Project: Port Moresby Sewerage System Upgrading
Location: Kila Police Rep # 7 - Port Moresby, NCD
Client: BDA

Job: NGTS01011
Date: March 2010

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System	**Location: Kila Police Rep**, Port Moresby - NCD

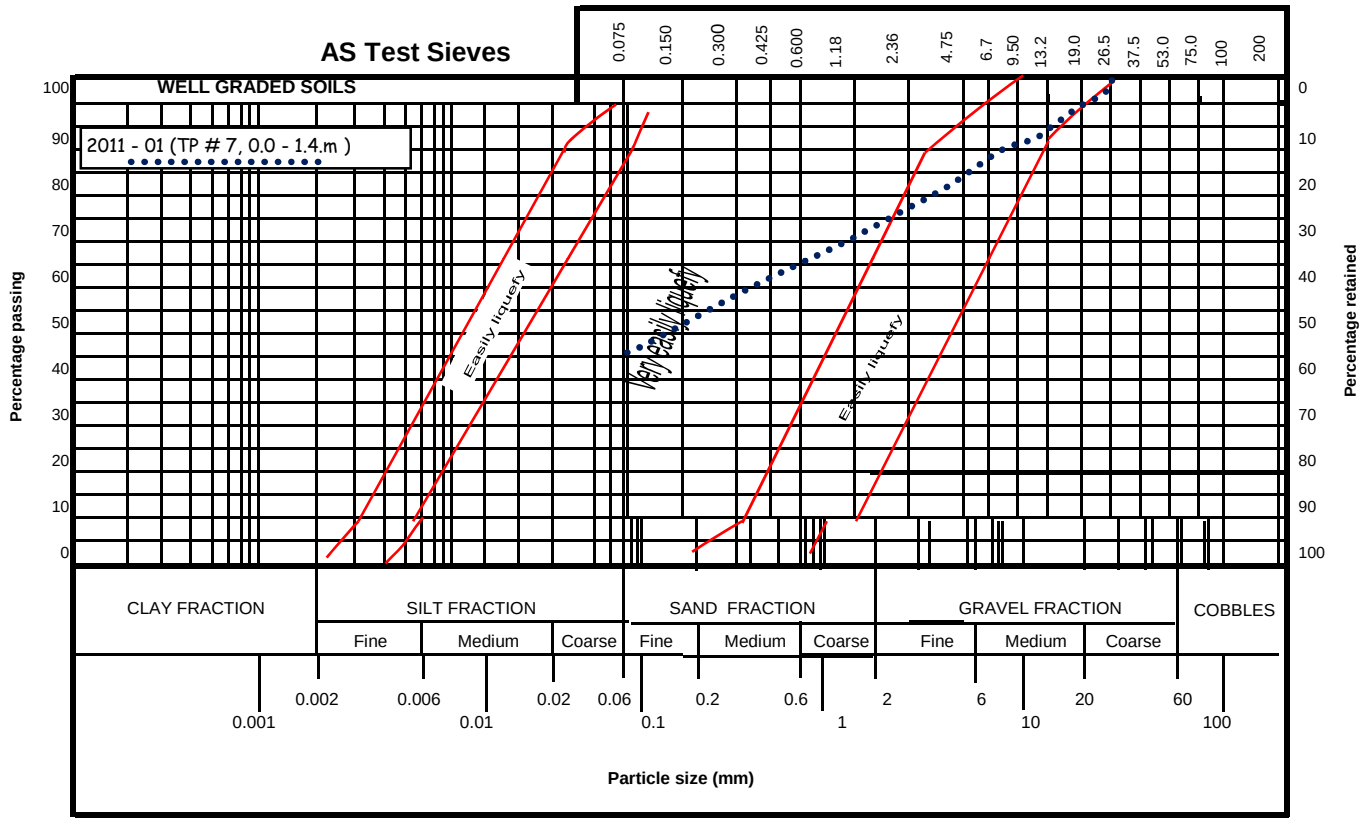


Figure 16 - GRADING CURVE FOR SAMPLES FROM TEST PIT # 7

Project: Port Moresby Sewerage System Upgrading

Location: Konebada New Pump Station # 8 - Port Moresby **Job No:** NGTS01011

Client: njs - JICA **Date:** April, 2011

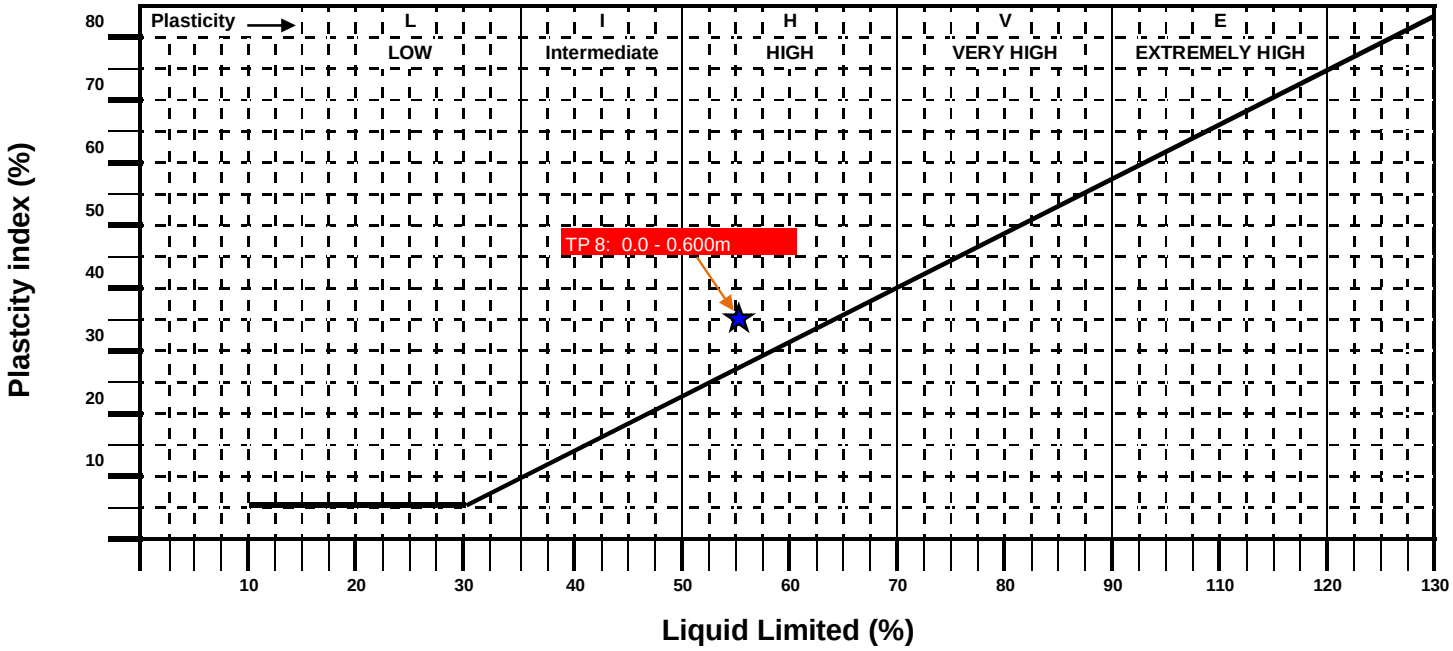


Figure 17. CASAGRANDE PLOT FOR SUBSOIL MATERIAL FROM TEST PIT # 8

Project: Port Moresby Sewerage System Upgrading
Location: Konebad # 8 - Port Moresby, NCD
Client: njs - JICA

Job: NGTS001011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby sewerage System upgrading	**Location:** Konebada # 8, Port Moresby - NCD

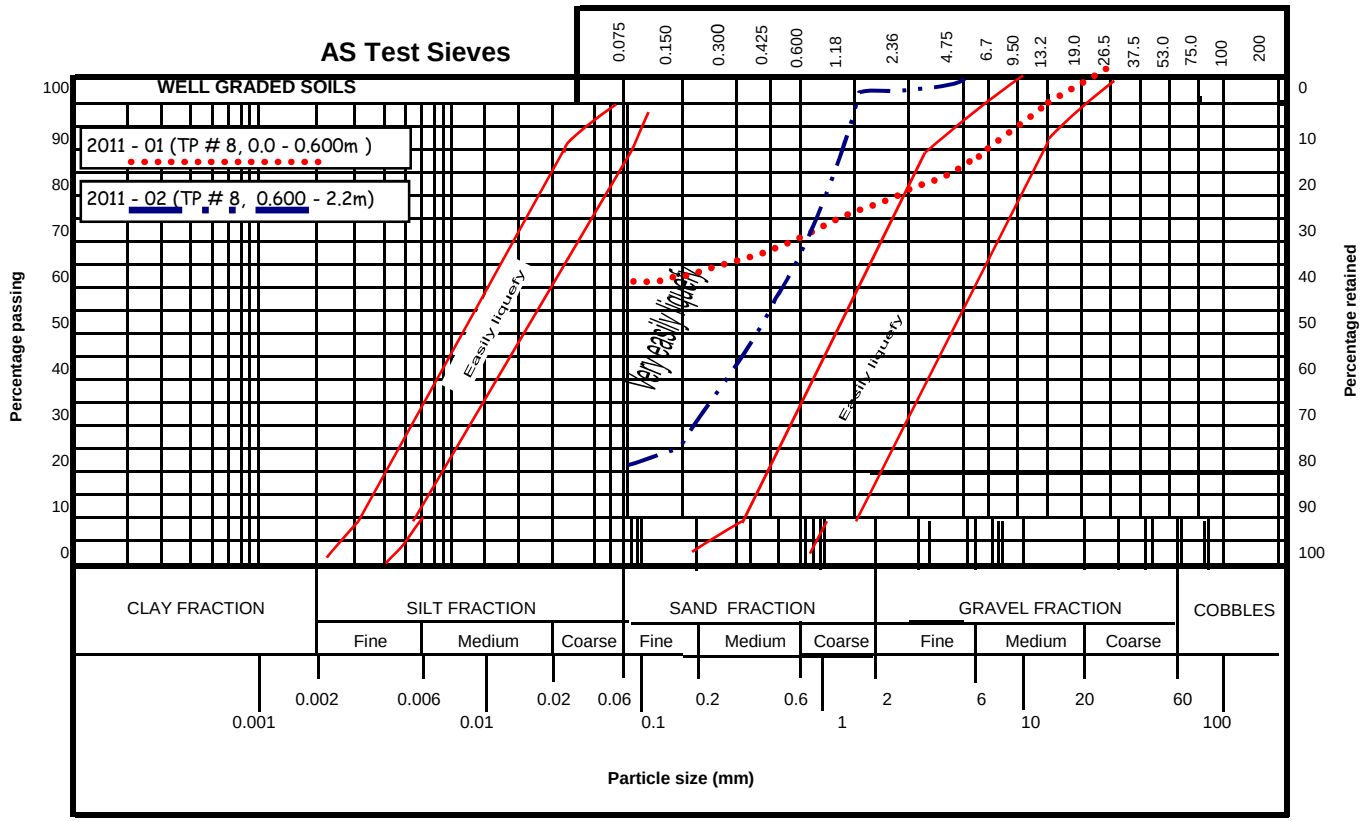


Figure 18 - GRADING CURVE FOR SAMPLES FROM TEST PIT # 8

Project: Port Moresby Sewerage System Upgrading

Location: Gabutu New Pump Station # 9 - Port Moresby **Job No:** NGTS01011

Client: njs - JICA **Date:** April, 2011

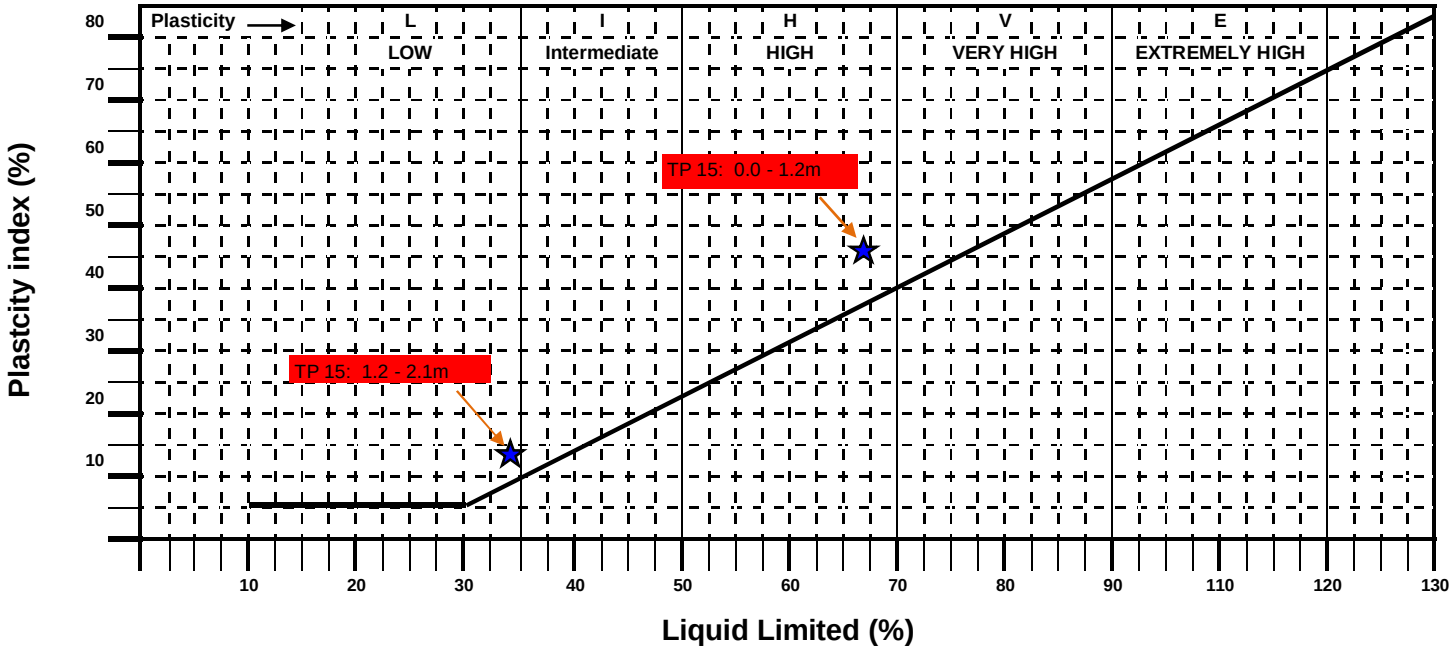


Figure 19. CASAGRANDE PLOT FOR SUBSOIL MATERIAL FROM TEST PIT # 9

Moresby Sewerage System Upgrading
butu # 15 - Port Moresby, NCD
ICA

Job: NGTS01011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System Upgrading	**Location:** Gabutu # 15, Port Moresby - NCD

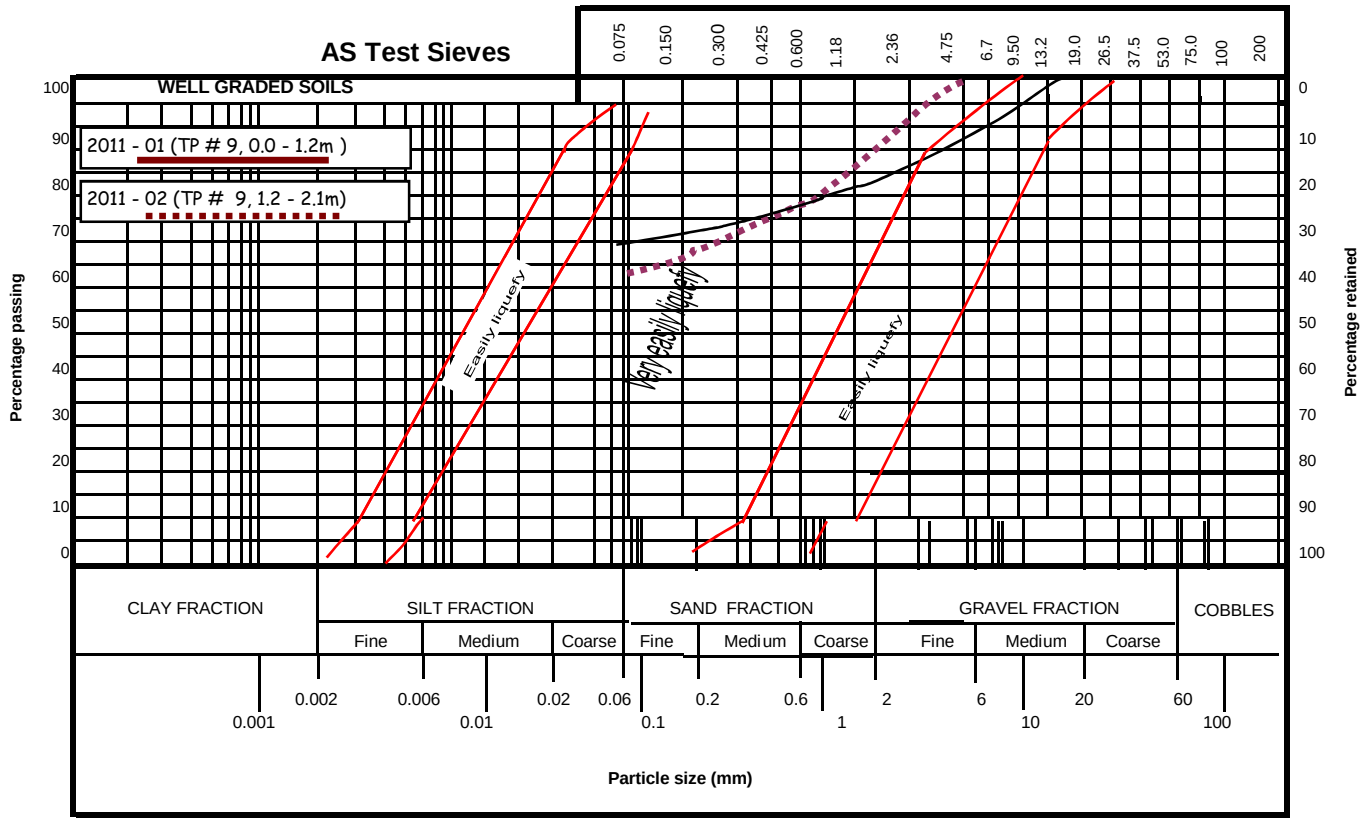


Figure 6 - GRADING CURVE FOR SAMPLES FROM TEST PITS

Project: Port Moresby Sewerage System Upgrading

Location: KilaKila New Pump Station # 10 - Port Moresby **Job No:** NGTS01011

Client: njs - JICA **Date:** April, 2011

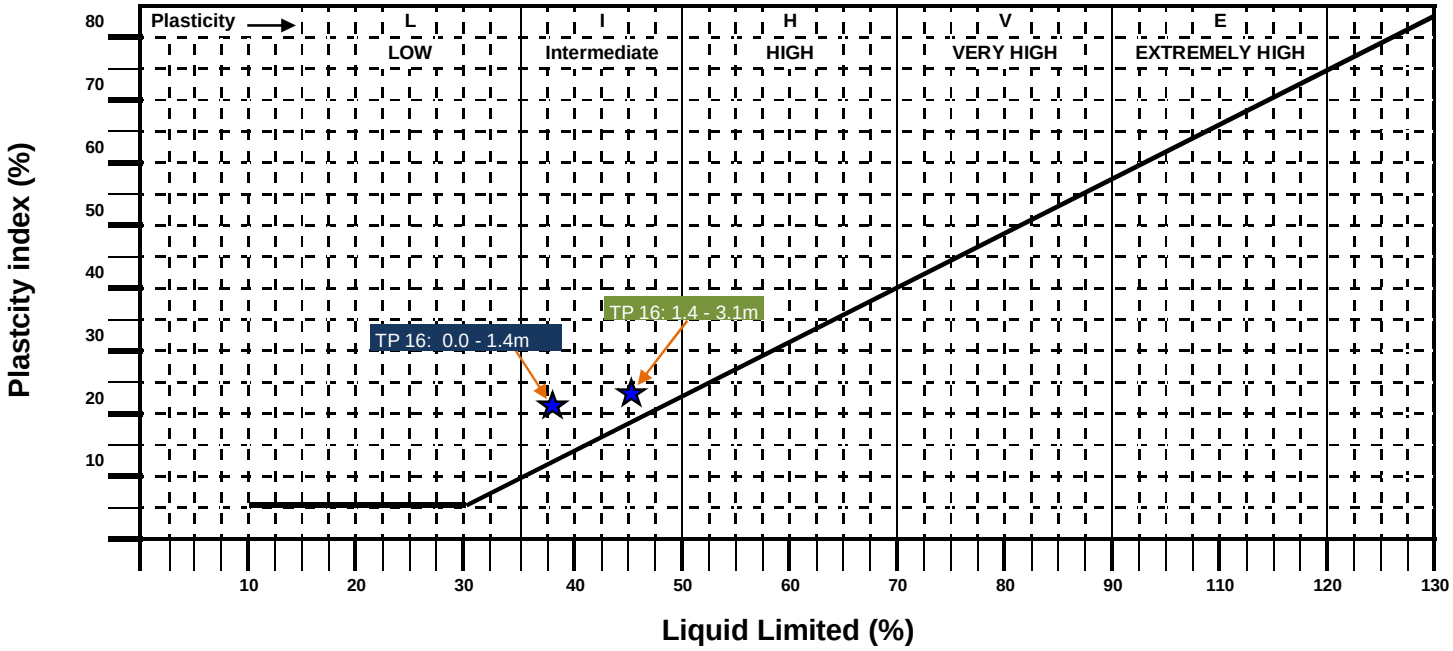


Figure 21. CASAGRANDE PLOT FOR SUBSOIL MATERIAL FROM TEST PIT # 10

Project: Port Moresby Sewerage System Upgrading
Location: KilaKila # 10 - Port Moresby, NCD
Client: njs - njs - JICA

Job: NGTS01011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System Upgrading	**Location:** KilaKila # 10, Port Moresby - NCD

