

PHASE I
GEOTECHNICAL SITE INVESTIGATION

FOR

ERVEN 10866-11008
IDAS VALLEY
STELLENBOSCH

FOR

ASLA DEVCO (PTY) LTD



**CORE GEOTECHNICAL
CONSULTANTS**

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ERVEN 10866-11008 IDAS VALLEY STELLENBOSCH**

JUNE 2014

Project no: 089-14

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ASLA DEVCO (PTY) LTD

June 2014

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Executive Summary

The area of investigation comprises a portion of land, approximately 5 Ha in extent, located north west of the suburb of Lindida in Stellenbosch. Topographically, the site is relatively flat with some depressions where water ponds to form marshes. The site is bound along the south and east by a drainage line and open along all other extents.

Regionally the site is underlain from surface by Recent unconsolidated silty sandy deposits of colluvial (transported) origin. Weathered residual granites of the Cape Granite Suite underlie the transported soils.

The water table was encountered in one of the seven test pits and is most likely associated with the nearby drainage line and the fact that it is at the lowest point of the site. The residual granite is expected to have a low permeability. The permeability of the overlying transported soils is also expected to be higher and thus infiltrated surface water becomes perched above the less permeable residual granites. Surface water will tend to run-off down slope towards the southern and south-eastern parts of the site. Ponding of water on surface may also occur in areas close to the wetland located in the central northern part side of the site.

The following geotechnical characteristics of the site are expected to have an impact on subsidy housing development and subsidy variations:-

- The potential for a high water table and wet conditions in the depressions across the site.
- Erodability of soils, even though ground slopes are not particularly steep
- Potentially moderately expansive or compressible founding conditions in the sandy transported soils and clayey residual granites found across the site.

A schedule of generic subsidy variations applicable to the site is outlined in Table 6.3.

The Residential Site Class Designation (after Watermeyer & Tromp and the Joint Structural Division) is set out in Table 7.1. The areal extent of classified areas is shown in the site plan in Appendix A. In essence the entire site is classified as S/H1.

Structures may be founded conventionally using strip or pad footings at a nominal founding depth. A foundation bearing pressure of up to 150 kPa is applicable under these conditions. Or structures may be found using piers and ground beams where a bearing pressure of 120 kPa is applicable. Structures will require modified normal construction techniques to be applied to cater for the predicted heave and settlement movements of up to 15 mm.

This Phase 1 geotechnical site investigation indicates that the site is broadly suitable for project linked subsidy housing development, provided that aspects of concern relating to the geotechnical character of the site are addressed.

1. Introduction

At the request of Mrs K Siebrits of Asla Devco (Pty) Ltd , we have carried out a Phase 1 Geotechnical Site Investigation for the proposed Idas Valley housing development in Stellenbosch

The objectives of this investigation were as follows: -

- a) Identify any potential hazards
- b) Define the ground conditions and provide site classifications including detailed soil profiles and groundwater occurrences within the zone of influence of foundations
- c) Provide the geotechnical basis for safe and appropriate land use planning, infrastructure design, housing unit design and the formulation of precautionary measures and risk management procedures
- d) Broadly classify the land that is to be developed for subsidy housing in terms of the Housing Code's Residential Site Class Designations
- e) Gather factual data that has a bearing on the determination of housing subsidy variations and the installation of township services.

This report has been prepared in accordance with the standard specifications of the National Housing Code for Project Linked Greenfield Subsidy Housing Projects (Standard Specification GFSH-2).

2. Information used in the study

The following information sources were used in the investigation: -

- a) Remote colour imagery - Google (2013)
- b) The 1:250 000 geological map – 3318 Cape Town (Council for Geoscience)
- c) A roads layout plan of the proposed residential development

3. Site description

The area of investigation comprises a portion of land, approximately 5 Ha in extent, located north west of the suburb of Lindida in Stellenbosch. The location of the site is indicated in Figure 3.1.

Topographically, the site is relatively flat with some depressions where water ponds to form marshes. The site is bounded along the south and east by a drainage line and open along all other extents. Figure 3.2 depicts the physiological features on the site.

The site consists partially of disused farming land with demolished outbuildings towards the south. In terms of vegetation, the area is either covered with short grasses and shrubs. The aerial extent can be seen in the remote imagery (Figure 3.2).

No minerals or natural resources of economic value are known to underlie the site and no mining activity has consequently been undertaken in the area. The site is apparently not undermined.

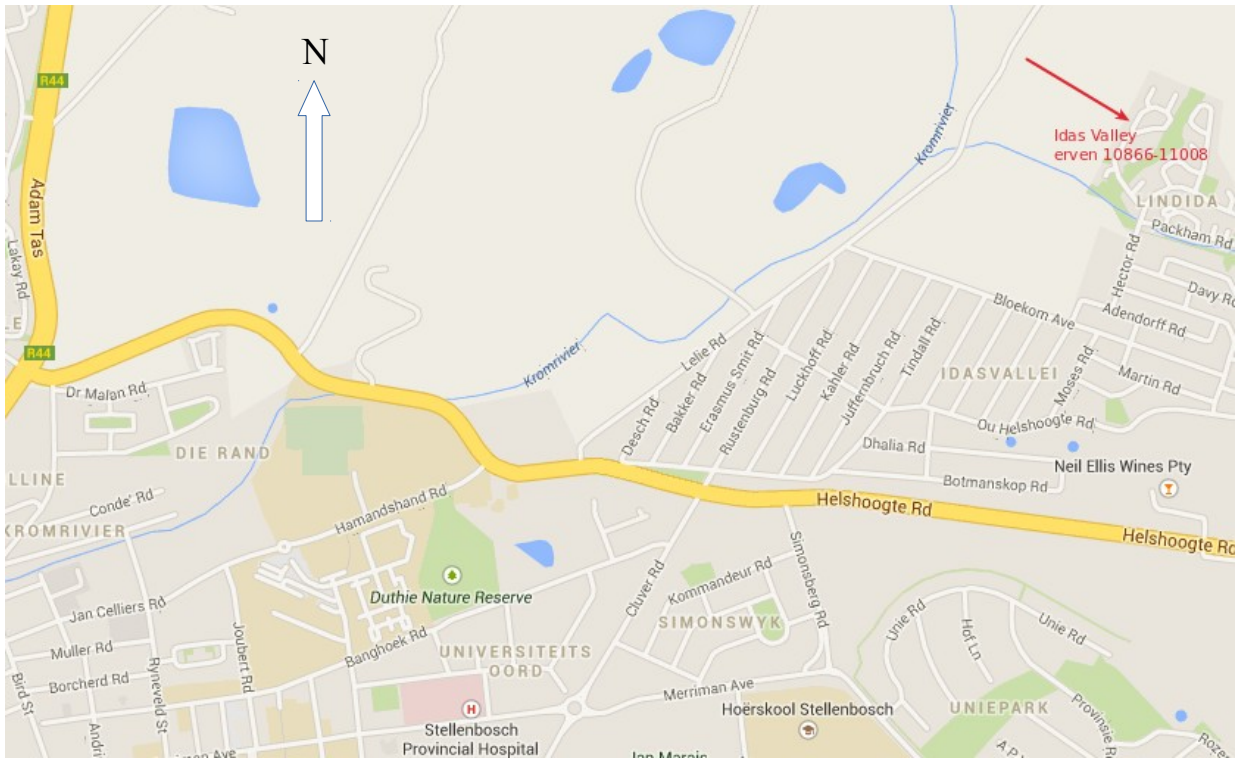


Figure 3.1: Locality of Stellenbosch Idas Valley erven 10866-11008

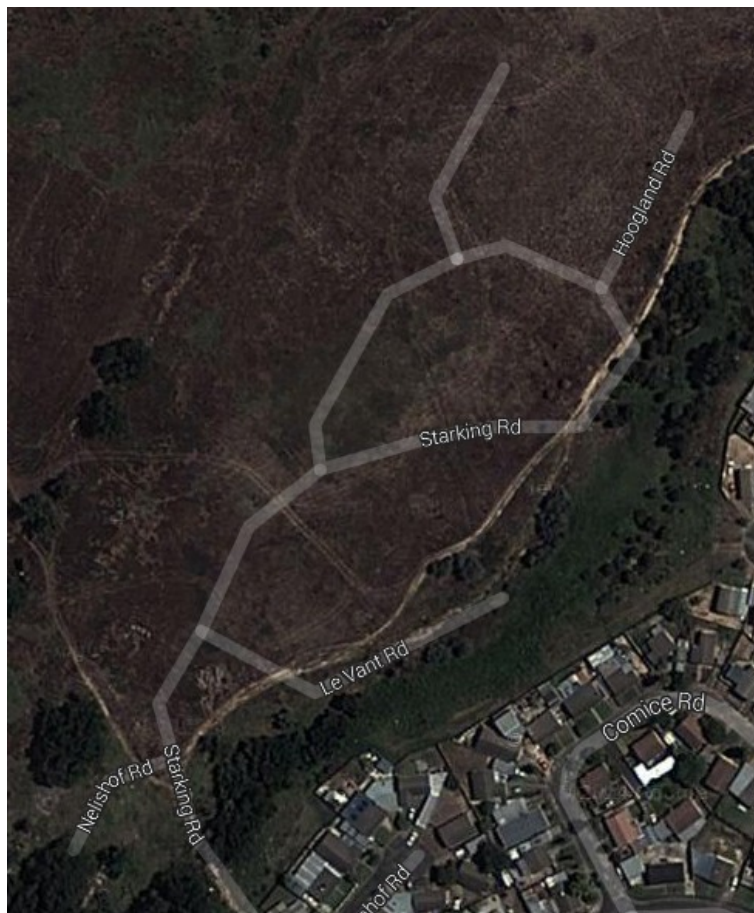


Figure 3.2: Physiological features of the site

4. Nature of investigation

4.1 Test pits and dynamic probe light (DPL) tests

The following field work was carried out: -

- a) Seven test pits (TP1-TP7), located across the site by Asla, were excavated using a digger-loader to expose the soil profile. All test pits were visually profiled, with representative soil samples being taken from selected horizons for laboratory testing purposes
- b) Six dynamic probe light (DPL) tests were carried out from surface at each test pit location, to assess near-surface soil compressibility and strength

Test pit and exposure soil profiles and DPL probe test positions are shown on the site plan (see Appendix A). Copies of the recorded soil profiles and DPL test results are included in Appendices B and C respectively.

