions dated 17 March 2009, I hereby inform you that the location of Non-Directional Beacon (NDB) and Distance Measuring Equipment (DME) will be relocated and will be placed between PWD office and Sports Ground. This relocation measure is decided by Ministry of Communication, Transport and Tourism, although final formalization by Cabinet is still required. Cabinet endorsement is expected within a few weeks, and the relocation will be completed before the AM Radio Project starts. I will inform you the cabinet approval later, but I believe there is no more problem for the location issue of this AM Radio Project and I renew our highest expectation of the project being implemented as quickly as possible.

Before concluding this letter, I wish to remind you our request of water cistern under the TMD building, which was raised during the discussion with your Basic Design Team. It is for the sake of disaster prevention especially draught that has been one of our biggest concerns and becoming serious year by year in Funafuti. I believe JICA understand our seriousness of the issue and wishing JICA to consider it positively, although it is not directly related with AM Radio itself.

Thank you very much for your attention.

Yours Sincerely,



Solofa Uota  
Secretary to Government (Ag)

Cc. Ms. Sunema Simati, Director of Budget and Planning (Ag)  
Mr. Vitori Iosefa, Director of Civil Aviation  
Mr. Stanley Manao, Director of Tuvalu Media Department (Ag)



**TUVALU GOVERNMENT  
OFFICE OF THE PRIME MINISTER**

VAIAKU, FUNAFUTI, TUVALU  
Phone: (688) 20815 Fax: (688) 20113

14 May, 2009

Mr. Juichiro Sasaki  
JICA Resident Representative  
JICA Fiji Office

Subject: AM Radio Project

Dear Mr. Sasaki,

Following my previous letter to you dated 15 April 2009, regarding AM Radio Project, I hereby inform you that the location of Non-Directional Beacon (NDB) and Distance Measuring Equipment (DME) will be relocated and will be placed between PWD office and Sports Ground. This relocation measure is formalized by Cabinet. I believe there is no more problem for the location issue of this AM Radio Project and I renew our highest expectation of the project being implemented as quickly as possible.

Thank you very much for your attention.

Yours Sincerely,



Solofa Uota  
Secretary to Government (Ag)

Cc. Mr. Stanley Manao, Director of Tuvalu Media Department (Ag)

## **APPENDIX 7**

### **TMD'S RADIO PROGRAMME LISTING**

## **7. TMD's Radio Programme Listing**

### **Monday-Saturday**

- 6:00 Tuning Call  
Programme Summary  
Morning Devotion  
Early Bird Show
- 7:00 World News
- 7:10 Advertisements/Shipping/Weather /Tidal Prediction
- 7:30 National News in Tuvaluan  
Community Announcements/Shipping/Weather/Tidal Prediction
- 7:45 Local Programme for kids
- 8:00 Programme from Medical Department /Polokalame mai te Ola Lei
- 8:15 Local Programme-Fakaasi tou poto
- 8:30 Dedication Calls/Local Music
- 9:00 Close Down

### **Sunday 9:00am-2:00pm**

- Tuning Call
- Programme Summary
- Local Church Hymns
- 10:00- Local Programme for kids
- 10:30- Drama
- 12:00- Local News Bulletin
- 12:30- Community Announcements
- 12:45- Local Church hymns
- 13:00- Drama
- 13:30- 14:00-Local church hymns-close down transmission

### **Noon Transmission**

- 11:00 Tuning Call  
Programme Summary  
Local Music
- 11:30 Pacific Music
- 12:00 Local News Bulletin  
Community Announcements/Shipping/Weather/Tidal Prediction
- 12:15 Recipe for the Day /Local programme

- 13:30 Funny Tales / Agriculture/Fisheries/Business Development/Vox Pop/Interviews
- 13:45 Local Music/Dedication Calls
- 14:00 Close Down

**Evening Transmission**

- 6:00 Tuning Call
  - Programme Summary
  - Children's Evening Devotion
  - Story for Kids
  - Local programme for children
  - Local Music
  - Pacific Music
- 6:45 English Music
- 7:00 World News
- 7:10 Local News in English
  - Community Announcements/Weather/Tidal/Shipping Report
- 7:30 Local News in Tuvaluan
  - Local Announcements/Weather/Tidal/Shipping Report
- 7:45 Pacific News in Tuvaluan
- 8:00 Religious/Women's Programme /Panel Discussion/Where I live and Why/Education/Seafarers/Dedication from Patients at PMH/Interviews/Quiz/Current Affairs/Agriculture/Tuvalu Family Planning/Medical/Drama/Debate/Funny Tales/Tala Fakamasausau/Te iloga Tuvalu/Oku Aso ko teka/Sunday Church Service/EKT Programme/Drama for Sunday.
- 9:30 Dedication Calls/Local Music
- 10:00 Close Down Transmission

## **APPENDIX 8**

### **FINDINGS OF THE NATURAL CONDITIONS SURVEY**

# REPORT

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**YACHIYO ENGINEERING CO., LTD**

**Improvement of Medium Wave  
Radio Broadcasting Network in  
Tuvalu  
Site Survey and Soil  
Investigation Report**

**Report prepared for:**

YACHIYO ENGINEERING CO., LTD

**Report prepared by:**

TONKIN & TAYLOR INTERNATIONAL LTD

**Distribution:**

YACHIYO ENGINEERING CO., LTD

2 copies

TONKIN & TAYLOR INTERNATIONAL LTD (FILE)

1 copy

**April 2009**

**T&T Ref: 750677**





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# **1 Introduction**

## **1.1 General**

Yachiyo Engineering Co., Ltd (YEC) engaged Tonkin & Taylor International Ltd (T&TI) to carry out the soils investigation and topographical survey for the proposed improvement of the medium wave broadcasting network on Funafuti in Tuvalu. The investigation and survey have been carried out in accordance with the "Contract and Specification" (ref: Appendix A). The soils investigation consisted of three hand excavated test pits with hand auger boreholes in the base of the pits along with eight Scala penetrometer tests and laboratory testing of recovered soil samples. This work scope was agreed with YEC. This report summarises the results of the soils investigation work carried out.

## **1.2 Project Description**

The islands of Tuvalu consist of a group of nine islands in the south west Pacific Ocean. Funafuti is the capital of Tuvalu and is an atoll consisting of thirty islands surrounding a large lagoon. Fogafale Island is the main island of Funafuti and is the main population centre. The island is relatively flat and elevated only a few metres above sea level.

The proposed project involves constructing a new medium wave antenna and new building to house the Tuvalu Media Department on the island of Fogafale, Funafuti. The locations of the sites to be developed are described in more detail in Section 2.

# **2 Site Description**

The project sites are located on opposite sides of Fogafale Island. Site A, the planned location of the medium wave antenna, is located on the south eastern side of the air strip and to the north east of the sports field. This site is currently undeveloped.

Site B, the location of the Tuvalu Media Department, is located on the western side of the island, opposite the Vaiaku Lagi Hotel. The Tuvalu Media Department building is located in the centre of the site. This comprises a concrete block structure with a corrugated iron roof.

The location of the two sites is shown in Figure 1 below.

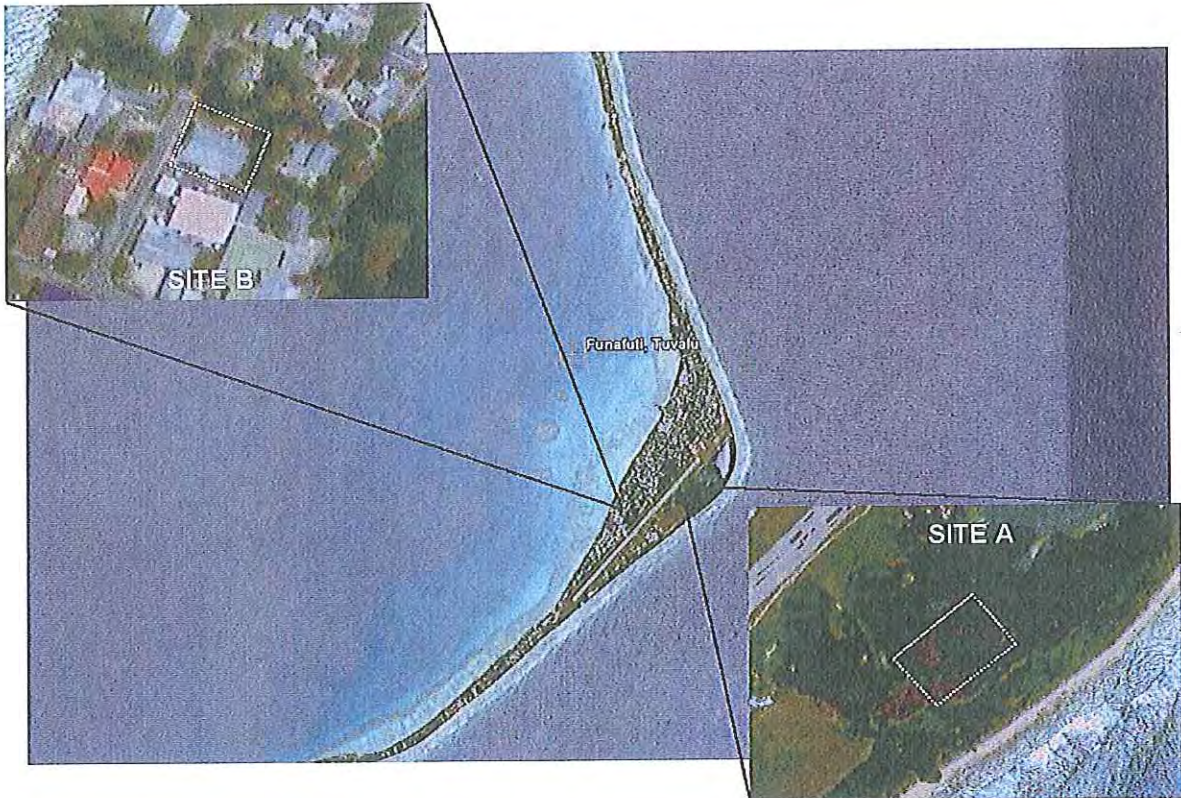


Figure 1: Site location Plan

### 3 Summary of Site Survey

The topographical survey was carried out between 19 and 24 March 2009 using a Sokkia 3030R3 Total Station and iron rods and wooden plugs as control points.

A combination of traversing and topographical survey was done on the two sites and the survey data was calculated using 12d and Autocad 2009 software programmes respectively.

The site survey plans are attached in Appendix B (drawings 750677 – 01 and 02)

### 4 Summary of Soils Investigation

#### 4.1 General

The soils investigations were carried out in March 2009 and the scope of work was completed in accordance with the “Contract and Specification” attached in Appendix A.

The following tasks were completed for the soils investigation:

- Site A
  - 5 No. Scala penetrometer tests to “refusal”.
  - 1 No. hand excavated test pit to 0.5 m below ground level.

- Site B
  - 3 No. hand excavated test pits to 2 m below ground level.
  - 3 No. hand auger boreholes in the base of each test pit to “refusal”.
  - 3 No. Scala penetrometer tests to “refusal” next to each test.

The subsections below present a summary of the investigation work and laboratory testing results. Site investigation logs are presented in Appendix B and laboratory testing results are presented in Appendix C.

## 4.2 Test pit and hand auger investigations

The test pit excavations were commenced on 13 March 2009 and were excavated by hand to a depth of 2 m below ground level. Below this depth the investigations were advanced using a hand auger until the soils could no longer be penetrated. The test locations are presented on Drawing 750677-01 and 02 in Appendix B. The work was completed over a period of one day and was undertaken under the continuous supervision of a geotechnical field engineer from Tonkin & Taylor International, Mr Chris Hewitt. The subsurface soils were logged and the logs are attached in Appendix C.