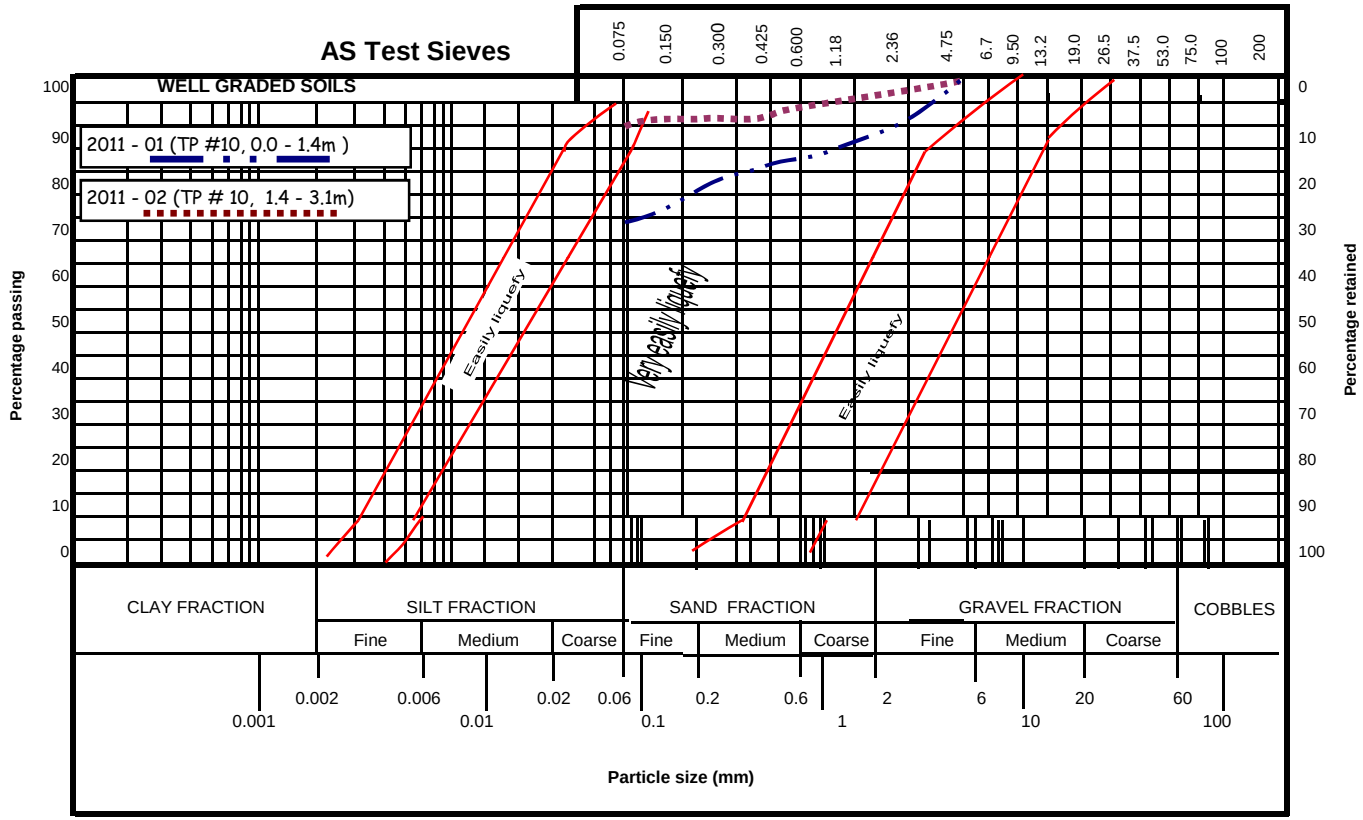


Figure 22 - GRADING CURVE FOR SAMPLES FROM TEST PIT # 10

Project: Port Moresby Sewerage System Upgrading

Location: KilaKila STP - Port Moresby, NCD **Job No:** NGTS01011

Client: njs - JICA **Date:** March, 2011

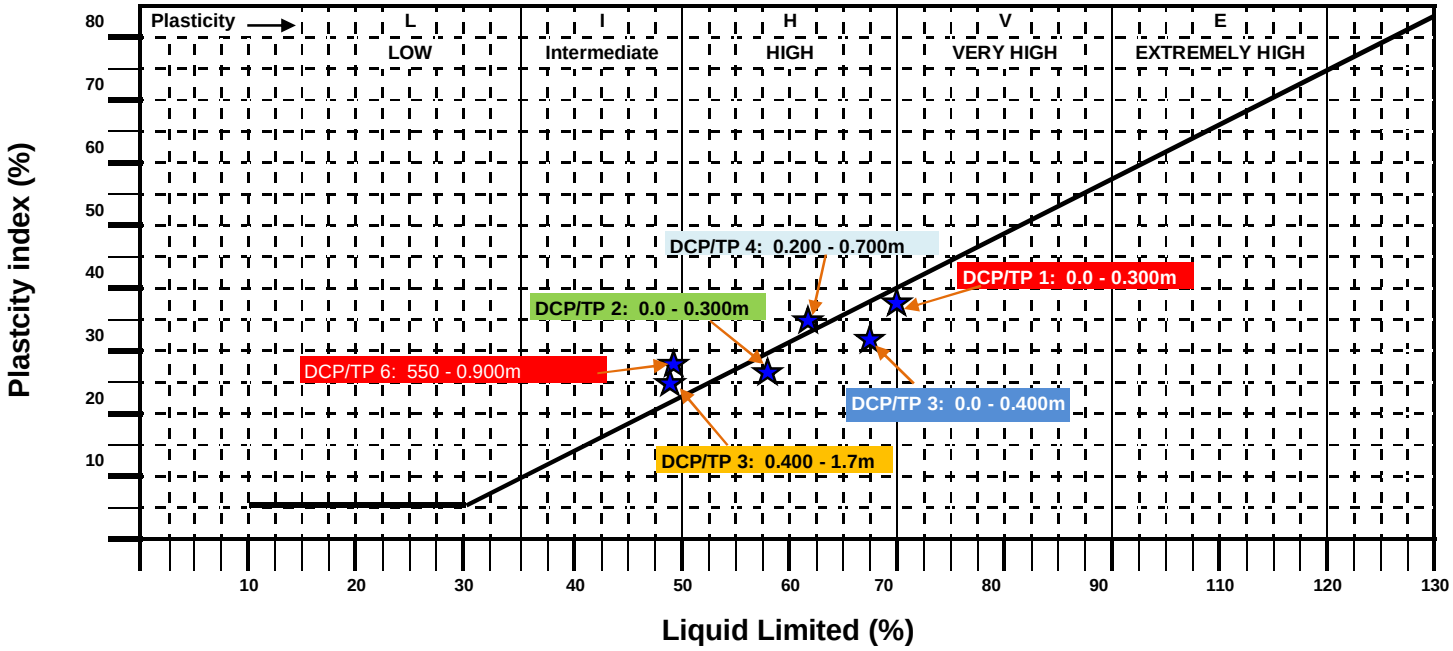


Figure 23. CASAGRANDE PLOT FOR SUBSOIL MATERIAL FROM TEST PIT AT KILAKILA

Project: Port Moresby Sewerage System Upgrading
Location: KilaKila - Port Moresby, NCD
Client: njs - JICA

Job: NGTS01011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System Upgrading	**Location:** KilaKila, Port Moresby - NCD

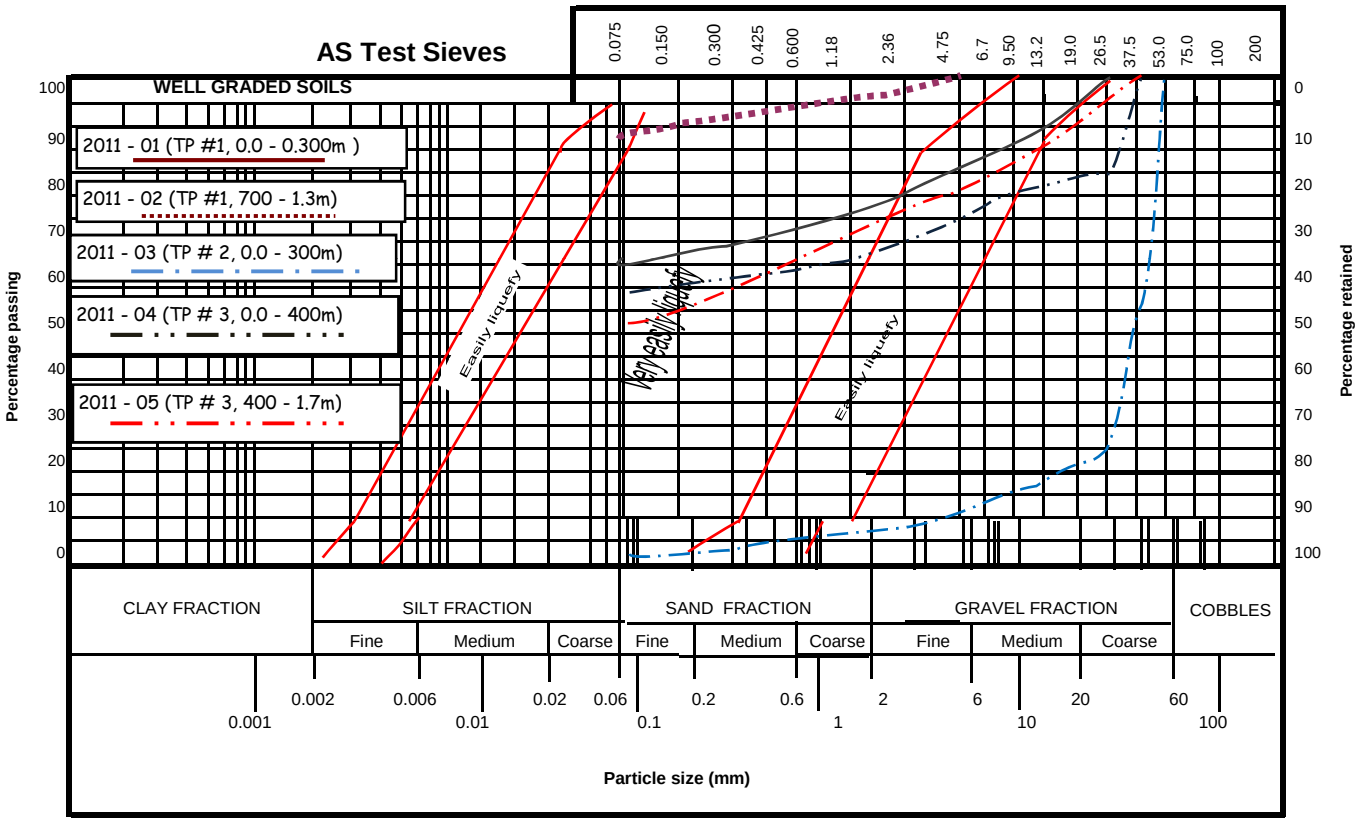


Figure 24 - GRADING CURVE FOR SAMPLES FROM TEST PIT AT KILAKILA

Project: Port Moresby Sewerage System Upgrading
Location: KilaKila - Port Moresby, NCD
Client: njs - JICA

Job: NGTS01011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System Upgrading	**Location:** KilaKila, Port Moresby - NCD

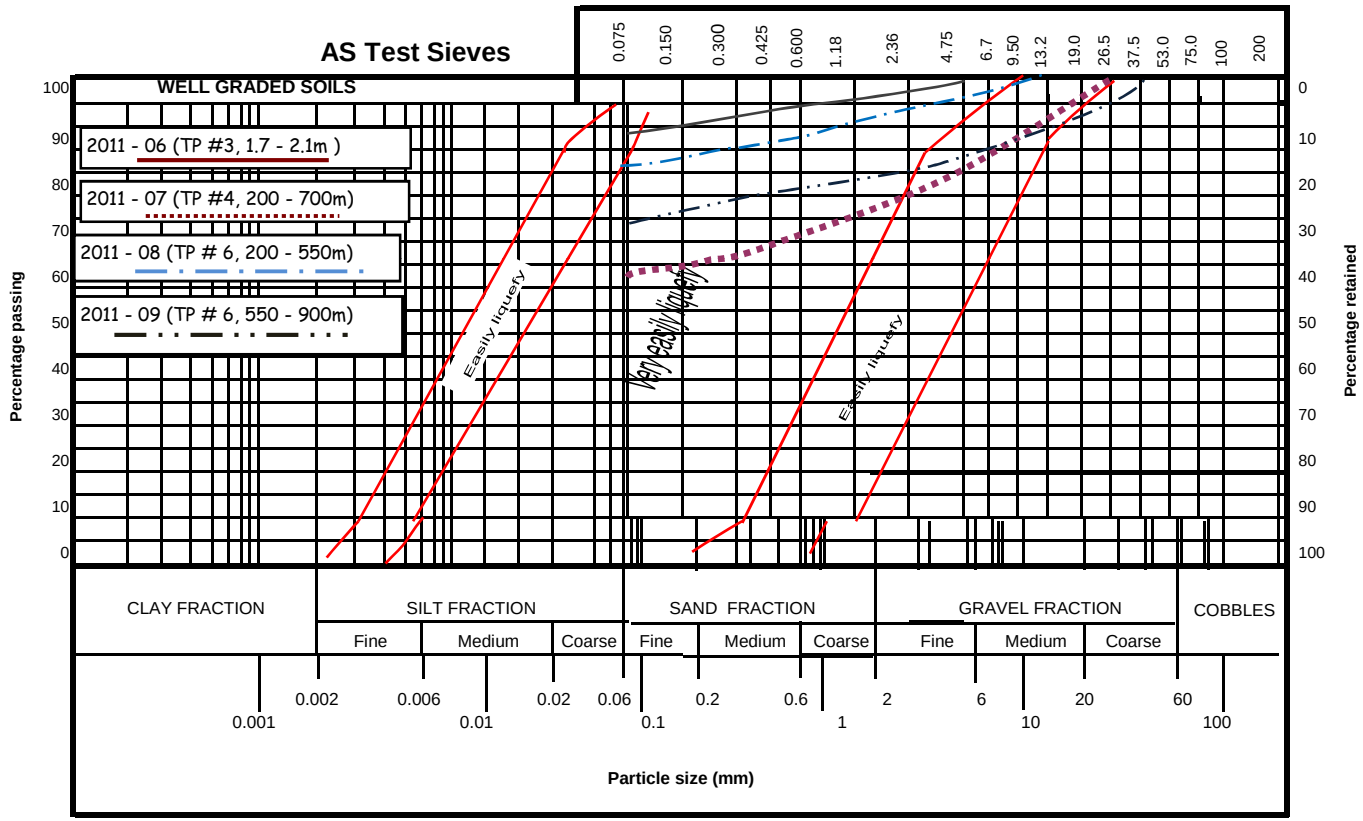


Figure 24a- GRADING CURVE FOR SAMPLES FROM TEST PIT AT KILAKILA

Project: Port Moresby Sewerage System Upgrading

Location: Morata - Port Moresby, NCD **Job No:** NGTS01011

Client: njs - JICA **Date:** March, 2011

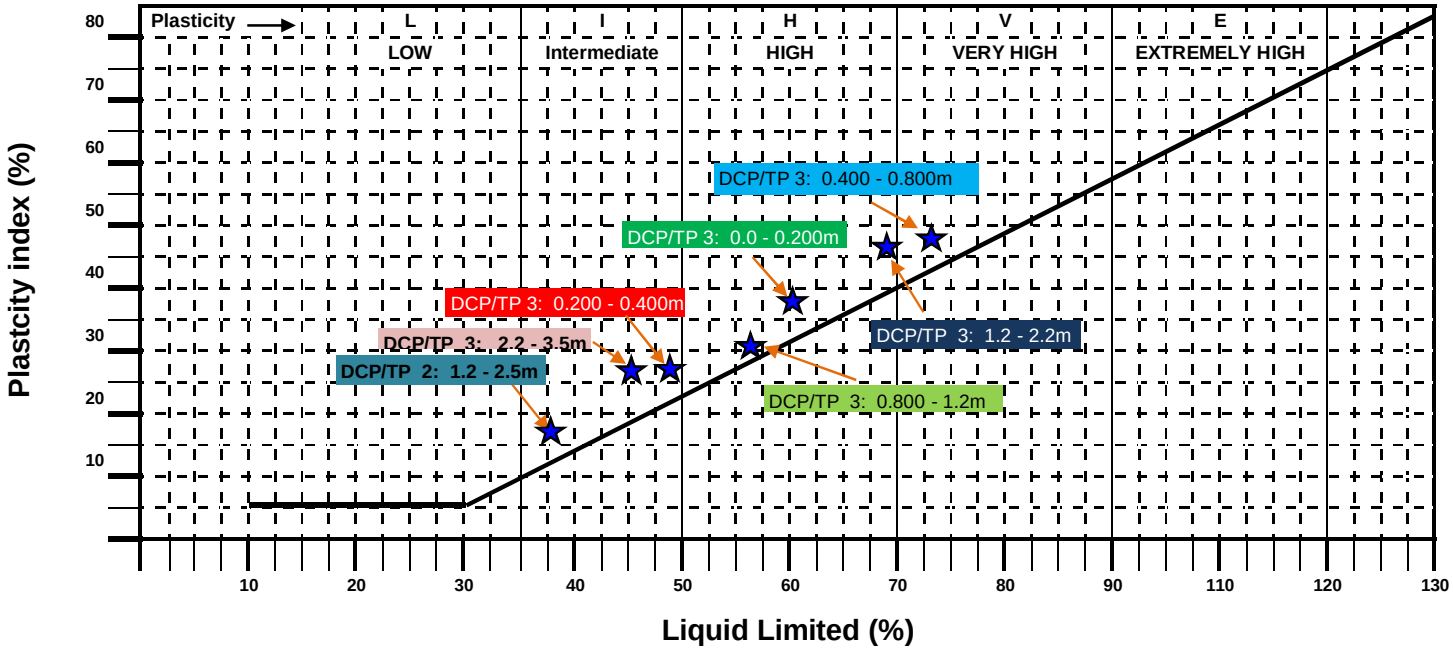


Figure 25. CASAGRANDE PLOT FOR SUBSOIL MATERIAL FROM TEST PIT AT MORATA

Project: Port Moresby Sewerage System Upgrading
Location: Morata - Port Moresby, NCD
Client: njs - JICA

Job: NGTS01011
Date: March 2011

PARTICLE SIZE DISTRIBUTION & LIQUEFACTION POTENTIAL

Client: njs - JICA	**Project number:** NGTS01011
Project: Port Moresby Sewerage System Upgrading	**Location:** Morata, Port Moresby - NCD

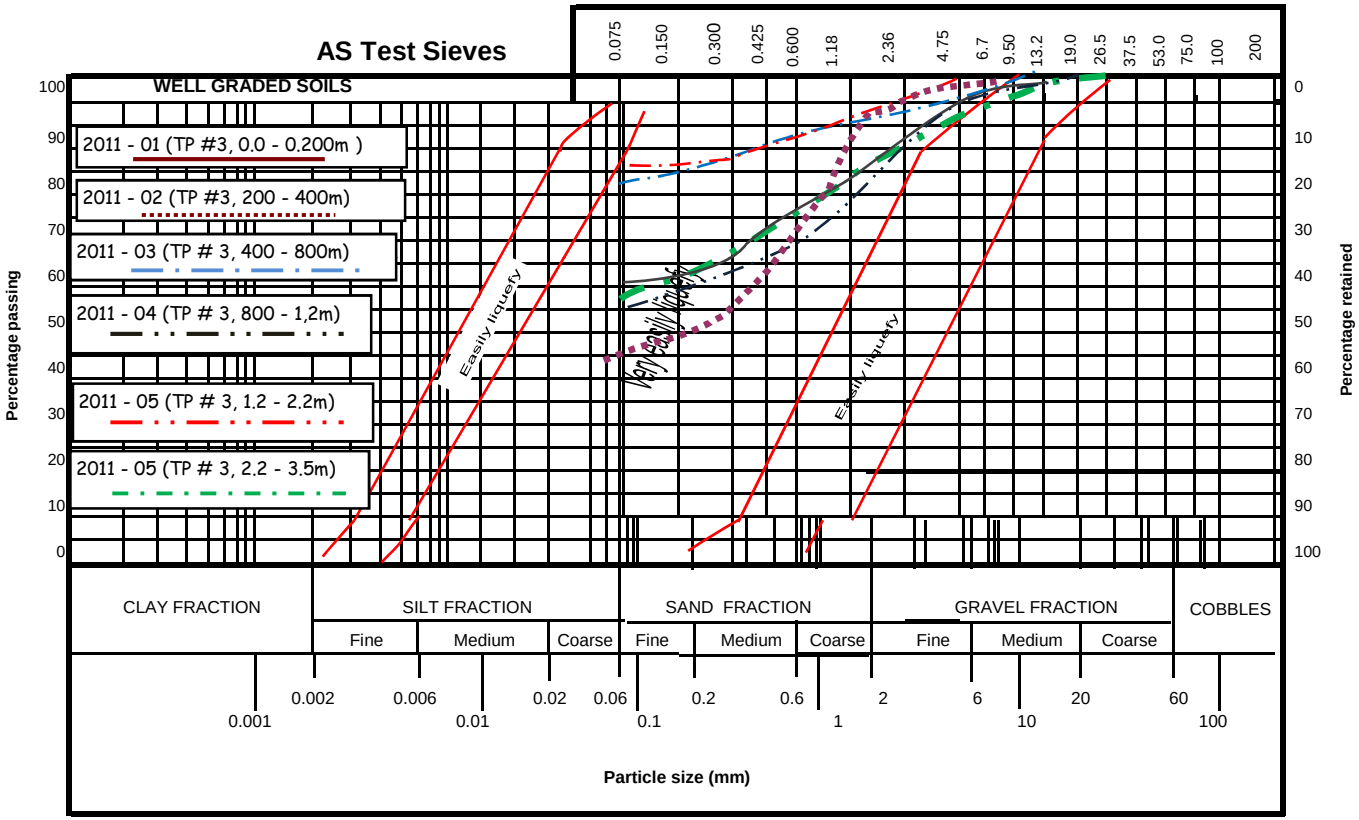


Figure 26 - GRADING CURVE FOR SAMPLES FROM TEST PIT AT MORATA

SOIL AND ROCK DESCRIPTION SHEET 1

GENERAL

Soil and rock descriptions are generally in accordance with the recommendations of Australian Standard 1726 - 1981 and cover the following properties:

SOIL
- Colour
- Plasticity
- Grain Size
- Minor Components
- Moisture
- Consistency
- Origin & Structure
- Other Relevant Information

ROCK
- Colour
- Grain Size
- Structure
- Minor Components
- Weathering
- Strength
- Discontinuities

Field tests have been used extensively to assess soil consistency, rock strength and grain size. Unless specifically stated otherwise these assessments have been transferred directly to the record sheets and not modified to coincide with laboratory test results. Field descriptions may therefore be used as an independent estimate of material properties which can be correlated with other data.
Descriptive terms used on the record sheets are explained on the succeeding pages.

TERMS COMMON TO SOIL AND ROCK:

STRUCTURE

BEDDING	SPACING (mm)	JOINTING	BLOCKINESS	BLOCK SHAPE
Very thickly bedded	>2000	Very widely jointed		
Thickly bedded	600 - 2000	Widely jointed		
Medium bedded	200 - 600	Medium jointed		
Thinly bedded	60 - 200	Closely jointed	Blocky	Bulky
Very thinly bedded	20 - 60	Very closely jointed	Cloddy	(equally developed along three axes)
Laminated	6 - 20	Extremely closely jointed	Nutty	
Thinly Laminated	<6	Intensely jointed		
	Dimension stated		Prismatic	Elongated
	Generally <10		Shattered	Lenticular platey or wedge-shaped

COLOUR

Individual assessment of colour has been used and no reference made to standard colour charts unless specifically stated.

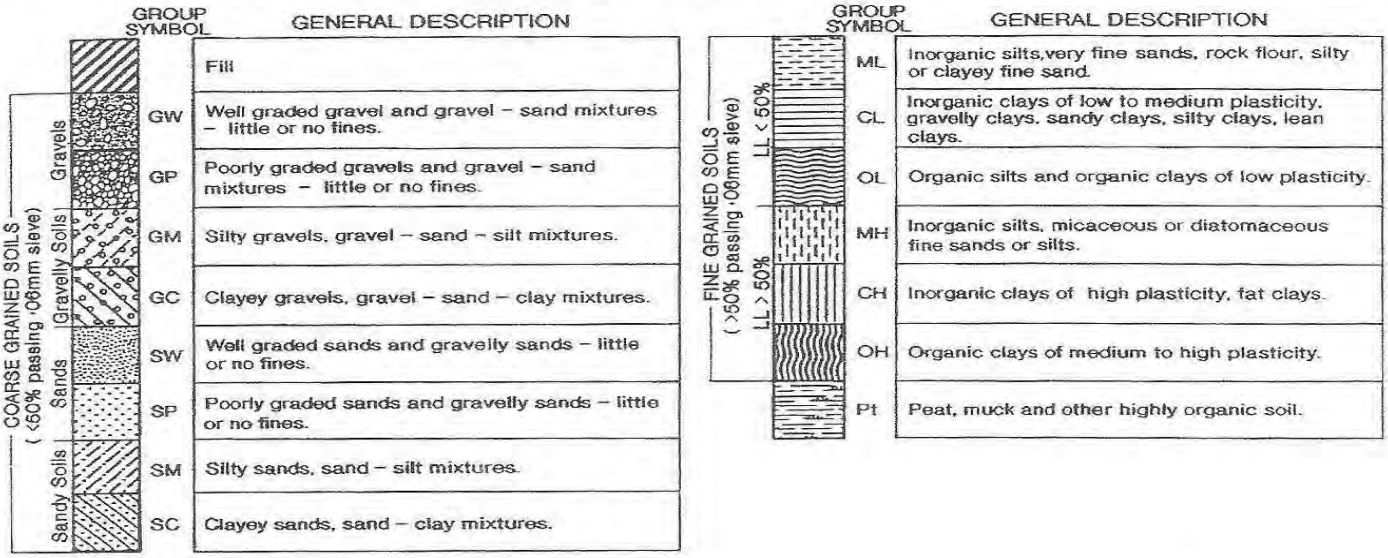
PROPORTIONS OF MINOR COMPONENTS

a trace	up to 10 percent
a little	10 to 25 percent
some	25 to 40 percent
and	about 50 percent

APPENDIX 1A

EXPLANATORY NOTES SHEET 2

TYPICAL REPRESENTATION AND TERMS USED FOR SOILS



GROUP SYMBOL	GENERAL DESCRIPTION
	Fill
GW	Well graded gravel and gravel – sand mixtures – little or no fines.
GP	Poorly graded gravels and gravel – sand mixtures – little or no fines.
GM	Silty gravels, gravel – sand – silt mixtures.
GC	Clayey gravels, gravel – sand – clay mixtures.
SW	Well graded sands and gravelly sands – little or no fines.
SP	Poorly graded sands and gravelly sands – little or no fines.
SM	Silty sands, sand – silt mixtures.
SC	Clayey sands, sand – clay mixtures.

GROUP SYMBOL	GENERAL DESCRIPTION
ML	Inorganic silts,very fine sands, rock flour, silty or clayey fine sand.
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL	Organic silts and organic clays of low plasticity.
MH	Inorganic silts, micaceous or diatomaceous fine sands or silts.
CH	Inorganic clays of high plasticity, fat clays.
OH	Organic clays of medium to high plasticity.
Pt	Peat, muck and other highly organic soil.