4.2 Laboratory testing

The following laboratory tests were carried out on selected soil samples: -

- a) Indicator tests in the form of moisture content, grading and Atterberg Limits analyses to determine basic soils engineering properties
- b) Compaction testing in the form of CBR and Mod AASHTO tests to determine material compaction characteristics
- c) Geochemical testing (pH and conductivity) to indicate possible deleterious effects of soils on concrete and buried services.

Copies of the full laboratory test results are included in Appendix D.

5. Site geology and groundwater conditions

5.1 General

Regionally, the area is underlain from surface by Recent unconsolidated sandy and gravelly deposits of colluvial (transported) origin. Weathered residual granites of the Cape Granite Suite underlie the transported soils.

5.2 Soil profile

From ground surface, soils consist of transported clayey sands, silty sands and clayey silts between 0.6 m to 1.3 m thick. The colluvial soils are underlain by residual granites, consisting of a clayey sands that are intersected below approximately 1.3 m across the site.

The soil profile is fairly similar and uniform across the entire site, which is confirmed by DPL results of which are further discussed in Section 6.1.

Detailed descriptions of the soils underlying the site and DPL results may be found in the recorded soil profiles (see Appendix B).

5.3 Water table

The water table was encountered in one of the seven test pits and is most likely associated with the nearby drainage line and that fact that it is at the lowest point of the site. The residual granite is expected to have a low permeability. The permeability of the overlying transported soils is also expected to be higher and thus infiltrated surface water becomes perched above the less permeable residual granites. Surface water will tend to run-off down slope towards the southern and south-eastern parts of the site.

A perched water table is expected to develop within 0.5 m of ground surface in the lower lying, flatter areas towards the south. Ponding of water on surface may also occur in areas close to the wetland located in the central northern part side of the site.

The groundwater relies mainly on recharge from direct infiltration of rainfall, as well as from up-slope recharge of the groundwater via horizontal flow in the transported soils . As such, this water table will be best-developed during winter, with water table elevations dropping over the dry summer season.

The main water table is expected to occur close to the contact of granite rock and sedimentary horizons at depth.

6. Geotechnical evaluation

6.1 Engineering and material characteristics

On the basis of the desk study, the available geotechnical investigation information and the laboratory test results summarised in Table 6.1 and Table 6.2, the following points relating to site geotechnical conditions and constraints, may be made:-

- a) The DPL probe tests indicate the transported soils at surface, across the site to be of a medium dense consistency within 0.5 m to 1.1 m of ground surface. These soils will exhibit moderate compressibility but will have moderate post-compaction strength. These soils will form a suitable founding horizon provided that bearing pressures are restricted or ground improvement is undertaken.
- b) The residual granites exhibit low compressibility and low to moderate plasticity. Post-compaction strength is expected to be low. Poor workability and drainage characteristics make these soils unsuitable for use in construction. Although these soils have a potential for low to moderate heave movements, they will be suitable for use as a load-bearing founding horizon, provided that appropriate design precautions are implemented.
- c) No particular excavation problems are anticipated within the transported soils and residual granite. Although shoring may be required for test pits in excess of 1.0 m in cohesionless silty sands.

Table 6.1 Summary of Soils Engineering Properties

Test Pit	Depth (m)	Material Description	LL	PI	LS	MC	GM	pH	Conductivity (mS/m)	CBR@ 95%
TP2	0.4	Colluvial silty sand	SP	SP	SP	-	0.85	4.3	28	20
TP7	0.3	Colluvial clayey sand	27	8	3.0	20.3	0.44	4.6	12	-

Key: LL - liquid limit. PI - plasticity index. LS - linear shrinkage. S-P - slightly plastic. MC - in-situ moisture content. GM - grading modulus. CBR - california bearing ratio.

Table 6.2 Engineering Properties of Compacted Materials

Material	Potential usage	Shear strength when compacted	Drainage characteristics	Workability as a construction material	TRH 14 classification
Transported silty and clayey sands	General fill/ Selected layer	Poor to moderate	Fair	Good	G8/G9
Residual granite	Unsuitable	Poor	Poor	Poor	-

- d) Soils samples tested geochemically are very slightly acidic in terms of pH and have a low conductivity. No particular problems are foreseen with regard to possible deleterious effects on buried services. Sound dense concrete should be used in foundations, possibly with additional (sacrificial) cover in view of the acidic nature of the soils.

6.2 Slope stability and erosion

The granular nature of the near-surface sandy soils indicates that they will be susceptible to erosion by water. Water also ponds in depressions/wetland areas in the central northern parts of the site, appropriate design precautions will therefore be necessary, particularly as regards storm water management.

The natural slopes in the area are relatively stable under present conditions. Excavations deeper than 1.0 m for services trenches on side slopes will require shoring or battered slopes for safety reasons.

6.3 Excavation classification with respect to services

Excavation in all transported soils, as well as in the stiff residual granites, classifies as “soft excavation” in terms of the SANS 1200 D Earthworks Specification. In practice, these materials can be excavated and worked using conventional earthmoving equipment. Shoring may be required as sidewall collapse occurs in excavations deeper than 1.0m.

6.4 Impact of the geotechnical character of the site on subsidy housing developments

The following geotechnical characteristics of the site are expected to have an impact on subsidy housing development and subsidy variations:-

- Although the water table was encountered in only one test pit (TP1), a potential exists for the development of a perched water table above the less permeable residual granite, occurring within 0.6 m of ground surface.
- Potential for erosion of granular surface soils, even though slopes are not excessively steep
- Potentially moderately expansive founding conditions in the clayey residual granites

A schedule of generic subsidy variations applicable to the site is outlined in Table 6.3.

Table 6.3 Factors to consider in subsidy variations

Category of subsidy Variation	Verification Criteria	Factors Affecting Amount of Subsidy Variation
Site conditions: Seepage/groundwater Category 1	Potential for the development of a perched water table less than 1.0 m below ground surface in the southern flatter parts of the site (15-20% of site)	Subsurface drainage/ improved damp-proofing measures to houses; service trenches to be de-watered during construction.
Site conditions: Erodability of soil	Upper soil horizon classifies as SP or SM in terms of USC classification	Provision of earthworks and surface water management
Founding conditions: Expansive soils Class S1 and H1	Site class designations classified in accordance with 2.5 of Part 1 Section2 of the NHBRC Home Building Manual	Masonry houses will require foundation design, building procedures and precautionary measures to be in accordance with Tables 5, 6 and 7 of Part 1 Section2 of the NHBRC Home Building Manual

Positive impacts of the geotechnical character of the site on service installation are ease of excavation within the upper transported soils.

Required inputs to the variation calculator are presented in tabular form in Appendix E. It should be noted that Groundwater Category 1 applies to the central northern portion of the site, as delineated on the site plan (see Appendix A). This affected area is approximately 10 % to 15 % of the total develop-able site area.

7. Site classification

The Residential Site Class Designation (after Watermeyer & Tromp and the Joint Structural Division) is set out in Table 7.1. The areal extent of classified areas is shown in Figure 3 in Appendix A.

The surface transported silty sandy soils, indicates a Site Class of S1 for this material. The underlying potentially slightly expansive residual granite, classified as H1. Hence the overall Site Class Designation of S1/H1 is assigned to the entire site.

Table 7.1 Residential Site Class Designations

Site Classification	Character of founding materials	Expected range of total soil movement (mm)	Assumed differential movement (% of total)	Maximum allowable bearing pressure (kPa)
S1/H1	Moderately compressible silty sandy transported soils overlying potentially moderately expansive clayey residual shale soils	10 - 15	50	120

8. Foundation recommendations and solutions

The following founding options are recommended based on the geotechnical evaluation:-

- a) Over-excavate 0.5 m, compact the base of the excavation to 95% Mod AASHTO. Re-compact silty sands to 95% Mod AASHTO up to construction level and found nominally using strip footings. In areas where soft spots occur (TP 1), over-excavate and re-compact to at least 1.0 m. A maximum allowable bearing pressure of 150 kPa is applicable under these conditions
- b) Alternatively, found on medium dense sands at depths of between 0.6 m and 1.2 m below ground level, using a system of piers and ground beams. A safe allowable bearing pressure of 120 kPa is applicable.

