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_____SOUTH AFRICA_____

GEOTECHNICAL SOIL TEST REPORT

Client: THOMAS BEMELMAN
Project: ERF 1216 SEA VISTA ST FRANCIS BAY
Date of test: 5 NOVEMBER 2023

Geotechnical Constraint	Risk			NHBRC Classification
	Low	Medium	High	
Active clay	X			
Compressible soil		X		S
Collapsible soil	X			
Imported/uncontrolled fill		X		
Chemically aggressive soils		X		
Saturated soils/ groundwater seepage	X			
Shallow hard rock/ difficult excavations	X			
Slope stability problems	X			
Flood potential	X			
Seismicity	X			
Dolomitic land	X			

Site description:

The site, erf 1216 is in Santarem, St Francis Bay, close to the sea and at approximately 3-4m above mean sea level.

At the time of the investigation the erf was vacant.

The ground surface is generally flat with coastal vegetation (see Fig 1).

Access to the site was easily gained from the northern boundary of the site, on asphalt roads.

At the time of the investigation, the surface conditions of the erf were dry with no signs of any significant drainage issues, scour, or unstable ground problems.

FIGURE 1

Methods of investigation:

Two shallow test pits were excavated by hand to a max depth of NGL-1.2m.

A total of 4 no. DCP penetration test was conducted across the site (refer to attachment).

Results:

The geology of the site consisted of thick deposits of estuarine/dune sand.

The soil profile exposed in the test pits consisted almost entirely of good graded, sand with no clay.

No bedrock or groundwater was encountered in any of the test holes at a depth of 1,5 m, at the time of the investigation.

Although there might still be the good possibility of encountering small outcrops of hard rock at shallow depths.

The site is well drained with generally good soil permeability.

The groundwater table is expected at 1,5 to 3m NGL with seasonal and tidal fluctuations expected.

DCP tests indicated that the soil consistency was good and being medium dense.

with penetration rates of 10-30mm/blow starting from approximately 500 mm below NGL.

Recommendations:

Earthworks: Minor earthworks are anticipated to clear, level and prepare the site surface for construction.

Earthworks could be accomplished by hand or with light machinery and all excavations to a depth of at least 3m. were provisionally classified as per SABS1200D as "soft".

Excavations below 1.5m were expected to encounter the water table.

The insitu sandy soils were deemed suitable for backfilling and compaction under floors and foundations at the optimum moisture content.

Any organic matter, foreign matter (rubbish) or large rubble fragments should be removed from potential fill material.

Excavations were expected to be highly unstable at angles steeper than 35°, and adequate battering of slopes or lateral support systems.

may be required for excavations deeper than1m.

Foundations and floors: Single/double storey masonry structures can be found on reinforced concrete strip, pad, or raft foundations.

Strip and pad foundations should be found at a minimum embedment depth of 0.7m in well compacted in situ sands.

Bearing pressures should be limited to 120kPa, to minimize settlement.

The structural engineer can consider additional improvements or variations to the foundation preparation method as he/she sees fit.

It was recommended that the structural engineer conduct inspections of the foundation trenches and ensure suitable conditions before contractors cast foundations.

Filling under reinforced concrete surface beds should be compacted at the optimum moisture content (10-12%) to 100% of maximum dry density.

Steel reinforcement in foundations should have adequate cover (min 40mm) to prevent corrosion due to saline soil conditions.

Roads: The in-situ roadbed material was marginal G7/G8 quality sandy soil, which was loose and prone to rutting.

Imported SSG gravel material may be required to pioneer the driveway layer works.

This will include an imported G5 subbase layer of at least 150mm thick (compacted to 95%MDD) and cement interlocking pavers on 20mm bedding sand.

Drainage: The soil was generally highly permeable and site drainage was not envisaged to be a problem, but conventional stormwater management systems were recommended to collect and handle run-off from hard surfaces.