CONSISTENCY NON – COHESIVE SOILS

FIELD TEST	Easily excavated with a spade	Some resistance to a spade or penetration with a hand bar	Considerable resistance to spade or penetration with a hand bar	No penetration with a hand bar; requires pick for excavation	High resistance to a pick
SPT 'N' VALUE (blows/300mm)	0 – 4	4 – 10	10 – 30	30 – 50	
DESIGNATION	Very loose (VL)	Loose (L)	Medium Dense (MD)	Dense (D)	Very Dense (VD)
RELATIVE DENSITY %	0 – 15	15 – 35	35 – 65	65 – 85	85 – 100

CONSISTENCY COHESIVE SOILS

FIELD TEST	Penetrated by or exudes between fingers when squeezed	Easily penetrated by thumb or moulded with fingers	Penetrated by thumb with effort, moulded only by strong pressure of fingers	Indented by thumb cannot be moulded by fingers	Penetrated by thumb nail and to about 15mm with knife
DESIGNATION	Very Soft (VS)	Soft (S)	Firm (F)	Stiff (ST)	Very Stiff (VST) / Hard (H)
UNDRAINED SHEAR STRENGTH (Cu) kPa	12	25	50	100	200

GRAIN SIZE

FIELD TEST	i Not visible with x10 lens ii Does not dilate on shaking iii Adheres to fingers when dry	i Particles >10µm visible with x10 lens ii Dilates on shaking iii Does not adhere to fingers when dry iv Feels gritty on teeth	i Particles >60µm visible to naked eye ii Fine sand feels gritty in fingers	Visual identification						
DESIGNATION	CLAY	SILT	SAND			GRAVEL			COBBLES	BOULDERS
			Fine (f)	Medium (m)	Coarse (c)	Fine (f)	Medium (m)	Coarse (c)		
GRAIN SIZE	2 – 60	60 – 200	200 – 600			2 – 6	6 – 20	20 – 60	60 – 200	
	Microns					Millimetres				

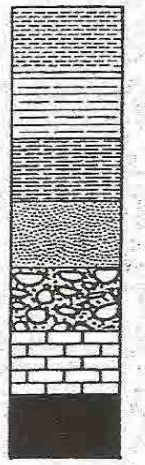
APPENDIX A1

EXPLANATORY NOTES

SHEET 3

TYPICAL REPRESENTATION AND TERMS USED FOR ROCK

SEDIMENTARY

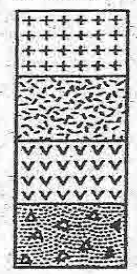


Mudstone
Shale
Siltstone
Sandstone
Conglomerate
Limestone
Coal

METAMORPHIC

Low grade: slate, phyllite, schist etc.
High grade: quartzite, gneiss, marble etc.

IGNEOUS



Plutonic (generally coarse grained): granite, gabbo etc.
Hypabyssal (generally medium grained): micro – granite, dolerite etc.
Volcanic (generally fine grained): rhyolite, andesite, basalt etc.
Pyroclastic: pumice, tuff etc.

WEATHERING BASED ON VISUAL IDENTIFICATION

FIELD APPERANCE	Shows chemical and physical alteration to fabric caused by temperature, pressure or injection of other material	Has soil properties and often shows complete change in appearance. Rock fabric not visible	Shows considerable change in appearance and loss in strength. Material is still rock but normally very low strength	Visible change in appearance and significant loss in strength	Visible change in appearance but no significant loss in strength	No weathering effects visible to naked eye
DESIGNATION	Altered (A)	Completely weathered (CW)	Highly weathered (HW)	Moderately weathered (MW)	Slightly weathered (SW)	Fresh (F)

STRENGTH BASED ON POINT LOAD STRENGTH INDEX, CORRECTED TO 50mm DIAMETER

FIELD TEST	Indented by thumb nail with difficulty	Scratched by thumb nail	Easily broken by hand or pared with knife	Broken by hand or scraped with knife	Broken in hand with firm hammer blows. Cannot be scraped with a knife	Broken against soild object with single hammer blow	Difficult to break against solid object with several hammer blows
POINT LOAD STRENGTH INDEX Is(50) MPa	0.03	0.1	0.3	1	3	10	
DESIGNATION	Extremely low (EL)	Very low (VL)	Low (L)	Medium (M)	High (H)	Very high (VH)	Extremely high (EH)
UNCONFINED COMPRESSIVE STRENGTH (qu) MPa	The unconfined compressive strength is typically about 20 x Is(50). The ratio may vary widely for different rock types.						

STRUCTURE & DISCONTINUITY SPACING BASED ON VISUAL IDENTIFICATION

STRUCTURE DESIGNATION	Thinly laminated	Laminated	Very thinly bedded	Thinly bedded	Medium bedded	Thickly bedded	Very thickly bedded
SPACING mm	6	20	60	200	600	2000	
DISCONTINUITY DESIGNATION	Intense	Extremely close	Very close	Close	Medium	Wide	Very wide

APPENDIX A1

EXPLANATORY NOTES

SHEET 4

SYMBOLS & ABBREVIATIONS

DRILLING METHOD

AD	Auger drilling [drilled to depths shown (m)]
V bit	Steel 'V' bit
TC	Tungsten carbide bit
RR	Tricone (rock roller) bit
W	Washboring
NMLC,BMLC	Triple tube rotary core drilling (52 mm, 35 mm dia.)
NQ,HQ	Wireline core drilling
D	Diatube coring

SUPPORT

W	Water
M	Mud
C	Casing
T	Timbering
U	Unsupported

SAMPLE & FIELD TESTING

D	Disturbed sample
U(x)	Undisturbed sample x mm diameter
U(x)+	U(x) attempted, little or no recovery
PT	Pressuremeter test
PL	Point load test (● axial, o diametral test)
Is(50)	Point load strength index (MPa)
qc	Cone resistance (from CPT)
qp,PP	Unconfined compressive strength estimated from pocket penetrometer (kPa)
RQD	Rock quality designation expressed as: $\frac{\text{sum of lengths of sound core pieces} > 100\text{ mm}}{\text{total length of core section considered}}$
D/DD	Dip/dip direction of rock discontinuity (degrees)
CPT	Cone penetration test
SPT	Standard penetration test
N	SPT blow count (blows/300 mm)
R	SPT refusal
V	In situ vane test [showing peak/residual value (kPa)]
W	Water sample
B	Bulk sample

WATER – MOISTURE

W	Wet
M	Moist
D	Dry
S	Standpipe installed to depth shown
P	Piezometer installed at depth shown
→▽	Inflow / Level (date)
←▽	Outflow (loss) / Partial loss

SOIL PROPERTIES

CBR	California Bearing Ratio
Cc	Compression index
Cu	Undrained shear strength
Cv	Coefficient of consolidation
Cα	Coefficient of secondary compression
c'	Effective shear strength
DD	Dry density
Dr	Dry density expressed as a percentage of MDD
E	Elastic modulus
e	Void ratio
G	Shear modulus
Gs	Specific gravity
k	Permeability
MDD	Maximum dry density obtained in compaction test
mv	Coefficient of volume compressibility
NDD	Natural dry density
NMC	Natural moisture content
OMC	Optimum moisture content obtained in compaction test
LI	Liquidity index
LL	Liquid limit
LS	Linear shrinkage
PI	Plasticity index
PL	Plastic limit
qu,UCS	Unconfined compressive strength
w	Moisture content
γb	Bulk density
γd	Dry density
γw	Density of water
ν	Poisson's ratio
ϕu	Apparent angle of friction from quick undrained triaxial test
$\phi u, \phi u'$	Effective angles of friction in drained and undrained conditions

DESIGN PARAMETERS

Ab	Footing or pile base area
B	Footing or pile width or diameter
D	Footing or pile depth
d	Diameter of pile (m)
K	Coefficient of earth pressure
Ka	Coefficient of active pressure
Ko	Coefficient of earth pressure at rest
Kp	Coefficient of passive pressure
L	Footing length
Nc,Nq,Nγ	Bearing capacity factors
NSF	Negative skin friction
P	Load
Pa	Total active force
Pb	Pile base load
Pp	Total passive force
Ps	Pile shaft load
pa	Active earth pressure
pb	Pile base pressure
pp	Passive earth pressure
ps	Pile shaft adhesion
S	Settlement
Tv	Dimensionless time factor
t	Time
U	Degree of consolidation
u	Pore water pressure
α	Shaft adhesion factor
δ	Angle of friction between soil and structure
σ	Total normal stress
σ'	Effective normal stress
τ	Shear stress

Subscript	all	allowable or working
Subscript	h	horizontal
Subscript	r	residual
Subscript	ult	ultimate
Subscript	v	vertical

APPENDIX A

NIAWANG GEOTECH LIMITED
Suite # 6, NCD LikLik Bisnis Centre. Portion 2401.
Stores Road. 4 Mile
PO Box 6298, BOROKO. NCD
Fax/Tel: (675) 323 1836
Mobile: 76986593 / 73277732 or 72101529
Email: niawanggeotech@daltron.com.pg

Job No: NGTS/0111

Borehole and Test Pit No: 1

Sheet No: 1 of 1

Equipment : Backhoe, Drill Rig, DCP & Hand Auger

Location: KANUDI
PS : 1

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 1.057

Coordinates
GPS 109221.660 N
103717.567 E

Program Duration
Commence : 01/04/11
Completed: 01/04/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil mixture of root fibres and peat			0.1, 0.2, 0.3	0.3					
Sandy Silty GRAVEL soft to Medium dense, fairly graded coarse grained, low plasticity, grey.			0.4, **0-5**, 0.6, 0.7, 0.8, 0.9, **1.0**, 1.1, 1.2, 1.3, 1.4, **1.5**, 1.6, 1.7, 1.8, 1.9, **2.0**, 2.1, 2.2, 2.3, 2.4, **2.5**, 2.6, 2.7, 2.8, 2.9, **3.0**, 3.1, 3.2, 3.3, 3.4, **3.5**, 3.6, 3.7, 3.8, 3.9, **4.0**, 4.1, 4.2, 4.3, 4.4, **4.5**	GWT 0.5	DCP	0.5	2/4/3 N = 7	172	0.0 – 0.5m depth Loose/Firm
----As above but non plasticity……					DCP	1.0	4/4/4 N = 8	190	0.5 – 1.0m depth Loose/Firm
					DCP	1.5	4/3/5 N = 8	190	1.0 - 1.5m depth Loose/Firm
					DCP	2.0	4/3/4 N = 7	172	1.5 – 2.0m depth Loose/Firm
					DCP	2.5	4/5/4 N = 9	207	2.0 – 2.5m depth Loose to medium dense
					DCP	3.0	5/5/5 N = 10	223	2.5 – 3.0m depth Loose to medium dense
					DCP	3.5	7/9/8 N = 16	316	3.0 – 3.5m depth Medium dense 3.5 – 4.0m depth Medium dense
					DCP	4.0	9/12/12 N = 24	425	4.0 – 4.5m depth medium dense to dense
					DCP	4.5	15/17/20 N = 37	574	
Terminated at 4.5m depth			**4.6**, **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks: Further investigation will continue with drilling after the land issue with land owners is settled by EDA RANU.

Logged by: WKG
Checked by: ME
Drafted by :
Scale:

NIAWANG GEOTECH LIMITED
Suite # 6, NCD LikLik Bisnis Centre. Portion 2401.
Stores Road. 4 Mile
PO Box 6298, BOROKO. NCD
Fax/Tel: (675) 323 1836
Mobile: 76986593 / 73277732 or 72101529
Email: niawanggeotech@daltron.com.pg

Job No: NGTS/0111

Borehole No: DCP/TP 2

Sheet No: 1 of 1

Equipment : Backhoe, Drill Rig, DCP & Hand Auger

Location: IDUBADA
PS : 2

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 1.325

Coordinates
GPS 108465.480 N
104182.277 E

Program Duration
Commence : 01/04/11
Completed01/04/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
FILL: Red ridge gravelly CLAY, medium plasticity, red ridge Sandy Gravelly CLAY (FILL) 00 – 800mm thick			0.1, 0.2, 0.3, 0.4, **0-5**, 0.6, 0.7		DCP	0.5	2/4/2 N = 6	153	0.0 – 0.5m depth Soft - firm 0.5 – 1.0m depth Soft
Gravelly Sandy CLAY black – grayish, high plasticity, (800 – 2.0m thickness) ▽ water table at 2.0m			0.8, 0.9, **1.0**, 1.1, 1.2, 1.3, 1.4, **1.5**, 1.6, 1.7, 1.8, 1.9, **2.0**		DCP	1.0 1.5 2.0	1/2/2 N = 4 3/4/3 N = 7 2/1/2 N = 3	114 172 92	1.0 - 1.5m depth Soft - firm 1.5 – 2.0m depth Firm 2.0 – 2.5m depth Soft
.....As above but firm to stiff.....			2.1, 2.2, 2.3, 2.4, **2.5**, 2.6, 2.7, 2.8, 2.9, **3.0**, 3.1, 3.2, 3.3, 3.4		DCP	2.5 3.0	2/2/2 N = 6 4/6/9 N = 15	92 301	2.5 – 3.0m depth Firm – stiff 3.0 – 3.m depth Stiff or hard
Terminated at 3.5m depth on bed rock			**3.5**, 3.6, 3.7, 3.8, 3.9, **4.0**, 4.1, 4.2, 4.3, 4.4, **4.5**, **4.6**, **4.7**		DCP	3.5 4.0 4.5	11/13/11 N = 24 14/16/13 N = 29 16/22 N = 38	425 496 584	3.5 – 4.0m depth Stiff or hard 4.0 – 4.5m depth Firm to Stiff or Hard weathered bed rock, very hard to excavate

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity

USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks:
Ground Water Table was encountered at 2.0m and it was high tide during the time of the investigation.

Logged by: WKG
Checked by: PE
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111

Borehole and Test Pit No: 3

Sheet No: 1 of 1

Equipment : Backhoe, DCP & Hand Auger

Location: ELEVALA
PS : 3

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 6.007

GPS Coordinates
104926.283 E
107928.257 N

Program Duration
Commence: 01/04/11
Completed: 01/04/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: Black silty CLAY ≥ PI (0.0 - 400mm thickness)			0.1 0.2 0.3 0.4	0.400			3/8/4		0.0 – 0.5m depth Soft
Light brown, gravelly CLAY ≥ PI (400 - 800mm thickness)			**0-5** 0.6 0.7 0.8	0.800	DCP	0.5	N = 12	255	0.5 – 1.0m depth Soft - Firm
Medium plasticity, dark brown , gravelly CLAY mc ≤ PI (800 – 1.5m thick)			0.9 **1.0** 1.1 1.2 1.3 1.4 **1.5**	1.5	DCP	1.0	7/14/7 N = 21	385	1.0 - 1.5m depth soft
high plasticity, soft to firm, moist, grey mc ≤ PI (1.5 – 2.5m thick)			1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5**		DCP	1.5	6/6/6 N = 12	255	1.5 – 2.0m depth soft
					DCP	2.0	6/6/6 N = 12	255	
					DCP	2.5	7/15/20 N = 35	554	2.0 – 2.5m depth firm
Terminated at 2.5m depth on bed rock			2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
No Ground Water Table Encountered, dry on completion

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111

Borehole and Test Pit No: 4

Sheet No: 1 of 1

Equipment : Backhoe, DCP & Hand Auger

Location: HANUABADA
PS : 4

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 3.269

Coordinates
GPS 106943.456 N
105447.235 E

Program Duration
Commence : 01/04/11
Completed: 01/04/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples / Tests: Sample Depth (m)	Samples / Tests: SPT N' VALUE	Samples / Tests: ABC (kPa)	Field Records
Topsoil: Fill material			0.1, 0.2, 0.3	0.300					
Brown silty CLAY, medium plasticity, mc ≤ PI (300 – 800mm thickness)			0.4, **0-5**, 0.6, 0.7	0.800	DCP	0.5	5/5/6 N = 11	240	0.0 – 0.5m depth Soft
Silty gravel of reddish/brown mixture with Dark Brown, silty clay (800 – 1.3m thickness)			0.8, 0.9, **1.0**, 1.1, 1.2, 1.3	1.3	DCP	1.0	6/7/7 N = 14	286	0.5 – 1.0m depth Soft
Black, CLAY with some fine to medium size grain, medium – high plasticity, mc ≤ PI (1.3 – 3.7m depth)			1.4, **1.5**, 1.6, 1.7, 1.8, 1.9, **2.0**, 2.1, 2.2, 2.3, 2.4, **2.5**, 2.6, 2.7, 2.8, 2.9, **3.0**, 3.1, 3.2, 3.3, 3.4, **3.5**, 3.6, 3.7		DCP	1.5	10/7/9 N = 16	316	1.0 - 1.5m depth Soft - Firm
					DCP	2.0	9/15/5 N = 20	372	1.5 – 2.0m depth Soft - Firm
					DCP	2.5	5/7/7 N = 14	286	2.0 – 2.5m depth Firm - stiff
					DCP	3.0	7/6/4 N = 10	223	2.5 – 3.0m depth Firm
					DCP	3.5	3/3/3 N = 6	190	3.0 – 3.7m depth Firm – stiff or hard
Terminated at 3.7m depth on bed rock			3.8, 3.9, **4.0**, 4.1, 4.2, 4.3, 4.4, **4.5**, **4.6**, **4.7**		DCP	3.7	12/24 N = 36	564	

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
Water was encountered from the runoff from the hills and Eda Ranu sump.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole and Test Pit No: 5

Sheet No: 1 of 1

Equipment : Backhoe, Drill Rig, DCP & Hand Auger

Location: DAVARA , ELA BEACH
PS : 9

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 1.355

Coordinates
GPS 104632.233 N
105304.996 E

Program Duration
Commence : 17/04/11
Completed: 03/05/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Bitumen (20mm thickness)			0.4			0.0 – 1.0			Excavation
Road Base (20 – 250mm thickness)			0.8						
			1.2				2/4/3		1.0 – 2.0m depth
Sub-Base (250 – 500mm thickness)			1.6		DCP	1.5	N = 7	172	Very loose - loose
			2.0						
			2.4				4/4/8		2.0 – 2.5m depth
medium plasticity, red ridge Sandy Gravelly CLAY (FILL) 500 – 800mm thick			2.8		DCP	2.0	N = 12	255	Medium dense
			3.2						
			3.6		DCP	2.7	12/11/15		2.5 – 3.0m depth
			4.0				N = 26	456	Dense
WASHED OUT			4.4						
Drill core was completely washed out. This section is therefore interpreted as being occupied by fine grained beach sand and coral mixture.			4.8						Depth from 3.0 to 10.5m was all wash boring.
			5.2						
			5.6						Bed Rock was at 9.5m depth.
			6.0						
			6.4						
			6.8						
			7.2						
			7.6						
			8.0						
			8.4						
			8.8						
			9.2						
Bed rock			9.6						
			10.0						
			10.4						
Terminated at 10.5m depth			10.8						
			11.2						
			11.6						
			12.0						
			12.4						
			12.8						
			13.2						
			13.6						
			14.0						
			14.4						
			14.8						
			15.2						
			15.6						
			16.0						
			16.4						
			16.8						
			17.2						
			17.6						
			18.0						
			18.4						
			18.6						

.KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks:
No Ground Water Table was encountered on completion

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole and Test Pit No: 6

Sheet No: 1 of 1

Equipment : Backhoe, Drill Rig, DCP & Hand Auger

Location: LAWES ROAD , ELA BEACH
PS : 6

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 2.160

Coordinates
GPS 104799.009 N
105987.285 E

Program Duration
Commence : 17/04/11
Completed: 17/04/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
SILTY SANDY GRAVEL Medium dense, slightly firm, some loose, fairly graded, coarse grained, grey .sand mixture with low plasticity (0.0 – 0.700mm depth)			0.4	0.700					0 – 1.0m all Excavation
			0.8						
			1.2						
			1.6		DCP	1.5	4/12/16		1.0 – 1.50m depth
			2.0	2.0			N = 28	472	Medium dense
SILTY SAND Medium dense, slightly firm, some loose with trace of gravel, brown (0.700 – 2.00m depth)			2.4						
			2.8		DCP	2.0			1.5– 2.0m depth dense
			3.2				16/16/20		
			3.6				N = 36	564	
			4.0						
			4.4						
			4.8						
			5.2						
WASHED OUT Drill core was completely washed out. Grey – milky white beach deposit, some clay and silty gravel with corals. This section is therefore interpreted as being occupied by fine grained beach sand and coral mixture.			5.6						Depth from 2.0 to 10.5m was all wash boring. Bed Rock was at 10.5m depth.
			6.0						
			6.4						
			6.8						
			7.2						
			7.6						
			8.0						
			8.4						
			8.8						
			9.2						
			9.6						
			10.0						
			10.4	10.5					
			10.8						
Bed Rock encountered at 10.5m depth			11.2						
			11.6						
			12.0						
			12.4						
			12.8						
			13.2						
			13.6						
			14.0						
			14.4						
			14.8						
			15.2						
			15.6						
			16.0						
			16.4						
			16.8						
			17.2						
			17.6						
			18.0						
			18.4						
Terminated at 10.85m depth			**18.6**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

ELG Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
No Ground Water Table was encountered on completion

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole and Test Pit No: 7

Sheet No: 1 of 1

Equipment : Backhoe, DCP & Hand Auger

Location: KILA POLICE PS : 7

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 0.533

Coordinates GPS 102934.812 N 108384.989 E

Program Duration — Commence : 23/04/11 — Completed: 23/04/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Gravelly Sandy CLAY High plasticity, soft o firm clay, brown			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0** 1.1 1.2 1.3		DCP	0.5	3/4/5 N = 9	207	0.0 – 0.5m depth Soft - fir m 0.5 – 1.0m depth Soft - firm
					DCP	1.0	4/4/5 N = 9	207	
					DCP	1.2	20/16/20 N = 36	564	1.0 - 1.5m depth Firm to stiff
Terminated at 1.4m depth on bed rock			1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole and Test Pit No: 8

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KONEBADA
PS : 8

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 3.057

Coordinates
GPS 103380.583 N
108120.595 E

Program Duration
Commence : 23/04/11
Completed: 23/04/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Sandy Gravelly CLAY, low – medium plasticity, brown			0.1, 0.2, 0.3, 0.4, **0-5**, 0.6	0.600	DCP	0.5	2/4/3 N = 7	172	0.0 –0.5m depth loose
Silty SAND with trace of gravel, non – plasticity, white (0.600 – 3.0m depth)			0.7, 0.8, 0.9, **1.0**, 1.1, 1.2, 1.3, 1.4, **1.5**, 1.6, 1.7, 1.8, 1.9, **2.0**, 2.1, 2.2, 2.3, 2.4, **2.5**, 2.6, 2.7, 2.8, 2.9, **3.0**, 3.1, 3.2, 3.3, 3.4, **3.5**	3.00	DCP	1.0	3/4/6 N = 10	223	0.5 – 1.0m depth Loose
					DCP	1.5	3/3/6 N = 9	207	1.0 – 1.5m depth loose
					DCP	2.0	7/5/6 N = 11	240	1.5 – 2.0m depth Loose
					DCP	2.5	9/14/18 N = 32	536	2.0 – 2.5m depth Medium dense – dense
					DCP	3.0	16/14/10 N = 24	425	2.5 – 3.0m depth Medium dense
					DCP	3.5	9/10/18 N = 28	472	3.0 – 3.5m depth Medium dense
Terminated at 3.5m depth on bed rock			3.6, 3.7, 3.8, 3.9, **4.0**, 4.1, 4.2, 4.3, 4.4, **4.5**, **4.6**, **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole and Test Pit No: 9

Sheet No: 1 of 1

Equipment : Backhoe, DCP & Hand Auger

Location: GABUTU
PS : 9

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 1.888

Coordinates
GPS 103870.850 N
108132.109 E

Program Duration
Commence : 23/04/11
Completed: 23/04/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
GRAVELLY SANDY CLAY High plasticity, soft to firm, moist, black clay			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0** 1.1	1.2	DCP	0.5	4/4/3 N = 7	172	0.0 – 0.5m depth soft - firm
					DCP	1.0	3/6/6 N = 12	255	0.5 – 1.0m depth firm - stiff
..As above but becomes firm/hard, grey……			1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0**		DCP	1.5	8/9/9 N = 18	344	1.0 - 1.5m depth firm - stiff
					DCP	2.0	9/10/11 N = 21	385	1.5 – 2.0m depth firm = Stiff
					DCP	2.5	10/10/16 N = 26	456	2.0 – 2.5m depth firm or hard
				3.0 ▽GWT	DCP	3.0	16/15/21 N = 36	564	2.5 – 3.0m depth firm or hard
Terminated at 3.0m depth on bed rock			3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
Ground Water Table was encountered at 3.0 meters, run off from the hills and table drain.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111