Structures will require modified normal construction techniques to be applied to cater for the predicted heave movements of up to 15 mm. Suitable measures would include additional reinforcement in brickwork in plinth walls and above doors and windows, reinforcement of surface beds, articulation of brick panels using construction joints and effective water management as outlined in Section 9 (refer also to NHBRC Home Building Manual).

Based on the performance of existing houses in the area and the nature of the soils, it is our opinion that the required precautions should minimize the risk of problems associated with the identified geotechnical character of the site.

9. Drainage

In view of the potentially impermeable nature of the residual granites, together with permeable transported soils, sound water management is required, especially in lower lying areas. Close attention to drainage and the effective collection and disposal of storm water run-off.

Roads should also be constructed with adequate drainage to minimize the possible effects of this seasonal shallow perched ground water and surface water run-off and to prevent deterioration of the upper layer works (base course and sub-base layers). This may include subsurface drainage in low-lying areas (see site plan for delineated area), unless levels can be raised sufficiently to ensure that shallow groundwater is kept well below road layer works.

Measures to prevent water ingress into soils below foundations are also required. These would include grading of slopes to promote run-off and prevent ponding close to houses, effective collection and removal off site of storm water and water from downpipes and regular checking of wet services for leaks.

10. Special precautionary measures

Apart from those outlined above, no special precautionary measures are expected to be required.

The required Phase 2 geotechnical site investigation would need to confirm site ground conditions, as described herein, and also confirm the design precautions necessary for structures and roads. Normally the Phase 2 investigation would involve the inspection of service trenches across the site as a minimum, with an Addendum report to be attached to the Phase 1 geotechnical report.

11. Conclusions

This Phase 1 geotechnical site investigation indicates that the western side of the site is broadly suitable for project linked subsidy housing development, provided that aspects of concern relating to the geotechnical character of the site are addressed. These aspects are highlighted in the report and essentially include provision of subsurface drainage in areas of potential shallow groundwater, terracing and servicing of sites on moderate slopes and design of units for moderate heave movements.

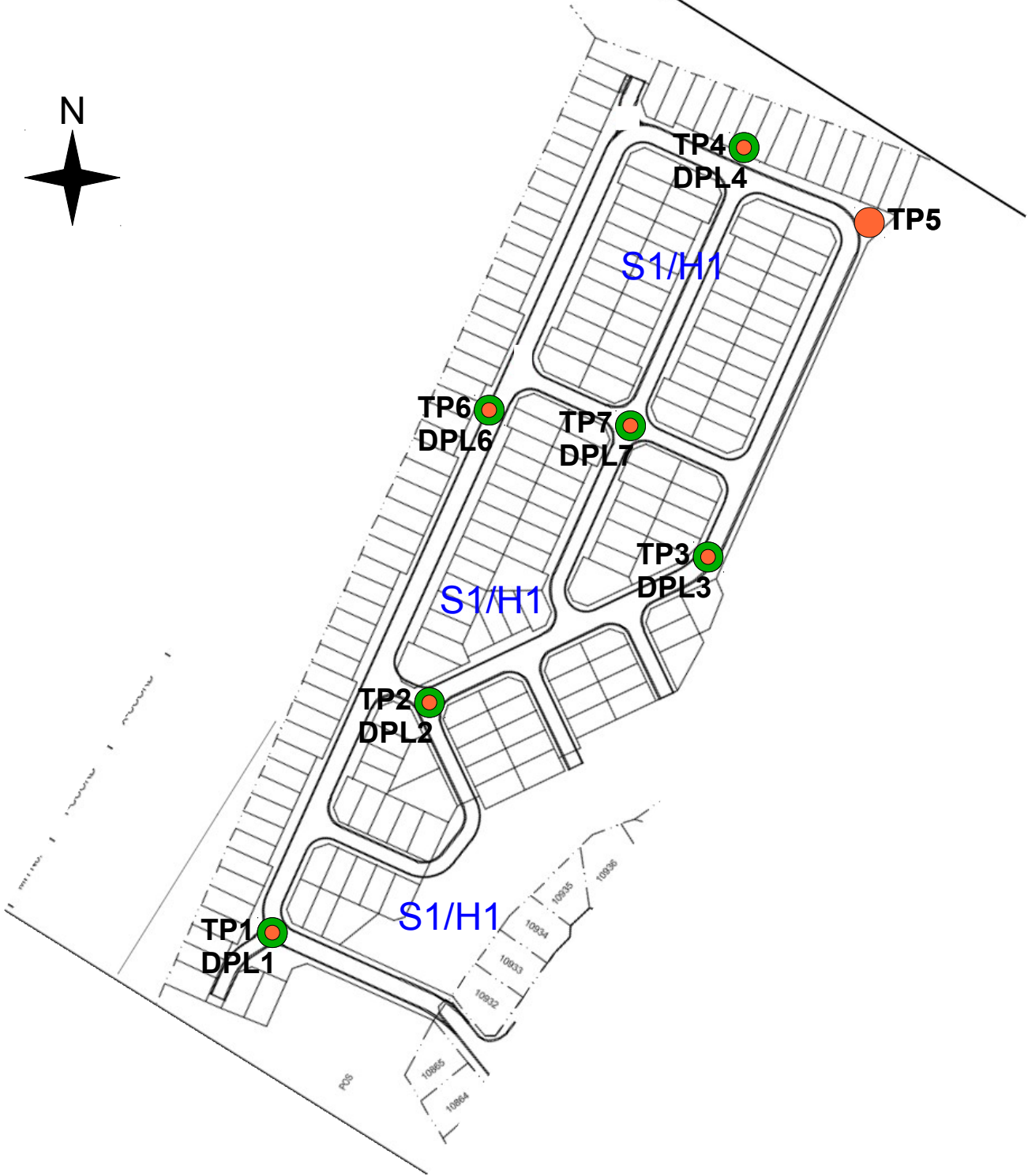




JOHN YATES



MATTHEW JONES

APPENDIX A
SITE PLAN AND CLASSIFICATION



KEY	
	TP - Test pit DPL test
	Test pit

SITE CLASSIFICATION DESIGNATION

S1/H1	Moderately compressible silty sandy transported soils overlying potentially moderately expansive clayey residual shale soils
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Engineering Geology and Geohydrology

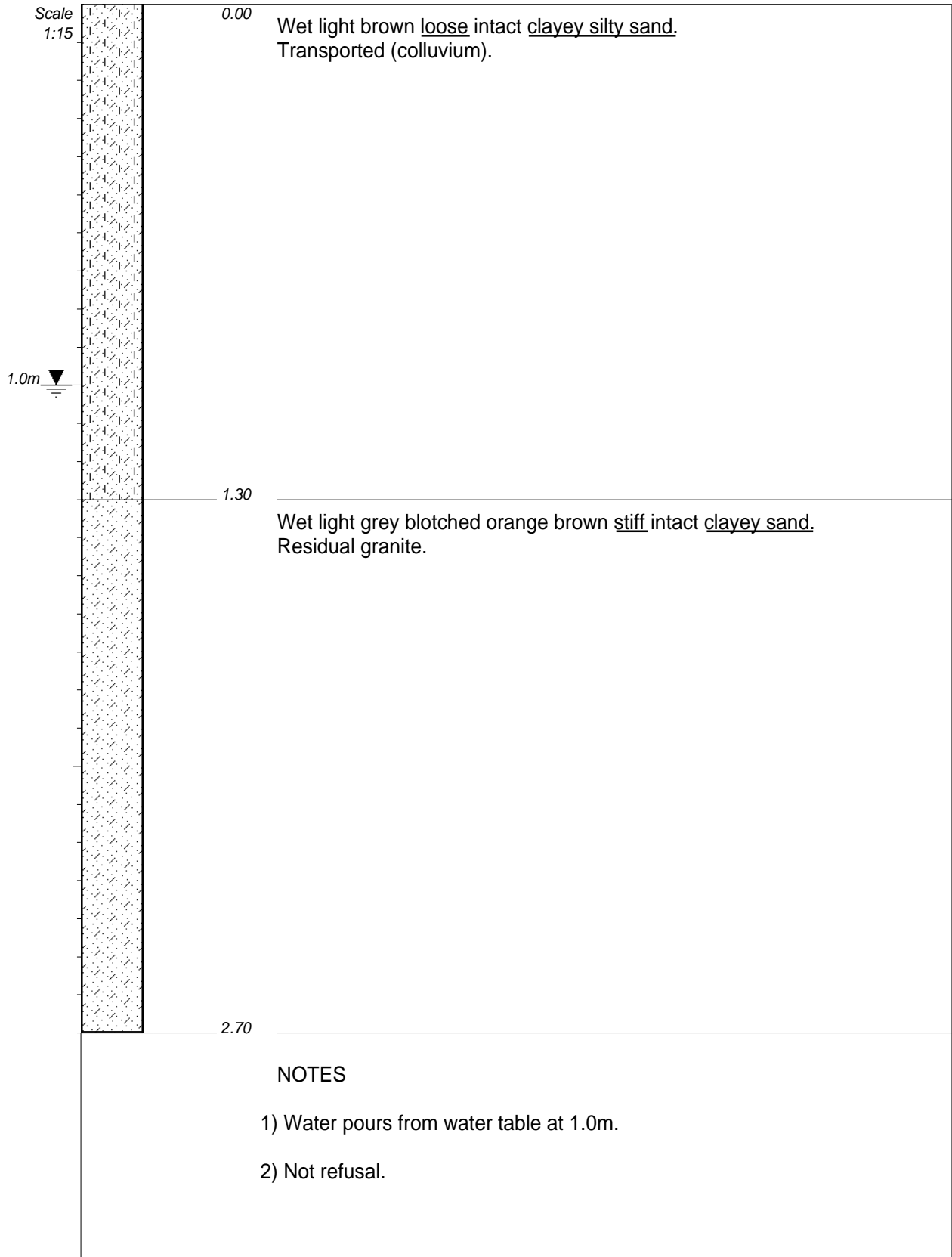
Tel: +27 21 671 4274/4280 Fax: +27 21 671 4277 Cell: +27 82 442 6231
Email: admin@coregeotech.co.za
Postal address: Postnet Suite 177, Private Bag X3, 7801, Plumstead
Physical address: Unitb1, Clareview Business Park, 236 Imam Haron Road, Claremont, 7708