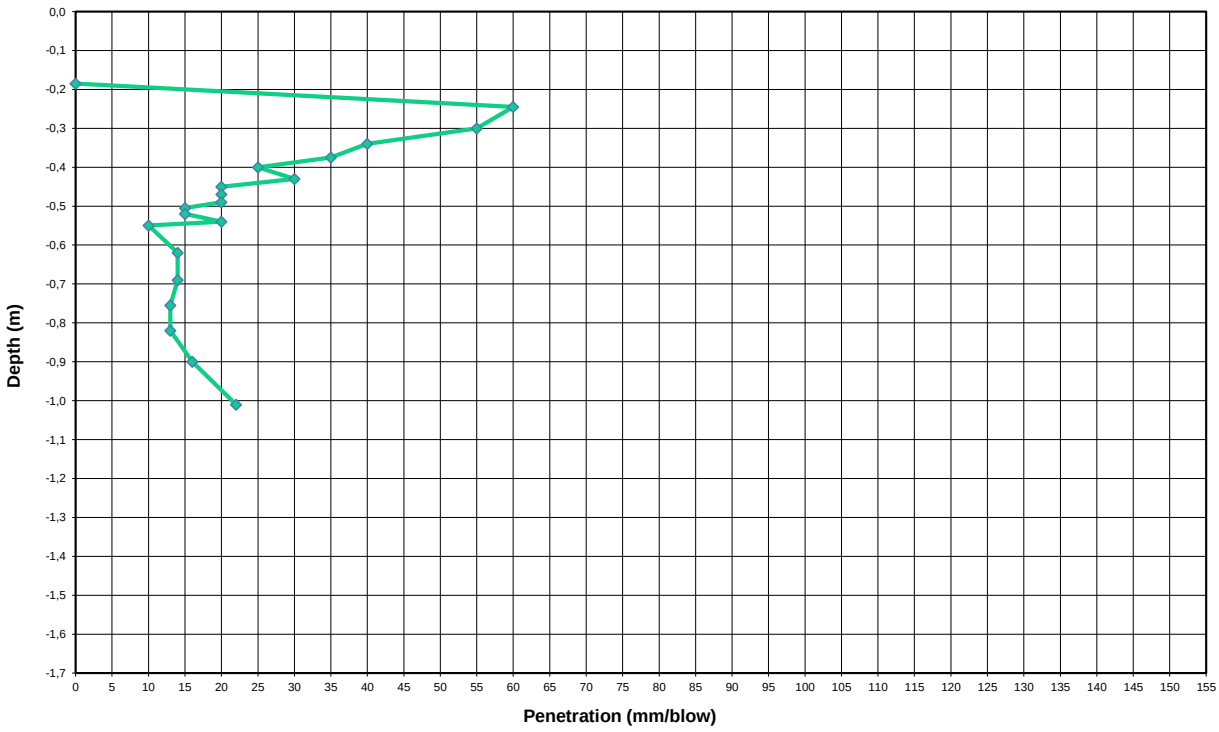
No subsoil drains are deemed necessary, except behind retaining walls in basement structures where necessary.

Conclusions:

The site was considered suitable for the proposed development with conventional construction methods but there were some geotechnical constraints, mainly compressible sands, which required consideration by the structural engineer and contractor.

Preliminary recommendations were provided to improve founding conditions, but all information should be verified on site during construction.