Borehole and Test Pit No: 10

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA (Horse Camp)
PS : 10

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 1.534

Coordinates
GPS 103047.593 N
109671.233 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: root fibres (20mm thickness)			0.1						0.0 -.0.2m penetration by weight of the DCP (Very Soft)
Gravelly Sandy **CLAY,** medium to high plasticity, black. (0.1 – 1.4m depth)			0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0** 1.1 1.2 1.3 1.4 **1.5**	0.9 ▽ GWT	DCP	0.5	2/1/2 N = 3	92	0.3– 0.5m depth Very Soft
					DCP	1.0	1/2/1 N = 3	92	0.6 - 1.0m depth Very Soft
									1.1 – 1.5m depth Very Soft
High plasticity, CLAY with some sand and trace of gravel, black (1.4 – 3.5m depth)					DCP	1.5	2/1/1 N = 2	68	1.6 – 2.0m depth Soft
			1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5**		DCP	2.0	1/2/3 N = 5	134	2.1 – 2.5m depth Soft
					DCP	2.5	1/3/3 N = 6	153	2.6 – 3.0m depth Soft
					DCP	3.0	3/3/3 N = 6	153	3.1 – 3.5m depth Soft – Firm (Clay)
Terminated at 3.5m depth					DCP	3.5	4/7/8 N = 15	301	3.6 – 4.0m depth Firm – Stiff (Clay)
			3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**		DCP	4.0	10/15/11 N = 26	456	4.1 – 4.5m depth Firm – Stiff (Clay)
					DCP	4.5	14/12/12 N = 24	425	

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks: The soil profile was soft in depth so further investigation was carried out by drilling down to 10 meters depth.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP : 1
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
DCP/TP : 1

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 15.354

Coordinates
GPS 8949805.202 N
521093.746 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Sandy Gravelly CLAY Black silty CLAY, medium plasticity (0 - 500mm thickness)			0.1, 0.2, 0.3, 0.4, **0-5**, 0.6, 0.7	0.7	DCP	0.5	2/4/4 N = 8	190	0.0 – 0.5m depth Firm
Sandy CLAY brown stiff CLAY high plasticity, mc ≤ PI 500 – 800mm thick			0.8, 0.9, **1.0**, 1.1, 1.2, 1.3	1.3	DCP	1.0	4/15 N = 19	358	0.5 – 1.0m depth Firm – Stiff or Hard
BED ROCK Hard weathered mudstone			1.3, 1.4, **1.5**, 1.6	1.6					Firm to Stiff or Hard weathered bed rock, very hard to excavate at 1.3m depth
Terminated at 1.6m depth on bed rock/hard weathered mudstone			1.7, 1.8, 1.9, **2.0**, 2.1, 2.2, 2.3, 2.4, **2.5**, 2.6, 2.7, 2.8, 2.9, **3.0**, 3.1, 3.2, 3.3, 3.4, **3.5**, 3.6, 3.7, 3.8, 3.9, **4.0**, 4.1, 4.2, 4.3, 4.4, **4.5**, **4.6**, **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/EPE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP 2
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
DCP/TP : 2

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 12.739

Coordinates
GPS 8949813.912 N
521131.161 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples / Tests: Samples Depth (m)	Samples / Tests: SPT N' VALUE	Samples / Tests: ABC (kPa)	Field Records
Sandy GRAVEL Brown, with trace of silty clay, medium plasticity (0 - 600mm depeth)			0.1 0.2 0.3 0.4 **0-5** 0.6		DCP	0.5	7/2/1 N = 3	92	0.0 – 0.5m depth Soft
Charted bedrock (600 – 1.00m thick)			0.7 0.8 0.9 **1.0**		DCP	1.0	3/12/20 N = 32	534	0.5 – 1.0m depth Firm – Stiff or Hard
Terminated at 1.0m depth and Charted bed rock			1.1 1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						Firm to Stiff or Hard very hard to excavate at 0.6m depth

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowance Bearing Capacity

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP 3
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
TP: 3

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 14.099

GPS Coordinates
8949896.153 N
521062.589 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Sandy Gravelly CLAY, low - medium plasticity , brown. (0 - 400mm depth)			0.1 0.2 0.3 0.4	0.400	DCP	0.5	2/4/3 N = 7	172	0.0 – 0.5m depth Very Soft - Soft
Sandy Gravelly CLAY, medium - high plasticity , brown. (400 – 1.7m depth)			**0-5** 0.6 0.7 0.8 0.9 **1.0** 1.1 1.2 1.3 1.4 **1.5** 1.6 1.7	**1.7**	DCP	1.0	2/2/6 N = 8	190	0.5 – 1.0m depth Soft - Firm
					DCP	1.5	5/7/7 N = 14	286	1.0 - 1.5m depth Firm
Sandy CLAY with trace of gravel, non - plasticity, whitish, mc ≤ PI 1.7 – 2.1m depth			1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5**	**2.5**	DCP	2.0	10/20 N = 30	521	1.5 – 2.0m depth Firm – Stiff or Hard 2.0 – 2.5m depth .....As Above.....
Highly weathered weak mudstone									Firm to Stiff or Hard on weathered bed rock, very hard to excavate at 2.1m depth
Terminated at 2.5m depth on bed rock			2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111

Borehole No: DCP/TP : 4

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
DCP/TP : 4

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Equipment : Backhoe
DCP & Hand Auger

Ground Level: 6.099

GPS Coordinates
8949911.096 N
521108.675 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: root fibres and peat (0 – 0-20mm depth)			0.1	0.20					
			0.2						
			0.3				2/3/5		0.0 – 0.5m depth
			0.4		DCP	0.5	N = 8	190	Very Soft - Soft
brown Sandy Gravelly CLAY, medium - high plasticity, mc ≤ PI 200 – 700mm depth			**0.5**						
			0.6	0.70					
			0.7				5/5/11		
			0.8		DCP	1.0	N = 16	316	0.5 – 1.0m depth Soft - Firm
			0.9						
Sandy Gravelly CLAY, medium - high plasticity , brown. (0.700 – 1.3m depth)			**1.0**						
			1.1						
			1.2	**1.3**		1.5			1.0 - 1.5m depth Firm – Stiff or Hard
chart weathered mudstone			1.3						
			1.4						
			1.5						1.5 – 2.0m depth .....As above.....
			1.6	1.7					
Terminated at 1.7m depth on bed rock/hard weathered mudstone			1.7						
			1.8						Firm to Stiff or Hard on weathered bed rock, very hard to excavate at 1.3m depth
			1.9						
			2.0						
			2.1						
			2.2						
			2.3						
			2.4						
			2.5						
			2.6						
			2.7						
			2.8						
			2.9						
			3.0						
			3.1						
			3.2						
			3.3						
			3.4						
			3.5						
			3.6						
			3.7						
			3.8						
			3.9						
			4.0						
			4.1						
			4.2						
			4.3						
			4.4						
			4.5						
			4.6						
			4.7						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP : 5
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
DCP/TP : 5

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 19.626

Coordinates
GPS 8949974.770 N
521042.324 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Charted Bedrock, high weathered mudstone (0 – 1.00m depth)			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0**		DCP	0.5	3/2/1 N = 3	92	0.0 – 0.5m depth Soft
					DCP	1.0	2/10/20 N = 30	521	0.5 – 1.0m depth Firm to Stiff or Hard
Terminated at 1.0m depth on bedrock/high weathered			1.1 1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**						Firm to Stiff or Hard weathered bed rock, very hard to excavate at 1.0m depth

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT▽ Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP 6
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: KILAKILA
DCP/TP: 6

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 7.662

GPS Coordinates
8949985.557 N
521086.753 E

Program Duration
Commenced : 23/03/11
Completed : 23/03/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: Black silty CLAY, medium plasticity (0 - 200mm thickness)			0.1 0.2	0.20					
Whitish silty CLAY, medium plasticity, mc ≤ PI 200 – 800mm thick			0.3 0.4 **0-5** 0.6 0.7		DCP	0.5	3/2/1 N = 3	92	0.0 – 0.5m depth Very Soft
Weathered mudstone			0.8 0.9 **1.0** 1.1	0.800	DCP	1.0	2/8/20 N = 28	472	0.5 – 1.0m depth Very Soft - Firm
Terminated at 1.1m depth on bed rock/hard weathered mudstone			1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5**						1.0 - 1.5m depth Firm – Stiff or Hard Firm to Stiff or Hard on weathered bed rock, very hard to excavate at 0.8m depth

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Pressure **(kPa)**

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT▽ Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111

Borehole No: DCP/TP: 1

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: MORATA STP
DCP/TP : 1

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 17.708

GPS Coordinates
8962014.389 N
520227.242 E

Program Duration
Commence : 24/03/11
Completed: 12/05/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: mixture with root fibres, red ridge silty CLAY low – medium plasticity, reddih brown (00 - 300mm depth)			0.1 0.2 0.3 0.4 **0-5**	0.300	DCP	0.5	2/4/2 N = 6	153	0.0 – 0.5m depth Soft - firm
Siilty Gravelly CLAY, medium – high plasticity, white, mc ≤ PI			0.6 0.7 0.8 0.9 **1.0**		DCP	1.0	2/6/12 N = 18	344	0.5 – 1.0m depth Firm - stiff
highly weathered mudstone ,medium plasticity, whitish brown (1.0 –1.3m depth)			1.1 1.2 1.3	1.3					
Bed rock, highly weathered (1.3 - 2.0m depth)			1.4 **1.5** 1.6 1.7 1.8 1.9		DCP	1.5	N = 20	372	1.0 - 1.5m depth Firm – Stiff or hard on bedrock
Bed rock, highly weathered (2.0 – 2.8m depth			**2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8	2.0					
Terminated at 2.0m depth on bed rock			2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**					

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)
ABC Allowable Bearing Capacity (kPa)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
No Ground water Table encountered, dry on completion.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP :2
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: MORATA STP
DCP/TP : 2

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 16.757

Coordinates
GPS 520225.540 E
8962028.369 N

Program Duration
Commence : 24/03/11
Completed: 12/05/11

Description	USC	Graphic Log	Depth (m)	Samples / Tests: Strata Thickness (m)	Samples: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: mixture with root fibres, red ridge silty CLAY low – medium plasticity, reddih brown (00 - 300mm depth)			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0** 1.1 1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9 **2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**	0.300	DCP	0.5	1/2/1 N = 3	92	0.0 – 0.5m depth Soft
Siilty Gravelly CLAY, medium – high plasticity, white, mc ≤ PI			0.8 ∇GWT		DCP	1.0	1/1/2 N = 3	92	0.5 – 1.0m depth Soft
highly weathered mudstone ,medium plasticity, whitish brown (1.3 – 2.0m depth)			1.3		DCP	1.5	4/2/12 N = 14	286	1.0 - 1.5m depth Firm
Bed rock, highly weathered (2.0 – 3.0m depth)			2.0		DCP	2.0	13/15/23 N = 38	584	1.5 – 2.0m depth Firm – Stiff/Hard
Terminated at 3.0m depth on bed rock									

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
Ground Water Table encountered at 0.800m depth , seepage from the existing sewerage pond.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

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Job No: NGTS/0111
Borehole No: DCP/TP: 3
Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: MORATA STP
DCP/TP : 3

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 16.596

Coordinates
GPS 8962030.891 N
5202251.378 E

Program Duration
Commence : 24/03/11
Completed : 12/05/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Gravelly Sandy CLAY High plasticity, soft to firm, moist, black clay			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7		DCP	0.5	2/2/1 N = 3	92	0.0 – 0.5m depth Soft
Gravelly Clayey SAND Medium dense, slightly firm, some loose, well graded, fine to medium grained, black			0.8 0.9 **1.0** 1.1 1.2	0.800 ▽ GWT	DCP	1.0	2/2/1 N = 3	92	0.5 – 1.0m depth Soft
Sandy CLAY with some gravel, very high plasticity, grey			1.3 1.4 **1.5** 1.6 1.7		DCP	1.5	1/2/4 N = 5	134	1.0 - 1.5m depth Soft
Gravelly Sandy CLAY with some gravel, very high plasticity, grey			1.8 1.9 **2.0** 2.1 2.2 2.3 2.4		DCP	2.0	6/9/14 N = 23	412	1.5 – 2.0m depth Soft
Sandy CLAY with trace of gravel, high plasticity, grey			**2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4	2.5	DCP	2.5 3.0 3.5	16/19/24 N = 43		2.0 – 3.5m depth Firm – Stiff/hard
CLAY, firm to stiff, high plasticity, grey			**3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4			4.0 4.5			
Terminated at 3.5m depth			**4.5** **4.6** **4.7**						

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT ▽ Ground Water Table

Remarks: Ground Water Table was encountered at 0.8m depth, seepage from the existing sewerage pond. One borehole was drilled to 9.5m where bedrock of highly weathered mudstone was encountered.

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

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Job No: NGTS/0111

Borehole No: DCP/TP 4

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: MORATA STP
DCP/TP : 4

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 18.725

Coordinates
GPS 8962043.714 N
520269.721 E

Program Duration
Commence : 24/03/11
Completed: 12/05/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples / Tests: Type	Samples: Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: mixture with root fibres, red ridge silty CLAY low – medium plasticity, reddih brown (00 - 300mm depth)			0.1 0.2 0.3 0.4 **0-5** 0.6 0.7 0.8 0.9 **1.0**	0.300	DCP	0.5	2/1/6 N = 7	172	0.0 – 0.5m depth Soft
Siilty Gravelly CLAY, medium – high plasticity, brown, mc ≤ PI			1.1 1.2 1.3 1.4 **1.5** 1.6 1.7 1.8 1.9	1.300	DCP	1.0	4/6/5 N = 11	240	0.5 – 1.0m depth Soft
highly weathered mudstone ,medium plasticity, brown (1.3 – 2.0m depth)			**2.0** 2.1 2.2 2.3 2.4 **2.5** 2.6 2.7 2.8 2.9	2.00	DCP	1.5	4/6/10 N = 16	316	1.0 - 1.5m depth soft
Bed rock, highly weathered (2.0 – 3.0m depth)			**3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**		DCP	2.0	15/15/15 N = 30	521	1.5 – 2.0m depth soft
Terminated at 3.0m depth on bed rock					DCP	2.5	27/15/21 N = 36	564	2.0 – 2.5m depth Firm – Stiff or hard on highly weathered bedrock

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
No Ground Water Table was encountered, dry on completion

Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

APPENDIX A

NIAWANG GEOTECH LIMITED
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Stores Road. 4 Mile
PO Box 6298, BOROKO. NCD
Fax/Tel: (675) 323 1836
Mobile: 76986593 / 73277732 or 72101529
Email: niawanggeotech@daltron.com.pg

Job No: NGTS/0111

Borehole No: DCP/TP: 5

Sheet No: 1 of 1

Equipment : Backhoe
DCP & Hand Auger

Location: MORATA STP
DCP/TP : 5

CLIENT : njs - JICA (eda ranu)

PROJECT : Port Moresby Sewerage System Upgrading

Ground Level: 16.907

Coordinates
GPS 8962066.174 N
520258.222 E

Program Duration
Commence : 24/03/11
Completed: 12/05/11

Description	USC	Graphic Log	Depth (m)	Strata Thickness (m)	Samples Type	Samples Depth (m)	SPT N' VALUE	ABC (kPa)	Field Records
Topsoil: mixture with root fibres, red ridge silty CLAY low – medium plasticity, reddih brown (00 - 400mm depth)			0.1 0.2 0.3 0.4	0.400					0.0 – 0.5m depth Soft
Siilty Gravelly CLAY, low - medium plasticity, white, mc ≤ PI			**0-5** 0.6 0.7 0.8 0.9		DCP	0.5	2/3/4 N =7	172	
			1.0 ▽ GWT	1.0					0.5– 1.0m depth Soft - Firm
highly weathered mudstone ,medium plasticity, whitish brown (1.0 – 1.7m depth)			**1.0** 1.1 1.2 1.3 1.4 **1.5** 1.6 1.7		DCP	1.0	4/5/4 N = 9	207	
Bed rock, highly weathered (2.0 – 3.0m depth)			1.8 1.9 **2.0** 2.1 2.2 2.3 2.4	1.7	DCP	1.5	10/11/19 N = 30	521	1.0 - 1.5m depth Firm – stiff/hard
Terminated at 2.5m depth on bed rock			**2.5** 2.6 2.7 2.8 2.9 **3.0** 3.1 3.2 3.3 3.4 **3.5** 3.6 3.7 3.8 3.9 **4.0** 4.1 4.2 4.3 4.4 **4.5** **4.6** **4.7**	2.5					

KEY:
DCP Dynamic Cone Penetrometer
SPT Standard Penetration Test
VST Vane Shear Test
CR Core Recovery (%)
RQD Rock Quality Designation (%)

EGL Existing Ground Level
USC Unified Soil Classification
D Disturbed
UD Undisturbed
PP Pocket Penetrometer
GWT Ground Water Table

Remarks:
Ground Water Table encountered at 1.0m depth, seepage from existing sewerage pond

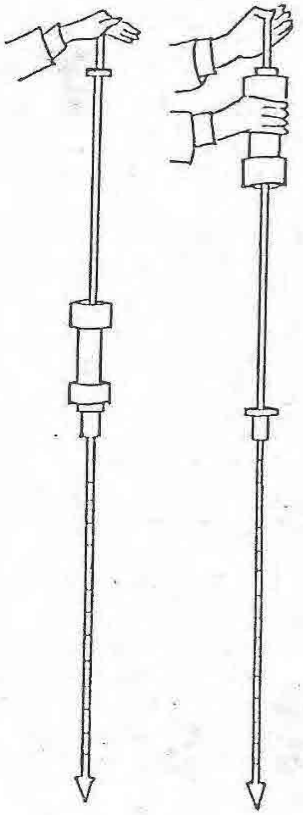
Logged by: WG/PE
Checked by: ME
Drafted by :
Scale:

SCALA DYNAMIC CONE PENETROMETER

INTRODUCTION

The Scala Penetrometer Test is one of several simple and quick methods of obtaining a measure of subgrade strength for use in the design of road and airport pavements. This test, which was developed by A J Scala, was the first insitu cone penetration test to be widely used in this part of the world for the assessment of CBR strengths. Scala's paper outlining the design, use and interpretation of this dynamic cone penetrometer is titled "Simple Methods of Flexible Pavement Design Using Cone Penetrometers" and was published in February 1956 in New Zealand Engineering.

When Scala Penetrometer testing is carried out by the DOW Materials Laboratories it is generally done in association with a limited programme of laboratory or insitu CBR testing. The Scala Penetrometer Test has proved to be very useful in clay soils and reasonable correlation has been found with CBR measurements. Since a great number of tests can be carried out very quickly it can be used to confirm the uniformity of subgrade strength or to identify localised occurrences of soft subgrade ("soft spots") which might otherwise have remained unidentified.



INSTRUMENT DESCRIPTION

The apparatus consists of a 9.07 kg (20 1b) steel drop hammer which falls through a distance of 508 mm (20 in). The hammer slides on a 16 mm diameter steel rod and strikes an anvil at the lower end of that rod. A second length of 16 mm diameter steel rod with a hardened steel point having a cross sectional area of 322 mm (0.5 sq in) is screwed into the lower extremity, the point itself having a 30 degree point. The lower section of the rod is marked at intervals of 50 mm (2 in).

The overall length of the apparatus when assembled is 1.83 meters (6ft) and the weight is 12.7 kg (28 1b). When dis-assembled it can be readily packed in a car.

TEST PROCEDURE AND PRESENTATION OF RESULTS

The penetrometer may be driven from the surface on undeveloped sites. Where the subgrade of an existing pavement is to be tested it is necessary to make a small hole through the pavement so that the penetrometer will not have to penetrate any hard or large material. The penetrometer may be driven adjacent to a road under certain circumstances but the moisture content and density of soils beside the road are unlikely to be truely representative of those beneath the pavement.

The penetrometer is driven by blows of the drop hammer to a depth of 760 mm and a record is made of the depth of the point below the surface (or top of the pavement) after each blow. This is best done with the aid of a measuring stick or ruler 760 mm long which is held beside the instrument, then the decrease in height of the anvil from the ground can be measured after each blow. Plainly, one person must operate the penetrometer whilst another measures and records the amount of penetration.

The results should be plotted graphically with the cumulative number of blows being plotted against depth of penetration. The slope of the curve at any depth is then a measure of the srength of the material over that depth range. A typical trialpit log and penetration record is shown on the example following this Data Sheet.

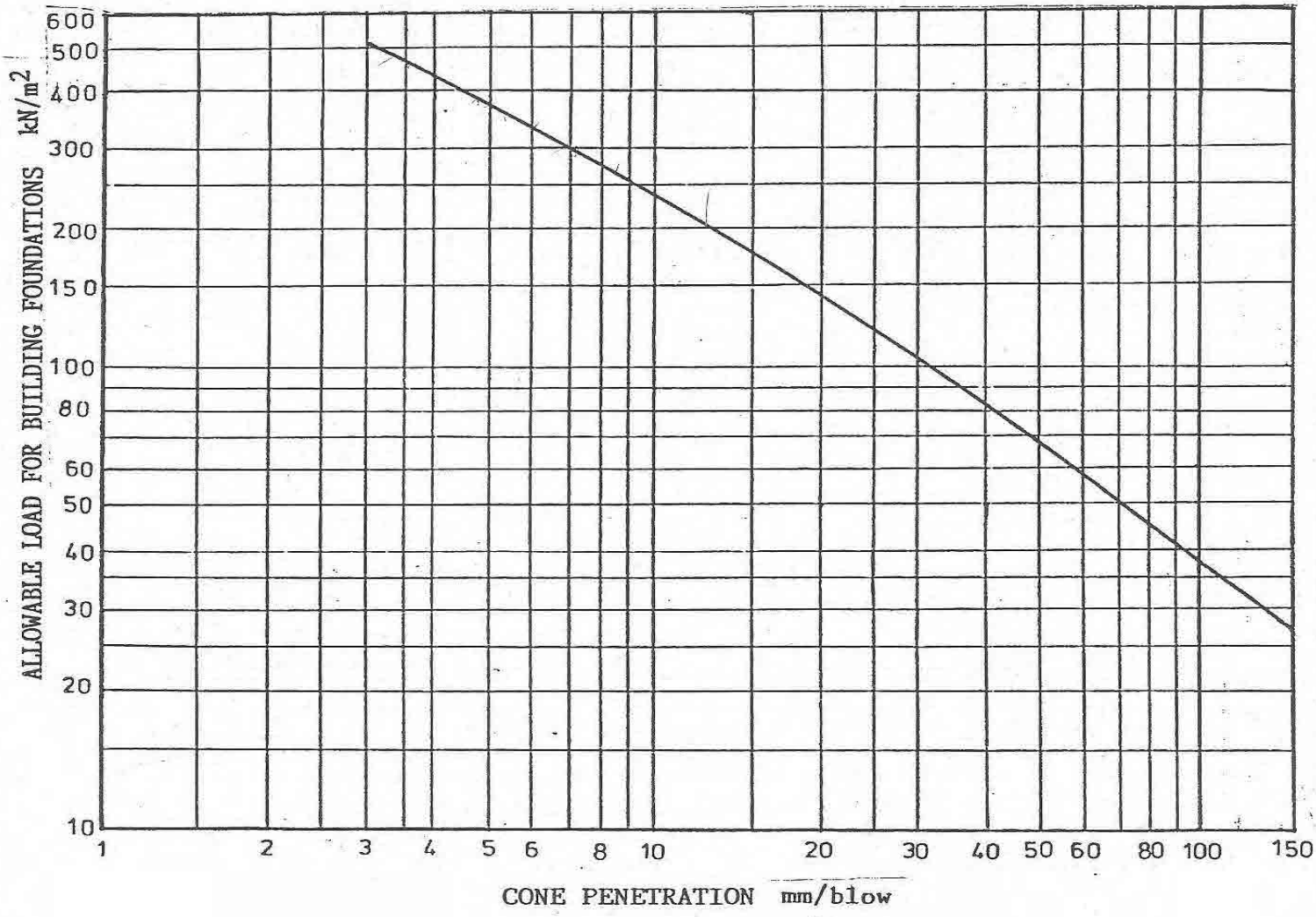
INTERPRETATION OF RESULTS

Scala (1956) reports the findings of a comprehensive investigation made to correlate the results of tests obtained using the cone penetrometer with actual field CBR values for the soils tested. The correlation with CBR at 2.5 mm (max CBR) is shown on Figure 1. This Figure should be used for the determination of CBR values from Scala Penetrometer results. Pavement design can then be determined in accordance with published CBR design charts.

