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CENTRAL LABORATORY : 10 St Pauls Road, East London, 5201, Tel: 043 722 5420 / 722 8565, Fax: 043 743 9942, P O Box 346, East London, 5200

OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Port Elizabeth, Lusaka - Zambia

Reference: GOBA (PTY) LTD - LUSIKISIKI SEWER AND SEWAGE TREATMENT PANT PHASE 1 - MT12991

28 November 2011

Goba (Pty) Ltd
P O Box 8245
NAHOON
5210

ATTENTION: MR J PETZER

Dear Sir

LUSIKISIKI SEWER AND SEWAGE TREATMENT PLANT – PHASE 1: MATERIALS INVESTIGATION REPORT

Controlab was appointed to do a materials investigation on the above-mentioned project. The investigation consisted of seven (7) trial pits and Dynamic Cone Penetrometer (DCP) tests (at each trial pit and in between trial pits – eleven (11) in total). The trial pits were profiled by a qualified Engineering Technician utilising “The Revised Guide to Soil Profiling for Civil Engineering Purposes in Southern Africa” produced by Jennings Brink & Williams. All the trial pits were hand excavated.

Disturbed samples of typical materials encountered in the various trial pits were tested for suitability for foundations, backfill and bedding materials. The DCP results as well as the test pit profiles will provide information with regards to the excavate ability of the materials.

All the test results sheets and profile log sheets are attached to this document.

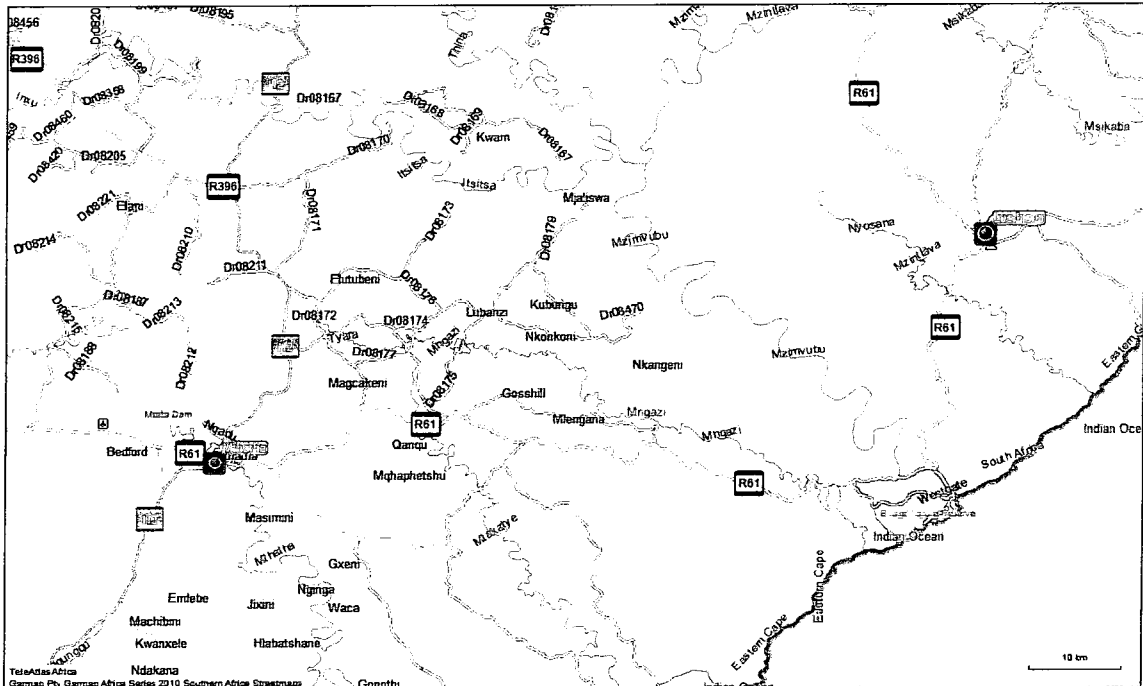
- **REGIONAL GEOLOGY**

The proposed water scheme will be situated on the southern and eastern sides of the town of Lusikisiki and falls within the OR Thambo District Municipality in the Eastern Cape Province. Lusikisiki is situated approximately 125km east of Mthatha.

According to the geological map number 2128 Mthatha published in 1979 by the Chief Director of Surveys and Mapping, the site under investigation falls within the Karoo sequence, embracing the Ecca group. The formations would generally consist of mudstones, sandstones, shale and tillite.

Lusikisiki normally receives about 874mm of rain per year, with most rainfall occurring mainly during summer. It receives the lowest rainfall (12mm) in July and the highest (124mm) in February. The average midday temperatures for Lusikisiki range from 20.2°C in July to 25.5°C in February. The region is the coldest during July when the mercury drops to 8°C on average during the night.

Wienerts climatic N number for the area is less than 2, which should indicate that the rocks would decompose implying that chemical weathering would dominate over mechanical weathering.