CLIENT: ASLA				
PROJECT: STELLENBOSCH IDAS VALLEY ERVEN 10866-11008				
TITLE: SITE PLAN SHOWING TEST PIT POSITIONS & SITE CLASS				
DATE:	Jul-14	TRACED BY:	SS	
SCALE:	NTS	FIG.NO.	1	JOB NO. 089-14

APPENDIX B - SOIL PROFILES



TEST PIT SOIL PROFILES



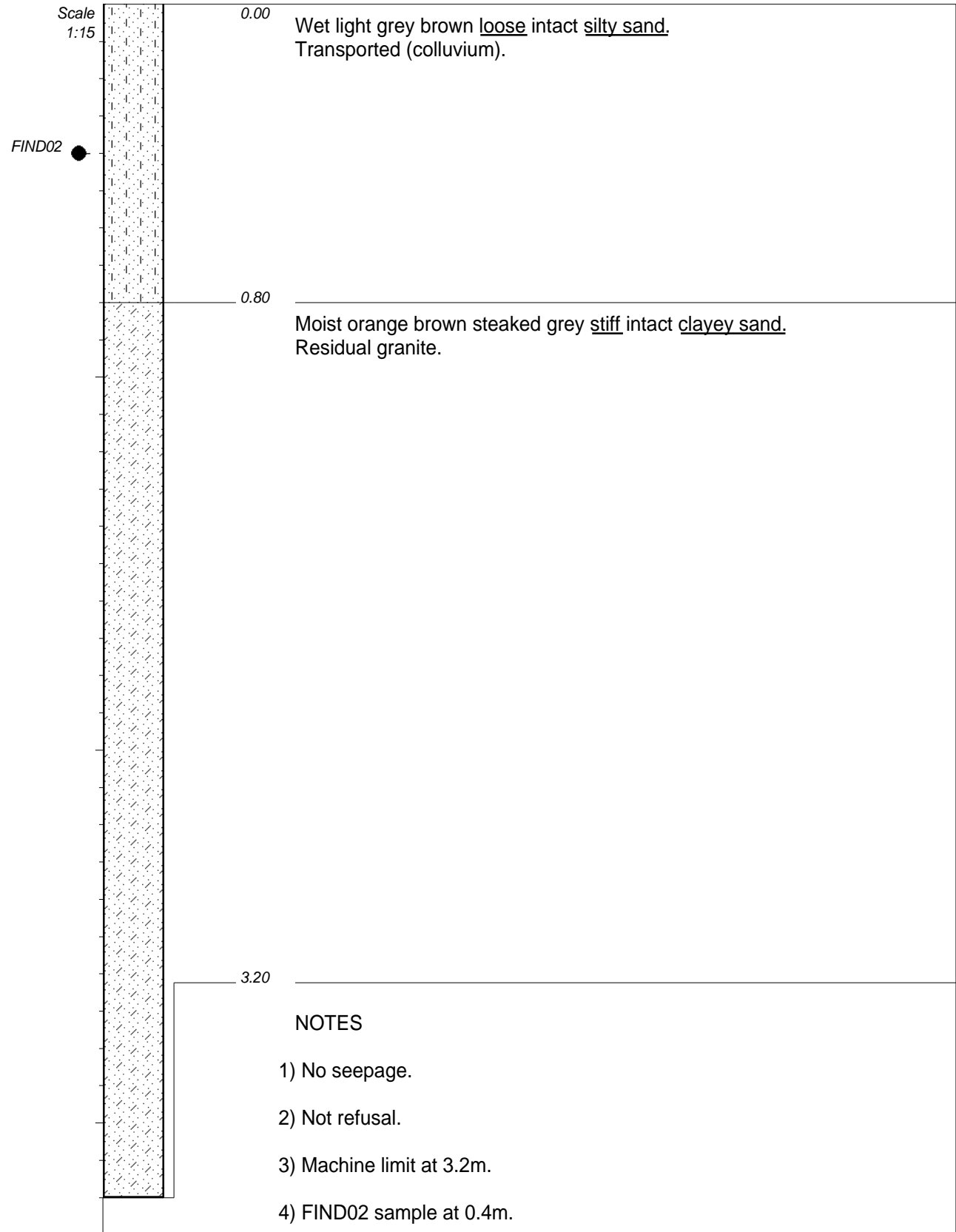
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MACHINE : TLB
DRILLED BY :
PROFILED BY : Matthew Jones
TYPE SET BY :
SETUP FILE : STANDARD.SET

LOCATION:
DIAM :
DATE :
DATE : 12 June 2014
DATE : 27/06/2014 08:56
TEXT : C:\dot5000\ida10866.txt

COLLAR LEVEL : Ground level
X COORD :
Y COORD :



TEST PIT SOIL PROFILES



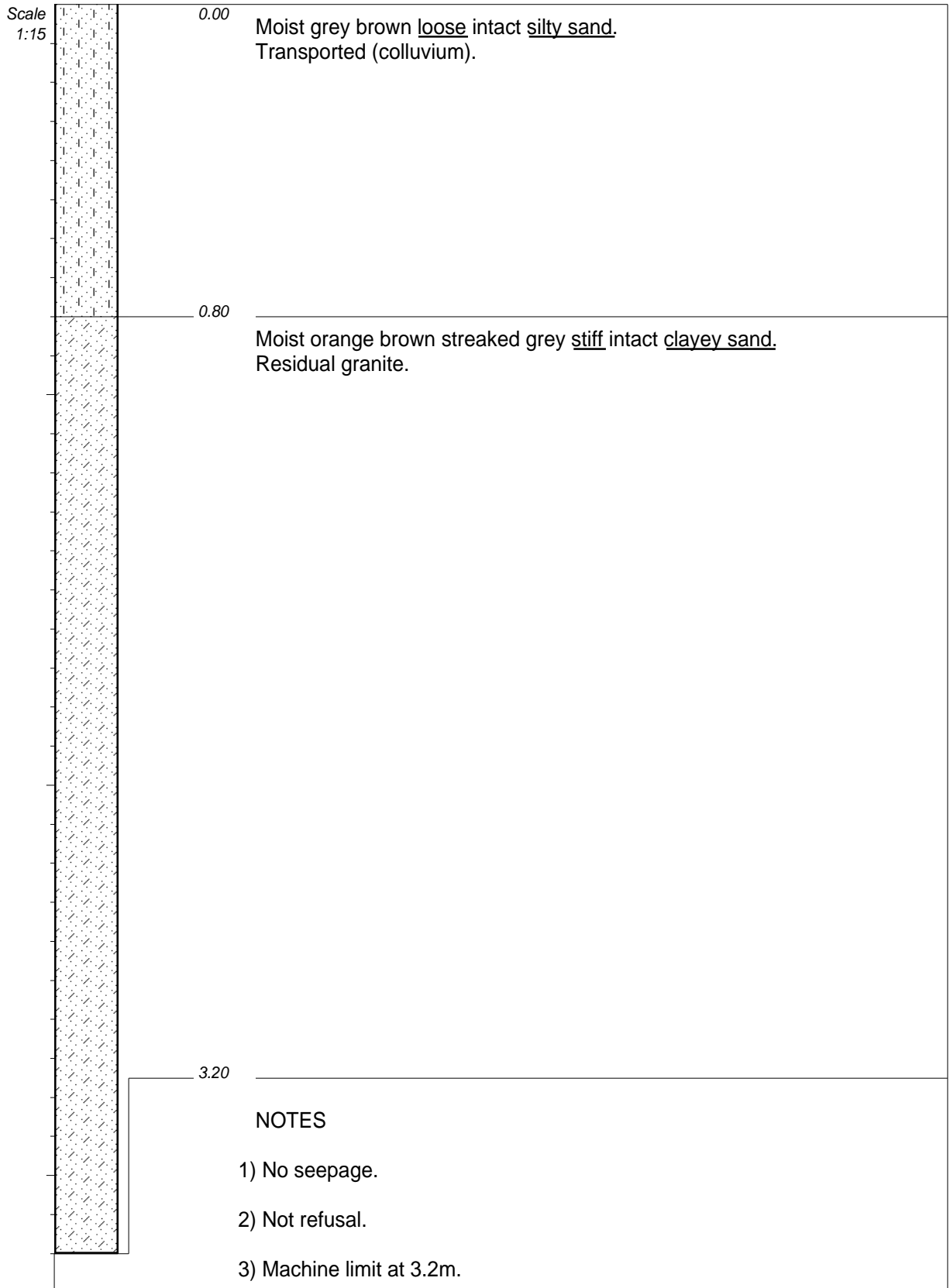
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DATE :
DATE : 12 June 2014
DATE : 27/06/2014 08:56
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COLLAR LEVEL :
X COORD :
Y COORD :