The in-situ testing carried out comprised continuous Scala penetrometer tests down to refusal (>10 blows/50 mm). The results of these tests are included in Appendix C.

Soils samples, for laboratory testing, were recovered from the test pit excavations at depths and locations agreed with YEC.

## 4.3 Geotechnical Laboratory Testing

The recovered samples were air freighted back to Auckland and geotechnical laboratory testing was carried out by Geotechnics Ltd, a subsidiary company of the Tonkin & Taylor Group. The laboratory tests have been completed in full accordance with the relevant New Zealand standards, identified in the subsections below, and the laboratory is fully accredited with International Accreditation New Zealand (IANZ) registration.

The soils testing consisted of the following:

- Specific Gravity tests (5 No.)
- Grain size analysis (5 No.)
- Moisture content test (5 No.)

The results of this testing are presented in Appendix D.

# 5 Subsurface Conditions

## 5.1 Geological Setting

The islands of Tuvalu are atolls with low-lying coral sand covering modern reef built upon older volcanic sea mounts<sup>1</sup>. The islands are geologically young, having been formed in the last 3000 years.

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<sup>1</sup> SOPAC Preliminary Report 38 (1991). Mapping survey and baseline study of coastal erosion on the islands of Tuvalu.

## 5.2 Subsurface Materials and Groundwater

The subsurface materials mainly consist of Coral sand overlying coral gravels and coral rock.

### 5.2.1 Site A

The local residents advise that during the 1940's the area encompassing Site A was excavated and the overlying sand used to build the Funafuti Airstrip. The sand was excavated down to the top of the coral rock. This is now overlain by organic silt made up from decomposed plant material that has been growing in the area.

The coral rock is approximately 0.5 m below the current ground level and consists of weak to moderately strong, white/yellowish white, porous rock. This rock was impenetrable with the Scala penetrometer.

Groundwater at this site is dependent on the tide, but was generally encountered at around 100 mm above or below the ground surface.

### 5.2.2 Site B

Site B does not appear to have been subject to earthworks. The subsurface conditions consist mainly of Coral sands overlying coral gravels.

The coral sand consists of a loose to dense, fine to coarse grained, light brown/pinkish cream sand with shell and coral fragments.

The coral gravel consists of fine to medium grained, dense to very dense, light brown/pinkish cream gravel. This was proven to the base of the boreholes at 2.8 m below ground level

The Scala penetrometer reached refusal between 2.7 and 4.9 m below ground level at Site B.

Groundwater was measured at approximately 2.5 m below the ground surface at high tide.

## 6 Discussion and Engineering Properties

Recommendations and opinions contained in this report are based upon data from:

- 3 No. test pit excavations with hand auger boreholes in the base
- 8 No. Scala penetrometer tests

The nature and continuity of the subsoil away from the test locations is inferred, but it must be appreciated that actual conditions could vary from the assumed model.

From the results of the soils investigation, geotechnical laboratory testing and also using published empirical relationships, we have assessed the engineering properties for the coral sands and rock for the designer's consideration in the following subsections:

### 6.1 Bulk Density Range ( $\gamma$ )

The coral sands (including gravel-sands) can be assumed to have the following bulk densities:

$$\gamma(\text{Bulk Density}) \text{ range} = 12 - 19 \text{ kN/m}^3$$

## 6.2 Effective Cohesion (c')

The material exhibits no effective cohesion. A value of zero should be used for design.

$$c' \text{ (Effective Cohesion)} = 0 \text{ kPa}$$

## 6.3 Effective Internal Friction Angle ( $\phi$ )

The effective internal friction angle for the coral sands at Site B has been estimated using a correlation from the Scala penetrometer. A value of 28° should be used as the effective internal friction angle for design.

$$\phi \text{ (Effective internal friction angle)} = 28^\circ$$

## 6.4 Bearing Capacity

### 6.4.1 Site A

For the coral rock at Site A an unconfined compressive strength of 2 MPa can be assumed. For foundation design, where the footings are on coral rock, a geotechnical ultimate bearing capacity of 2 MPa can be adopted. We recommend using a strength reduction factor of 0.5 ( $\phi_G = 0.5$ ) to give an ultimate limit state bearing capacity, in accordance with New Zealand Design Standards (ref: NZS 1170), of 1 MPa. For serviceability limit state design we recommend a strength reduction factor of 0.33 ( $\phi_G = 0.3$ ) to give an allowable bearing capacity of 660 kPa.

### 6.4.2 Site B

Site B is underlain by coral sands of varying density. The table below has been derived from the graph shown in figure 2 and shows allowable bearing capacities for the coral sand derived from the Scala penetrometer results. The Scala values have been converted to Standard Penetration Test (SPT) "N" values for the corresponding depths using a conversion factor of 1.5. These bearing capacities should limit settlements to less than 20 to 25 mm in the static case.

**Table 5.1 – Allowable Bearing Capacities – Site B**

Depth (Below Ground level)	Approx Scala Blows per 300 mm	Corresponding SPT "N" value	Breadth of Footing			
			0.5 m	1.0 m	1.5 m	2.0 m
0.5 m	8	5	40 kPa	40 kPa	35 kPa	30 kPa
1.0 m	10	7	60 kPa	60 kPa	50 kPa	45 kPa
1.5 m	12	8	80 kPa	80 kPa	70 kPa	65 kPa
2.0 m	15	10	110 kPa	110 kPa	100 kPa	90 kPa
2.5 m	17	11	120 kPa	120 kPa	110 kPa	100 kPa



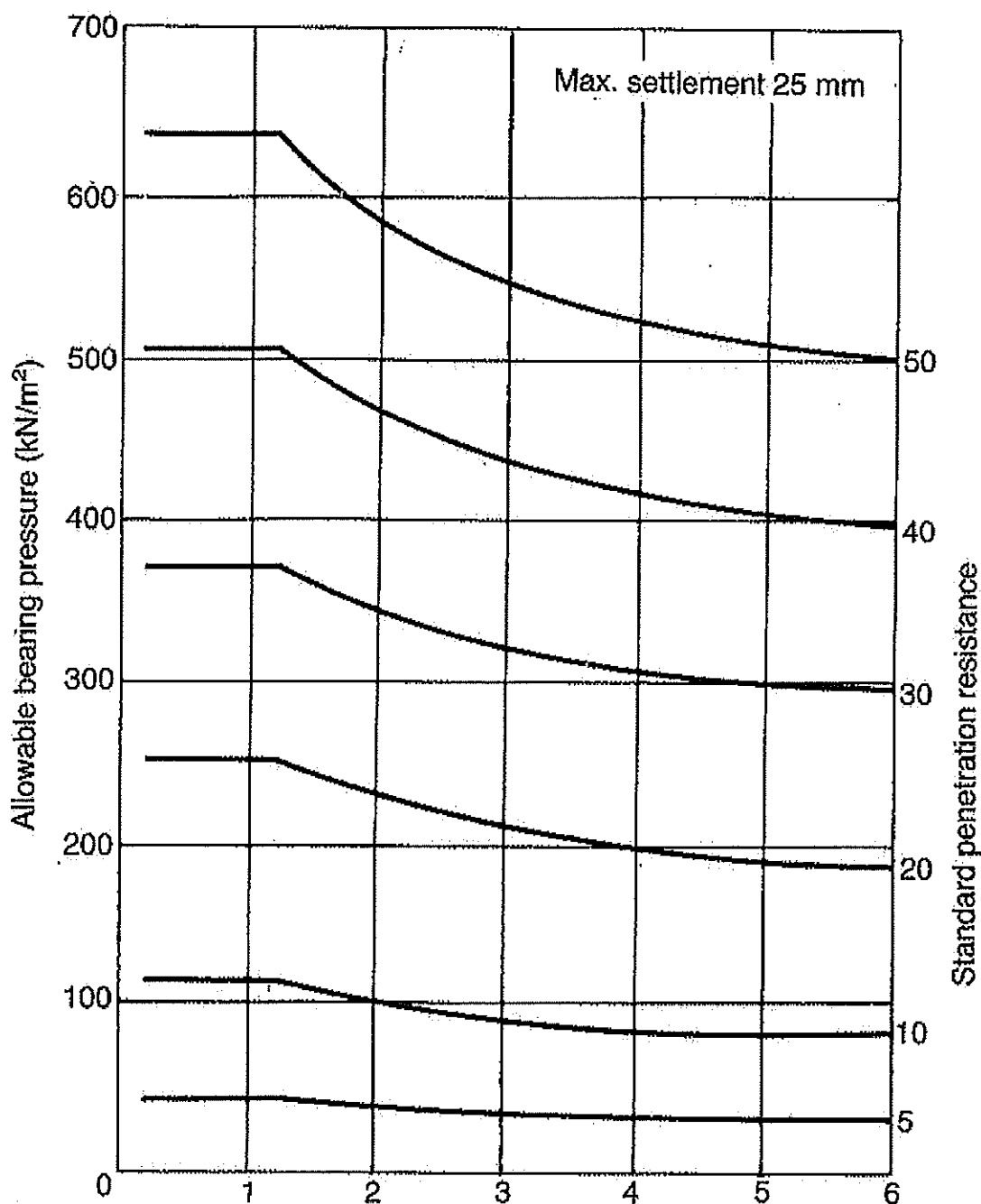


Figure 2: Craig, R.F. *Soil Mechanics, fifth edition*, Chapman and Hall, London, 1992. Relationship between standard penetration test and allowable bearing capacity, Pg 320.

## 6.5 Young's Modulus Range (E)

### 6.5.1 Site A

The soil stiffness or Young's Modulus, E has been calculated from a correlation with SPT N values (Bowles et al) derived from the Scala penetrometer readings. The table below gives Young's Modulus values for varying depths at Site B.

**Table 5.2 – Youngs Modulus, E**

Depth (Below Ground level)	Approx Scala Blows per 300 mm	Corresponding SPT "N" value	Estimated Youngs Modulus, E (MPa)
0.5 m	8	5	13
1.0 m	10	7	19
1.5 m	12	8	22
2.0 m	15	10	27
2.5 m	17	11	30

## 7 Applicability

This report has been prepared for the benefit of Yachiyo Engineering Co., Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

TONKIN & TAYLOR INTERNATIONAL LTD

Environmental and Engineering Consultants

Report prepared by:

Reviewed by:

Chris Hewitt

Geotechnical Engineer

Andrew Pomfret

Project Manager

Authorised for Tonkin & Taylor International by:

Chris Freer

Project Director

clh

P:\750677\WorkingMaterial\clh.190309.REPORT.doc



## **Appendix B: Drawings**

- **Survey Plans**
- **Site Investigations Plan**

NOTES :

- All dimensions are in millimetres unless noted otherwise.
- Base layout prepared by 'Wood & Jepsen Consultants', Job No. 6170, Dwg No. 6170, dated 28th March 2009.
- Datum of Level : Mean Sea Level  
Origin of Coordinates : FUN48  
N : 8056487.07 E : 57135.77  
RL : 3.00  
Bearings & Coordinates are in Universal Transverse Mercator(UTM)

Q	First Issue	BY	DATE
DESIGNED :	CLH	Apr.09	
DRAWN :	LJD	Apr.09	
DESIGN CHECKED :			
DRAFTING CHECKED :			
REFERENCE :			

CADFILE : \\750677-01.dwg  
**APPROVED FOR CONSTRUCTION**  
 This drawing is not to be used for construction purposes unless signed as approved.  
 COPYRIGHT ON THIS DRAWING IS RESERVED



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**YACHIYO ENGINEERING CO. LTD.**  
 IMPROVEMENT OF MEDIUM WAVE RADIO BROADCASTING NETWORK  
 TUVALU  
 SITE A-AM ANTENNA  
 Topographical Survey & Site Investigation Plan  
 SCALE (AT A3 SIZE) 1:750  
 Dwg. No. 750677-01  
 REV. 0