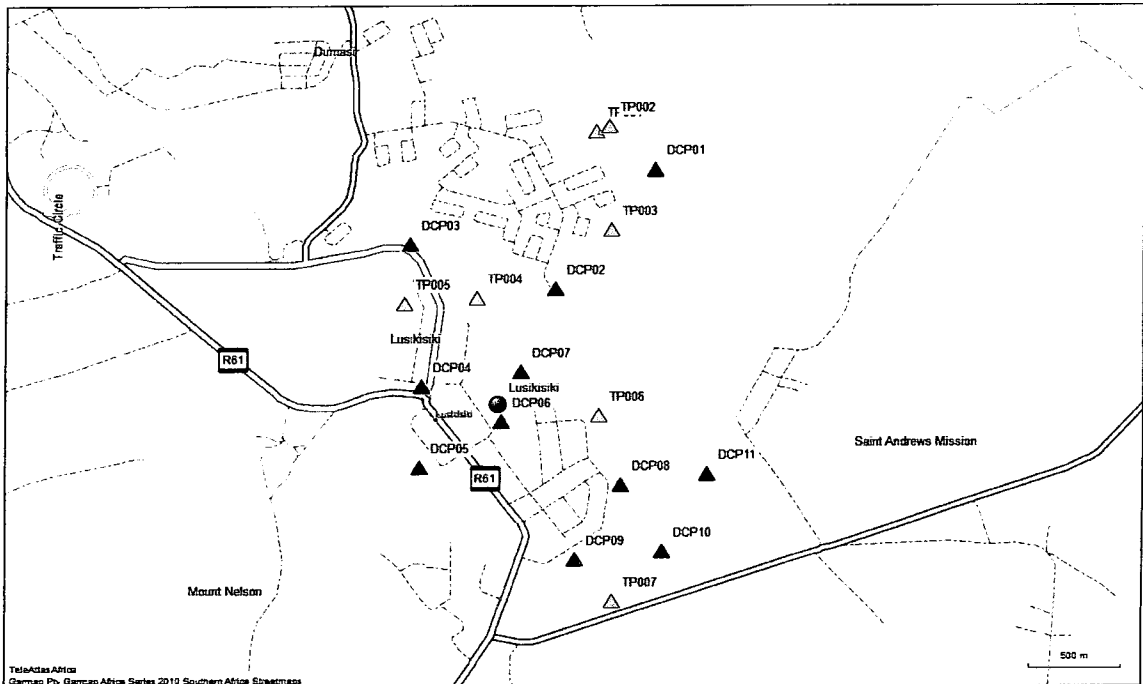


- **TEST PIT CO-ORDINATES**

Seven (7) pits were excavated by hand at the various positions for the pipeline and additional DCP tests were performed. The coordinates of these test pits and DCP positions are as follows:

➤ Trial Hole 1	S 31°21'07.9"	E 29°34'54.0"
➤ Trial Hole 2	S 31°21'06.9"	E 29°34'56.3"
➤ Trial Hole 3	S 31°21'25.2"	E 29°34'56.8"
➤ Trial Hole 4	S 31°21'37.2"	E 29°34'32.0"
➤ Trial Hole 5	S 31°21'38.2"	E 29°34'18.6"
➤ Trial Hole 6	S 31°21'58.2"	E 29°34'54.7"
➤ Trial Hole 7	S 31°22'30.9"	E 29°34'57.2"
➤ DCP 1 Ground Level	S 31°21'14.4"	E 29°35'04.9"
➤ DCP 2 Ground Level	S 31°21'35.6"	E 29°34'46.6"
➤ DCP 3 Ground Level	S 31°21'27.7"	E 29°34'19.7"
➤ DCP 4 Ground Level	S 31°21'53.0"	E 29°34'21.9"
➤ DCP 5 Ground Level	S 31°22'07.4"	E 29°34'21.6"
➤ DCP 6 Ground Level	S 31°21'59.3"	E 29°34'36.7"

➤	DCP 7 Ground Level	S 31°21'50.4"	E 29°34'40.3"
➤	DCP 8 Ground Level	S 31°22'10.4"	E 29°34'58.7"
➤	DCP 9 Ground Level	S 31°22'23.6"	E 29°34'50.4"
➤	DCP 10 Ground Level	S 31°22'22.1"	E 29°35'06.4"
➤	DCP 11 Ground Level	S 31°22'08.5"	E 29°35'14.7"



• **DCP RESULTS**

The DCP results can be used to determine the excavatability of the materials. A total of eighteen (18) DCP tests were performed and at two of the test positions DCP refusals were recorded at a depth in the order of 1400mm. All other tests were tested to depths of 1800mm.

All the DCP test sheets are attached to the document.

• **MATERIAL UTILIZATION**

Nine (9) samples of typical materials encountered on the project were tested to determine the Atterberg limits, grading and compactibility factor.

When analyzing the results in accordance to SABS1200 LB: Pipe (Bedding) the following notes can be made:

- The SABS specifies that the compactibility factor maximum is 0.4. All of the materials tested conformed to the compactibility requirement of the specification

- The SABS specifies that bedding shall be non-cohesive material that falls within the 0.6mm to 19.0mm grading envelope. The tests indicated PI values ranging between 3 to a maximum of 16. This implies that most of the material does not conform to the bedding requirement and provision for importing bedding material must be made in the tender document's schedule of quantities
- The SABS specifies that fill material must have a PI less than 10 and that all particle sizes be smaller than 30mm. Selected material conformed to this material requirement and it is recommended that allowance for the importation of fill material be made in the schedule of quantities for the sections where clayey materials were encountered.

POSITION	DEPTH	DESCRIPTION	GM	L L (%)	PI (%)	L S (%)	COMPACTABILITY
TP 1	0 - 1270	dk Br sdy st	0.49	16	5	2.0	
TP 2	0 - 1100	dk Br sdy st	0.53	18	3	1.5	
TP 3	0 - 700	dk Br sty s	1.01	18	6	2.5	0.20
TP 3	700 - 2000	dk Y O sdy cl	0.36	33	13	6.0	0.20
TP 4	470 - 1060	lt R Br dk O Ms + sty s	1.89	29	7	3.0	
TP 5	0 - 930	dk Br sdy cl	0.45	31	12	5.5	0.20
TP 5	1300 - 2000	lt Y O sdy cl	0.38	31	16	7.5	0.30
TP 6	480 - 1200	lt Y Br O Ferr + sdy st	0.47	21	9	4.5	0.20
TP 7	0 - 1160	lt Br sdy cl	0.48	29	10	5	0.10