TEST PIT SOIL PROFILES



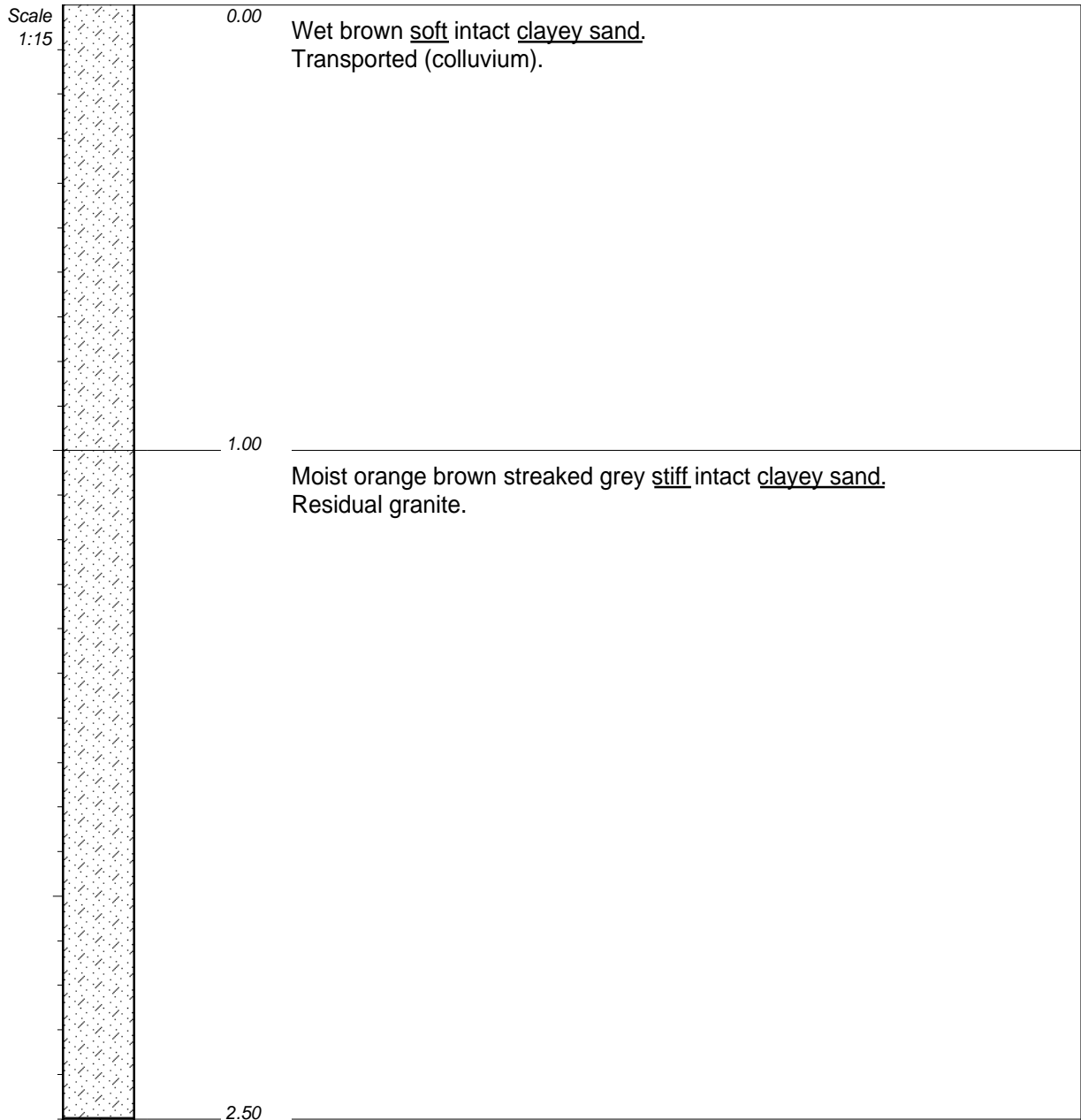
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PROFILED BY : Matthew Jones
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SETUP FILE : STANDARD.SET

LOCATION:
DIAM :
DATE :
DATE : 12 June 2014
DATE : 27/06/2014 08:56
TEXT : C:\dot5000\ida10866.txt

COLLAR LEVEL :
X COORD :
Y COORD :



TEST PIT SOIL PROFILES



NOTES

- 1) No seepage.
- 2) Test pit ??? and topsoil too soft causing machine to get stuck.

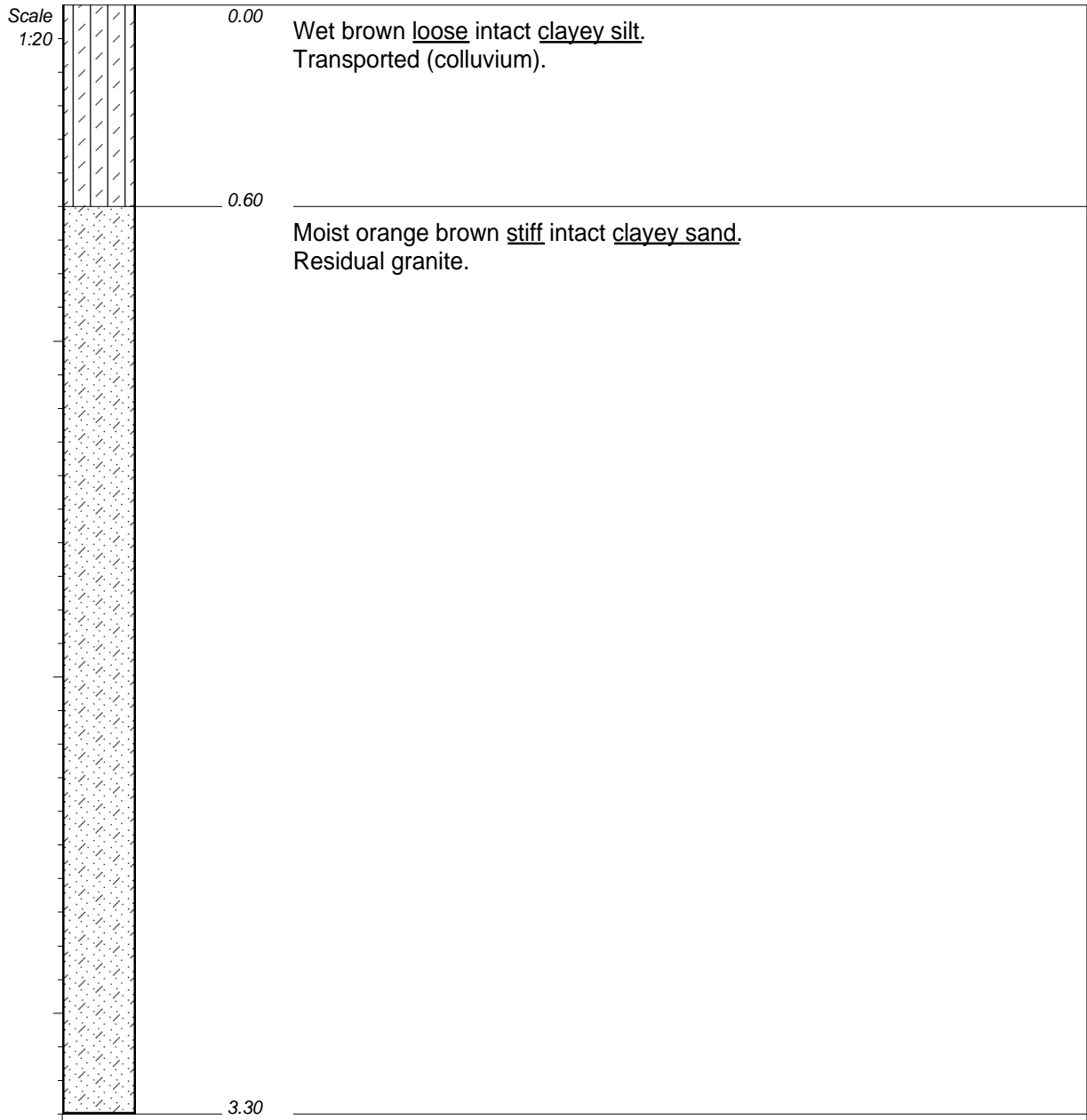
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DIAM :
DATE :
DATE : 12 June 2014
DATE : 27/06/2014 08:56
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COLLAR LEVEL :
X COORD :
Y COORD :



TEST PIT SOIL PROFILES



NOTES

- 1) No seepage.
- 2) Not refusal.
- 3) Machine limit at 3.3m.