DEPARTMENT OF WORKS

DATA SHEET
Sht 4 of 4

SCALA DYNAMIC CONE PENETROMETER



After:
Stockwell MJ
New Zealand Engineering
(32,6) 15 June 1977

SCALA PENETROMETER
ALLOWABLE BEARING
PRESSURE CORRELATION

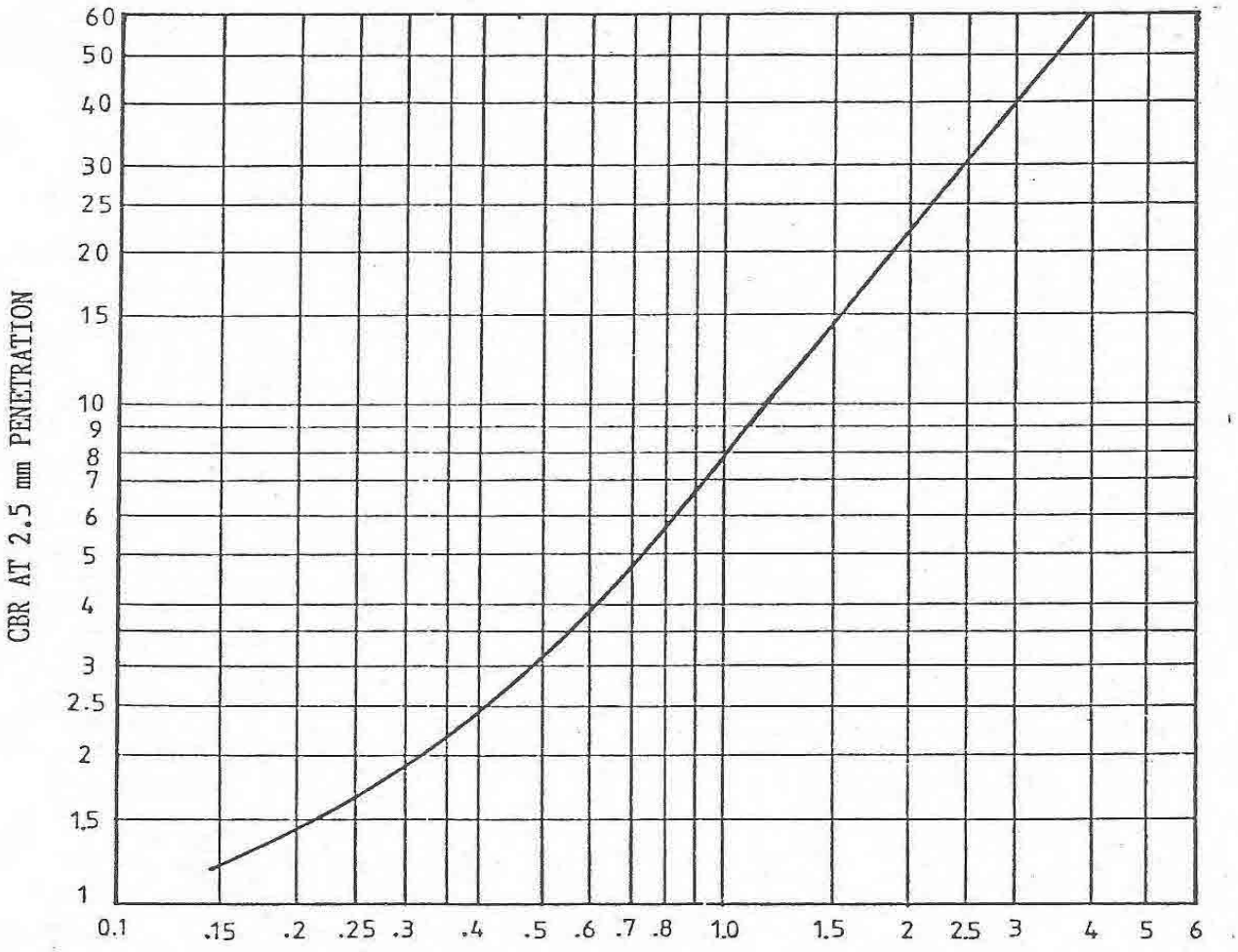
Figure 2

DEPARTMENT OF WORKS

DATA SHEET

Sht 3 of 4

SCALA DYNAMIC CONE PENETROMETER



SCALA PENETROMETER
CBR CORRELATION

Figure 1

MTL 86-1

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

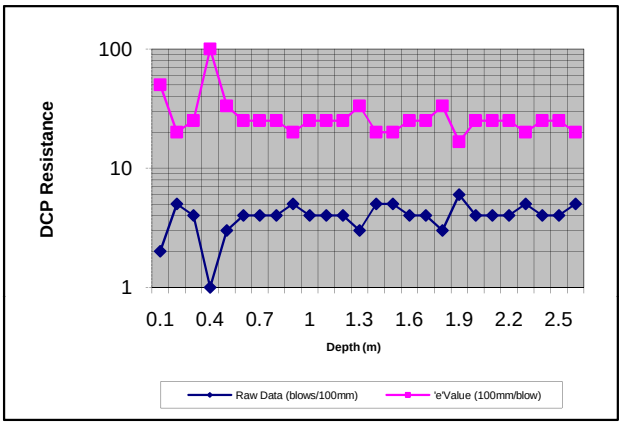
Location: **New Pump Station - No. 1 Kanudi**

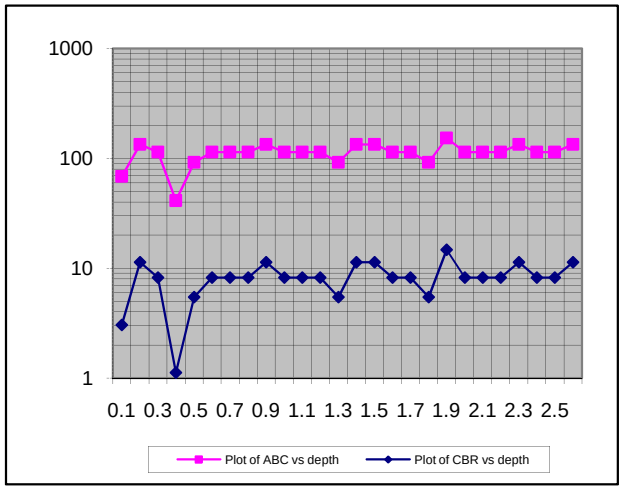
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST 1 at Kanudi Pump Station

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	5	20	134	11
0.3	4	25	114	8
0.4	1	100	41	1
0.5	3	33	92	5
0.6	4	25	114	8
0.7	4	25	114	8
0.8	4	25	114	8
0.9	5	20	134	11
1	4	25	114	8
1.1	4	25	114	8
1.2	4	25	114	8
1.3	3	33	92	5
1.4	5	20	134	11
1.5	5	20	134	11
1.6	4	25	114	8
1.7	4	25	114	8
1.8	3	33	92	5
1.9	6	17	153	15
2	4	25	114	8
2.1	4	25	114	8
2.2	4	25	114	8
2.3	5	20	134	11
2.4	4	25	114	8
2.5	4	25	114	8
2.6	5	20	134	11
2.7	6	17	153	15
2.8	5	20	134	11
2.9	4	25	114	8
3	5	20	134	11
3.1	7	14	172	18
3.2	7	14	172	18
3.3	9	11	207	27
3.4	9	11	207	27
3.5	8	13	190	22





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Project: **Port Moresby Sewerage Upgrading**

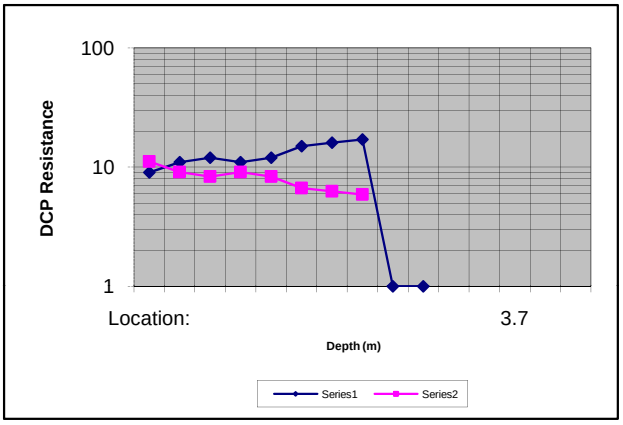
Location: **New Pump Station - No. 1 Kanudi**

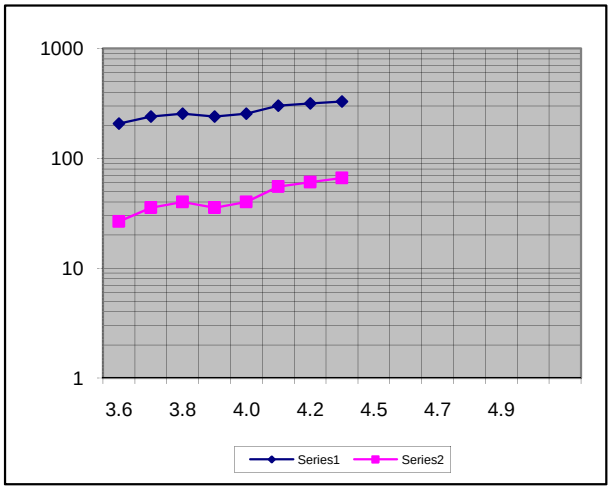
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

Continuation

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
3.6	9	11	207	27
3.7	11	9	240	35
3.8	12	8	255	40
3.9	11	9	240	35
4.0	12	8	255	40
4.1	15	7	301	55
4.2	16	6	316	61
4.3	17	6	330	66
4.5	Refusal at			
4.6	4.3m depth			
4.7				
4.8				
4.9				
5.0				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

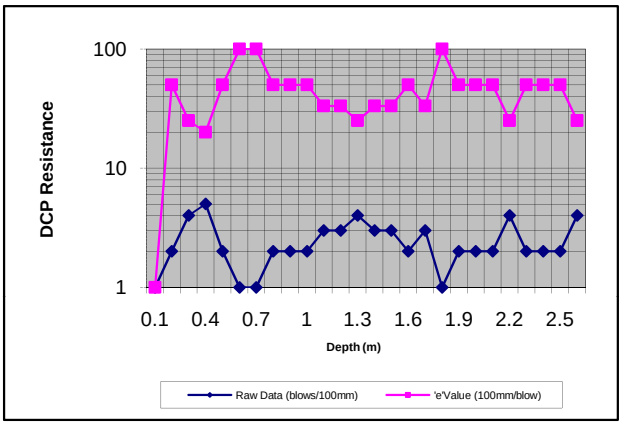
Location: **New Pump Station - No. 2 Idubada**

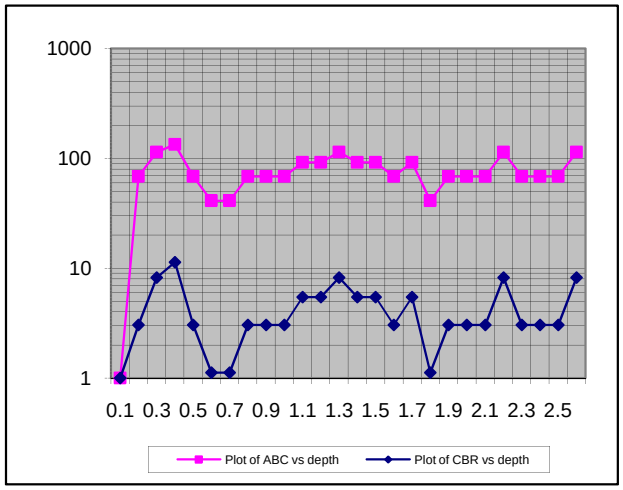
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 1

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	By weight	#VALUE!	#######	#######
0.2	2	50	68	3
0.3	4	25	114	8
0.4	5	20	134	11
0.5	2	50	68	3
0.6	1	100	41	1
0.7	1	100	41	1
0.8	2	50	68	3
0.9	2	50	68	3
1	2	50	68	3
1.1	3	33	92	5
1.2	3	33	92	5
1.3	4	25	114	8
1.4	3	33	92	5
1.5	3	33	92	5
1.6	2	50	68	3
1.7	3	33	92	5
1.8	1	100	41	1
1.9	2	50	68	3
2	2	50	68	3
2.1	2	50	68	3
2.2	4	25	114	8
2.3	2	50	68	3
2.4	2	50	68	3
2.5	2	50	68	3
2.6	4	25	114	8
2.7	6	17	153	15
2.8	6	17	153	15
2.9	9	11	207	27
3	9	11	207	27
3.1	11	9	240	35
3.2	12	8	255	40
3.3	13	8	271	45
3.4	12	8	255	40
3.5	11	9	240	35





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Project: **Port Moresby Sewerage Upgrading**

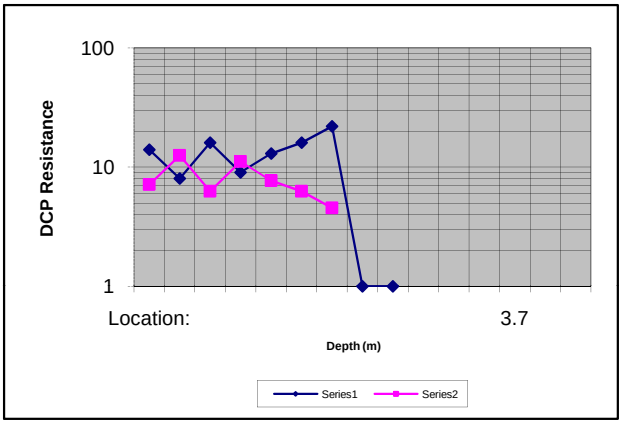
Location: **New Pump Station - No. 2 Idubada**

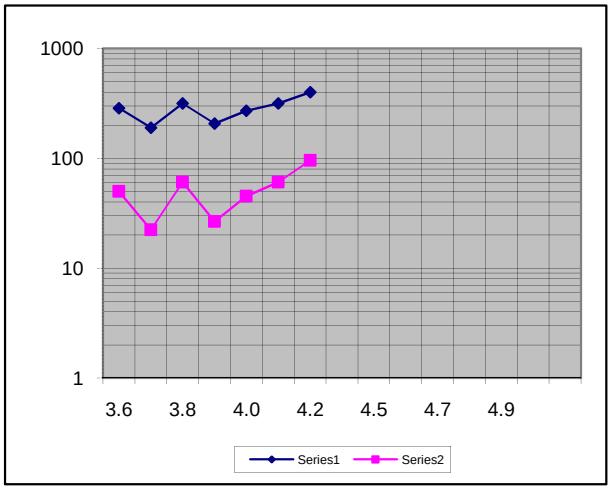
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

Continuation

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
3.6	14	7	286	50
3.7	8	13	190	22
3.8	16	6	316	61
3.9	9	11	207	27
4.0	13	8	271	45
4.1	16	6	316	61
4.2	22	5	399	96
4.3	Refusal at			
4.5	4.2m depth			
4.6				
4.7				
4.8				
4.9				
5.0				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

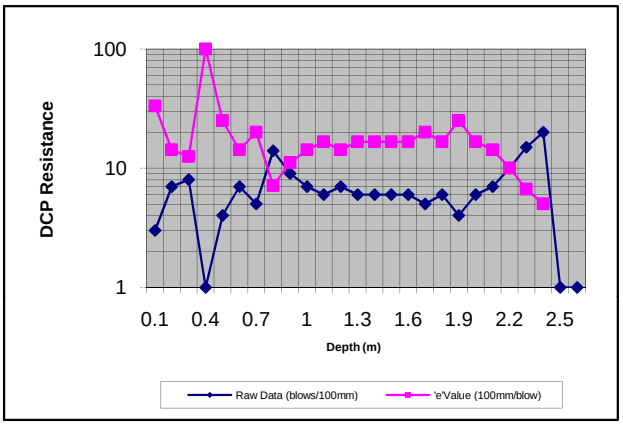
Location: **New Pump Station - No. 3 Elavala**

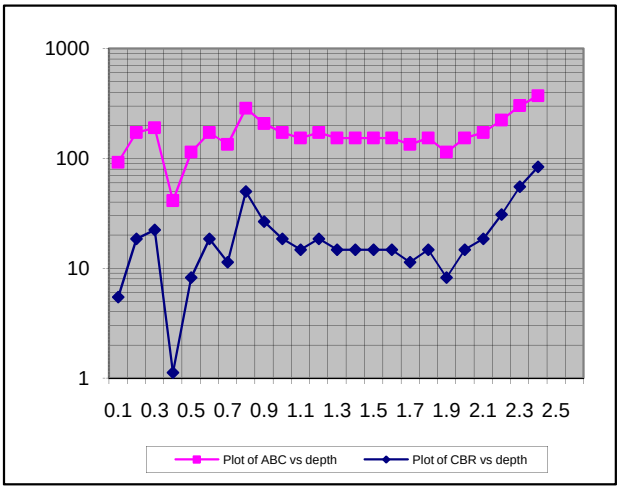
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 1

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	3	33	92	5
0.2	7	14	172	18
0.3	8	13	190	22
0.4	1	100	41	1
0.5	4	25	114	8
0.6	7	14	172	18
0.7	5	20	134	11
0.8	14	7	286	50
0.9	9	11	207	27
1	7	14	172	18
1.1	6	17	153	15
1.2	7	14	172	18
1.3	6	17	153	15
1.4	6	17	153	15
1.5	6	17	153	15
1.6	6	17	153	15
1.7	5	20	134	11
1.8	6	17	153	15
1.9	4	25	114	8
2	6	17	153	15
2.1	7	14	172	18
2.2	10	10	223	31
2.3	15	7	301	55
2.4	20	5	372	84
2.5	Refusal at			
2.6	2.4m			
2.7				
2.8				
2.9				
3				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Project: **Port Moresby Sewerage Upgrading**

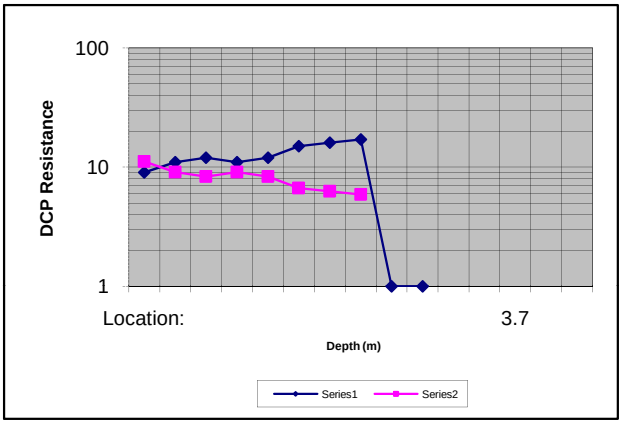
Location: **New Pump Station - No. 1 Kanudi**

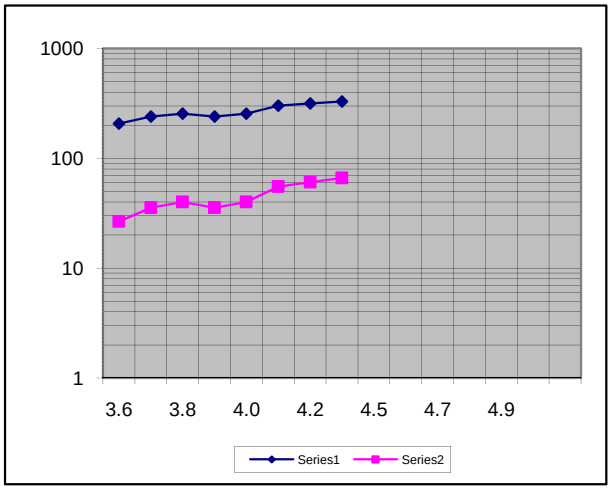
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

Continuation

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
3.6	9	11	207	27
3.7	11	9	240	35
3.8	12	8	255	40
3.9	11	9	240	35
4.0	12	8	255	40
4.1	15	7	301	55
4.2	16	6	316	61
4.3	17	6	330	66
4.5	Refusal at			
4.6	4.5m depth			
4.7				
4.8				
4.9				
5.0				





APPENDIX A

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

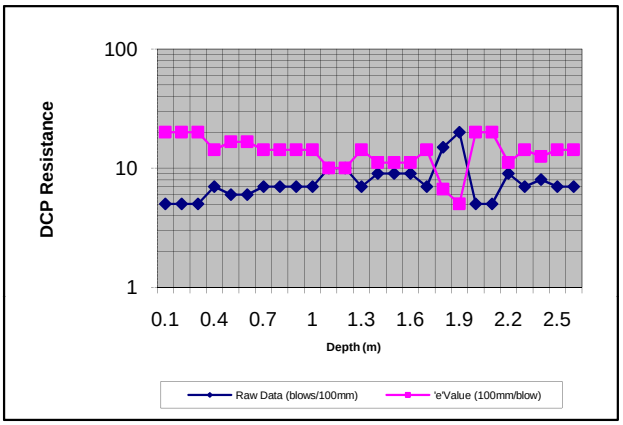
Location: **New Pump Station - No. 4 Hanuabada**

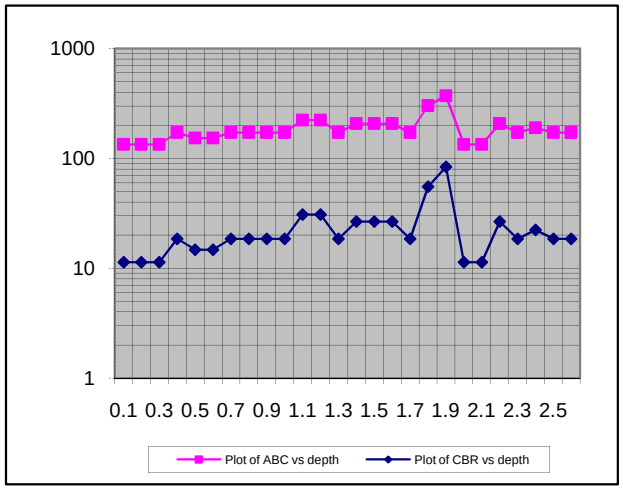
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 1

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	5	20	134	11
0.2	5	20	134	11
0.3	5	20	134	11
0.4	7	14	172	18
0.5	6	17	153	15
0.6	6	17	153	15
0.7	7	14	172	18
0.8	7	14	172	18
0.9	7	14	172	18
1	7	14	172	18
1.1	10	10	223	31
1.2	10	10	223	31
1.3	7	14	172	18
1.4	9	11	207	27
1.5	9	11	207	27
1.6	9	11	207	27
1.7	7	14	172	18
1.8	15	7	301	55
1.9	20	5	372	84
2	5	20	134	11
2.1	5	20	134	11
2.2	9	11	207	27
2.3	7	14	172	18
2.4	8	13	190	22
2.5	7	14	172	18
2.6	7	14	172	18
2.7	6	17	153	15
2.8	6	17	153	15
2.9	8	13	190	22
3	4	25	114	8
3.1	3	33	92	5
3.2	3	33	92	5
3.3	3	33	92	5
3.4	2	50	68	3
3.5	3	33	92	5





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Project: **Port Moresby Sewerage Upgrading**

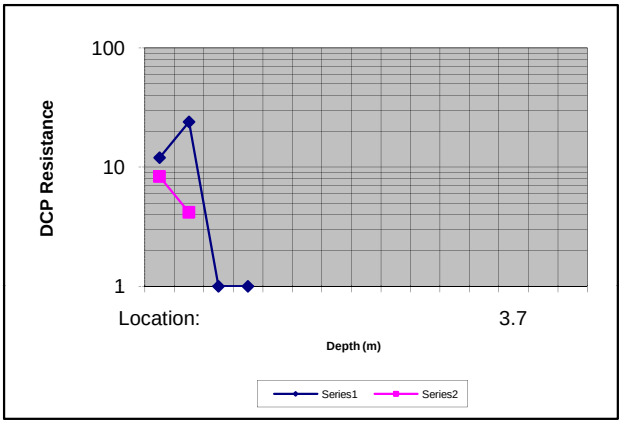
Location: **New Pump Station - No. 4 Hanuabada**