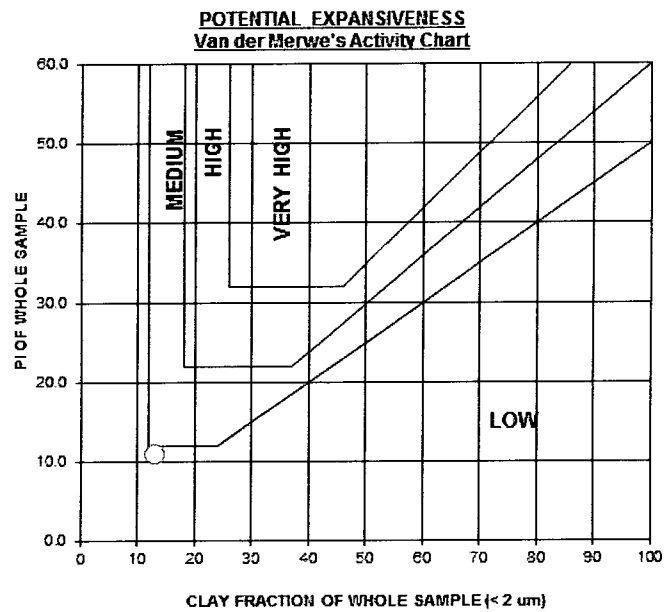
- **FOUNDATION INDICATOR TEST**

One (1) disturbed sample was tested to determine the risk associated with heave. The result indicated that there was a low potential risk for expansive material.

The expansiveness of the horizon tested was evaluated using Van der Merwe's method of classification. The PI of the whole sample was 11 and the clay fraction (0.002mm sieve) was 13%.

According to the SAICE Code of Practice (Foundations and Superstructures for Single Storey Residential Buildings and Masonry Construction) the proposed site may be classed "H/H1".

POSITION	DEPTH	DESCRIPTION	CLAY CONTENT	LINEAR SHRINKAGE	PI WHOLE SAMPLE	POTENTIAL EXPANSIVENESS
TP 2	1100 - 2000	lt Y Br O sdy cl	13	6.0	11.0	LOW



- EXCAVATABILITY/TEST PIT PROFILES**

The material encountered within the trial pit varied with the transported material consisting of sandy silt and sandy clay. The moisture condition of the transported material was moist, the consistency was generally soft to firm and the structure was generally intact (silty material) or slickensided (clayey material).

The residual material was encountered at trial pit 4 and consisted of mudstone with silty sand.

Water seepage was recorded at some of the trial pits and taking into account the moist conditions profiled, ground water may be problematic during excavations.

The test pit log sheets are attached to the document.

Should you require any further testing or assistance in analysis or interpretation of the test results please contact the undersigned.

Regards,

A handwritten signature in black ink, appearing to read 'Deon Louw', with a stylized, cursive script.

DEON LOUW Pr. Tech. Eng, MSc (Civil)
TECHNICAL MANAGER



TEST PIT LOGS

Position:

Trial Hole 1
S 31°21'07.9"
E 29°34'54.0"

0.0				
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				

Moist, dark Brown, soft, intact,
sandy silt + Roots.
Transported:

Moist, light Brown Orange dark Grey,
firm, slickensided, sandy clay.
Transported:

SAMPLE TAKEN: 9490
Water seepage
No refusal @ 2000mm

Position:

Trial Hole 2
S 31°21'06.9"
E 29°34'56.3"

0.0				
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				

Moist, dark Brown, soft, intact,
sandy silt + Roots. Transported:
Moist, light Brown Orange dark Grey,
firm, slickensided, clay.
Transported:

SAMPLES TAKEN: 9491, 9492
Water seepage
No refusal @ 2000mm

Position:

Trial Hole 3
S 31°21'25.2"
E 29°34'56.8"

0.0				
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				

Moist, dark Brown, soft, intact,
silty sand + Roots.
Transported:
Moist, dark Yellow Orange, firm,
slickensided, sandy clay.
Transported:

SAMPLES TAKEN: 9493, 9494
No ground water.
No refusal @ 2000mm



Controlab South Africa (Pty) Ltd

CIVIL ENGINEERING MATERIALS AND GEOTECHNICAL LABORATORY

CLIENT: Goba (Pty) Ltd
PROJECT: LUSIKISIKI SEWER & SEWAGE TREATMENT PLANT PHASE 1
REF: MT12991

TRIAL PIT No.'s : 4, 5, 6
EXCAVATED BY: BY HAND
DATE: 09-11-2011

TEST PIT LOGS

Position:

Trial Hole 4
S 31°21'37.2"
E 29°34'32.0"

0.0	
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	⋮

Moist, dark Brown, soft, fissured, silty sand.
 Transported:
 Moist, light Red Brown dark Orange, firm to stiff, slickensided, Mudstone + silty sand.
 Residual:
SAMPLE TAKEN: 9495
 No ground water.
 Refusal @ 1060mm

Position:

Trial Hole 5
S 31°21'38.2"
E 29°34'18.6"

0.0	
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	⋮

Moist, dark Brown, soft, fissured, sandy clay + Roots.
 Transported:
 Moist, dark Yellow Orange, firm, slickensided, sandy clay.
 Transported:
 Very moist, light Olive Yellow Orange, firm, slickensided, sandy clay.
 Transported:
SAMPLES TAKEN: 9496, 9497
 Water seepage
 No refusal @ 2000mm

Position:

Trial Hole 6
S 31°21'58.2"
E 29°34'54.7"

0.0	
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	⋮

Slightly moist, dark Brown, soft, intact, silty sand + Roots.
 Transported:
 Moist, light Yellow Brown Orange, firm, fissured, Ferricrete + sandy silt.
 Transported:
 Moist, dark Yellow Orange, firm, slickensided, sandy clay.
 Transported:
SAMPLE TAKEN: 9498
 No ground water.
 No refusal @ 2000mm