DRAWING STATUS: PRELIMINARY DRAFT



**LEGEND**

- Major Contour (0.5m)
- Minor Contour (0.2m)
- Boundary (Bearing & Distance)
- Spot Height
- Base of Rock Formation
- Tonkin & Taylor International Ltd (March 2009) Borehole/Scale Penetrometer
- Tonkin & Taylor International Ltd (March 2009) Testpit
- Surveyors Waypoints
- Edge of vegetation
- Palm tree





NOTES :

- All dimensions are in millimetres unless noted otherwise.
- Base layout prepared by 'Wood & Jepsen Consultants', Job No. 6170, Dwg No. 6170, dated 25th March 2009.
- Datum of Level : Mean Sea Level  
Origin of Coordinates : FUN48  
N : 8056487.07 E : 57135.77  
RL : 3.00  
Bearings & Coordinates are in Universal Transverse Mercator(UTM)

REVISION DESCRIPTION	BY	DATE
0. First Issue	CLH	Apr.09
DESIGNED :	LJD	Apr.09
DRAWN :		
DESIGN CHECKED :		
DRAFTING CHECKED :		
REFERENCE :		

FILE : \\750677-01.dwg  
 APPROVED FOR CONSTRUCTION  
 NOT FOR CONSTRUCTION  
 This drawing is not to be used for construction purposes unless signed and approved.  
 COPYRIGHT ON THIS DRAWING IS RESERVED

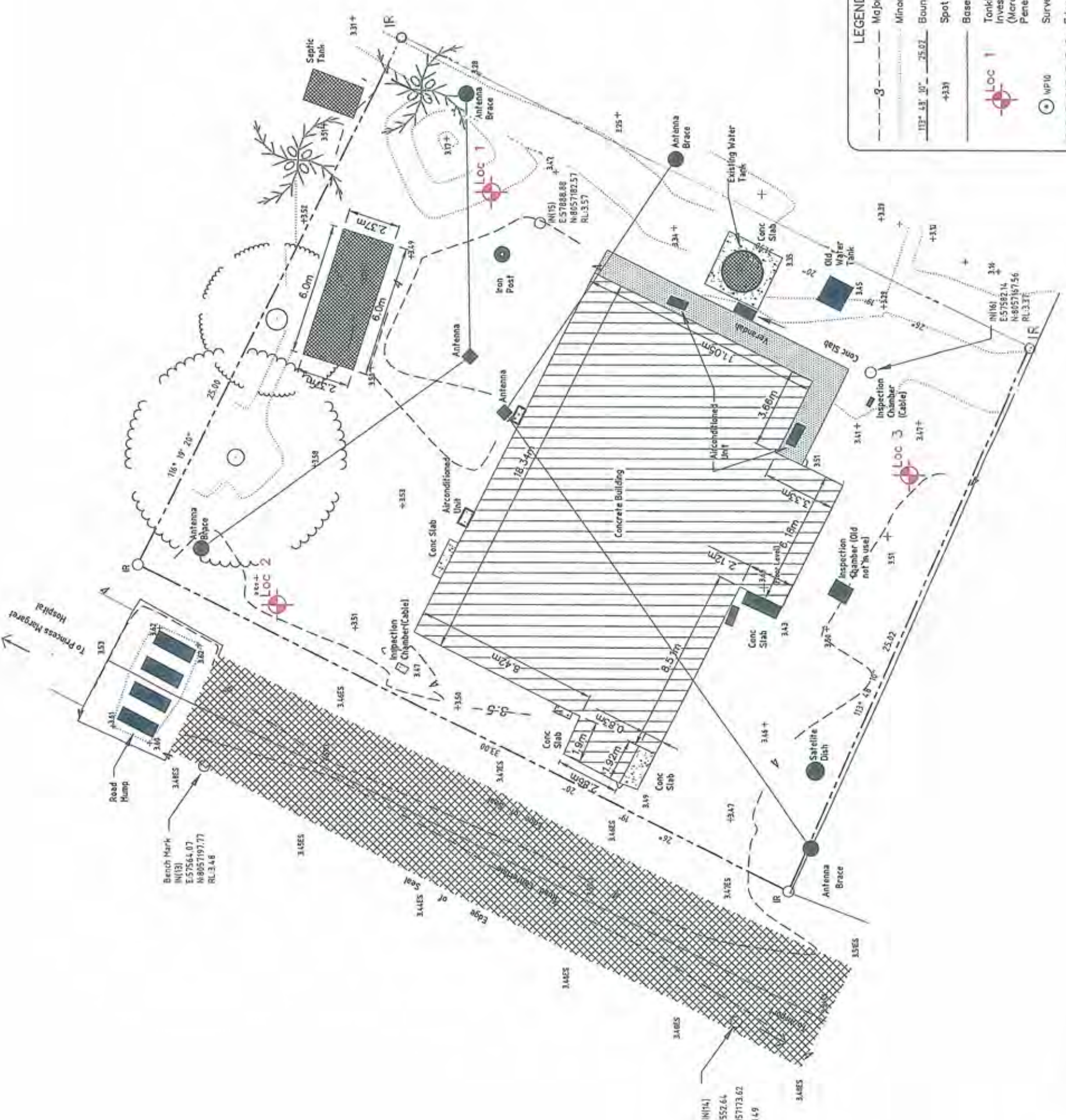


**Tonkin & Taylor**  
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**YACHIYO ENGINEERING CO. LTD.**  
 IMPROVEMENT OF MEDIUM WAVE RADIO BROADCASTING NETWORK  
 TUVALU SITE B—MEDIA CENTRE  
 Topographical Survey & Site Investigation Plan  
 SCALES (AT A3 SIZE)  
 1:200  
 Dwg. No. 750677-02  
 REV. 0

**LEGEND**

- Major Contour (0.5m)
- Minor Contour (0.2m)
- Boundary (Bearing & Distance)
- Spot Height
- Base of Rock Formation
- TONKIN & TAYLOR INTERNATIONAL LTD Investigation Test Location (March 2008) Borehole/Soils Penetrometer/Testpit
- Surveyors Waypoints
- Edge of vegetation
- Palm tree



## **Appendix C: Investigation Logs**

- **Trial pit and hand auger logs**
- **Dynamic cone penetrometer results**





# TONKIN & TAYLOR LTD

## EXCAVATION LOG

BOREHOLE No: TPB1  
 Location: Site B location 1  
 SHEET 1 OF 1

PROJECT: Broadcasting Tuvalu      LOCATION: Fogafale Island, Funafuti, Tuvalu      JOB No: 750677

CO-ORDINATES: mN      EXPOSURE TYPE: Test Pit      EXCAV. STARTED: 13/3/09  
 mE      EQUIPMENT: Hand Excavated      EXCAV FINISHED: 13/3/09  
 R.L.      OPERATOR:      LOGGED BY: CLH  
 DATUM      DIMENSIONS:      CHECKED BY:

EXCAVATION TESTS      ENGINEERING DESCRIPTION      GEOLOGICAL

PENETRATION	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa)	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								SAND with shell fragments, loose, fine to coarse, white flecked dark grey (beach sand).		I.			
					0.5			SAND, loose, fine to medium grained, light brown/pinkish cream.					
					1.0			-becomes medium dense		MD			
					1.5			-with gravel size (2 - 15mm) inclusions of coral					
				4	2.0			End of Test Pit at 2.0m depth Continued with hand auger HAB1					
					2.5								



TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: HAB1  
 Hole Location: Site B, Location 1  
 SHEET 1 OF 1

PROJECT: TUVALUBROADCASTING			LOCATION: Fogafale Island, Funafuli, Tuvalu			JOB No: 750677											
CO-ORDINATES mN mE			DRILL TYPE: Hand Auger			HOLE STARTED: 13/3/09											
R.L. m			DRILL METHOD: Hand Auger			HOLE FINISHED: 13/3/09											
DATUM			DRILL FLUID:			LOGGED BY: CLH CHECKED:											
GEOLOGICAL				ENGINEERING DESCRIPTION													
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE / WEATHERING CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION
																	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.
ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.																	
CORAL SAND									0.5	✱			MD				SAND, medium dense, fine to medium grained, light brown/pinkish cream with gravel sized fragments of coral.
CORAL GRAVEL		13/3/09 @ 17:00							0.5	✱			VD				GRAVEL, fine coral gravel, dense, pinkish white.
									1.0								becomes very dense
									1.5								End of Borehole at 2.7m depth Too stiff to auger further and hole collapsing
									2.0								
									2.5								
									3								



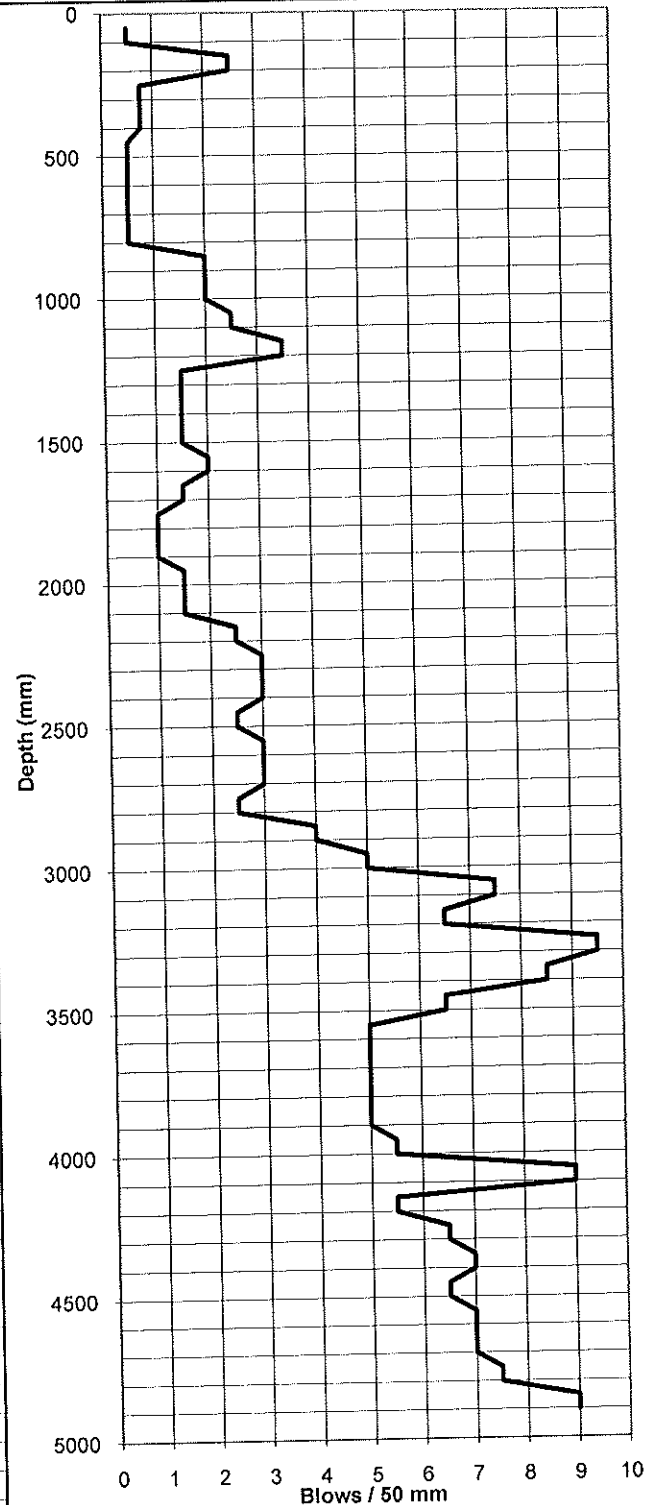
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCB2
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.5	2550	3
100	0.5	2600	3
150	2.5	2650	3
200	2.5	2700	3
250	0.75	2750	2.5
300	0.75	2800	2.5
350	0.75	2850	4
400	0.75	2900	4
450	0.5	2950	5
500	0.5	3000	5
550	0.5	3050	7.5
600	0.5	3100	7.5
650	0.5	3150	6.5
700	0.5	3200	6.5
750	0.5	3250	9.5
800	0.5	3300	9.5
850	2	3350	8.5
900	2	3400	8.5
950	2	3450	6.5
1000	2	3500	6.5
1050	2.5	3550	5
1100	2.5	3600	5
1150	3.5	3650	5
1200	3.5	3700	5
1250	1.5	3750	5
1300	1.5	3800	5
1350	1.5	3850	5
1400	1.5	3900	5
1450	1.5	3950	5.5
1500	1.5	4000	5.5
1550	2	4050	9
1600	2	4100	9
1650	1.5	4150	5.5
1700	1.5	4200	5.5
1750	1	4250	6.5
1800	1	4300	6.5
1850	1	4350	7
1900	1	4400	7
1950	1.5	4450	6.5
2000	1.5	4500	6.5
2050	1.5	4550	7
2100	1.5	4600	7
2150	2.5	4650	7
2200	2.5	4700	7
2250	3	4750	7.5
2300	3	4800	7.5
2350	3	4850	9
2400	3	4900	9
2450	2.5	4950	
2500	2.5	5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