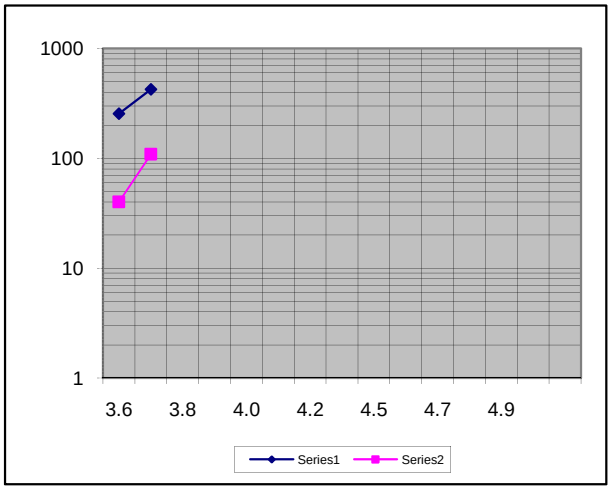
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

Continuation

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
3.6	12	8	255	40
3.7	24	4	425	109
3.8	Refusal at			
3.9	3.7m depth			
4.0				
4.1				
4.2				
4.3				
4.5				
4.6				
4.7				
4.8				
4.9				
5.0				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

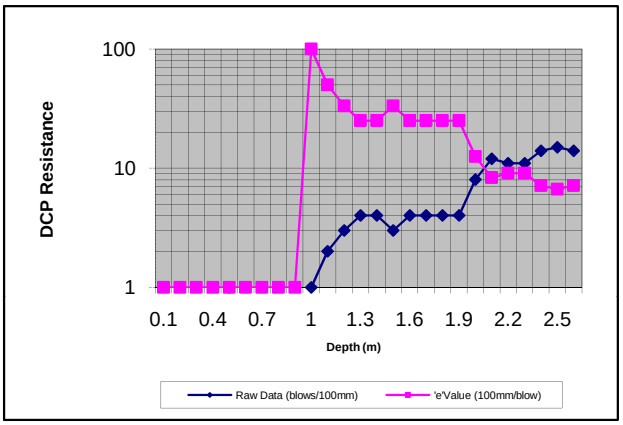
Location: **Davara Pump Station - No. 05 Ela Beach**

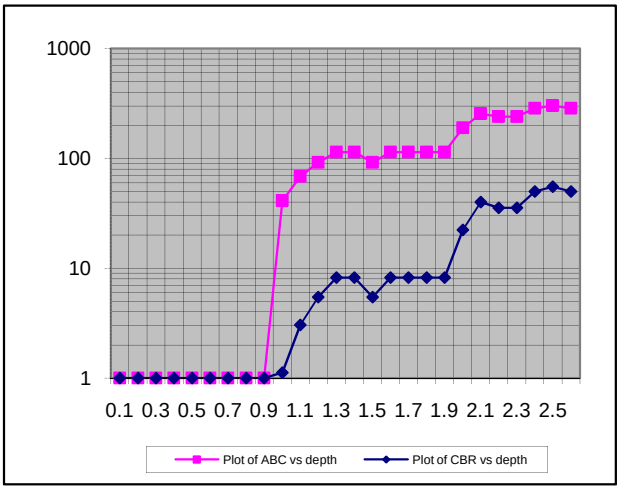
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 05

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1		#DIV/0!	#DIV/0!	#DIV/0!
0.2		#DIV/0!	#DIV/0!	#DIV/0!
0.3		#DIV/0!	#DIV/0!	#DIV/0!
0.4		#DIV/0!	#DIV/0!	#DIV/0!
0.5	Excavation	#VALUE!	#######	#######
0.6		#DIV/0!	#DIV/0!	#DIV/0!
0.7		#DIV/0!	#DIV/0!	#DIV/0!
0.8		#DIV/0!	#DIV/0!	#DIV/0!
0.9		#DIV/0!	#DIV/0!	#DIV/0!
1	1	100	41	1
1.1	2	50	68	3
1.2	3	33	92	5
1.3	4	25	114	8
1.4	4	25	114	8
1.5	3	33	92	5
1.6	4	25	114	8
1.7	4	25	114	8
1.8	4	25	114	8
1.9	4	25	114	8
2	8	13	190	22
2.1	12	8	255	40
2.2	11	9	240	35
2.3	11	9	240	35
2.4	14	7	286	50
2.5	15	7	301	55
2.6	14	7	286	50
2.7	20	5	372	84
2.8	Terminated at			
2.9	2.7m			
3				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

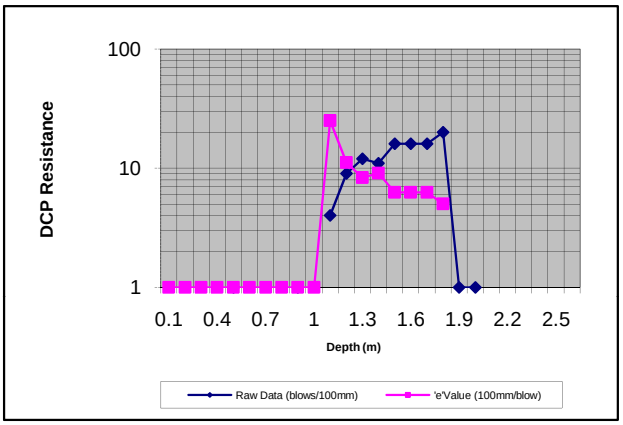
Location: **Lawes Road Pump Station - No. 6 Ela Beach**

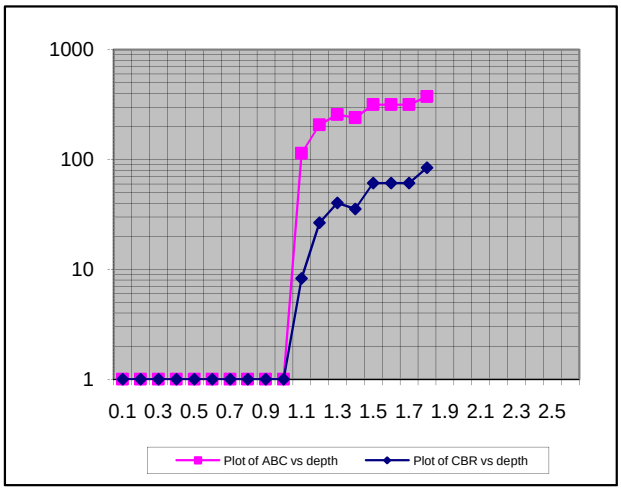
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 6

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1		#DIV/0!	#DIV/0!	#DIV/0!
0.2		#DIV/0!	#DIV/0!	#DIV/0!
0.3		#DIV/0!	#DIV/0!	#DIV/0!
0.4		#DIV/0!	#DIV/0!	#DIV/0!
0.5	Excavation	#VALUE!	#######	#######
0.6		#DIV/0!	#DIV/0!	#DIV/0!
0.7		#DIV/0!	#DIV/0!	#DIV/0!
0.8		#DIV/0!	#DIV/0!	#DIV/0!
0.9	By weight	#VALUE!	#######	#######
1		#DIV/0!	#DIV/0!	#DIV/0!
1.1	4	25	114	8
1.2	9	11	207	27
1.3	12	8	255	40
1.4	11	9	240	35
1.5	16	6	316	61
1.6	16	6	316	61
1.7	16	6	316	61
1.8	20	5	372	84
1.9	Terminated			
2	at 1.8m			
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

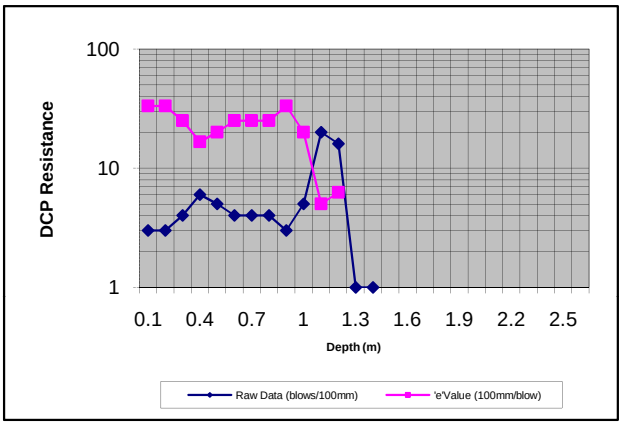
Location: **New Pump Station - No. 7 Kila Rep Police**

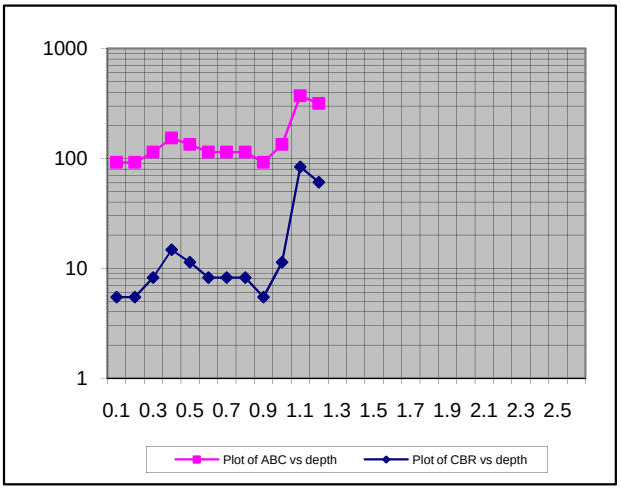
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 7

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	3	33	92	5
0.2	3	33	92	5
0.3	4	25	114	8
0.4	6	17	153	15
0.5	5	20	134	11
0.6	4	25	114	8
0.7	4	25	114	8
0.8	4	25	114	8
0.9	3	33	92	5
1	5	20	134	11
1.1	20	5	372	84
1.2	16	6	316	61
1.3	Refusal at			
1.4	1.2m depth			
1.5				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

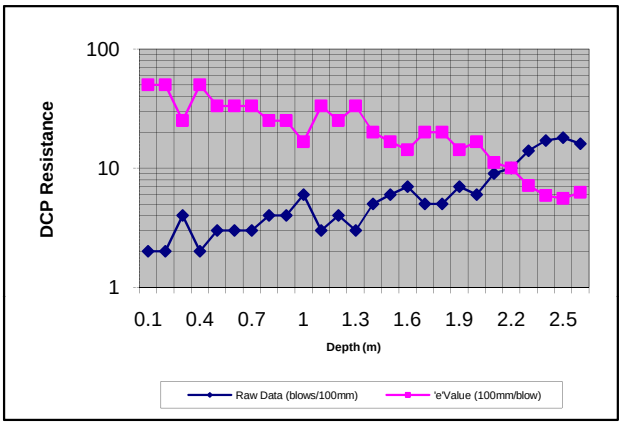
Location: **New Pump Station - No. 8 Konebada**

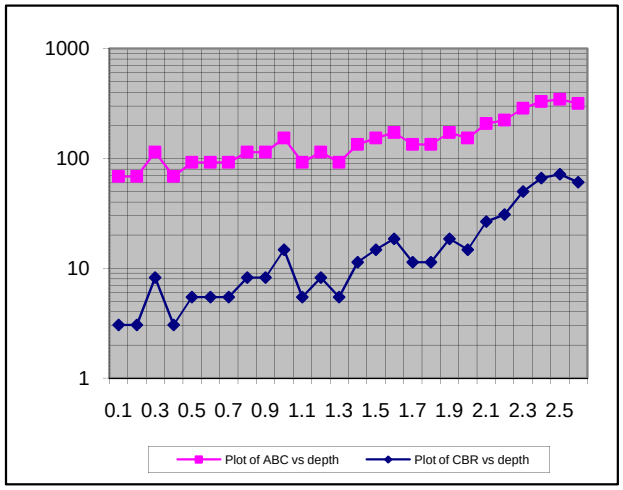
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 8

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	2	50	68	3
0.3	4	25	114	8
0.4	2	50	68	3
0.5	3	33	92	5
0.6	3	33	92	5
0.7	3	33	92	5
0.8	4	25	114	8
0.9	4	25	114	8
1	6	17	153	15
1.1	3	33	92	5
1.2	4	25	114	8
1.3	3	33	92	5
1.4	5	20	134	11
1.5	6	17	153	15
1.6	7	14	172	18
1.7	5	20	134	11
1.8	5	20	134	11
1.9	7	14	172	18
2	6	17	153	15
2.1	9	11	207	27
2.2	10	10	223	31
2.3	14	7	286	50
2.4	17	6	330	66
2.5	18	6	344	72
2.6	16	6	316	61
2.7	11	9	240	35
2.8	14	7	286	50
2.9	10	10	223	31
3	10	10	223	31
3.1	9	11	207	27
3.2	8	13	190	22
3.3	10	10	223	31
3.4	18	6	344	72
3.5	Refusal at 3.4m depth			





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

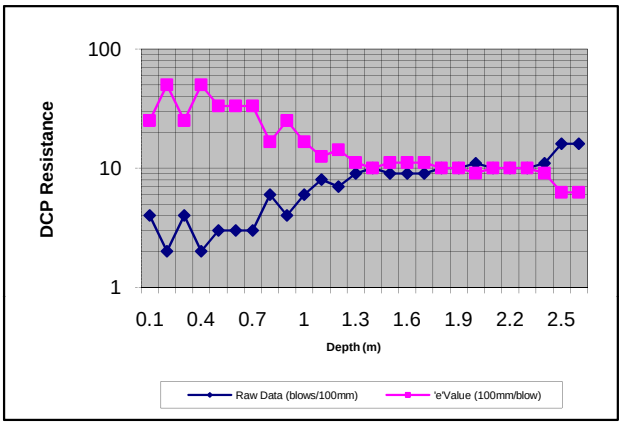
Location: **New Pump Station - No. 9 Gabutu**

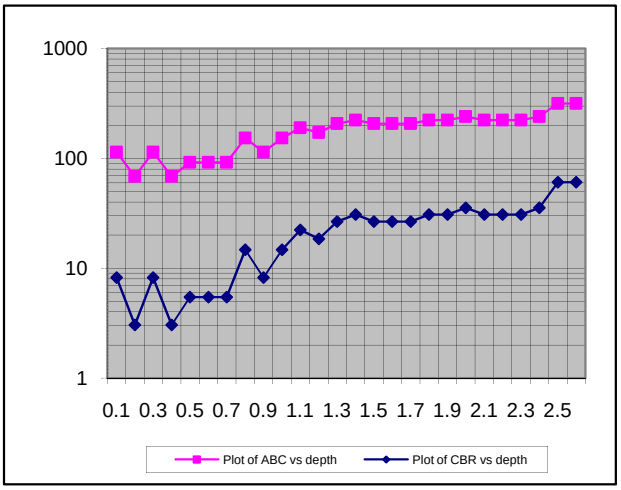
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 9

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	4	25	114	8
0.2	2	50	68	3
0.3	4	25	114	8
0.4	2	50	68	3
0.5	3	33	92	5
0.6	3	33	92	5
0.7	3	33	92	5
0.8	6	17	153	15
0.9	4	25	114	8
1	6	17	153	15
1.1	8	13	190	22
1.2	7	14	172	18
1.3	9	11	207	27
1.4	10	10	223	31
1.5	9	11	207	27
1.6	9	11	207	27
1.7	9	11	207	27
1.8	10	10	223	31
1.9	10	10	223	31
2	11	9	240	35
2.1	10	10	223	31
2.2	10	10	223	31
2.3	10	10	223	31
2.4	11	9	240	35
2.5	16	6	316	61
2.6	16	6	316	61
2.7	15	7	301	55
2.8	15	7	301	55
2.9	18	6	344	72
3	21	5	385	90
3.1	Terminate at			
3.2	3.00m			
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

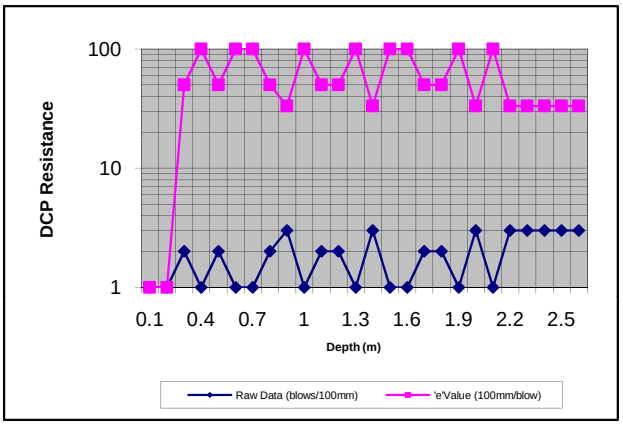
Location: **New Pump Station - No. 10 Kila Kila**

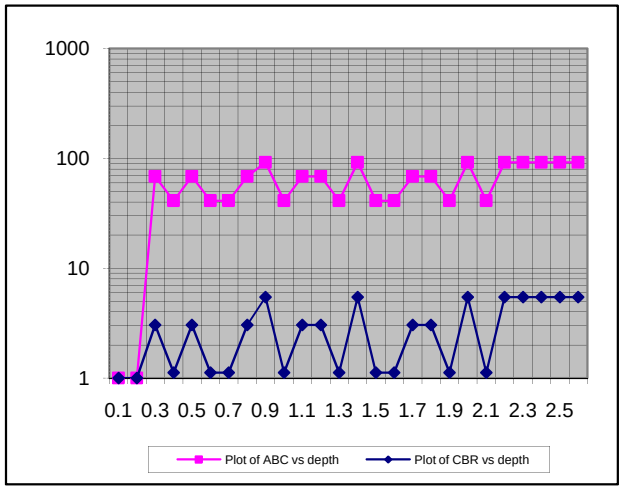
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 10

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	by	#VALUE!	#######	#######
0.2	wieght	#VALUE!	#######	#######
0.3	2	50	68	3
0.4	1	100	41	1
0.5	2	50	68	3
0.6	1	100	41	1
0.7	1	100	41	1
0.8	2	50	68	3
0.9	3	33	92	5
1	1	100	41	1
1.1	2	50	68	3
1.2	2	50	68	3
1.3	1	100	41	1
1.4	3	33	92	5
1.5	1	100	41	1
1.6	1	100	41	1
1.7	2	50	68	3
1.8	2	50	68	3
1.9	1	100	41	1
2	3	33	92	5
2.1	1	100	41	1
2.2	3	33	92	5
2.3	3	33	92	5
2.4	3	33	92	5
2.5	3	33	92	5
2.6	3	33	92	5
2.7	3	33	92	5
2.8	3	33	92	5
2.9	4	25	114	8
3	3	33	92	5
3.1	4	25	114	8
3.2	5	20	134	11
3.3	7	14	172	18
3.4	7	14	172	18
3.5	8	13	190	22





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

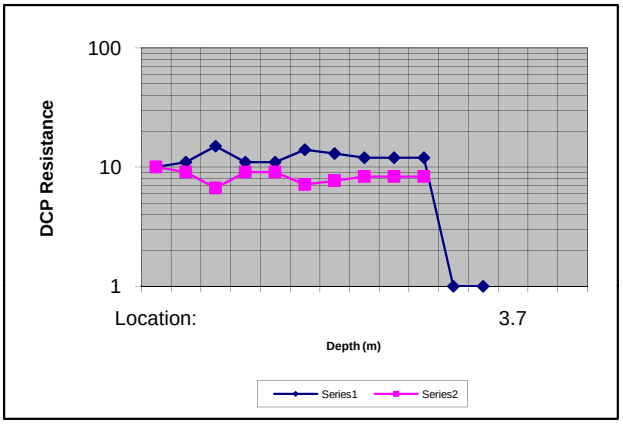
Location: **New Pump Station - No. 10 Kila Kila**

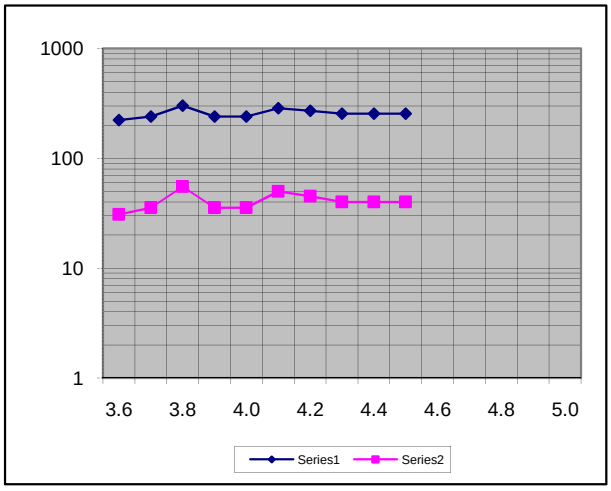
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

DCP 1 continuation

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
3.6	10	10	223	31
3.7	11	9	240	35
3.8	15	7	301	55
3.9	11	9	240	35
4.0	11	9	240	35
4.1	14	7	286	50
4.2	13	8	271	45
4.3	12	8	255	40
4.4	12	8	255	40
4.5	12	8	255	40
4.6	Terminate at			
4.7	4.5m depth			
4.8				
4.9				
5.0				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage Upgrading

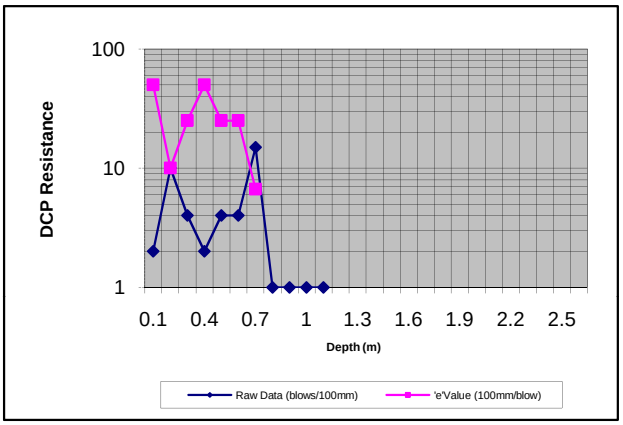
Location: KilaKila STP

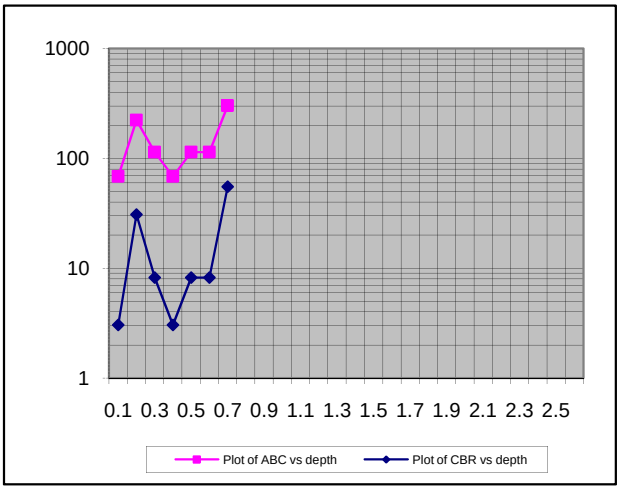
Client: njs - JICA

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 1

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	10	10	223	31
0.3	4	25	114	8
0.4	2	50	68	3
0.5	4	25	114	8
0.6	4	25	114	8
0.7	15	7	301	55
0.8	Refusal or			
0.9	Rebounce on			
1	bedrock at			
1.1	0.700mm depth			
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage Upgrading

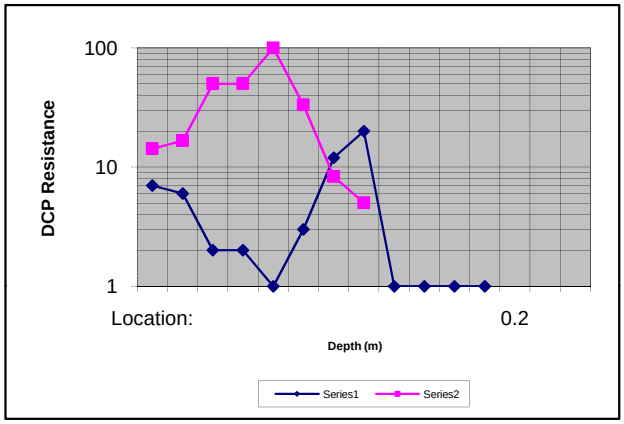
Location: KilaKila STP

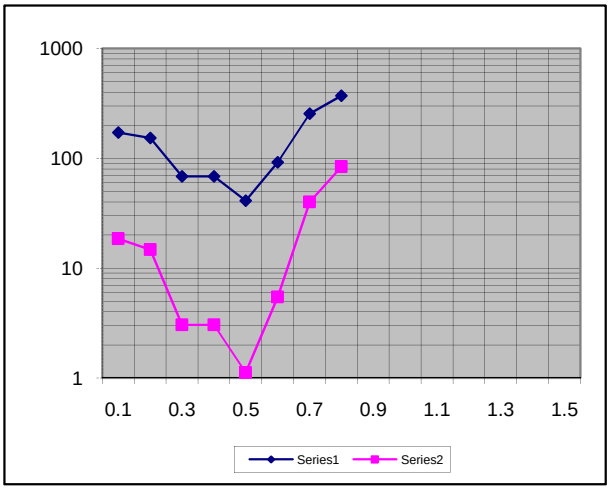
Client: njs - JICA

Job No.: NGTS/01011
Date: March, 2011

DCP 2

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	7	14	172	18
0.2	6	17	153	15
0.3	2	50	68	3
0.4	2	50	68	3
0.5	1	100	41	1
0.6	3	33	92	5
0.7	12	8	255	40
0.8	20	5	372	84
0.9	Refusal or			
1	Rebounce on			
1.1	bedrock at			
1.2	0.800mm			
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage Upgrading