Controlab South Africa (Pty) Ltd

CIVIL ENGINEERING MATERIALS AND GEOTECHNICAL LABORATORY

CLIENT:
PROJECT:
REF:

Goba (Pty) Ltd
LUSIKISIKI SEWER & SEWAGE
TREATMENT PLANT PHASE 1
MT12991

TRIAL PIT No.'s : 7
EXCAVATED BY: BY HAND
DATE: 09-11-2011

TEST PIT LOGS

Position:

Trial Hole 7
S 31°22'30.9"
E 29°34'57.2"

0.0		
0.1	τ : :	Moist, light Brown, soft, fissured,
0.2	: :	sandy clay + Roots.
0.3	: :	Transported:
0.4	: :τ	
0.5	: :	
0.6	: :	
0.7	τ : :	
0.8	: :τ	
0.9	: :	
1.0	: :	
1.1	τ : :	
1.2	: :	Moist, dark Red, firm, slickensided,
1.3	: :	sandy clay.
1.4	: :	Transported:
1.5	: :	
1.6	: :	
1.7	: :	
1.8	: :	
1.9	: :	
2.0	: :	
2.1		
2.2		
2.3		SAMPLE TAKEN: 9499
2.4		No ground water.
2.5		No refusal @ 2000mm



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CLIENT: Goba (Pty) Ltd
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NAHOON
5210

PROJECT: LUSIKISIKI SEWER AND SEWAGE
TREATMENT PLANT PHASE 1

DATE RECEIVED: 2011-11-09

DATE TESTED: 2011-11-17

DATE REPORTED: 2011-11-25

TEST REPORT NO.: MT12991

ATT: Mr J Petzer

MATERIALS TEST REPORT

SAMPLE NO:	9490	9491	9493	9494	
POSITION / CHAINAGE	TP 1	TP 2	TP 3		
DEPTH	0 - 1270	0 - 1100	0 - 700	700 - 2000	
DESCRIPTION	dk Br	dk Br	dk Br	dk Y O	
	sdv st	sdv st	sty s	sdv cl	

Sieve Analysis (Wet Preparation) TMH1 - Method A1 (a)

% PASSING 75 mm					
63 mm					
53 mm					
37.5 mm					
26.5 mm					
19 mm					
13.2 mm	100	100	100	100	
4.75 mm	99	99	94	99	
2.00 mm	99	99	79	99	
0.425 mm	96	95	74	97	
0.075 mm	55.7	53.0	46.1	67.6	

Soil Mortar Analysis - TMH1 - Method A5

COURSE SAND (%)	3	4	6	2	
FINE SAND (%)	41	42	35	30	
SILT / CLAY (%)	56	54	58	68	
GRADING MODULUS	0.49	0.53	1.01	0.36	

Atterberg Limits - TMH1 - Methods A2, A3, A4

LIQUID LIMIT (%)	16	18	18	33	
PLASTICITY INDEX (%)	5	3	6	13	
LINEAR SHRINKAGE (%)	2.0	1.5	2.5	6.0	

Maximum Dry Density & Optimum Moisture Content - TMH1 - Method A7 / California Bearing Ratio - TMH1 - Method A8

Maximum Dry Density (kg/m ³)	1940	1952			
Optimum Moisture Content (%)	9.1	10.2			
C.B.R. @ 100% COMPACTION	12	16			
C.B.R. @ 98 % COMPACTION	11	14			
C.B.R. @ 95 % COMPACTION	10	11			
C.B.R. @ 93 % COMPACTION	9	10			
C.B.R. @ 90 % COMPACTION	8	8			
SWELL @ 100% COMP. (%)	0.58	0.65			
COMPACTIBILITY			0.20	0.20	

The above test results are pertinent to the samples tested only. While the tests are carried out according to recognized standards, Controlab shall not be liable for erroneous testing or reporting thereof. This report may not be reproduced except in full without prior consent of Controlab.

Technical Signatory

J Atterbury

Remarks

Sample Delivered by Customer

Sampled by Controlab

TR001



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PROJECT: LUSIKISIKI SEWER AND SEWAGE
TREATMENT PLANT PHASE 1

DATE RECEIVED: 2011-11-09
DATE TESTED: 2011-11-17
DATE REPORTED: 2011-11-25

ATT: Mr J Petzer

TEST REPORT NO.: MT12991

MATERIALS TEST REPORT

SAMPLE NO:	9495	9496	9497	9498	9499	
POSITION / CHAINAGE	TP 4	TP 5		TP 6	TP 7	
DEPTH	470 - 1060	0 - 930	1300 - 2000	480 - 1200	0 - 1160	
DESCRIPTION	lt R Br dk O	dk Br	lt Y O	lt Y Br O	lt Br	
	Ms +	sdY cl	sdY cl	Ferr +	sdY cl	
	sty s			sdY st		

Sieve Analysis (Wet Preparation) TMH1 - Method A1 (a)

% PASSING	75 mm	63 mm	53 mm	37.5 mm	26.5 mm	19 mm	13.2 mm	4.75 mm	2.00 mm	0.425 mm	0.075 mm
	100	84	84	73	69	69	64	53	46	40	24.7
							100	99	99	95	60.9
							100	99	99	97	66.0
								100	99	96	58.0
									99	95	60.5

Soil Mortar Analysis - TMH1 - Method A5

COURSE SAND (%)	13	4	2	3	2
FINE SAND (%)	33	34	31	38	36
SILT / CLAY (%)	54	62	67	59	62
GRADING MODULUS	1.89	0.45	0.38	0.47	0.48

Atterberg Limits - TMH1 - Methods A2, A3, A4

LIQUID LIMIT (%)	29	31	31	21	29
PLASTICITY INDEX (%)	7	12	16	9	10
LINEAR SHRINKAGE (%)	3.0	5.5	7.5	4.5	4.5

Maximum Dry Density & Optimum Moisture Content - TMH1 - Method A7 / California Bearing Ratio - TMH1 - Method A8

Maximum Dry Density (kg/m ³)					
Optimum Moisture Content (%)					
C.B.R. @ 100% COMPACTION					
C.B.R. @ 98 % COMPACTION					
C.B.R. @ 95 % COMPACTION					
C.B.R. @ 93 % COMPACTION					
C.B.R. @ 90 % COMPACTION					
SWELL @ 100% COMP. (%)					
COMPACTIBILITY		0.20	0.30	0.20	0.10

The above test results are pertinent to the samples tested only. While the tests are carried out according to recognized standards, Controlab shall not be liable for erroneous testing or reporting thereof. This report may not be reproduced except in full without prior consent of Controlab.