DYNAMIC CONE PENETRATION GRAPH



TP 1 **Excavation depth** 0 **mm**

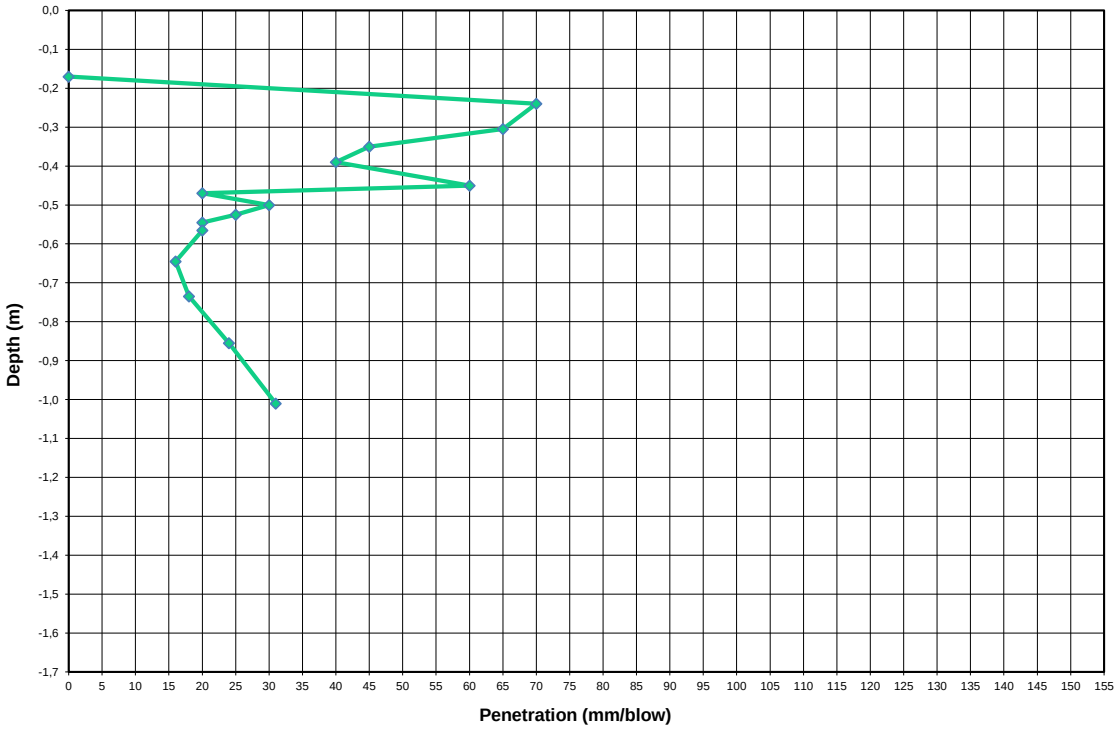
Input Blows	Accumulated Blows	Penetration depth below test surface (mm)	Penetration depth below actual surface (mm)	Penetration rate DN (mm/blow)	Penetration depth (m)	CBR DN>2	Bearing Pressure (KPa)	Soil Consistency
0	0	**185**	**185**	**0**	-0,19	0,00	0,00	Test Surface
1	1	**245**	**245**	**60**	-0,25	2,26	30,77	Loose
1	2	**300**	**300**	**55**	-0,30	2,53	33,91	Loose
1	3	**340**	**340**	**40**	-0,34	3,79	48,40	Loose
1	4	**375**	**375**	**35**	-0,38	4,49	56,19	Loose
1	5	**400**	**400**	**25**	-0,40	6,88	81,85	Medium Dense
1	6	**430**	**430**	**30**	-0,43	5,46	66,76	Loose
1	7	**450**	**450**	**20**	-0,45	9,13	105,03	Medium Dense
1	8	**470**	**470**	**20**	-0,47	9,13	105,03	Medium Dense
1	9	**490**	**490**	**20**	-0,49	9,13	105,03	Medium Dense
1	10	**505**	**505**	**15**	-0,51	13,16	144,86	Medium Dense
1	11	**520**	**520**	**15**	-0,52	13,16	144,86	Medium Dense
1	12	**540**	**540**	**20**	-0,54	9,13	105,03	Medium Dense
1	13	**550**	**550**	**10**	-0,55	22,02	227,90	Dense
5	18	**620**	**620**	**14**	-0,62	14,36	156,47	Medium Dense
5	23	**690**	**690**	**14**	-0,69	14,36	156,47	Medium Dense
5	28	**755**	**755**	**13**	-0,76	15,78	169,98	Medium Dense
5	33	**820**	**820**	**13**	-0,82	15,78	169,98	Medium Dense
5	38	**900**	**900**	**16**	-0,90	12,12	134,78	Medium Dense
5	43	**1010**	**1010**	**22**	-1,01	8,09	94,42	Medium Dense