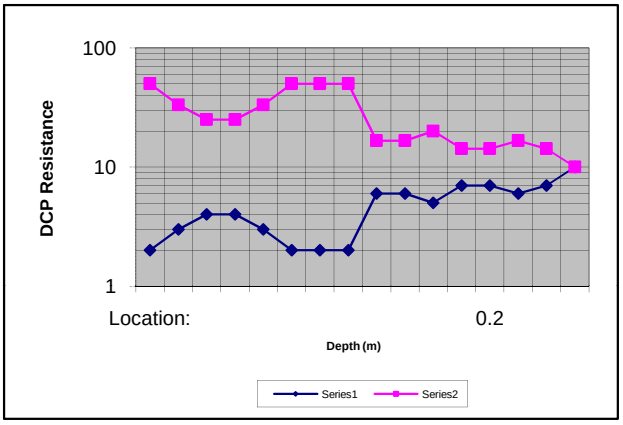
Location: KilaKila STP

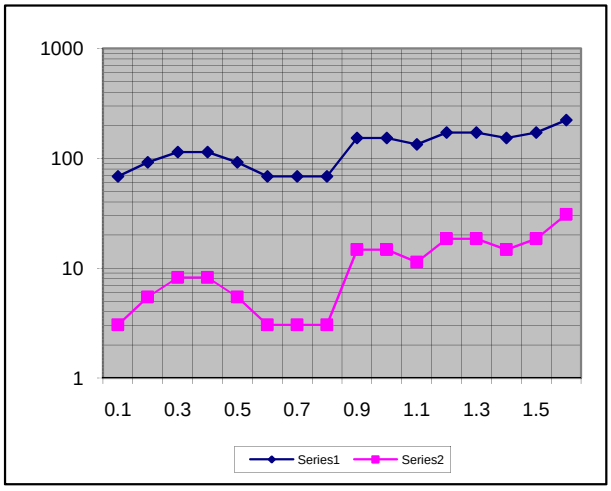
Client: njs - JICA

Job No.: NGTS/01011
Date: March, 2011

DCP 3

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	3	33	92	5
0.3	4	25	114	8
0.4	4	25	114	8
0.5	3	33	92	5
0.6	2	50	68	3
0.7	2	50	68	3
0.8	2	50	68	3
0.9	6	17	153	15
1	6	17	153	15
1.1	5	20	134	11
1.2	7	14	172	18
1.3	7	14	172	18
1.4	6	17	153	15
1.5	7	14	172	18
1.6	10	10	223	31
1.7	20	5	372	84
1.8	Refusal or			
1.9	Rebounce on			
2.0	bedrock at			
2.1	1.7m depth			
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage Upgrading

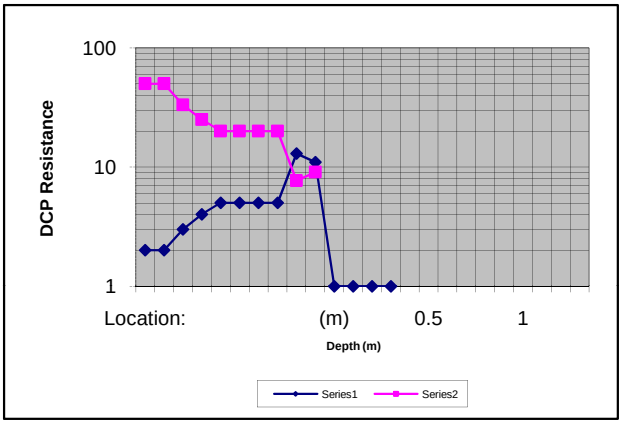
Location: KilaKila STP

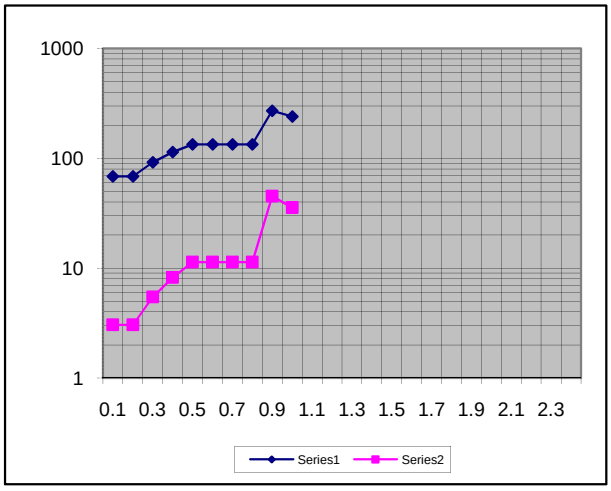
Client: njs - JICA

Job No.: NGTS/01011
Date: March, 2011

DCP 4

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	2	50	68	3
0.3	3	33	92	5
0.4	4	25	114	8
0.5	5	20	134	11
0.6	5	20	134	11
0.7	5	20	134	11
0.8	5	20	134	11
0.9	13	8	271	45
1	11	9	240	35
1.1	Refusal or			
1.2	Rebounce on			
1.3	bedrock at			
1.4	1.0m depth			
1.5				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				
2.4				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage Upgrading

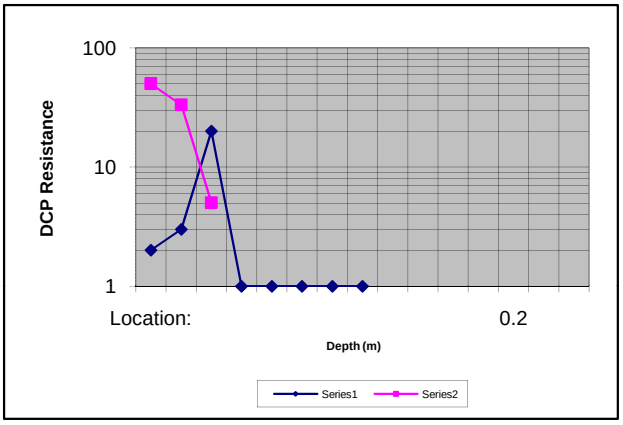
Location: KilaKila STP

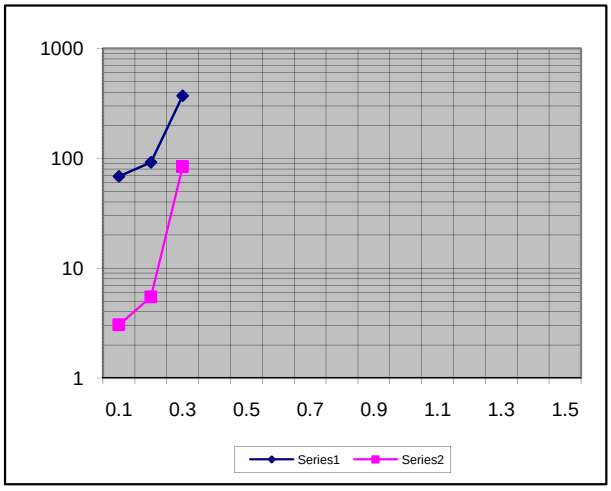
Client: njs - JICA

Job No.: NGTS/01011
Date: March, 2011

DCP 5

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	3	33	92	5
0.3	20	5	372	84
0.4	Refusal or			
0.5	Rebounce on			
0.6	bedrock at			
0.7	0.3m depth			
0.8	Rocky area			
0.9				
1				
1.1				
1.2				
1.3				
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: Port Moresby Sewerage System Upgrading

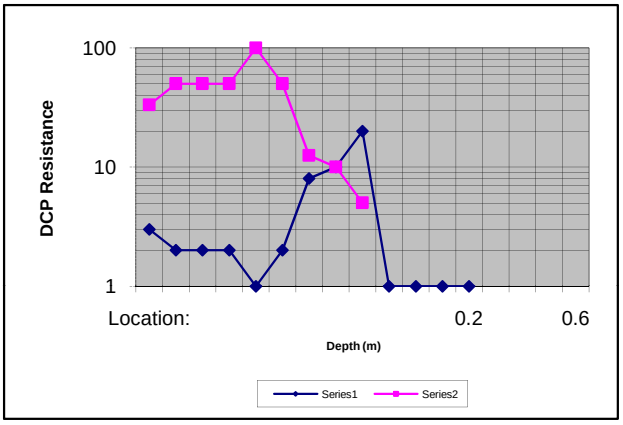
Location: Kila Kila STP

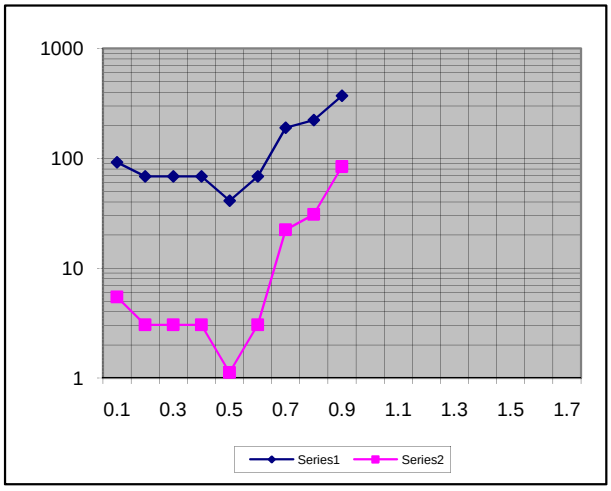
Client: njs - JICA

Job No.: NGTS/01011
Date: March, 2011

DCP 6

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	3	33	92	5
0.2	2	50	68	3
0.3	2	50	68	3
0.4	2	50	68	3
0.5	1	100	41	1
0.6	2	50	68	3
0.7	8	13	190	22
0.8	10	10	223	31
0.9	20	5	372	84
1	Refusal or			
1.1	Rebounce on			
1.2	bedrock at			
1.3	0.900m			
1.4				
1.5				
1.6				
1.7				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

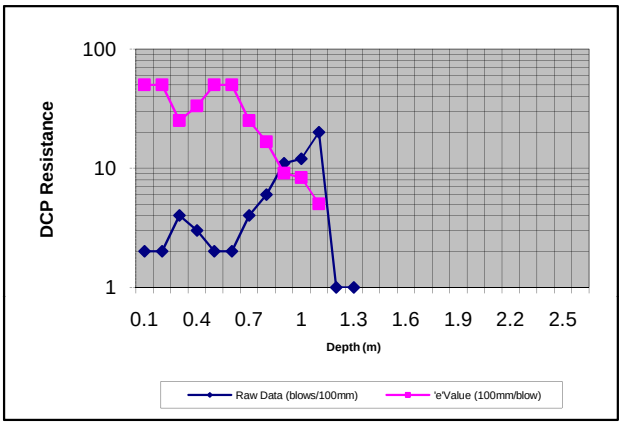
Location: **Morata STP**

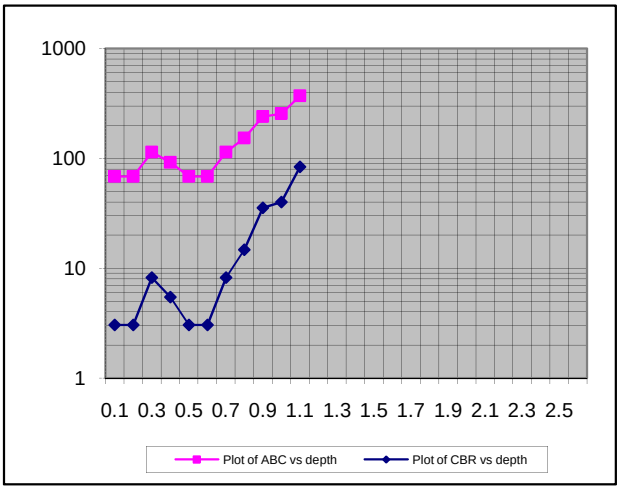
Client: **njs - JICA**

Job No: NGTS/01011
Date: March, 2011

DCP TEST # 1

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	2	50	68	3
0.3	4	25	114	8
0.4	3	33	92	5
0.5	2	50	68	3
0.6	2	50	68	3
0.7	4	25	114	8
0.8	6	17	153	15
0.9	11	9	240	35
1	12	8	255	40
1.1	20	5	372	84
1.2	Refusal at			
1.3	1.1m depth			
1.4				
1.5				
1.6				
1.7				
1.8				
1.9				
2				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3				
3.1				





APPENDIX B

DCP 'e' Values, California Bearing Ratio (CBR) & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

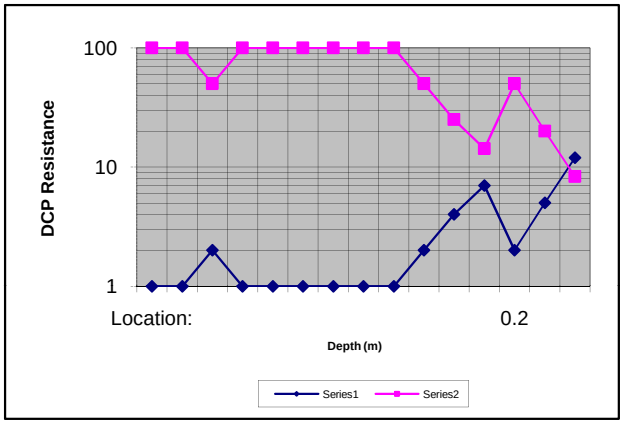
Location: **Morata STP**

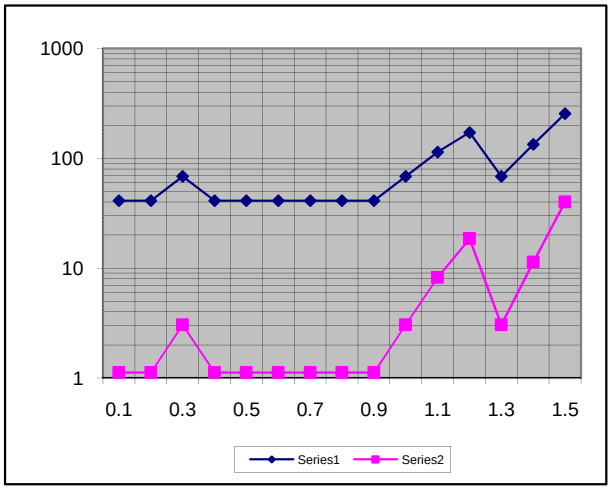
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

DCP 2

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	1	100	41	1
0.2	1	100	41	1
0.3	2	50	68	3
0.4	1	100	41	1
0.5	1	100	41	1
0.6	1	100	41	1
0.7	1	100	41	1
0.8	1	100	41	1
0.9	1	100	41	1
1	2	50	68	3
1.1	4	25	114	8
1.2	7	14	172	18
1.3	2	50	68	3
1.4	5	20	134	11
1.5	12	8	255	40
1.6	13	8	271	45
1.7	11	9	240	35
1.8	15	7	301	55
1.9	18	6	344	72
2	23	4	412	103
2.1	Refusal at			
2.2	2.0m depth			
2.3				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

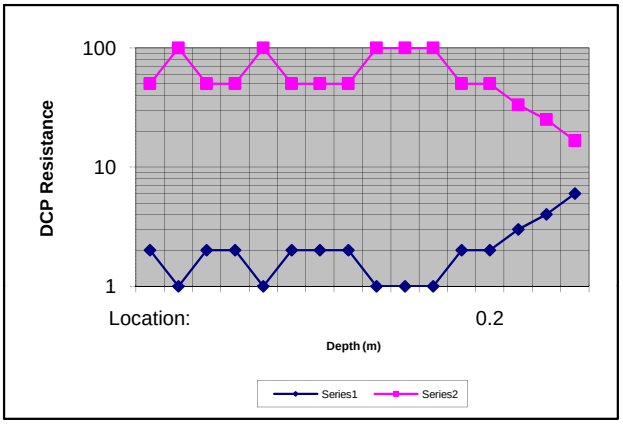
Location: **Morata STP**

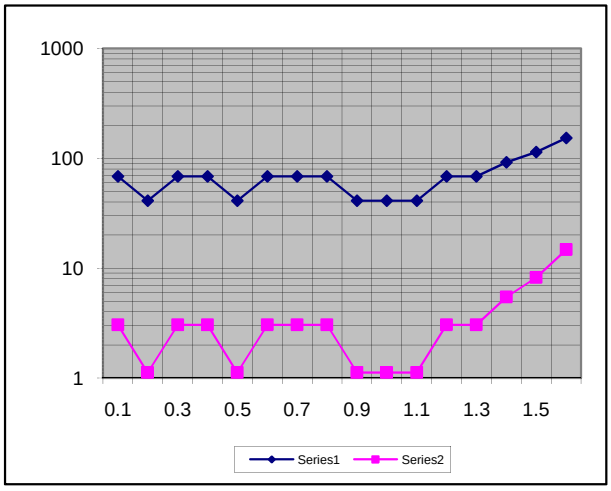
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

DCP 3

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	1	100	41	1
0.3	2	50	68	3
0.4	2	50	68	3
0.5	1	100	41	1
0.6	2	50	68	3
0.7	2	50	68	3
0.8	2	50	68	3
0.9	1	100	41	1
1	1	100	41	1
1.1	1	100	41	1
1.2	2	50	68	3
1.3	2	50	68	3
1.4	3	33	92	5
1.5	4	25	114	8
1.6	6	17	153	15
1.7	9	11	207	27
1.8	9	11	207	27
1.9	14	7	286	50
2.0	14	7	286	50
2.1	16	6	316	61
2.2	19	5	358	78
2.3	20	5	372	84
2.4	24	4	425	109
2.5	Refusal at			
2.6	2.4m depth			
2.7				
2.8				
2.9				
3.0				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

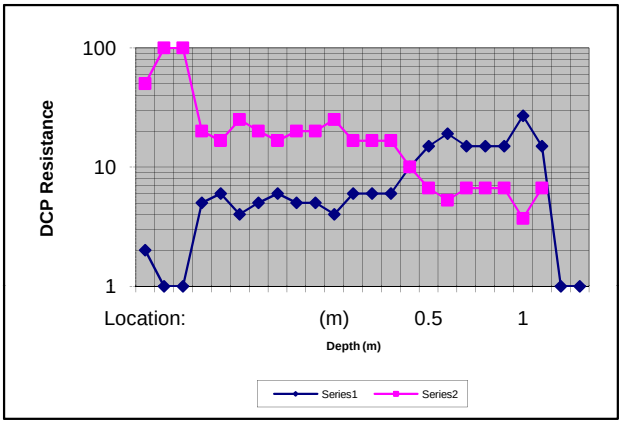
Location: **Morata STP**

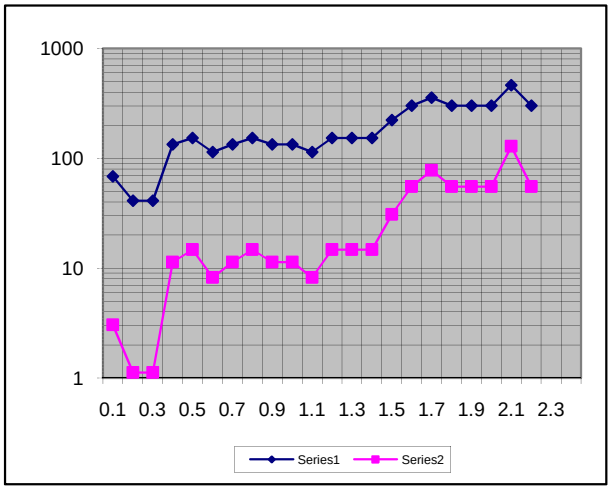
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

DCP 4

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	1	100	41	1
0.3	1	100	41	1
0.4	5	20	134	11
0.5	6	17	153	15
0.6	4	25	114	8
0.7	5	20	134	11
0.8	6	17	153	15
0.9	5	20	134	11
1	5	20	134	11
1.1	4	25	114	8
1.2	6	17	153	15
1.3	6	17	153	15
1.4	6	17	153	15
1.5	10	10	223	31
1.6	15	7	301	55
1.7	19	5	358	78
1.8	15	7	301	55
1.9	15	7	301	55
2	15	7	301	55
2.1	27	4	464	129
2.2	15	7	301	55
2.3	Refusal at			
2.4	2.2m depth			





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

Niawang Geotech

Project: **Port Moresby Sewerage Upgrading**

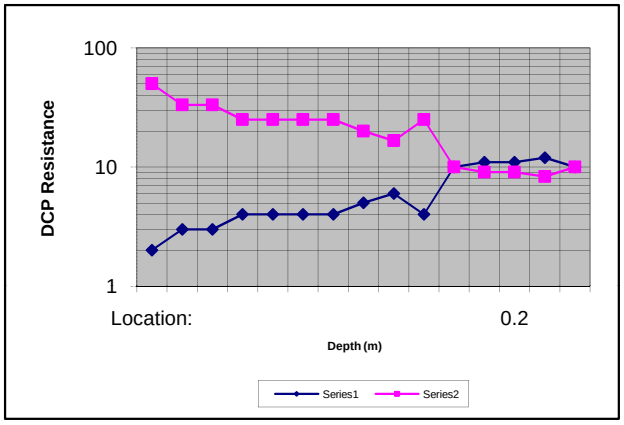
Location: **Morata STP**

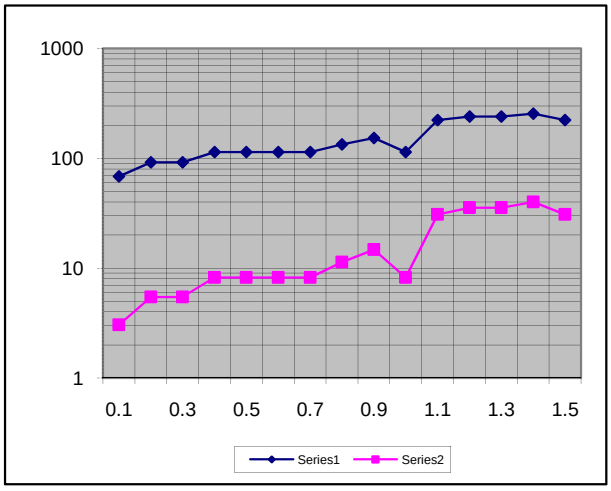
Client: **njs - JICA**

Job No.: NGTS/01011
Date: March, 2011

DCP 5

Depth (m)	Field Data (Blw/100mm)	e' Value (100mm/Blw)	ABC (kPa)	CBR (%)
0.1	2	50	68	3
0.2	3	33	92	5
0.3	3	33	92	5
0.4	4	25	114	8
0.5	4	25	114	8
0.6	4	25	114	8
0.7	4	25	114	8
0.8	5	20	134	11
0.9	6	17	153	15
1	4	25	114	8
1.1	10	10	223	31
1.2	11	9	240	35
1.3	11	9	240	35
1.4	12	8	255	40
1.5	10	10	223	31
1.6	19	5	358	78
1.7	Refusal at			
1.8	1.6m depth			
1.9				
2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				
3.2				
3.3				
3.4				
3.5				





APPENDIX B

DCP 'e' Values & Allowable Bearing Capacity (ABC) vs Depth

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs – JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Kanudi New Pump Station # 1				
Sample No.	2011 - 1	2011 - 2	2011 - 3		
Location:	TP # 01	TP # 01	TP # 01		
Chainage:					
Offset/					
Depth: (m)	0.300 – 0.500	0.500 – 0.700	0.700 – 1.500		
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm			***100***		
26.5mm	***100***	***100***	***81***		
19.0mm	***93***	***81***	***67***		
13.2mm	***87***	***62***	***58***		
9.50mm	***83***	***47***	***52***		
6.70mm	***76***	***33***	***46***		
4.75mm	***71***	***24***	***41***		
2.36mm	***62***	***15***	***35***		
1.18mm	***56***	***11***	***32***		
600um	***50***	***9.0***	***28***		
425um	***47***	***9.0***	***27***		
300um	***45***	***8.0***	***26***		
150um	***38***	***7.0***	***22***		
75um	***33***	***6.0***	***18***		