Technical Signatory

J Atterbury

Remarks

Sample Delivered by Customer

Sampled by Controlab





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CIVIL ENGINEERING MATERIALS AND GEOTECHNICAL LABORATORY

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CLIENT: Goba (Pty) Ltd
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NAHOON
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PROJECT: LUSIKISIKI SEWER AND SEWAGE
TREATMENT PLANT PHASE 1

DATE RECEIVED: 2011-11-09

DATE TESTED: 2011-11-17

DATE REPORTED: 2011-11-25

ATT : Mr J Petzer

TEST REPORT NO.: MT121991

FOUNDATION INDICATOR REPORT

SAMPLE NO	7887				
POSITION	TP 2				
DEPTH	1100 - 2000				
DESCRIPTION	lt Y Br O				
	sdv cl				

SIEVE ANALYSIS % PASSING SIEVES: Method :TMH1 A1(a) & A5

% PASSING	75 mm				
	37.5 mm				
	19 mm				
	9.5 mm	100			
	4.75 mm	98			
	2.36 mm	94			
	1.18 mm	92			
	0.600 mm	90			
	0.425 mm	88			
	0.300 mm	83			
	0.150 mm	68			
	0.075 mm	50.0			

HYDROMETER ANALYSIS: Method ASTM D422

	0.06 mm	35			
	0.02 mm	23			
	0.006 mm	15			
	0.002 mm	13			

ATTERBERG LIMITS: Method: TMH1 A2 ; A3 & A4

LIQUID LIMIT	30				
PLASTICITY INDEX	12				
LINEAR SHRINKAGE	6.0				

PREDICTION OF HEAVE (VAN DER MERWE METHOD)

PI WHOLE SAMPLE	11.0				
POTENTIAL EXPANSIVENESS	LOW				

The above test results are pertinent to the samples received and tested only

While the tests are carried out according to recognized standards Controlab shall not be liable for erroneous testing or reporting thereof. This report may not be reproduced except in full without prior consent of Controlab

Technical Signatory

J Atterbury

Remarks:

Samples Delivered by Customer

Sampled by Controlab: YES



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OTHER BRANCH OFFICES: Cape Town, Kokstad, Mthatha, Port Elizabeth, Lusaka - Zambia

CLIENT: Goba (Pty) Ltd
 P O Box 8245
 NAHOON
 5210
 ATT: Mr J Petzer

PROJECT: LUSIKISIKI SEWER AND
 SEWAGE TREATMENT PLANT
 REF: MT12991
 DATE: 2011-11-18

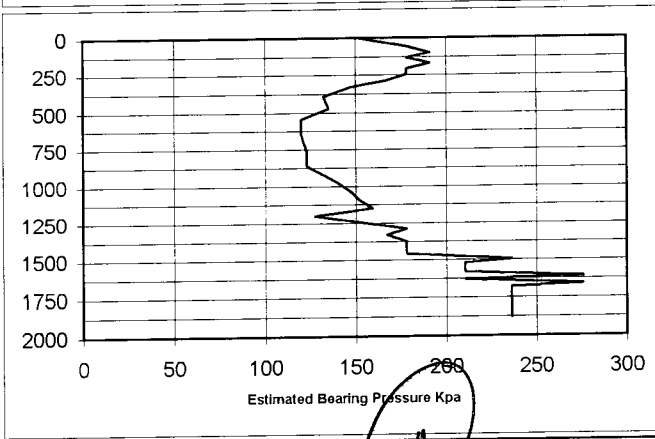
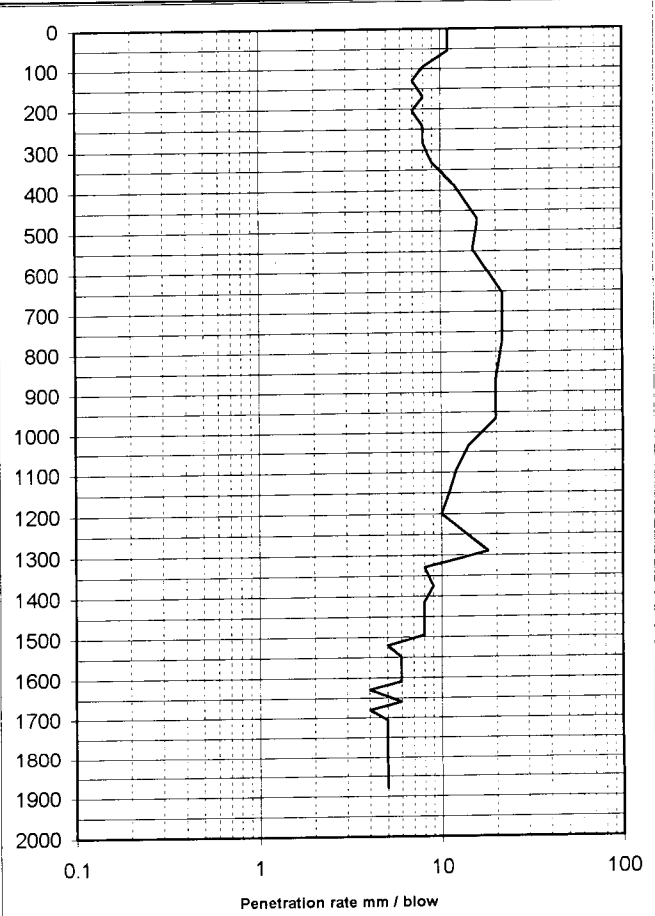
DYNAMIC CONE PENETROMETER DATA