Foundation design on sand

For single storey **DN** should not exceed **20** mm/blow

For double storey **DN** should not exceed **15** mm/blow

DYNAMIC CONE PENETRATION GRAPH



TP 2 **Excavation depth** 0 **mm**

Input Blows	Accumulated Blows	Penetration depth below test surface (mm)	Penetration depth below actual surface (mm)	Penetration rate DN (mm/blow)	Penetration depth (m)	CBR DN>2	Bearing Pressure (KPa)	Soil Consistency
0	0	**170**	**170**	**0**	-0,17	0,00	0,00	Test Surface
1	1	**240**	**240**	**70**	-0,24	1,86	25,90	Loose
1	2	**305**	**305**	**65**	-0,31	2,04	28,13	Loose
1	3	**350**	**350**	**45**	-0,35	3,26	42,43	Loose
1	4	**390**	**390**	**40**	-0,39	3,79	48,40	Loose
1	5	**450**	**450**	**60**	-0,45	2,26	30,77	Loose
1	6	**470**	**470**	**20**	-0,47	9,13	105,03	Medium Dense
1	7	**500**	**500**	**30**	-0,50	5,46	66,76	Loose
1	8	**525**	**525**	**25**	-0,53	6,88	81,85	Medium Dense
1	9	**545**	**545**	**20**	-0,55	9,13	105,03	Medium Dense
1	10	**565**	**565**	**20**	-0,57	9,13	105,03	Medium Dense
5	15	**645**	**645**	**16**	-0,65	12,12	134,78	Medium Dense
5	20	**735**	**735**	**18**	-0,74	10,44	118,15	Medium Dense
5	25	**855**	**855**	**24**	-0,86	7,24	85,67	Medium Dense
5	30	**1010**	**1010**	**31**	-1,01	5,23	64,36	Loose

Foundation design on sand

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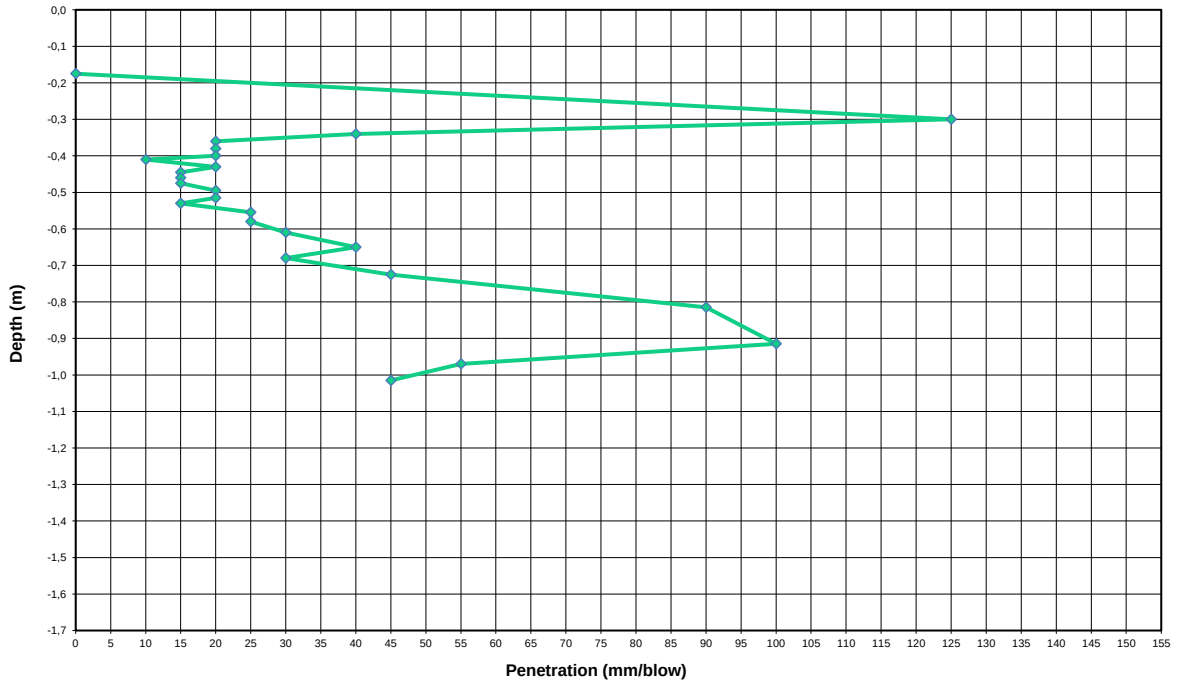
DYNAMIC CONE PENETRATION GRAPH