CLIENT  
 TITLE  
 REFERENCE No. 750677

August 2002

(1)



TONKIN & TAYLOR LTD

EXCAVATION LOG

BOREHOLE No: TPB2  
 Location: Site B location 2  
 SHEET 1 OF 1

PROJECT: Broadcasting Tuvalu

LOCATION: Fogafale Island, Funafuti, Tuvalu

JOB No: 750677

CO-ORDINATES: mN  
 mE

EXPOSURE TYPE: Test Pit  
 EQUIPMENT: Hand Excavated

EXCAV. STARTED: 13/3/09  
 EXCAV FINISHED: 13/3/09

R.L. m

OPERATOR:

LOGGED BY: CLH

DATUM

DIMENSIONS:

CHECKED BY:

EXCAVATION TESTS			ENGINEERING DESCRIPTION				GEOLOGICAL					
PENETRATION	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa)	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
1 3										0 25 50 100 200		
				1	0.0		SAND with shell fragments, loose, fine to coarse, white flecked dark grey (beach sand).		L			
				2	0.5		SAND, loose, fine to medium grained, light brown/pinkish cream.  -becomes medium dense		MD			
				3	1.0		-becomes dense		D			
					1.5		-with gravel size (2 - 15mm) fragments of coral					
					2.0		End of Test Pit at 2.0m depth Continued with hand auger HAB2					
					2.5							





# TONKIN & TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: HAB2  
 Hole Location: Site B, Location 2  
 SHEET 1 OF 1

PROJECT: TUVALUBROADCASTING LOCATION: Fogafole Island, Funafuti, Tuvalu JOB No: 750677

CO-ORDINATES mN  
 mE  
 R.L. m  
 DATUM  
 DRILL TYPE: Hand Auger HOLE STARTED: 13/3/09  
 DRILL METHOD: Hand Auger HOLE FINISHED: 13/3/09  
 DRILL FLUID: LOGGED BY: CLH CHECKED:

GEOLOGICAL										ENGINEERING DESCRIPTION										
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.										SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.										
ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.																				
FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE / WEATHERING CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)					
																SAND, medium dense, fine to medium grained, light brown/pinkish cream with gravel sized fragments of coral.				
								0.5								GRAVEL, fine coral gravel, dense, pinkish white.				
								1.0								End of Borehole at 2.7m depth Too stiff to auger further and hole collapsing Dynamic cone penetration test next to location identified very dense soils at 4.9 m below ground level				
								1.5												
								2.0												
								2.5												
								3												

13/3/09 @ 17:00



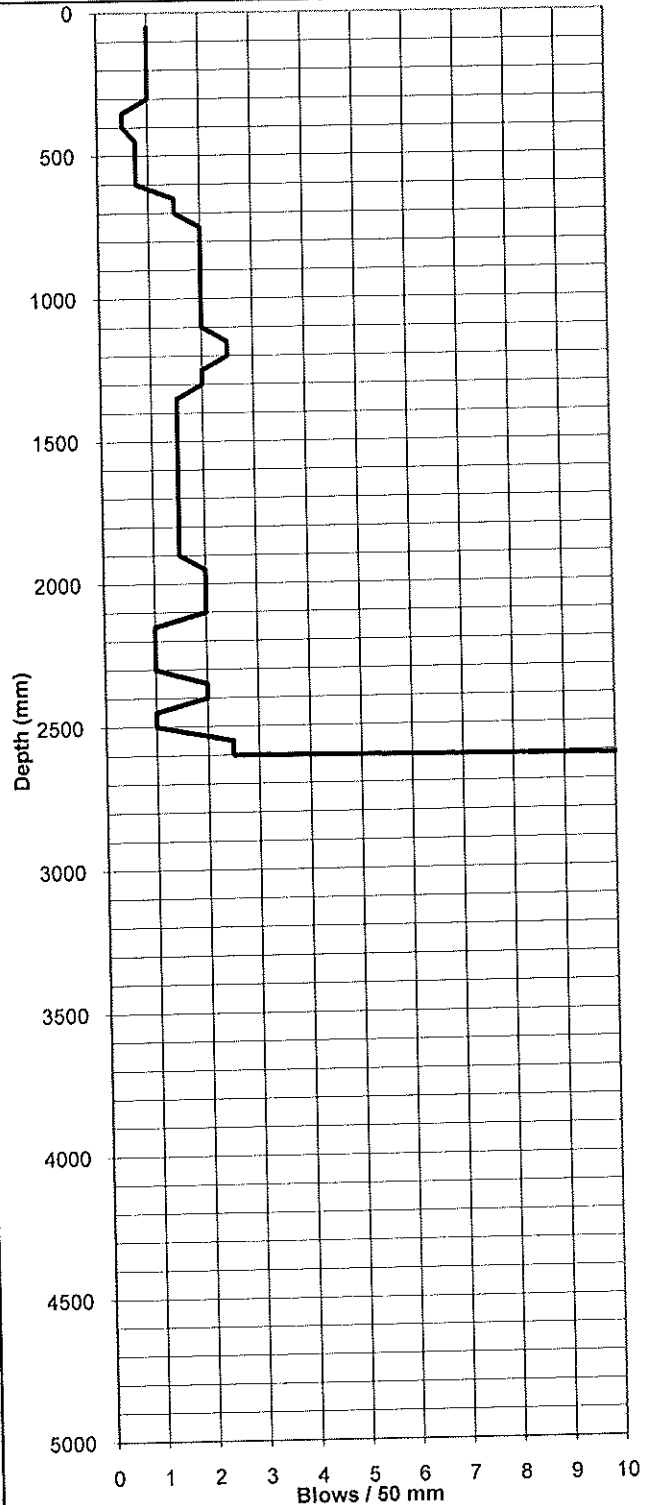
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCB1
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	1	2550	2.5
100	1	2600	2.5
150	1	2650	35
200	1	2700	
250	1	2750	
300	1	2800	
350	0.5	2850	
400	0.5	2900	
450	0.75	2950	
500	0.75	3000	
550	0.75	3050	
600	0.75	3100	
650	1.5	3150	
700	1.5	3200	
750	2	3250	
800	2	3300	
850	2	3350	
900	2	3400	
950	2	3450	
1000	2	3500	
1050	2	3550	
1100	2	3600	
1150	2.5	3650	
1200	2.5	3700	
1250	2	3750	
1300	2	3800	
1350	1.5	3850	
1400	1.5	3900	
1450	1.5	3950	
1500	1.5	4000	
1550	1.5	4050	
1600	1.5	4100	
1650	1.5	4150	
1700	1.5	4200	
1750	1.5	4250	
1800	1.5	4300	
1850	1.5	4350	
1900	1.5	4400	
1950	2	4450	
2000	2	4500	
2050	2	4550	
2100	2	4600	
2150	1	4650	
2200	1	4700	
2250	1	4750	
2300	1	4800	
2350	2	4850	
2400	2	4900	
2450	1	4950	
2500	1	5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



# TONKIN & TAYLOR LTD

## EXCAVATION LOG

BOREHOLE No: TPB3

Location: Site B location 3

SHEET 1 OF 1

PROJECT: Broadcasting Tuvalu

LOCATION: Fogafale Island, Funafuli, Tuvalu

JOB No: 750677

CO-ORDINATES: mN  
mE

EXPOSURE TYPE: Test Pit  
EQUIPMENT: Hand Excavated

EXCAV. STARTED: 13/3/09  
EXCAV FINISHED: 13/3/09

R.L. m

OPERATOR:

LOGGED BY: CLH

DATUM

DIMENSIONS:

CHECKED BY:

EXCAVATION TESTS			ENGINEERING DESCRIPTION				GEOLOGICAL				
1	2	3	R.L. (m)	DEPTH (m)	GRAPHIC LOG CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa)	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
PENETRATION	SUPPORT	WATER									
				0.0		CORAL GRAVEL, fine to medium grained, pinkish white.					
				0.5		SAND with shell fragments, loose, white flecked dark grey. SAND, fine to medium grained, medium dense, light brown/pinkish cream.					
				1.0		-becomes dense					
				1.5		-with fine to medium grained coral gravel inclusions					
				2.0		End of Test Pit at 2.0m depth Continued with hand auger HAB3					
				2.5							



TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: HAB3  
 Hole Location: Site B, Location 3  
 SHEET 1 OF 1

PROJECT: TUVALUBROADCASTING				LOCATION: Fogafale Island, Funafuti, Tuvalu				JOB No: 750677							
CO-ORDINATES		mN mE		DRILL TYPE: Hand Auger				HOLE STARTED: 13/3/09							
R.L.		m		DRILL METHOD: Hand Auger				HOLE FINISHED: 13/3/09							
DATUM				DRILL FLUID:				LOGGED BY: CLH CHECKED:							
GEOLOGICAL						ENGINEERING DESCRIPTION									
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.						SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.									
ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.															
FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE / WEATHERING CONDITION	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)
		13/3/09 @ 17:00						0.5	✱			D			
CORAL SAND						SAND, dense, fine to medium grained, light brown/pinkish cream with gravel sized coral inclusions.									
CORAL GRAVEL						CORAL GRAVEL, fine to medium grained, dense, light brown/pinkish cream									
						-becomes very dense End of Borehole at 2.7m depth Too stiff to auger further and hole collapsing									
						1.0									
						1.5									
						2.0									
						2.5									
						3									