POSITION: TP 3

REMARKS: No Refusal

S 31°21'25.2" E 29°34'56.8"

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
55	5	11	20
95	10	8	30
130	15	7	35
170	20	8	30
205	25	7	35
245	30	8	30
285	35	8	30
330	40	9	25
390	45	12	18
470	50	16	13
545	55	15	14
655	60	22	8
765	65	22	8
865	70	20	9
965	75	20	9
1035	80	14	15
1095	85	12	18
1150	90	11	20
1200	95	10	22
1290	100	18	11
1330	105	8	30
1375	110	9	25
1415	115	8	30
1455	120	8	30
1495	125	8	30
1520	130	5	55
1550	135	6	45
1580	140	6	45
1610	145	6	45
1630	150	4	75
1660	155	6	45
1680	160	4	75
1705	165	5	55



Technical Signatory:

J Atterbury



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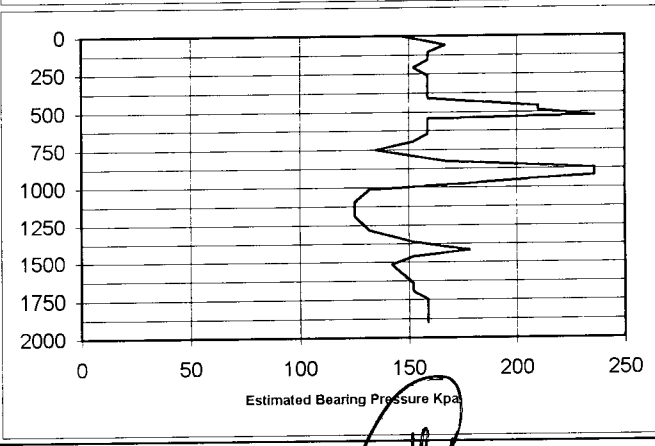
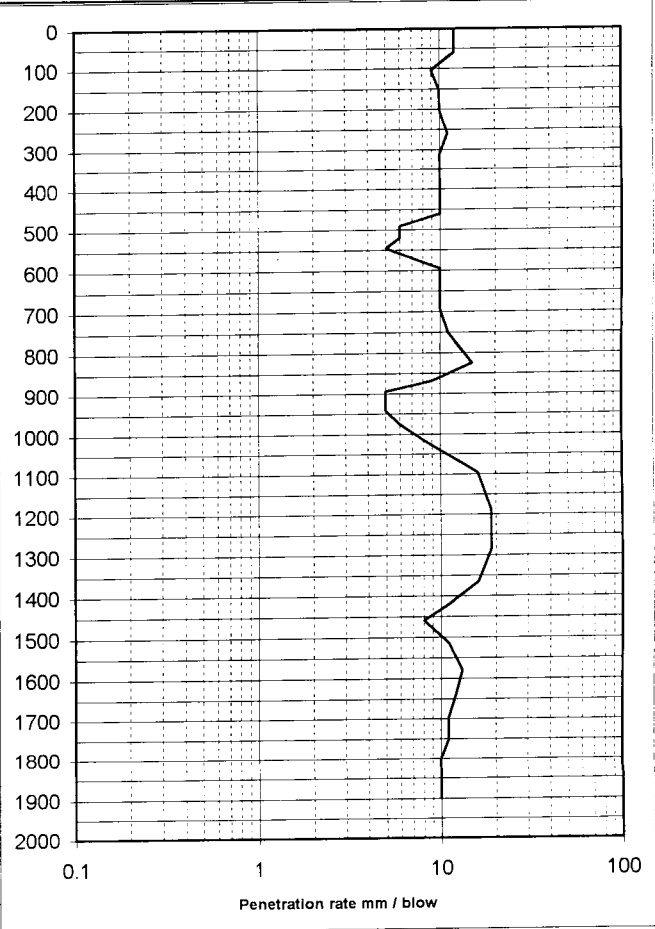
DYNAMIC CONE PENETROMETER DATA

POSITION: TP 6

REMARKS: No Refusal

S 31°21'58.2" E 29°34'54.8"

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
60	5	12	18
105	10	9	25
155	15	10	22
205	20	10	22
260	25	11	20
310	30	10	22
360	35	10	22
410	40	10	22
460	45	10	22
490	50	6	45
520	55	6	45
545	60	5	55
595	65	10	22
645	70	10	22
695	75	10	22
750	80	11	20
825	85	15	14
870	90	9	25
895	95	5	55
920	100	5	55
945	105	5	55
975	110	6	45
1015	115	8	30
1095	120	16	13
1190	125	19	10
1285	130	19	10
1365	135	16	13
1420	140	11	20
1460	145	8	30
1515	150	11	20
1580	155	13	16
1640	160	12	18
1695	165	11	20