TP 3

Excavation depth 0 **mm**

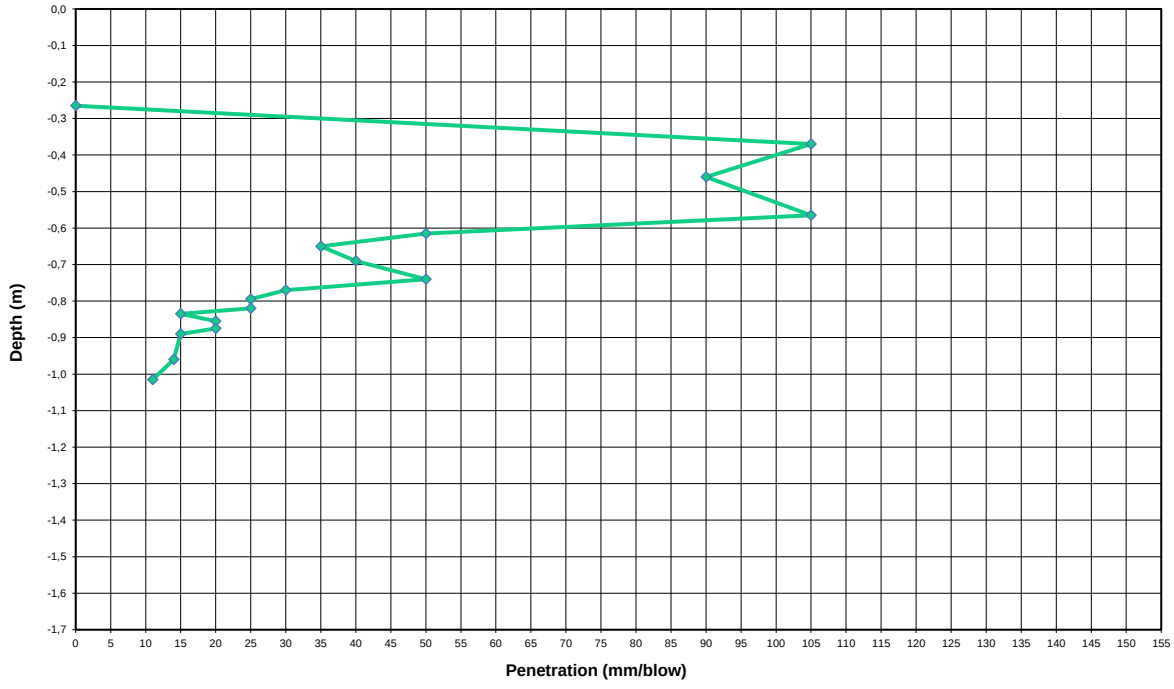
Input Blows	Accumulated Blows	Penetration depth below test surface (mm)	Penetration depth below actual surface (mm)	Penetration rate DN (mm/blow)	Penetration depth (m)	CBR DN>2	Bearing Pressure (KPa)	Soil Consistency
0	0	**175**	**175**	**0**	-0,18	0,00	0,00	Test Surface
1	1	**300**	**300**	**125**	-0,30	0,89	13,55	Very Loose
1	2	**340**	**340**	**40**	-0,34	3,79	48,40	Loose
1	3	**360**	**360**	**20**	-0,36	9,13	105,03	Medium Dense
1	4	**380**	**380**	**20**	-0,38	9,13	105,03	Medium Dense
1	5	**400**	**400**	**20**	-0,40	9,13	105,03	Medium Dense
1	6	**410**	**410**	**10**	-0,41	22,02	227,90	Dense
1	7	**430**	**430**	**20**	-0,43	9,13	105,03	Medium Dense
1	8	**445**	**445**	**15**	-0,45	13,16	144,86	Medium Dense
1	9	**460**	**460**	**15**	-0,46	13,16	144,86	Medium Dense
1	10	**475**	**475**	**15**	-0,48	13,16	144,86	Medium Dense
1	11	**495**	**495**	**20**	-0,50	9,13	105,03	Medium Dense
1	12	**515**	**515**	**20**	-0,52	9,13	105,03	Medium Dense
1	13	**530**	**530**	**15**	-0,53	13,16	144,86	Medium Dense
1	14	**555**	**555**	**25**	-0,56	6,88	81,85	Medium Dense
1	15	**580**	**580**	**25**	-0,58	6,88	81,85	Medium Dense
1	16	**610**	**610**	**30**	-0,61	5,46	66,76	Loose
1	17	**650**	**650**	**40**	-0,65	3,79	48,40	Loose
1	18	**680**	**680**	**30**	-0,68	5,46	66,76	Loose
1	19	**725**	**725**	**45**	-0,73	3,26	42,43	Loose
1	20	**815**	**815**	**90**	-0,82	1,35	19,56	Very Loose
1	21	**915**	**915**	**100**	-0,92	1,18	17,38	Very Loose
1	22	**970**	**970**	**55**	-0,97	2,53	33,91	Loose
1	23	**1015**	**1015**	**45**	-1,02	3,26	42,43	Loose