CONTRACTOR :
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 DRILLED BY :
 PROFILED BY : Matthew Jones
 TYPE SET BY :
 SETUP FILE : STANDARD.SET

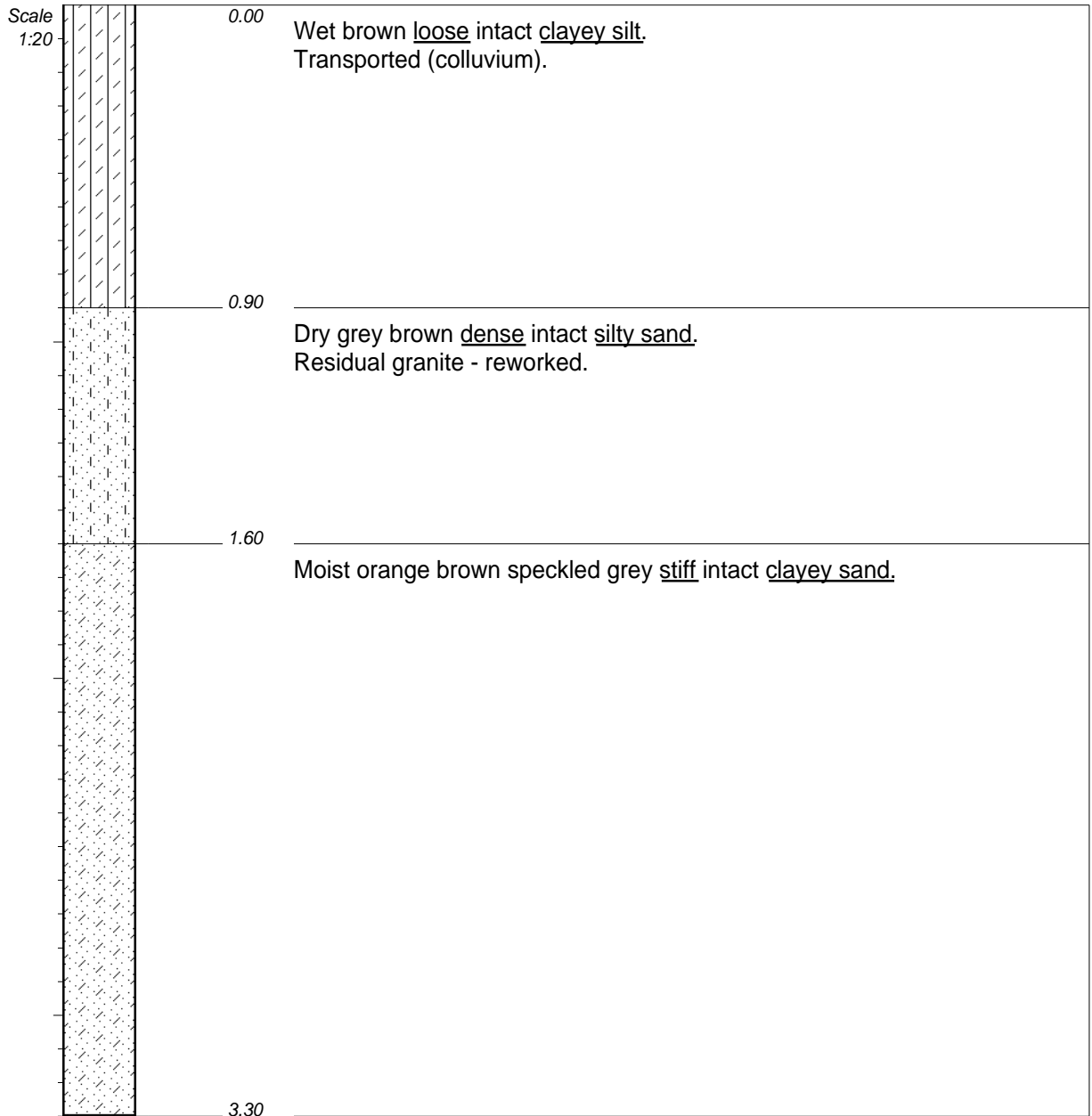
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 DATE : 12 June 2014
 DATE : 27/06/2014 08:56
 TEXT : C:\dot5000\ida10866.txt

COLLAR LEVEL :
 X COORD :
 Y COORD :



TEST PIT SOIL PROFILES

JOB NUMBER: 089-14



NOTES

- 1) No seepage.
- 2) Not refusal.
- 3) Machine limit at 3.3m.
- 4) Test pit moved due to very soft and wet conditions at surface.

CONTRACTOR :
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DRILLED BY :
PROFILED BY : Matthew Jones
TYPE SET BY :
SETUP FILE : STANDARD.SET

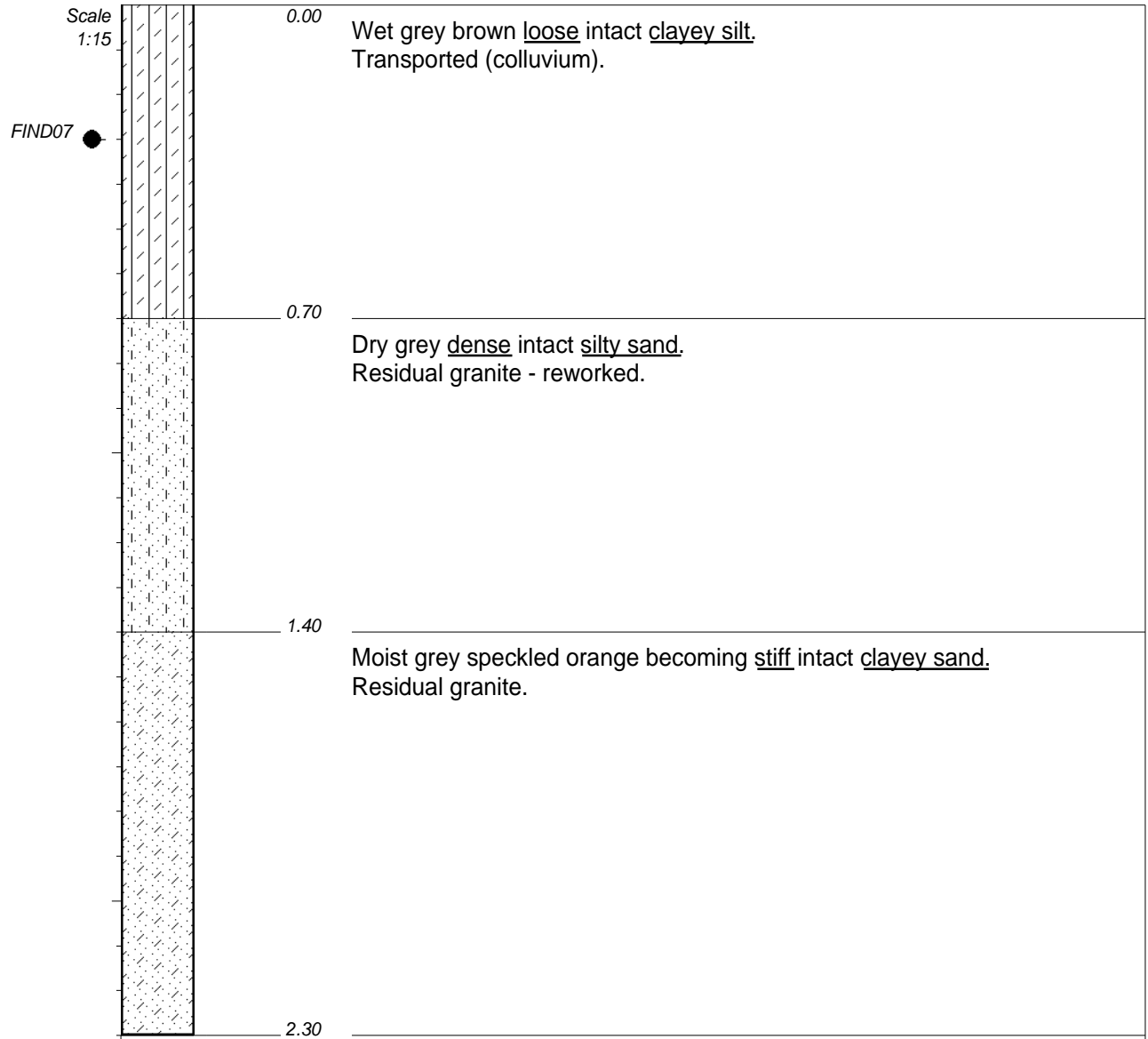
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DATE :
DATE : 12 June 2014
DATE : 27/06/2014 08:56
TEXT : C:\dot5000\ida10866.txt

COLLAR LEVEL :
X COORD :
Y COORD :