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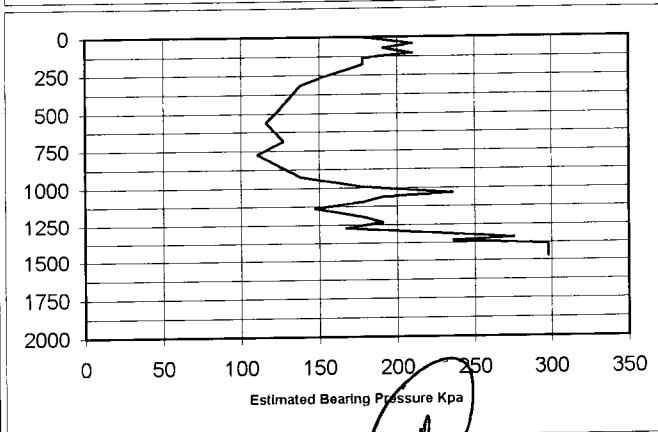
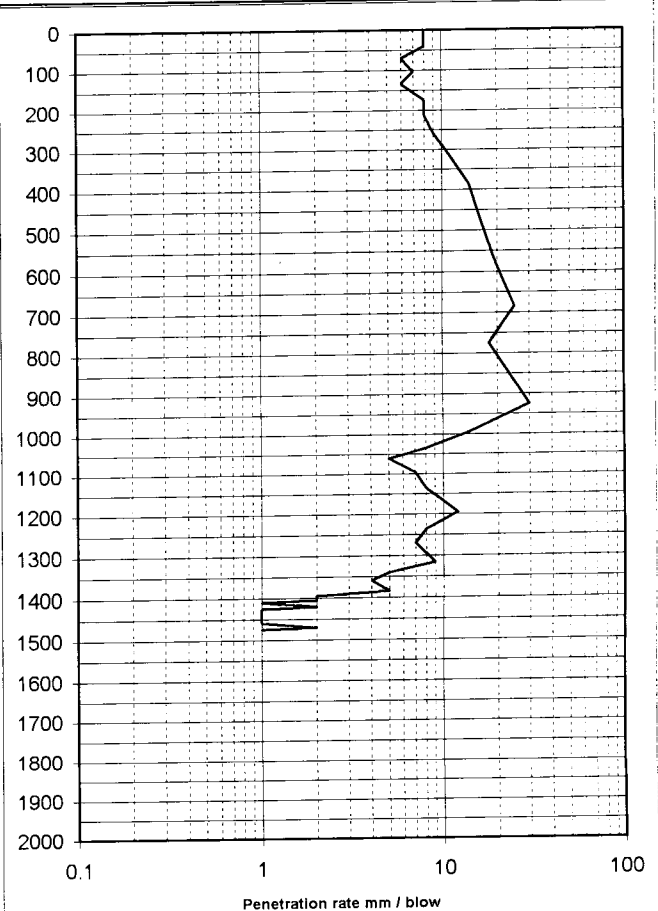
DYNAMIC CONE PENETROMETER DATA

POSITION: DCP 1 Ground Level

REMARKS: Refusal @ 1475mm

S 31°21'14.4" E 29°35'04.9"

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
40	5	8	30
70	10	6	45
105	15	7	35
135	20	6	45
175	25	8	30
215	30	8	30
260	35	9	25
315	40	11	20
385	45	14	15
465	50	16	13
560	55	19	10
685	60	25	7
775	65	18	11
925	70	30	6
995	75	14	15
1035	80	8	30
1060	85	5	55
1095	90	7	35
1135	95	8	30
1195	100	12	18
1235	105	8	30
1270	110	7	35
1315	115	9	25
1340	120	5	55
1360	125	4	75
1385	130	5	55
1395	135	2	>110
1405	140	2	>110
1410	145	1	>110
1420	150	2	>110
1425	155	1	>110
1430	160	1	>110
1435	165	1	>110
1440	170	1	>110
1445	175	1	>110
1450	180	1	>110
1455	185	1	>110
1460	190	1	>110
1470	195	2	>110
1475	200	1	>110



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DYNAMIC CONE PENETROMETER DATA

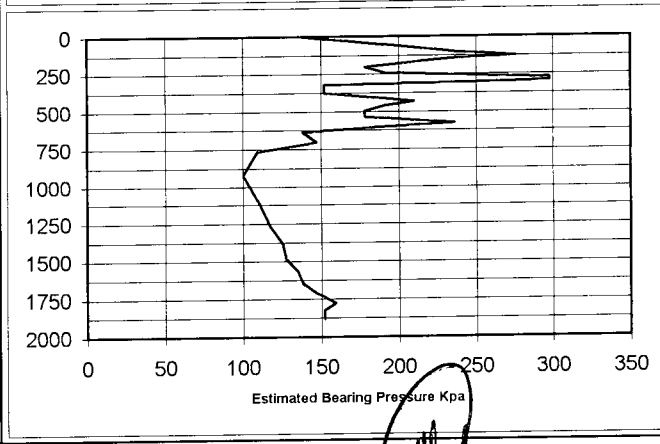
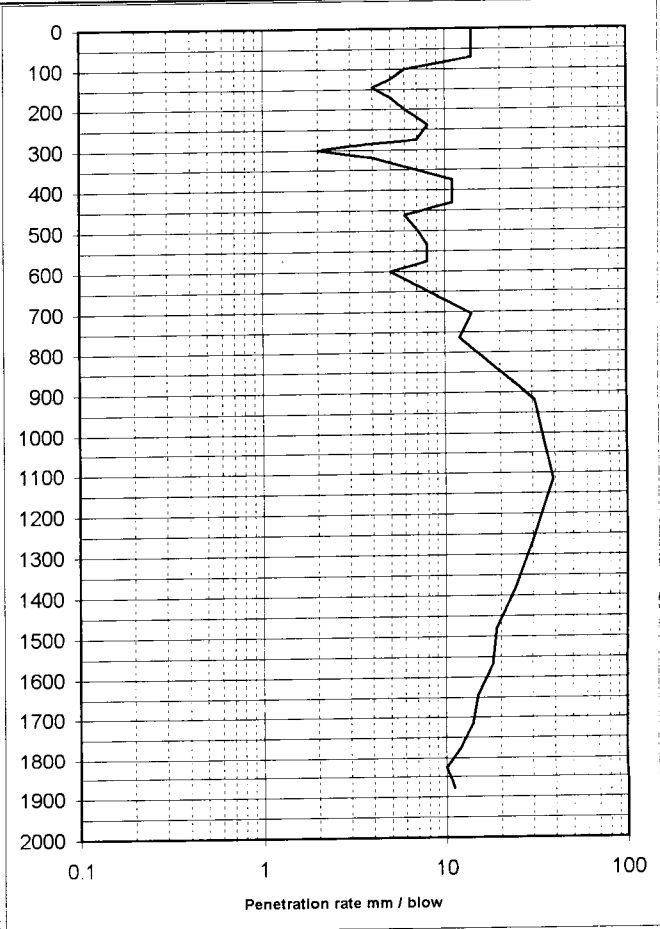
POSITION: DCP 3 Ground Level