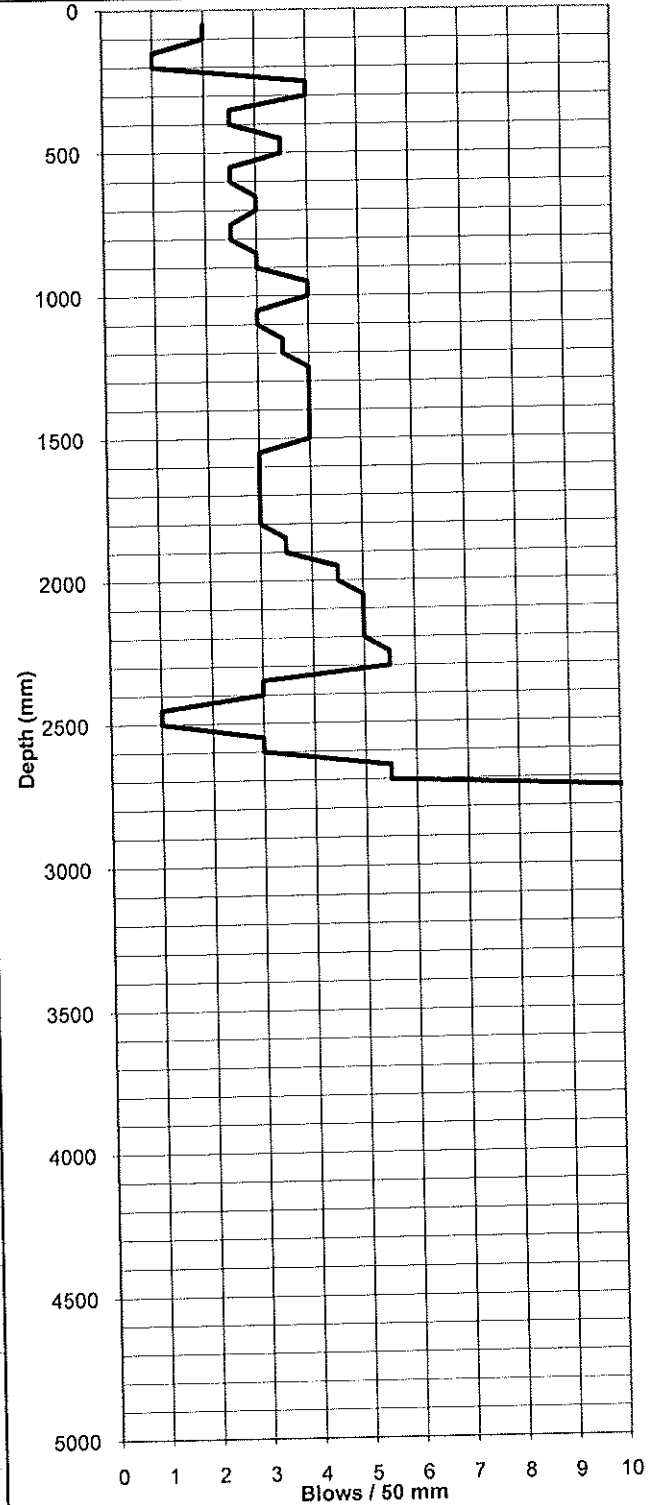
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCB3
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	2	2550	3
100	2	2600	3
150	1	2650	5.5
200	1	2700	5.5
250	4	2750	12.5
300	4	2800	12.5
350	2.5	2850	
400	2.5	2900	
450	3.5	2950	
500	3.5	3000	
550	2.5	3050	
600	2.5	3100	
650	3	3150	
700	3	3200	
750	2.5	3250	
800	2.5	3300	
850	3	3350	
900	3	3400	
950	4	3450	
1000	4	3500	
1050	3	3550	
1100	3	3600	
1150	3.5	3650	
1200	3.5	3700	
1250	4	3750	
1300	4	3800	
1350	4	3850	
1400	4	3900	
1450	4	3950	
1500	4	4000	
1550	3	4050	
1600	3	4100	
1650	3	4150	
1700	3	4200	
1750	3	4250	
1800	3	4300	
1850	3.5	4350	
1900	3.5	4400	
1950	4.5	4450	
2000	4.5	4500	
2050	5	4550	
2100	5	4600	
2150	5	4650	
2200	5	4700	
2250	5.5	4750	
2300	5.5	4800	
2350	3	4850	
2400	3	4900	
2450	1	4950	
2500	1	5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



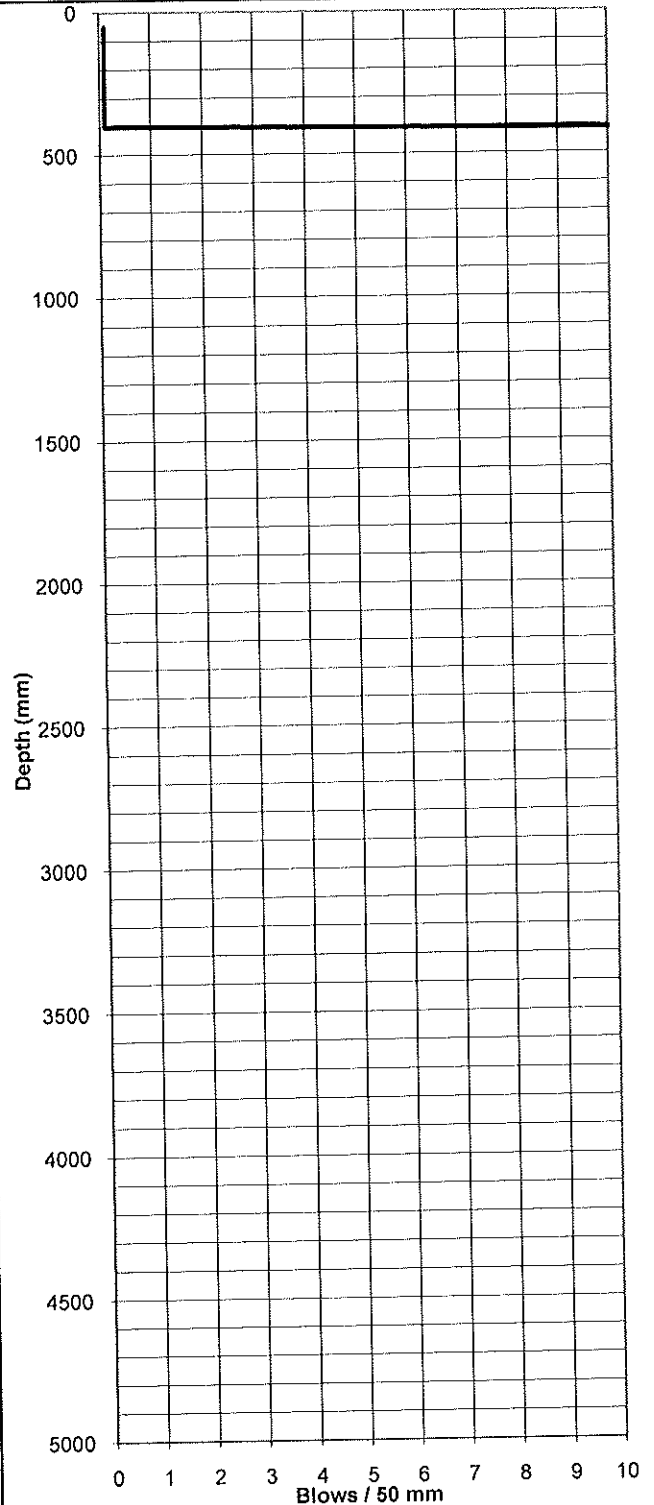
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCA1
Sheet	1
of	1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.1	2550	
100	0.1	2600	
150	0.1	2650	
200	0.1	2700	
250	0.1	2750	
300	0.1	2800	
350	0.1	2850	
400	0.1	2900	
450	40	2950	
500		3000	
550		3050	
600		3100	
650		3150	
700		3200	
750		3250	
800		3300	
850		3350	
900		3400	
950		3450	
1000		3500	
1050		3550	
1100		3600	
1150		3650	
1200		3700	
1250		3750	
1300		3800	
1350		3850	
1400		3900	
1450		3950	
1500		4000	
1550		4050	
1600		4100	
1650		4150	
1700		4200	
1750		4250	
1800		4300	
1850		4350	
1900		4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



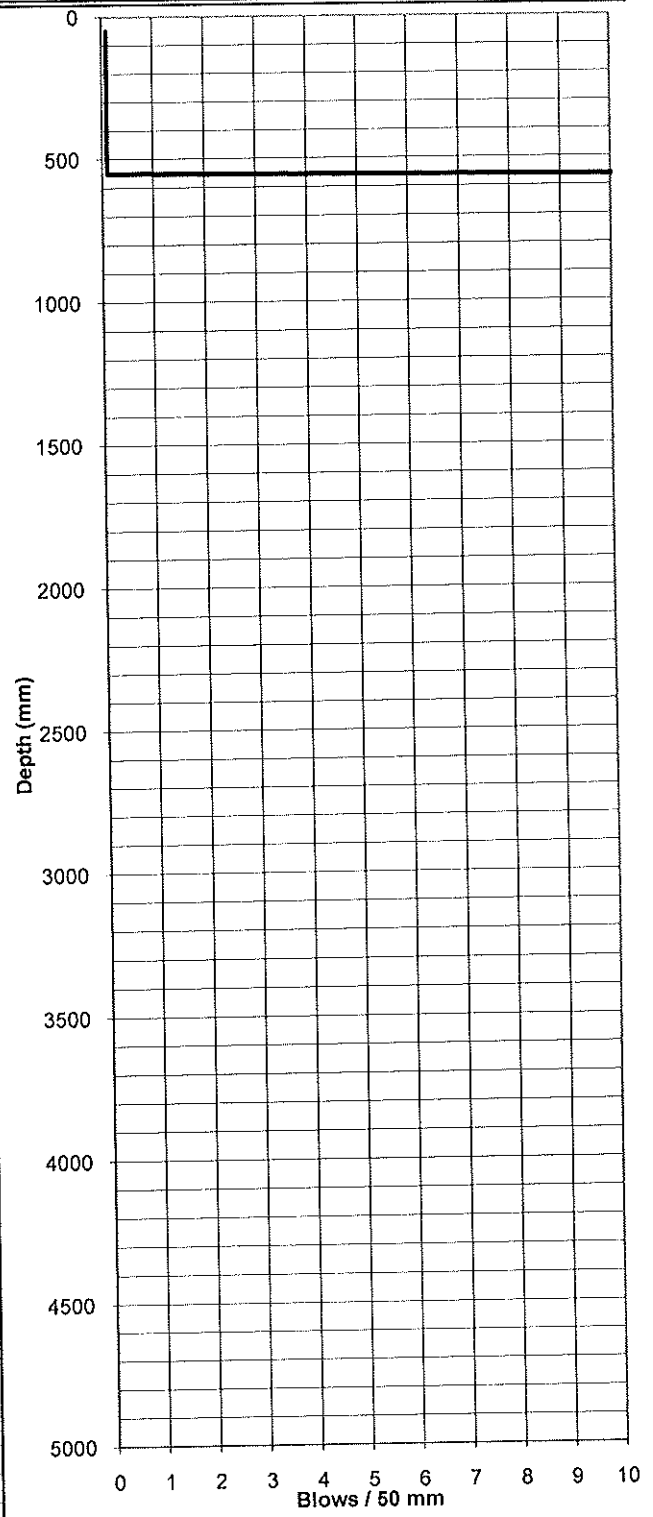
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCA2
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.1	2550	
100	0.1	2600	
150	0.1	2650	
200	0.1	2700	
250	0.1	2750	
300	0.1	2800	
350	0.1	2850	
400	0.1	2900	
450	0.1	2950	
500	0.1	3000	
550	0.1	3050	
600	40	3100	
650		3150	
700		3200	
750		3250	
800		3300	
850		3350	
900		3400	
950		3450	
1000		3500	
1050		3550	
1100		3600	
1150		3650	
1200		3700	
1250		3750	
1300		3800	
1350		3850	
1400		3900	
1450		3950	
1500		4000	
1550		4050	
1600		4100	
1650		4150	
1700		4200	
1750		4250	
1800		4300	
1850		4350	
1900		4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer

CLIENT  
 TITLE  
 REFERENCE No. 750677

CLIENT  
 TITLE  
 REFERENCE No. 750677



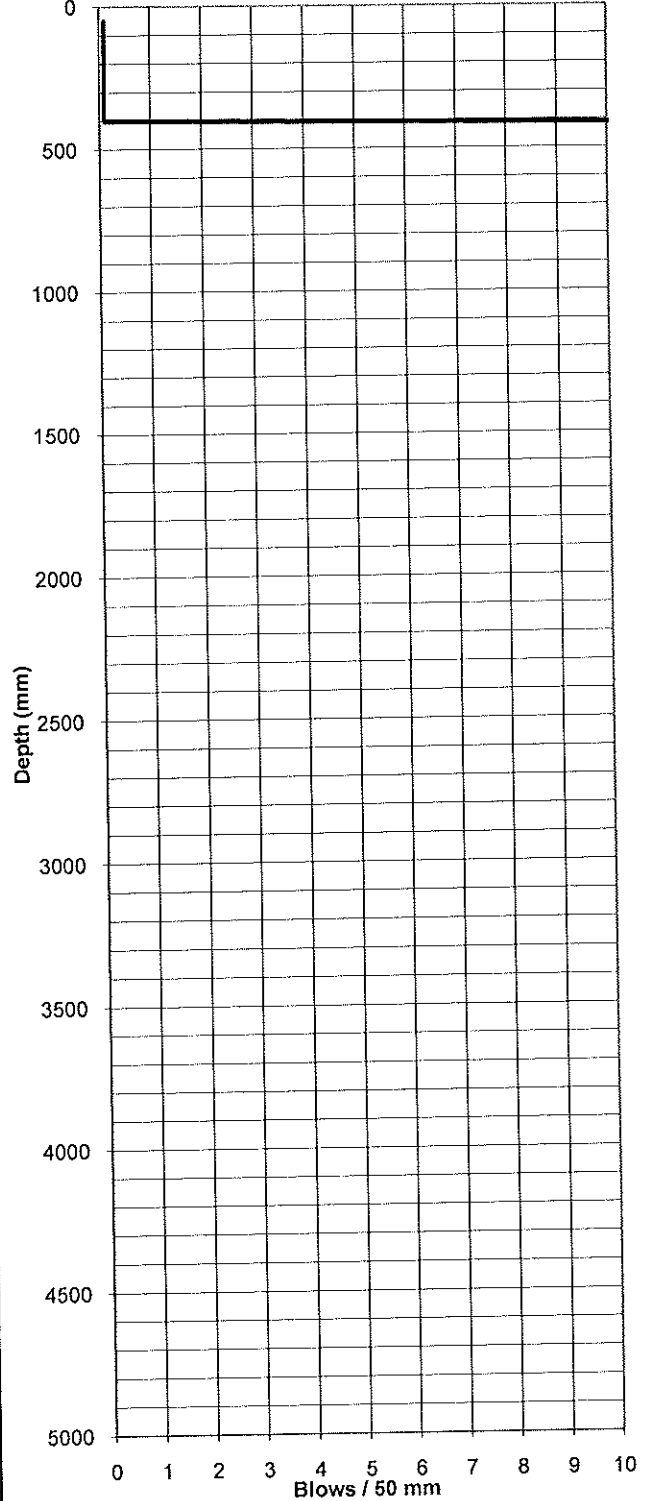
TONKIN & TAYLOR  
SCALA PENETROMETER LOG

Job No: 750677  
Project: Broadcasting Centre  
Location: Fogafale Island, Tuvalu  
RL: Ground level

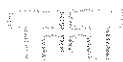
Date: 7/08/2002  
Operated by: CLH  
Logged by: CLH  
Checked by:

Test No.	SCA3
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.1	2550	
100	0.1	2600	
150	0.1	2650	
200	0.1	2700	
250	0.1	2750	
300	0.1	2800	
350	0.1	2850	
400	0.1	2900	
450	40	2950	
500		3000	
550		3050	
600		3100	
650		3150	
700		3200	
750		3250	
800		3300	
850		3350	
900		3400	
950		3450	
1000		3500	
1050		3550	
1100		3600	
1150		3650	
1200		3700	
1250		3750	
1300		3800	
1350		3850	
1400		3900	
1450		3950	
1500		4000	
1550		4050	
1600		4100	
1650		4150	
1700		4200	
1750		4250	
1800		4300	
1850		4350	
1900		4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



CLIENT  
TITLE  
REFERENCE No. 750677

August 2002





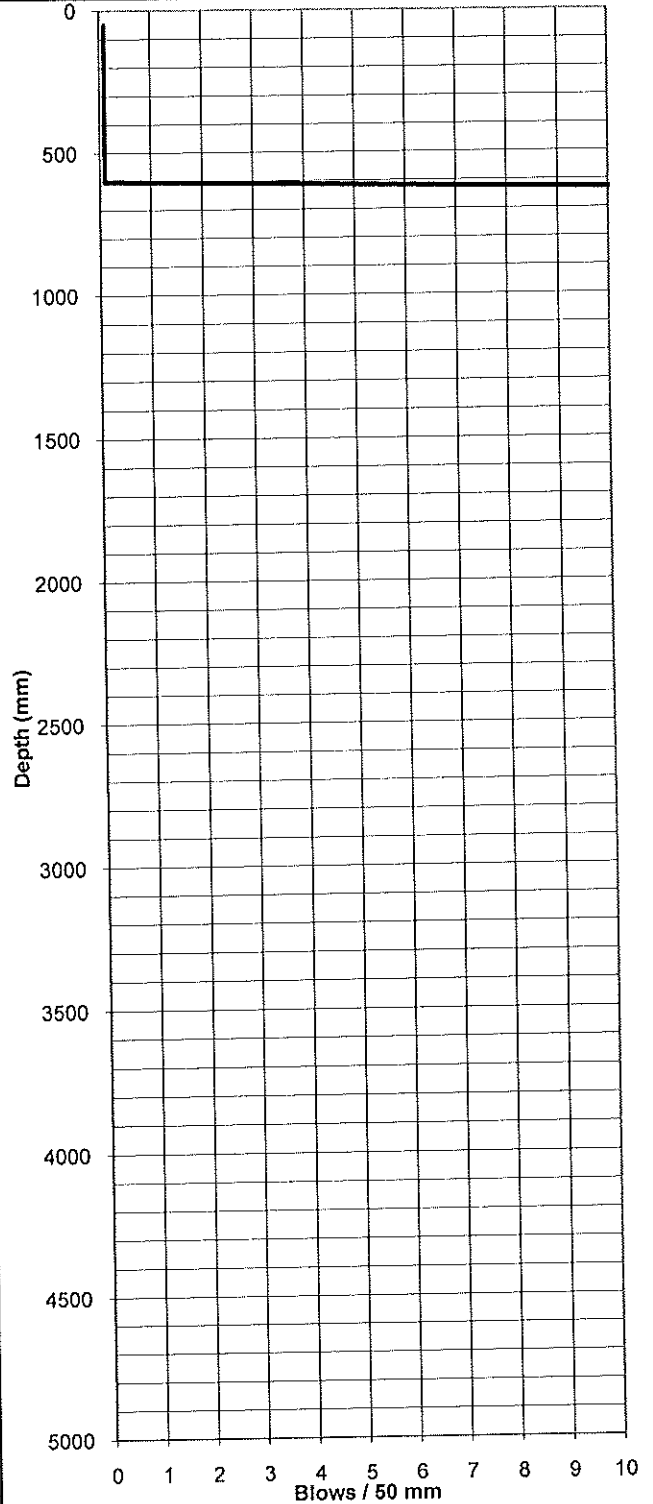
TONKIN & TAYLOR  
**SCALA PENETROMETER LOG**

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCA4
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.1	2550	
100	0.1	2600	
150	0.1	2650	
200	0.1	2700	
250	0.1	2750	
300	0.1	2800	
350	0.1	2850	
400	0.1	2900	
450	0.1	2950	
500	0.1	3000	
550	0.1	3050	
600	0.1	3100	
650	17	3150	
700	40	3200	
750		3250	
800		3300	
850		3350	
900		3400	
950		3450	
1000		3500	
1050		3550	
1100		3600	
1150		3650	
1200		3700	
1250		3750	
1300		3800	
1350		3850	
1400		3900	
1450		3950	
1500		4000	
1550		4050	
1600		4100	
1650		4150	
1700		4200	
1750		4250	
1800		4300	
1850		4350	
1900		4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer

CLIENT  
 TITLE  
 REFERENCE No. 750677

August 2002

{1}



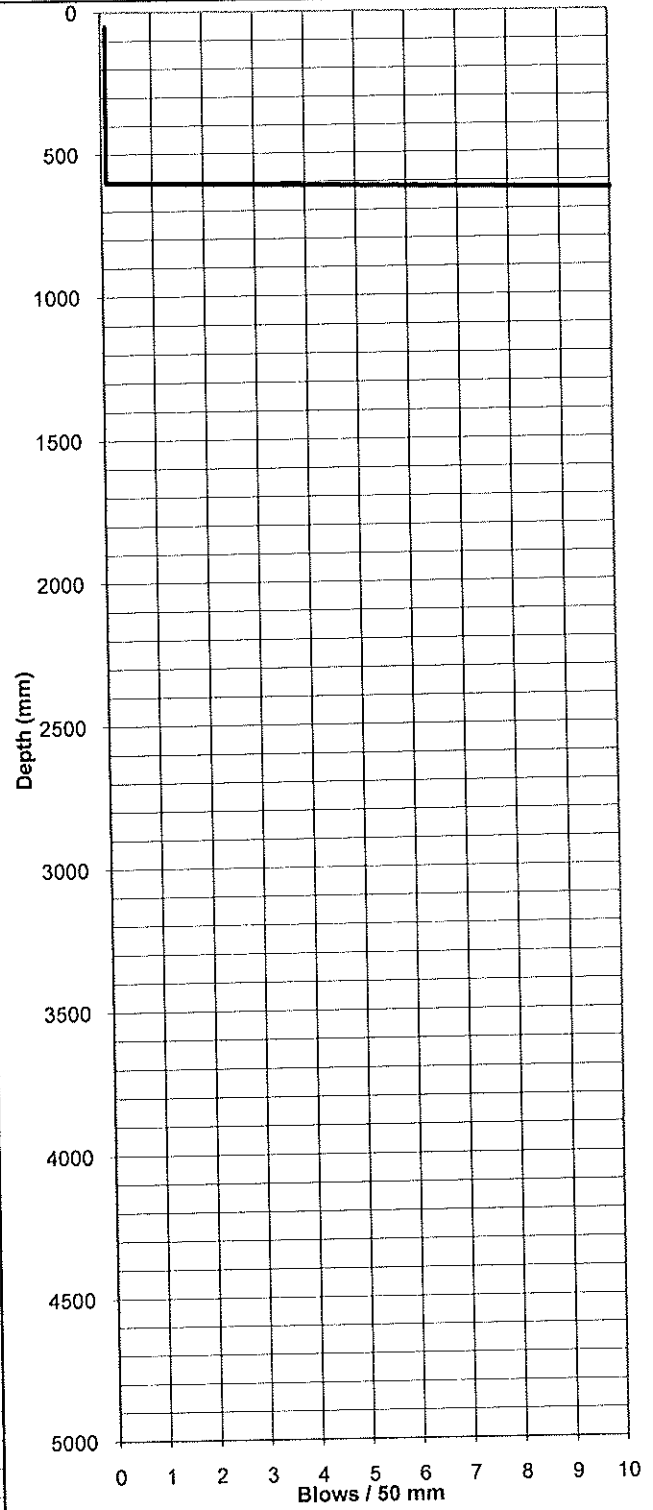
SCALA PENETROMETER LOG

Job No: 750677  
 Project: Broadcasting Centre  
 Location: Fogafale Island, Tuvalu  
 RL: Ground level

Date: 7/08/2002  
 Operated by: CLH  
 Logged by: CLH  
 Checked by:

Test No.	SCA5
Sheet of	1 / 1

mm Driven	No. of Blows	mm Driven	No. of Blows
50	0.1	2550	
100	0.1	2600	
150	0.1	2650	
200	0.1	2700	
250	0.1	2750	
300	0.1	2800	
350	0.1	2850	
400	0.1	2900	
450	0.1	2950	
500	0.1	3000	
550	0.1	3050	
600	0.1	3100	
650	17	3150	
700	40	3200	
750		3250	
800		3300	
850		3350	
900		3400	
950		3450	
1000		3500	
1050		3550	
1100		3600	
1150		3650	
1200		3700	
1250		3750	
1300		3800	
1350		3850	
1400		3900	
1450		3950	
1500		4000	
1550		4050	
1600		4100	
1650		4150	
1700		4200	
1750		4250	
1800		4300	
1850		4350	
1900		4400	
1950		4450	
2000		4500	
2050		4550	
2100		4600	
2150		4650	
2200		4700	
2250		4750	
2300		4800	
2350		4850	
2400		4900	
2450		4950	
2500		5000	



Test Method Used: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



CLIENT  
 TITLE  
 REFERENCE No. 750677

## **Appendix D: Laboratory Testing**



GEOTECHNICS

23 Morgan Street, Newmarket  
Auckland 1023, New Zealand  
p. +64 9 356 3510  
w. www.geotechnics.co.nz

Form No.: S4

Form Date: January 2004

The Full Reporting Model Water Content Summary.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_ Your Job No.: 750677

Site : AM Broadcasting, Funafuti, Tuvalu Our Job No.: 614964.000

Test Method Used: NZS 4402:1986 Test 2.1 Determination of Water Content

**WATER CONTENT TEST RESULTS**

Table 1: Solid Density

Site Location	Site B	Site B	Site B	Site B	Site B
Test Location	2	2	2	1	3
Sample No.:	1	2	3	4	5
Depth	@ Surface	1m Below GL	2m Below GL	2m Below GL	2m Below GL
Water Content (%)	17.3	17.1	12.6	23.7	16.6

Remarks : ---

Tested by: *ST*

Date: *26/3/09*

Checked by: *KND*

Date: *26/3/09*



23 Morgan Street, Newmarket  
 Auckland 1023, New Zealand  
 p. +64 9 356 3510  
 w. www.geotechnics.co.nz

Form No.: S4  
 Form Date: January 2004

The Post4Site file by Mike S. 2014 4/14/09 summary.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_ Your Job No.: 750677  
 Site : AM Broadcasting, Funafuti, Tuvalu Our Job No.: 614964.000  
 Test Method Used: NZS 4402:1986 Test 2.7.2 Determination of Solid Density of Soil Particles by Vacuum

**SOLID DENSITY TEST RESULTS**

Table 1: Solid Density

Site Location	Site B	Site B	Site B	Site B	Site B
Test Location	2	2	2	1	3
Sample No.:	1	2	3	4	5
Depth	@ Surface	1m Below GL	2m Below GL	2m Below GL	2m Below GL
Solid Density (t/m <sup>3</sup> )	2.75	2.76	2.77	2.76	2.77

Remarks : Solid density performed on whole material.  
 The average solid density reported to the nearest 0.01 t/m<sup>3</sup>

Tested by: *ST* Date: *26/3/09* Checked by: *SA* Date: *26/03/09*



GEOTECHNICS

23 Morgan Street, Newmarket  
Auckland 1023, New Zealand

p. +64 9 356 3510

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Form No.: S5

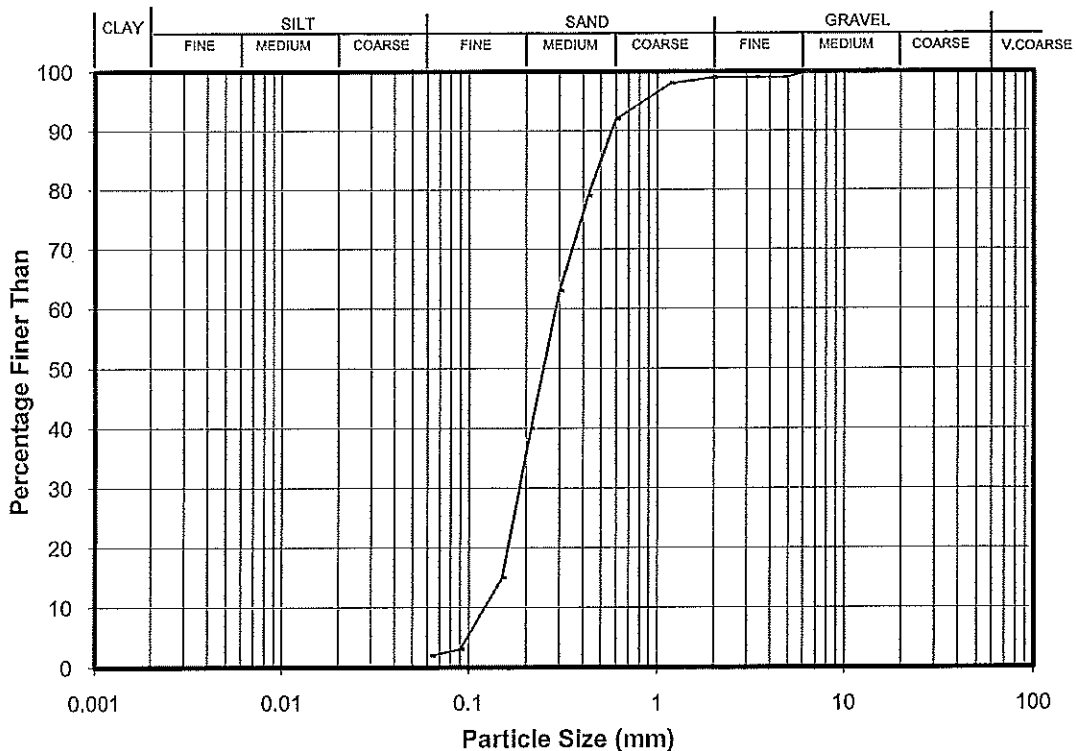
Form Date: JANUARY 2004

File: P:\614964.000\Working Material\Sample1\_Wet Sieve.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_  
Site : **AM Broadcasting, Funafuti, Tuvalu**  
Site Location: **Site B** Test Location: **2** Sample No.: **1**  
Test Method Used : **NZS 4402 : 1986 Test 2.8.1 Wet Sieve**

Your Job No.: **750677**  
Our Job No.: **614964.000**  
Depth: **@ Surface**

### PARTICLE SIZE ANALYSIS



Sieve (mm)	Total % Passing
37.5	---
26.5	---
19.0	---
13.2	---
9.50	---
6.70	100
4.75	99
3.35	99
2.00	99
1.18	98

Sieve (mm)	Total % Passing
0.600	92
0.425	79
0.300	63
0.212	40
0.150	15
0.090	3
0.063	2

Sample history : As received.

Description : Coral SAND with trace silt and trace fine gravel, loose, light grey/light yellow/orange with white.

Remarks: Percentage passing the finest sieve was obtained by difference.  
Sample description is not IANZ endorsed.

Entered by : **ST**

Date : **25/3/09**

Checked by : **JMC**

Date : **25/3/09**



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Form No.: S5

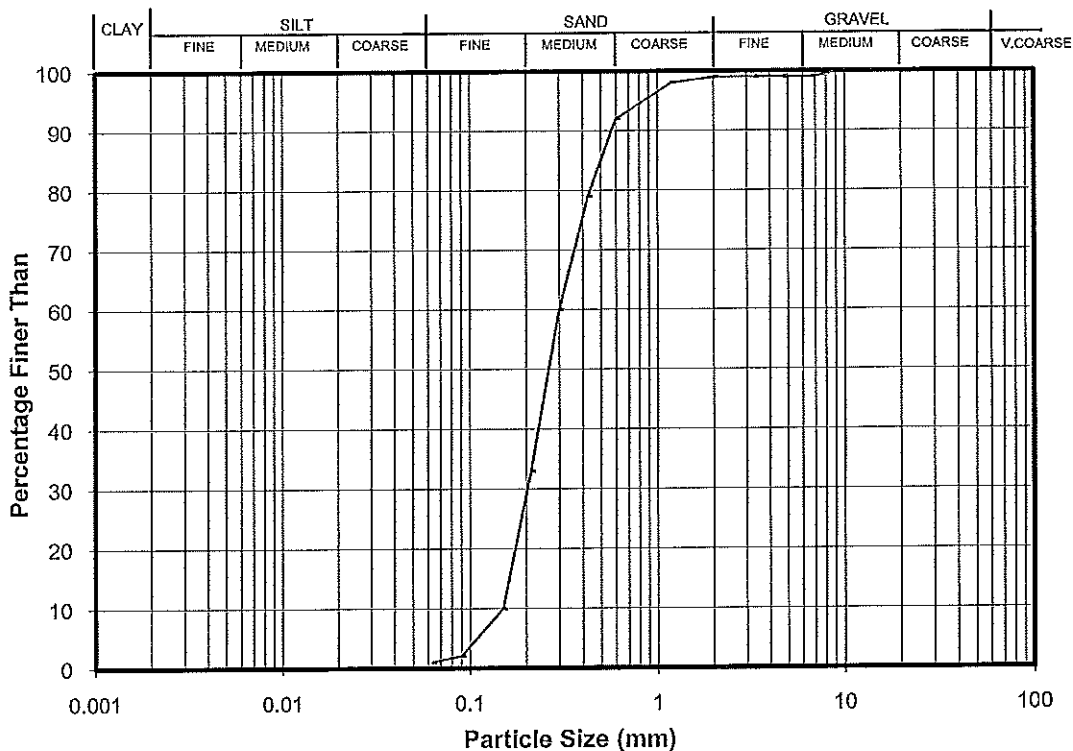
Form Date: JANUARY 2004

File: P:\M14984.000\Working\Matara\Sample2\_Wet Sieve.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_  
 Site : **AM Broadcasting, Funafuti, Tuvalu**  
 Site Location: **Site B** Test Location: **2** Sample No.: **2**  
 Test Method Used : NZS 4402 : 1986 Test 2.8.1 Wet Sieve

Your Job No.: **750677**  
 Our Job No.: **614964.000**  
 Depth: **1m Below GL**

**PARTICLE SIZE ANALYSIS**



Sieve (mm)	Total % Passing
37.5	---
26.5	---
19.0	---
13.2	100
9.50	100
6.70	99
4.75	99
3.35	99
2.00	99
1.18	98

Sieve (mm)	Total % Passing
0.600	92
0.425	79
0.300	60
0.212	33
0.150	10
0.090	2
0.063	1

Sample history : As received.

Description : Coral SAND with trace silt and trace fine to medium gravel, loose, light grey/light yellow/orange with white.

Remarks: Percentage passing the finest sieve was obtained by difference.  
 Sample description is not IANZ endorsed.