HOLE No: TP06



TEST PIT SOIL PROFILES



NOTES

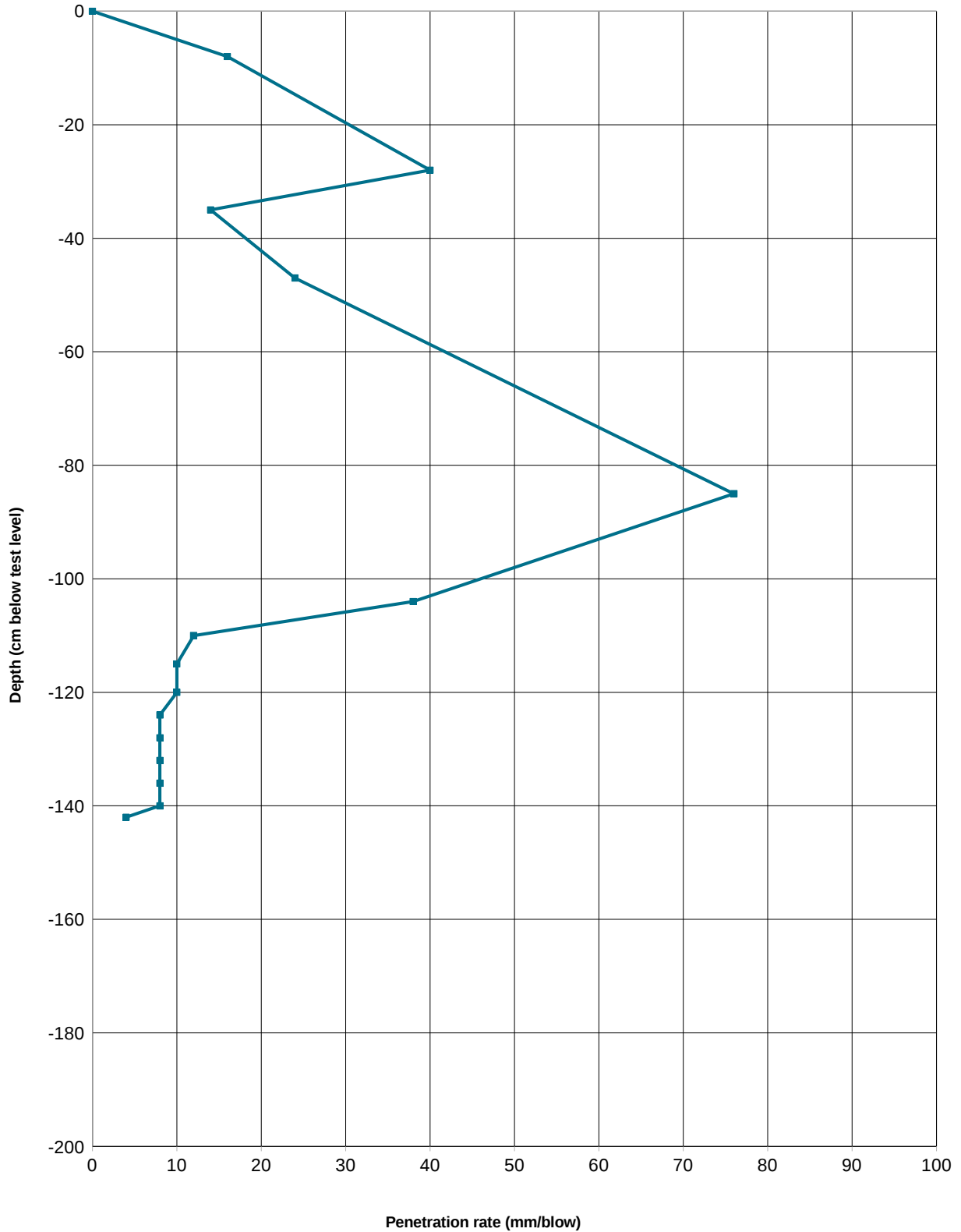
- 1) No seepage.
- 2) Not refusal.
- 3) FIND07 sample at 0.3m.

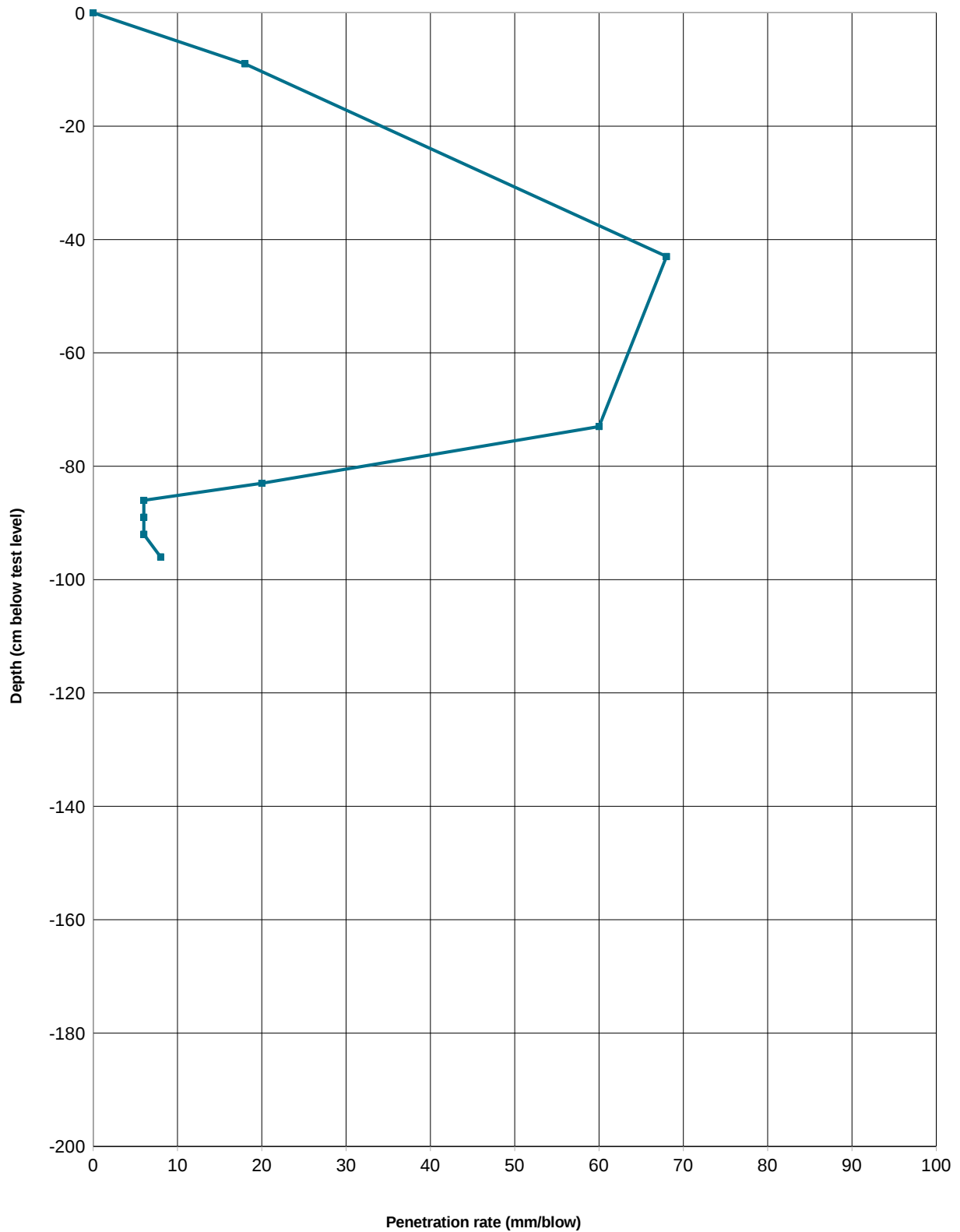
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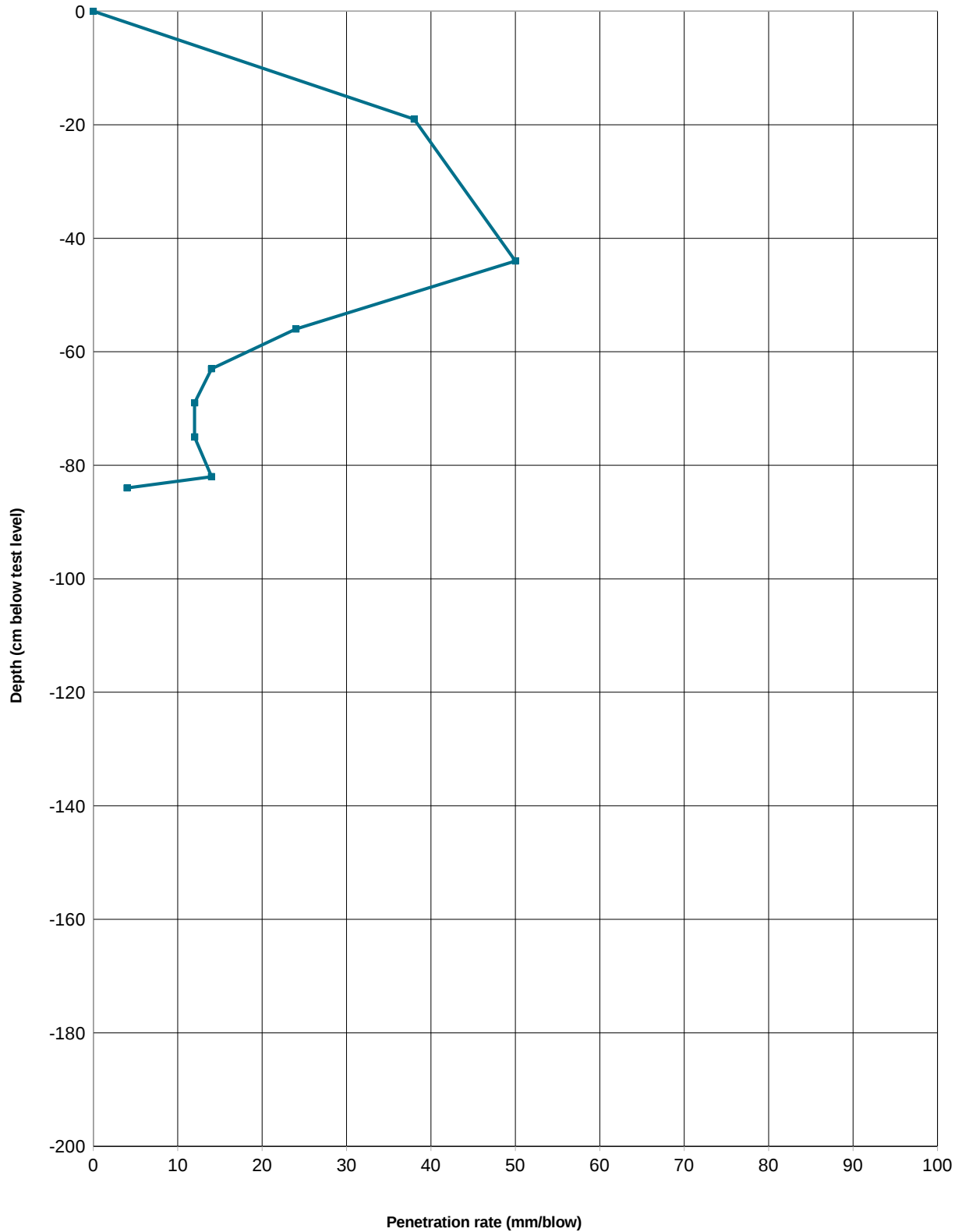
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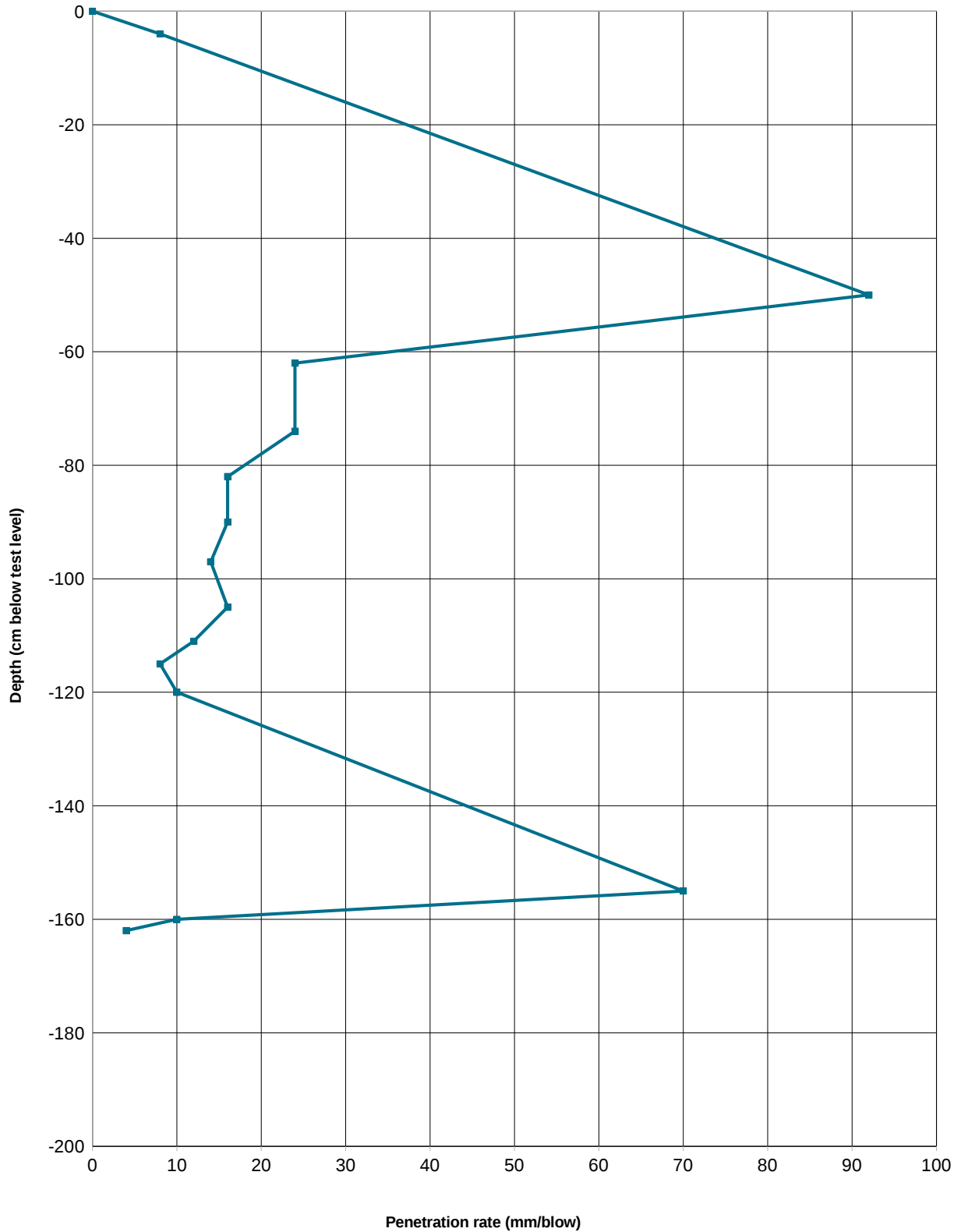
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X COORD :
Y COORD :