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Number: 10
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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To: njs - JICA				Sheet (1) of (1)	
Project: Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD					
Other Details: Idubada New Pump Station # 2					
Sample No.	2011 - 1	2011 - 2			
Location:	TP # 02	TP # 02			
Chainage:					
Offset/					
Depth: (m)	0.0 – 0.800	0.800 – 2.00			
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm	***100***				
26.5mm	***96***	***100***			
19.0mm	***88***	***96***			
13.2mm	***81***	***89***			
9.50mm	***79***	***86***			
6.70mm	***74***	***83***			
4.75mm	***70***	***80***			
2.36mm	***64***	***74***			
1.18mm	***58***	***69***			
600um	***54***	***63***			
425um	***53***	***61***			
300um	***52***	***59***			
150um	***50***	***51***			
75um	***49***	***47***			

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Elevala New Pump Station # 03				
Sample No.	2011 - 1	2011 - 2			
Location:	TP # 03	TP # 03			
Chainage:					
Offset/					
Depth: (m)	0.400 – 0.800	0.800 – 1.5			
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm		***100***			
26.5mm	***100***	***87***			
19.0mm	***91***	***80***			
13.2mm	***88***	***75***			
9.50mm	***84***	***71***			
6.70mm	***79***	***66***			
4.75mm	***74***	***61***			
2.36mm	***65***	***52***			
1.18mm	***55***	***46***			
600um	***47***	***40***			
425um	***43***	***38***			
300um	***40***	***37***			
150um	***33***	***33***			
75um	***28***	***31***			

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To: njs - JICA			Sheet (1) of (1)		
Project: Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD					
Other Details: Davara Pump Station # 5					
Sample No.	2010 - 1	2011 - 2	2011 - 3		
Location:	TP # 5	TP # 5	TP # 5		
Chainage:					
Offset/					
Depth: (m)	0.500 – 0.800	0.800 – 1.500	1.500 – 2.5		
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm	***100***				
19.0mm	***97***				
13.2mm	***91***				
9.50mm	***87***				
6.70mm	***82***				
4.75mm	***76***	***100***	***100***		
2.36mm	***67***	***97***	***99***		
1.18mm	***60***	***95***	***94***		
600um	***54***	***91***	***65***		
425um	***53***	***83***	***39***		
300um	***51***	***54***	***23***		
150um	***48***	***15***	***4***		
75um	***45***	***10***	***2***		

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Hanuabada New Pump Station # 4				
Sample No.	2011 - 1	2011 - 2	2011 - 3		
Location:	TP # 4	TP # 4	TP # (4)		
Chainage:					
Offset/					
Depth: (m)	0.300 – 0.800	1.3 – 2.4	2.4 – 3.00		
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm	***100***	***100***	***100***		
19.0mm	***94***	***93***	***94***		
13.2mm	***92***	***86***	***86***		
9.50mm	***89***	***84***	***81***		
6.70mm	***85***	***80***	***77***		
4.75mm	***80***	***77***	***71***		
2.36mm	***67***	***73***	***63***		
1.18mm	***52***	***69***	***56***		
600um	***40***	***66***	***49***		
425um	***34***	***65***	***46***		
300um	***30***	***64***	***42***		
150um	***23***	***60***	***31***		
75um	***20***	***57***	***29***		

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Lawes Road Pump Station # 6				
Sample No.	2011 - 1	2011 - 2	2011 - 3		
Location:	TP # 6	TP # 6	TP # 6		
Chainage:					
Offset/					
Depth: (m)	0.0 – 0.700	0.700 – 1.4	1.4 – 3.5		
Classification:	Silty Sandy **GRAVEL**	Silty **SAND**	***SAND***		

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm	***100***				
19.0mm	***87***				
13.2mm	***75***				
9.50mm	***67***				
6.70mm	***60***				
4.75mm	***53***	***100***	***100***		
2.36mm	***42***	***99***	***99***		
1.18mm	***33***	***87***	***92***		
600um	***22***	***46***	***62***		
425um	***16***	***32***	***42***		
300um	***11***	***22***	***28***		
150um	***2***	***8***	***4***		
75um	***0***	***6***	***2***		

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage system Upgrading – PORT MORESBY, NCD				
Other Details:	Kila Police Rep Pump Station # 7				
Sample No.	2011 - 1				
Location:	TP # 7				
Chainage:					
Offset/					
Depth: (m)	0.0 – 1.4				
Classification:					

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm	***100***				
19.0mm	***95***				
13.2mm	***90***				
9.50mm	***86***				
6.70mm	***82***				
4.75mm	***78***				
2.36mm	***72***				
1.18mm	***66***				
600um	***61***				
425um	***58***				
300um	***55***				
150um	***43***				
75um	***40***				

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Konebada New Pump Station # 8				
Sample No.	2011 - 1	2011 - 2			
Location:	TP # 8	TP # 8			
Chainage:					
Offset/					
Depth: (m)	0.0 – 0.600	0.600 – 2.2			
Classification:	Sandy Gravelly **SILT**	Silty **SAND**			

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm	***100***				
19.0mm	***97***				
13.2mm	***94***				
9.50mm	***90***				
6.70mm	***87***				
4.75mm	***83***	***100***			
2.36mm	***77***	***98***			
1.18mm	***73***	***96***			
600um	***69***	***83***			
425um	***66***	***58***			
300um	***63***	***42***			
150um	***58***	***20***			
75um	***56***	***16***			

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Gabutu New Pump Station # 9				
Sample No.	2011 - 1	2011 - 2			
Location:	TP # 9	TP # 9			
Chainage:					
Offset/					
Depth: (m)	0.0 – 1.2	1.2 – 2.1			
Classification:	Sandy **CLAY**	Sandy **CLAY**			

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm					
19.0mm	***100***				
13.2mm	***99***				
9.50mm	***95***				
6.70mm	***92***				
4.75mm	***90***	***100***			
2.36mm	***83***	***89***			
1.18mm	***78***	***79***			
600um	***75***	***71***			
425um	***73***	***69***			
300um	***72***	***67***			
150um	***68***	***63***			
75um	***65***	***57***			

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DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System – PORT MORESBY, NCD				
Other Details:	Kila Kila New Pump Station # 10				
Sample No.	2011 - 1	2011 - 2			
Location:	TP # 10	TP # 10			
Chainage:					
Offset/					
Depth: (m)	0.0 – 1.4	1.4 – 3.1			
Classification:	Gravelly Sandy **CLAY**	Sandy **CLAY**			

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm					
26.5mm					
19.0mm					
13.2mm					
9.50mm					
6.70mm					
4.75mm	***100***	***100***			
2.36mm	***91***	***98***			
1.18mm	***87***	***96***			
600um	***83***	***95***			
425um	***81***	***94***			
300um	***80***	***93***			
150um	***75***	***91***			
75um	***69***	***90***			

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (2)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Kila Kila STP				
Sample No.	2011 - 1	2011 - 2	2011 - 3	2011 - 4	2011 - 5
Location:	BH/TP # 1	BH/TP # 1	BH/TP # 2	BH/TP # 3	BH/TP # 3
Chainage:					
Offset/					
Depth: (m)	0.0 – 300	700 – 1.3	0.0 – 300	0.0 – 400	400 - 1.7
Classification:	Sandy Gravelly **CLAY**	Gravelly Sandy **CLAY**	Sandy **GRAVEL**	Sandy Gravelly **CLAY**	Sandy Gravelly **CLAY**

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm			***100***		
37.5mm			***51***	***100***	***100***
26.5mm	***100***		***38***	***80***	***97***
19.0mm	***95***		***31***	***80***	***91***
13.2mm	***93***		***27***	***79***	***88***
9.50mm	***89***		***22***	***77***	***84***
6.70mm	***85***		***18***	***73***	***80***
4.75mm	***82***	***100***	***16***	***71***	***76***
2.36mm	***76***	***97***	***12***	***67***	***69***
1.18mm	***71***	***95***	***9***	***64***	***63***
600um	***68***	***93***	***8***	***61***	***59***
425um	***67***	***92***	***7***	***60***	***58***
300um	***65***	***92***	***6***	***59***	***57***
150um	***63***	***90***	***3***	***56***	***53***
75um	***61***	***88***	***2***	***55***	***49***

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (2) of (2)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Kila Kila STP				
Sample No.	2011 - 6	2011 - 7	2011 - 8	2011 - 9	
Location:	***BH/TP # 3***	BH/TP # 4	BH/TP # 6	BH/TP # 3	
Chainage:					
Offset/					
Depth: (m)	1.7 – 2.1	200 – 700	200 – 550	550 - 900	
Classification:	Sandy Gravelly **CLAY**	Sandy Gravelly **CLAY**	Sandy **CLAY**	Sandy Gravelly **CLAY**	
A. S Sieves Percent Passing (AS 1289.3.6.1-1995)					
75.0mm					
53.0mm					
37.5mm				***100***	
26.5mm		***100***		***93***	
19.0mm		***96***		***90***	
13.2mm		***92***	***100***	***89***	
9.50mm		***86***	***99***	***87***	
6.70mm		***82***	***98***	***84***	
4.75mm	***100***	***79***	***97***	***82***	
2.36mm	***97***	***73***	***95***	***79***	
1.18mm	***95***	***69***	***92***	***77***	
600um	***95***	***66***	***91***	***76***	
425um	***94***	***65***	***90***	***75***	
300um	***93***	***64***	***89***	***75***	
150um	***90***	***61***	***85***	***73***	
75um	***90***	***59***	***82***	***70***	

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PNGLAS.REG.0010/01/23
(13/08/08 wkg)

DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To:	njs - JICA			Sheet (1) of (1)	
Project:	Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD				
Other Details:	Morata				
Sample No.	2011 - 1	2011 - 2	2011 - 3	2011 - 4	2011 - 5
Location:	BH/TP # 3	BH/TP # 3	BH/TP # 3	BH/TP # 3	BH/TP # 3
Chainage:					
Offset/					
Depth: (m)	0.0 – 0.200	0.200 – 0.400	0.400 – 0.800	0.800 – 1.200	1.200 – 2.200
Classification:	Sandy **CLAY**	Clayey **SAND**	Sandy ***CLAY***	Gravelly Sandy **CLAY**	Sandy **CLAY**
A. S Sieves Percent Passing (AS 1289.3.6.1-1995)					
75.0mm					
53.0mm					
37.5mm					
26.5mm					
19.0mm				***100***	
13.2mm	***100***		***100***	***98***	
9.50mm	***99***	***100***	***99***	***98***	
6.70mm	***98***	***99***	***97***	***96***	
4.75mm	***96***	***97***	***96***	***95***	100
2.36mm	***90***	***92***	***93***	***88***	99
1.18mm	***79***	***80***	***89***	***75***	93
600um	***69***	***64***	***85***	***63***	87
425um	***64***	***57***	***84***	***59***	85
300um	***62***	***51***	***82***	***57***	84
150um	***57***	***43***	***80***	***52***	82
75um	***56***	***41***	***79***	***50***	81

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DEPARTMENT OF WORKS
MATERIALS TESTING LABORATORY
TEST SUMMARY
(Particle Size Distribution)

Report To: njs - JICA				Sheet (2) of (2)	
Project: Port Moresby Sewerage System Upgrading – PORT MORESBY, NCD					
Other Details: Morata STP Site					
Sample No.	2011 - 1				
Location:	TP # 2				
Chainage:					
Offset/					
Depth: (m)	1.200 – 2.500				
Classification:	Sandy **GRAVEL**				

A. S Sieves Percent Passing (AS 1289.3.6.1-1995)

75.0mm					
53.0mm					
37.5mm	***100***				
26.5mm	***73***				
19.0mm	***72***				
13.2mm	***70***				
9.50mm	***70***				
6.70mm	***68***				
4.75mm	***65***				
2.36mm	***56***				
1.18mm	***47***				
600um	***40***				
425um	***37***				
300um	***35***				
150um	***30***				
75um	***26***				

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RESEARCH & MATERIALS TESTING BRANCH
MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO, NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Kanudi New Pump station # 1 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 1 0.300 - 0.500	**GP:** Sandy Clayey **GRAVEL**, low plasticity, Grey.	33	29	38	25.8	47	20	27	5.5					
11 - 02	DCP/TP 1 0.500 - 0.700	**GW:** Sandy Silty **GRAVEL**, non - plasticity, Grey.	6	9	85	21.1	Non - Plasticity								
11 - 03	DCP/TP 1 0.700 - 1.500	**GW:** Sandy Silty **GRAVEL**, non - plasticity, Grey.	18	17	65	29.8	Non - Plasticity								

Remarks:

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PNGLAS.REG.0010/87/01/23
(Revised 11/05/08)

KEY:

CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

DEPARTMENT OF WORKS (HQ)
RESEARCH & MATERIALS TESTING BRANCH
MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO , NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Idubada New Pump station # 2 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 2 0.0 - 800	Sandy Gravelly CLAY, high plasticity, black.	49	15	36	23.5	48	23	25	13					
11 - 02	DCP/TP 2 0.800 - 2.00	Gravelly Sandy CLAY, high plasticity, Grey.	46	28	26	35.2	52	22	30	11					

Remarks:

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KEY:

CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

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MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO, NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Elevala New Pump station # 03 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 03 0.400 - 0.800	Silty Gravelly SAND, low plasticity, brown.	28	37	35	12.7									
11 - 02	DCP/TP 03 0.800 - 1.500	Sandy Silty GRAVEL gravel, non - plasticity,white.	31	21	48	23.5									
11 - 03	DCP/TP 03 1.500 - 2.100	CLAY of high plasticity, Black				28.5	75	31	44	13.5					

Remarks:

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(Revised 11/05/08)

KEY:

CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

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MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO, NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Hanubada New Pump station # 4 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 4 0.300 - 800	Silty Gravelly SAND, medium plasticity, brown.	20	47	33	15.5	37	18	19	8.5					
11 - 02	DCP/TP 4 1.3 - 2.4	Sandy Gravelly CLAY, high plasticity,brown	57	16	27	24.1	59	23	36	14					
11 - 03	DCP/TP 4 2.4 - 3.0	Silty Sandy GRAVEL, medium plasticity, black	29	34	37	26.1	45	20	25	6.5					

Remarks:

.....***Date*** ..../ ..../....

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KEY:

CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

DEPARTMENT OF WORKS (HQ)
RESEARCH & MATERIALS TESTING BRANCH
MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO, NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Davara Pump station # 05 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 05 0.500 - 0.800	Sandy Gravelly SILT, non plasticity, brown.	45	22	33	24.7	Non - Plastic								
11 - 02	DCP/TP 05 0.800 - 1.500	Silty SAND with trace of gravel, non - plasticity,white.	10	87	3	10.5	Non - Plastic								
11 - 03	DCP/TP 05 1.500 - 2.500	SAND with trace of silt and gravel, non - plasticity,white.	2	97	1	18.5	Non - Plastic								

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KEY:

CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

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RESEARCH & MATERIALS TESTING BRANCH
MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO , NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Lawes Road Pump station # 6 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 6 0.0 - 700	Silty Sandy GRAVEL, non plasticity, grey.	10	32	58	10.3	Non - Plastic								
11 - 02	DCP/TP 6 0.700 - 1.4	Silty SAND with trace of gravel, non - plasticity, white	16	82	2	7.5	Non - Plastic								
11 - 03	DCP/TP 6 1.4 - 3.5	SAND with trace of silt and gravel, non - plasticity, white	2	97	1	5.7	Non - Plastic								

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PNGLAS.REG.0010/87/01/23
(Revised 11/05/08)

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CI/Si	***= Clay / Silt***	***LS***	***= Linear Shrinkages***
Sa	***= Sand***	***PD***	***= Soil Particle Density***
LL	***= Liquid Limits***	***OPT w (%)***	***= Optimum Moisture Content***
PL	***= Plastic Limits***	***CBR***	***= California Bearing Ratio***
Gr	***= Gravel***	***DD***	***= Dry Density***
PI	***= Plasticity Index***	***w***	***= Moisture***

DEPARTMENT OF WORKS (HQ)
RESEARCH & MATERIALS TESTING BRANCH
MATERIALS TESTING LABORATORY
P. O. BOX 1108, BOROKO , NCD, PNG
TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Kila Police Rep Pump station # 7- NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 7 0.0 - 1.4	Gravelly Sandy CLAY, high plasticity, brown.	40	32	28	19.6	79	29	50	17.1					

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Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Konebada New Pump station # 8 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 8 0.0 - 600	Sandy Gravelly SILT, high plasticity, brown.	56	21	23	24.1	54	23	31	12					
11 - 02	DCP/TP 8 0.600 - 2.200	Silty SAND with trace of gravel, non - plasticity,white.	16	82	2	9.7	Non - Plastic								

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TEL: (675) 324 1372 FAX: (675) 324 1374

Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Gabutu New Pump station # 9 - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*April 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 15 0.0 - 1.2	**CI:** Gravelly Sandy CLAY, medium plasticity, brown.	67	21	46	33.9	67	21	46	10					
11 - 02	DCP/TP 15 1.2 - 2.1	**CL:** Gravelly Sandy CLAY low - medium plasticity, grey.	57	32	11	32.2	33	19	14	10					

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Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	KilaKila - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*March 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 1 0.0 - 300	Sandy Gravelly **CLAY,** high plasticity, brown.	61	15	24	28.8	70	33	37	13.5					
11 - 02	DCP/TP 1 0.700 - 1.3	Sandy **CLAY** with trace of gravel, high plasticity, brown.	88	9	3	34.1									
11 - 03	DCP/TP 2 0.0 - 0.300	Sandy **GRAVEL** with trace of clay, high plasticity, brown.	2	10	88	28.8	56	30	26	13.5					
11 - 04	DCP/TP 3 0.0 - 400	Sandy Gravelly **CLAY,** high plasticity, brown.	55	12	33	27.4	66	34	31	11					
11 - 05	DCP/TP 3 400 - 1.7	Sandy Gravelly **CLAY,** intermediate to high plasticity, brown.	49	20	31	24.9	49	24	25	8.5					
11 - 06	DCP/TP 3 1.7 - 2.1	Sandy **CLAY** with trace of gravel, high plasticity,white.	90	7	3	35.1									
11 - 07	DCP/TP 4 200 - 700	Sandy Gravelly **CLAY,** high plasticity, brown.	59	14	27	27.3	61	26	35	9.5					

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Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	KilaKila - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*March 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 08	DCP/TP 6 200 - 550	Sandy **CLAY** with trace of gravel, high plasticity,white.	82	13	5	34.8									
11 - 09	DCP/TP 6 550 - 900	Sandy Gravelly **CLAY,** intermediate to high plasticity, brown.	70	9	21	23.6	49	21	28	15					

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Client:	njs - JICA	*Job No:*	*J11/P/LTS01*
Project:	Port Moresby Sewerage System Upgrading	*Lab Test No:*	
Location:	Morata - NCD	*Sampled By:*	*NGTS*
Test Methods:	*AS.1289.2.1.1,3.6.1,3.1,3.4.1*	*Sampling Date:*	*March 2011*

LABORATORY TEST RESULTS

Sample No.	Location Depth (m)	Material Description	Particle Size Distribution			Atterberg					Compaction		CBR		
			CI/Si %	Sa %	Gr %	Nat %	LL %	PL %	PI %	LS %	MDD t/m3	Opt w%	CBR %	DD t/m3	w %
11 - 01	DCP/TP 3 0.0 - 200	Gravelly Sandy CLAY, high plasticity, black.	56	34	10	24.5	60	23	37	15					
11 - 02	DCP/TP 3 0.200 - 0.400	Gravelly Clayey SAND gravel, intermediate to high plas black.	41	51	8	23.5	49	21	28	15					
11 - 03	DCP/TP 3 0.400 - 0.800	Sandy CLAY with some gravel very high plasticity, grey.	79	14	7	34.3	72	24	48	16.5					
11 - 04	DCP/TP 3 0.800 - 1.200	Gravelly Sandy CLAY, high plasticity, grey.	50	38	12	38.9	55	24	31	15.5					
11 - 05	DCP/TP 3 1.200 - 2.200	Sandy CLAY with trace gravel high plasticity, grey.	81	18	1	34.4	69	23	46	12.5					
11 - 06	DCP/TP 3 2.200 - 3.5	Gravelly Sandy **CLAY**, high plasticity, grey.	52	31	17	22.0	44	17	27	12.5					
11 - 07	DCP/TP 2 1.200 - 2.5	Gravelly Sandy **CLAY**, high plasticity, grey.	26	30	44	10.7	38	19	19	8					

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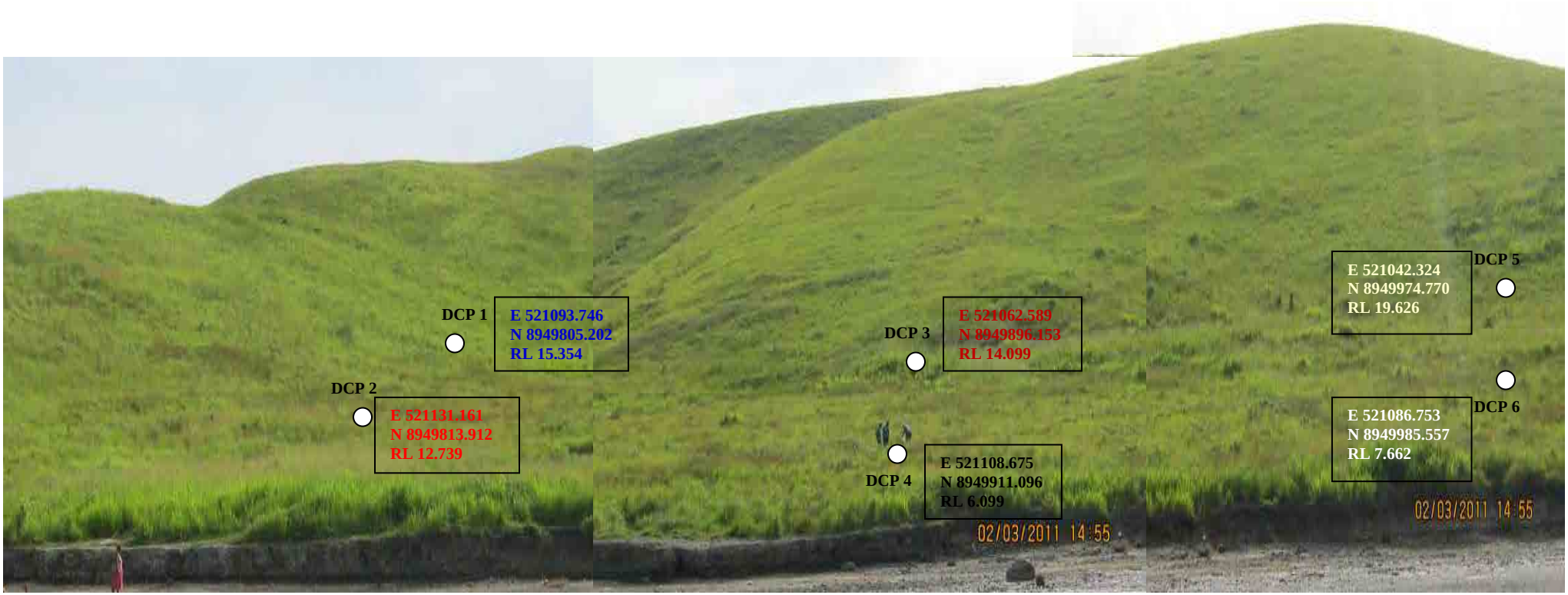

Photograph 1 : General Landscape of the KilaKila STP Project Site and the Test Location.

Photograph 2 : General Landscape of the Morata STP Project Site and the Test Location

Site Photos of Pumping Station No: 1 - Kanudi

Existina Surface view

Bore Hole

Backhoe Excavation

Drilling Rig Setup before Land dispute

Site Photos of Pumping Station No: 2 - Idubada

Site Photos of Pumping station No: 3 - Elevala

Surface view of the PS Location

Inter Oil pipeline lying 3metres away from the proposed location

DCP Test done on Site

Excavation done using a backhoe

Site Photo of Pumping Station No: 4 - Hanuabada

Excavation at PS Number 4

Site Photos of Pump Station No : 5 - Davara

Existing pumping station

Excavation at the car park

Sewerage outlet to the sea

Excavation of car park fill

Site Photos of Pumping Station No: 6 – Lawes Road

Existing Surface View

Excavation

DCP Testing

Wash Boring

Site Photos of Pumping Station No: 7 – Kila Police Barracks

Existing Surface

Existing Pumping Station outlet

Site Photos of Pumping Station No. 8 - Konebada

DCP Testing

Site Photo of Pumping Station No. 9 - Gabutu

Excavation at PS No: 9

Site Photos of Pumping station No: 10 – Horse Camp

Access Road to the Pump Station

PS surrounded by residents

Stand Pipe for Piezometer Measurement

Wash Boring at 8.0 meters

Site Photos of Kila Kila STP

Calcurious mudstone at shoreline during low tide

Photos taken during Low Tide

Site Photos for Morata STP

Over View of the Morata STP Site

Bore Hole

Drilling Rig

Stand Pipe for Piezometer Measurement