REMARKS:

No Refusal - Building Rubble at this position

S 31°21'27.7" E 29°34'19.7" (moved from S31°21'27.1" E29°34'21.8")

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
70	5	14	15
100	10	6	45
125	15	5	55
145	20	4	75
170	25	5	55
200	30	6	45
240	35	8	30
275	40	7	35
290	45	3	110
300	50	2	>110
320	55	4	75
375	60	11	20
430	65	11	20
460	70	6	45
495	75	7	35
535	80	8	30
575	85	8	30
600	90	5	55
635	95	7	35
705	100	14	15
765	105	12	18
920	110	31	5
1115	115	39	4
1265	120	30	6
1385	125	24	8
1480	130	19	10
1570	135	18	11
1645	140	15	14
1715	145	14	15
1775	150	12	18
1825	155	10	22
1880	160	11	20



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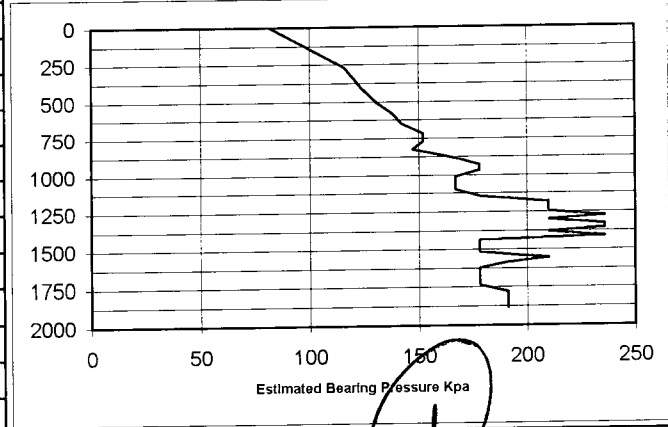
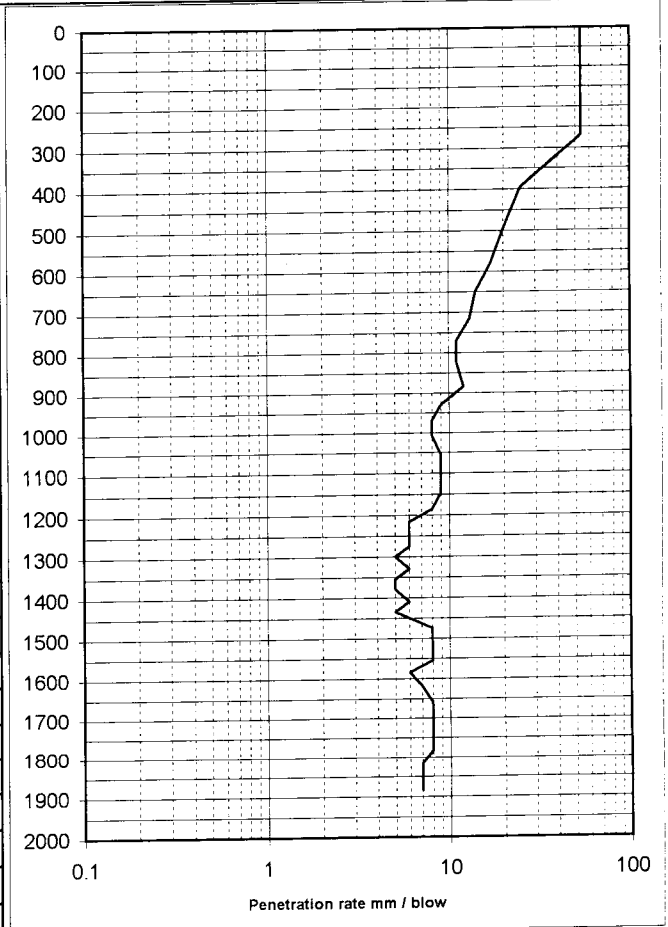
PROJECT: LUSIKISIKI SEWER AND
 SEWAGE TREATMENT PLANT
 REF: MT12991
 DATE: 2011-11-18

DYNAMIC CONE PENETROMETER DATA

POSITION: DCP 5 Ground Level
 S 31°21'07.4" E 29°34'21.6" (moved from S31°22'08.3" E29°34'19.7")

REMARKS: No Refusal - DCP 5 moved due to
 wet land

Depth (mm)	Cumulative No. Blows	Penetration Rate (mm)	Estimated Insitu CBR
0			
270	5	54	3
395	10	25	7
495	15	20	9
580	20	17	12
650	25	14	15
715	30	13	16
770	35	11	20
825	40	11	20
885	45	12	18
930	50	9	25
970	55	8	30
1010	60	8	30
1055	65	9	25
1100	70	9	25
1145	75	9	25
1185	80	8	30
1215	85	6	45
1245	90	6	45
1275	95	6	45
1300	100	5	55
1330	105	6	45
1355	110	5	55
1380	115	5	55
1410	120	6	45
1435	125	5	55
1475	130	8	30
1515	135	8	30
1555	140	8	30
1585	145	6	45
1620	150	7	35
1660	155	8	30
1700	160	8	30
1740	165	8	30



Technical Signatory:  J Atterbury