Foundation design on sand

For single storey **DN** should not exceed **20** mm/blow

For double storey **DN** should not exceed **15** mm/blow

DYNAMIC CONE PENETRATION GRAPH



TP 4

Excavation depth 0 **mm**

Input Blows	Accumulated Blows	Penetration depth below test surface (mm)	Penetration depth below actual surface (mm)	Penetration rate DN (mm/blow)	Penetration depth (m)	CBR DN>2	Bearing Pressure (KPa)	Soil Consistency
0	0	**265**	**265**	**0**	-0,27	0,00	0,00	Test Surface
1	1	**370**	**370**	**105**	-0,37	1,11	16,46	Very Loose
1	2	**460**	**460**	**90**	-0,46	1,35	19,56	Very Loose
1	3	**565**	**565**	**105**	-0,57	1,11	16,46	Very Loose
1	4	**615**	**615**	**50**	-0,62	2,85	37,72	Loose
1	5	**650**	**650**	**35**	-0,65	4,49	56,19	Loose
1	6	**690**	**690**	**40**	-0,69	3,79	48,40	Loose
1	7	**740**	**740**	**50**	-0,74	2,85	37,72	Loose
1	8	**770**	**770**	**30**	-0,77	5,46	66,76	Loose
1	9	**795**	**795**	**25**	-0,80	6,88	81,85	Medium Dense
1	10	**820**	**820**	**25**	-0,82	6,88	81,85	Medium Dense
1	11	**835**	**835**	**15**	-0,84	13,16	144,86	Medium Dense
1	12	**855**	**855**	**20**	-0,86	9,13	105,03	Medium Dense
1	13	**875**	**875**	**20**	-0,88	9,13	105,03	Medium Dense
1	14	**890**	**890**	**15**	-0,89	13,16	144,86	Medium Dense
5	19	**960**	**960**	**14**	-0,96	14,36	156,47	Medium Dense
5	24	**1015**	**1015**	**11**	-1,02	19,51	204,87	Dense

Foundation design on sand

For single storey **DN** should not exceed **20** mm/blow

For double storey **DN** should not exceed **15** mm/blow