Entered by : *ST*

Date : *25/3/09*

Checked by : *me*

Date : *25/3/09*



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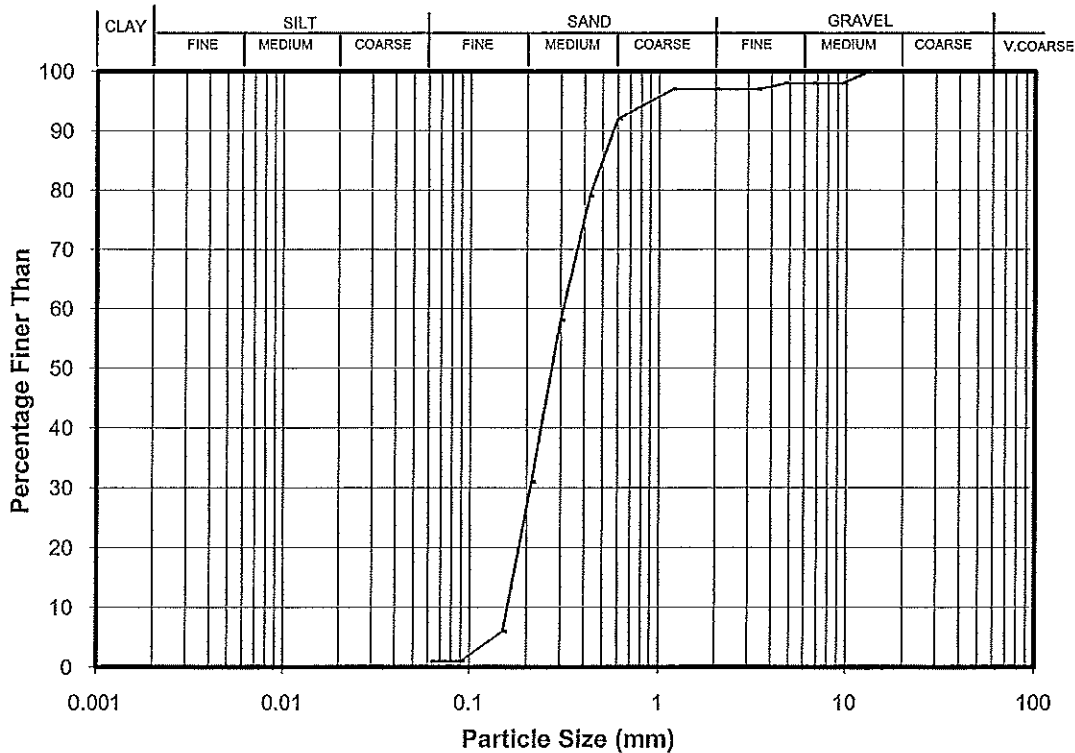
Form Date: JANUARY 2004

File: P:\614964.000\Working Material\Sample3\_Wet Sieve.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_  
 Site : **AM Broadcasting, Funafuti, Tuvalu**  
 Site Location: **Site B** Test Location: **2** Sample No.: **3**  
 Test Method Used : NZS 4402 : 1986 Test 2.8.1 Wet Sieve

Your Job No.: **750677**  
 Our Job No.: **614964.000**  
 Depth: **2m Below GL**

**PARTICLE SIZE ANALYSIS**



Sieve (mm)	Total % Passing
37.5	---
26.5	---
19.0	---
13.2	100
9.50	98
6.70	98
4.75	98
3.35	97
2.00	97
1.18	97

Sieve (mm)	Total % Passing
0.600	92
0.425	79
0.300	58
0.212	31
0.150	6
0.090	1
0.063	1

Sample history : As received.

Description : Coral SAND with trace gravel and trace silt, loose, light grey/light yellow/orange with white.

Remarks: Percentage passing the finest sieve was obtained by difference.  
 Sample description is not IANZ endorsed.

Entered by : **ST**

Date : **25/3/09**

Checked by : **SA**

Date : **25/3/09**





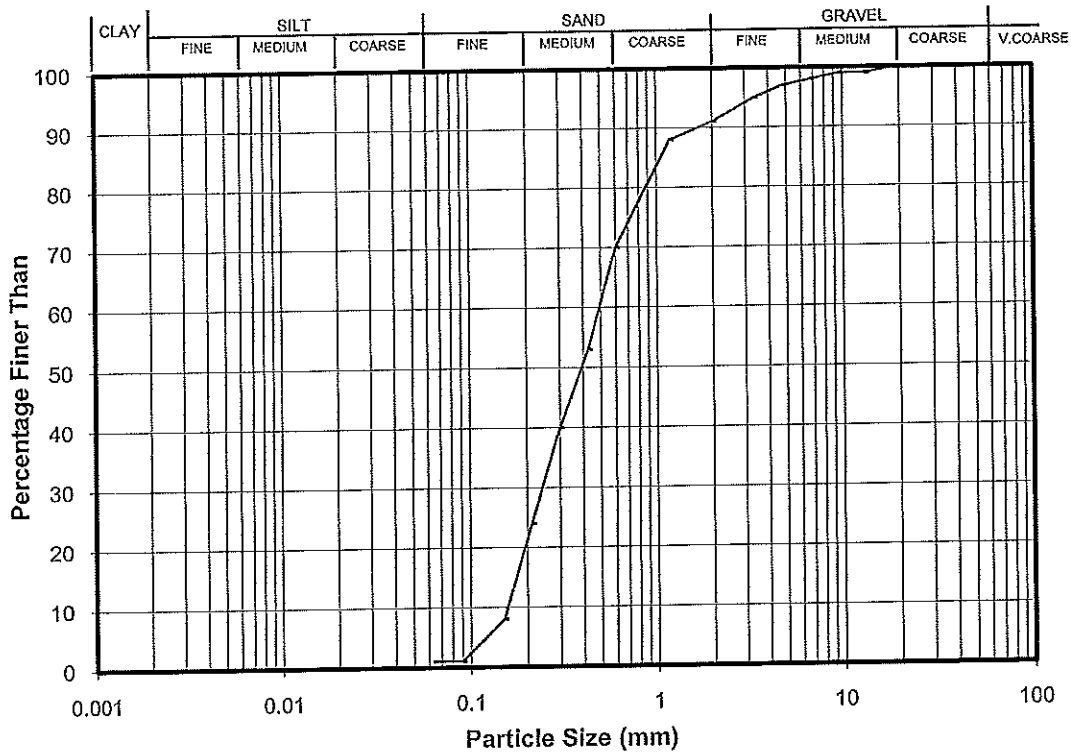
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Form No.: S5
Form Date: JANUARY 2004
File: P:\614964.000\Working Material\Sample4_Wet Sieve.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_ Your Job No.: **750677**  
 Site : **AM Broadcasting, Funafuti, Tuvalu** Our Job No.: **614964.000**  
 Site Location: **Site B** Test Location: **1** Sample No.: **4** Depth: **2m Below GL**  
 Test Method Used : **NZS 4402 : 1986 Test 2.8.1 Wet Sieve**

### PARTICLE SIZE ANALYSIS



Sieve (mm)	Total % Passing
37.5	---
26.5	---
19.0	100
13.2	99
9.50	99
6.70	98
4.75	97
3.35	95
2.00	91
1.18	88

Sieve (mm)	Total % Passing
0.600	70
0.425	53
0.300	40
0.212	24
0.150	8
0.090	1
0.063	1

Sample history : As received.

Description : Coral SAND with minor gravel and trace silt, loose, light grey/light yellow/orange with white.

Remarks: Percentage passing the finest sieve was obtained by difference.  
Sample description is not IANZ endorsed.

Entered by : **ST** Date : **25/3/09** Checked by : **SA** Date : **25/03/09**



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Form No.: S5

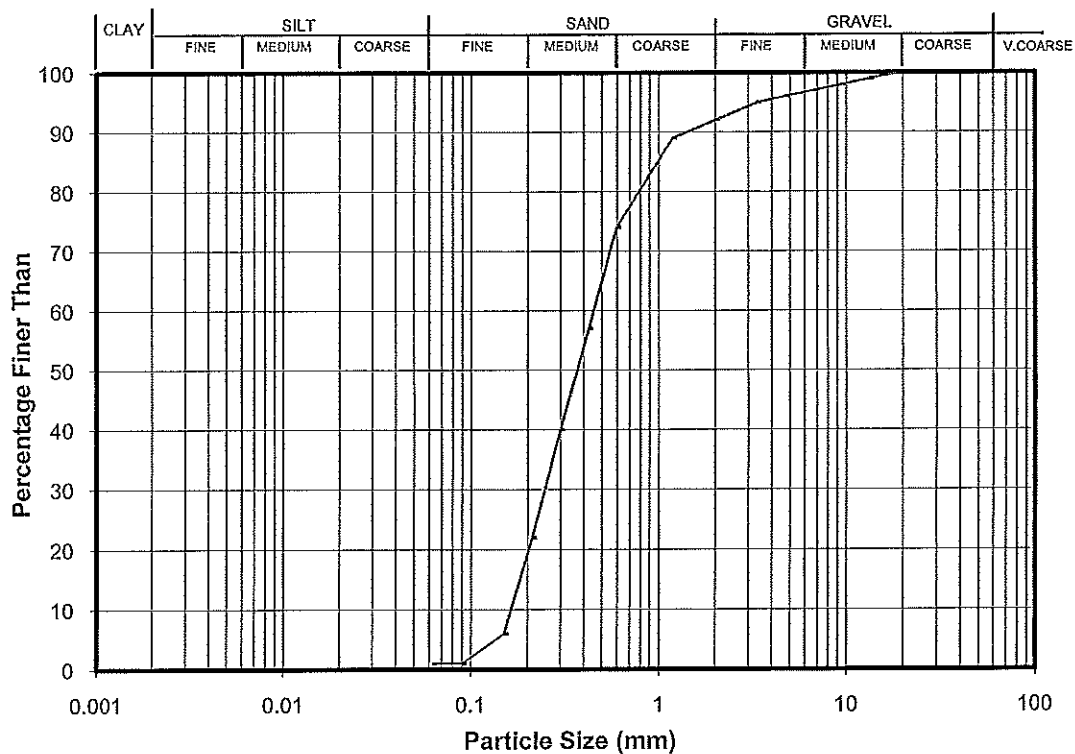
Form Date: JANUARY 2004

File: P:\614964.000\Working Material\Sample5\_Wet Sieve.xls

Plate No.: \_\_\_\_\_ Page of \_\_\_\_\_  
 Site : **AM Broadcasting, Funafuti, Tuvalu**  
 Site Location: **Site B** Test Location: **3** Sample No.: **5**  
 Test Method Used : NZS 4402 : 1986 Test 2.8.1 Wet Sieve

Your Job No.: **750677**  
 Our Job No.: **614964.000**  
 Depth: **2m Below GL**

**PARTICLE SIZE ANALYSIS**



Sieve (mm)	Total % Passing
37.5	---
26.5	---
19.0	100
13.2	99
9.50	98
6.70	97
4.75	96
3.35	95
2.00	92
1.18	89

Sieve (mm)	Total % Passing
0.600	74
0.425	57
0.300	40
0.212	22
0.150	6
0.090	1
0.063	1

Sample history : As received.

Description : Coral SAND with minor gravel and trace silt, loose, light grey/light yellow/orange with white.

Remarks: Percentage passing the finest sieve was obtained by difference.  
 Sample description is not IANZ endorsed.

Entered by : **ST**

Date : **25/3/09**

Checked by : **SA**

Date : **25/3/09**

## **APPENDIX 9**

### **OTHER RELEVANT DATA**

## 9. Other Relevant Data

Survey Title: Preparatory Survey on the Project for Improvement of Medium-Wave Radio Broadcasting and Disaster Prevention in Tuvalu

No	Title	Type (Printed Document, Video, Map, Photo, etc.)	Original/Copy	Published by	Year of Publication
1	TE KAKEEGA II (National Strategy for Sustainable Development 2005-2015)	Printed Document	Copy	Ministry of Finance, Economic Planning and Industries, Tuvalu Government	2005
2	Household Income and Expenditure Survey – 2004/2005	Printed Document	Copy	Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu	2006
3	Tuvalu Government National Budget 2009	Printed Document	Copy	Ministry of Finance, Economic Planning and Industries, Tuvalu Government	2008
4	Tuvalu Government National Budget 2009: Program Description	Printed Document	Copy	Ministry of Finance, Economic Planning and Industries, Tuvalu Government	2008
5	Tuvalu Millennium Development Goals Report 2006	Printed Document	Copy	United Nations Development Programme	2007
6	TMD FM Radio Program	Printed Document	Copy	Tuvalu Media Department	2009
7	Biannual Statistical Report	Printed Document	Copy	Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu	2008
8	2005 Statistical Report	Printed Document	Copy	Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu	2006