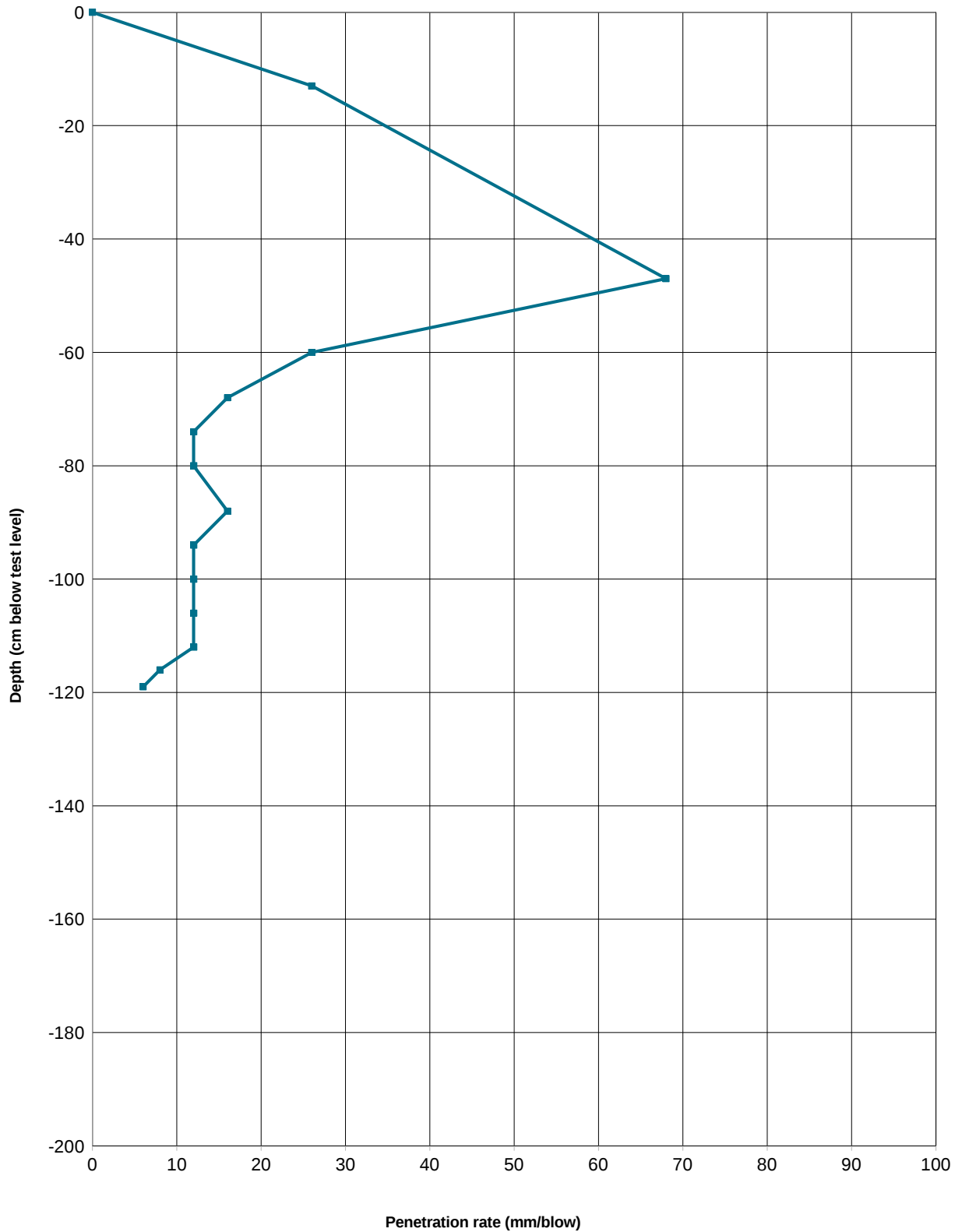
**APPENDIX C - DYNAMIC PROBE LIGHT
(DPL) TESTS**

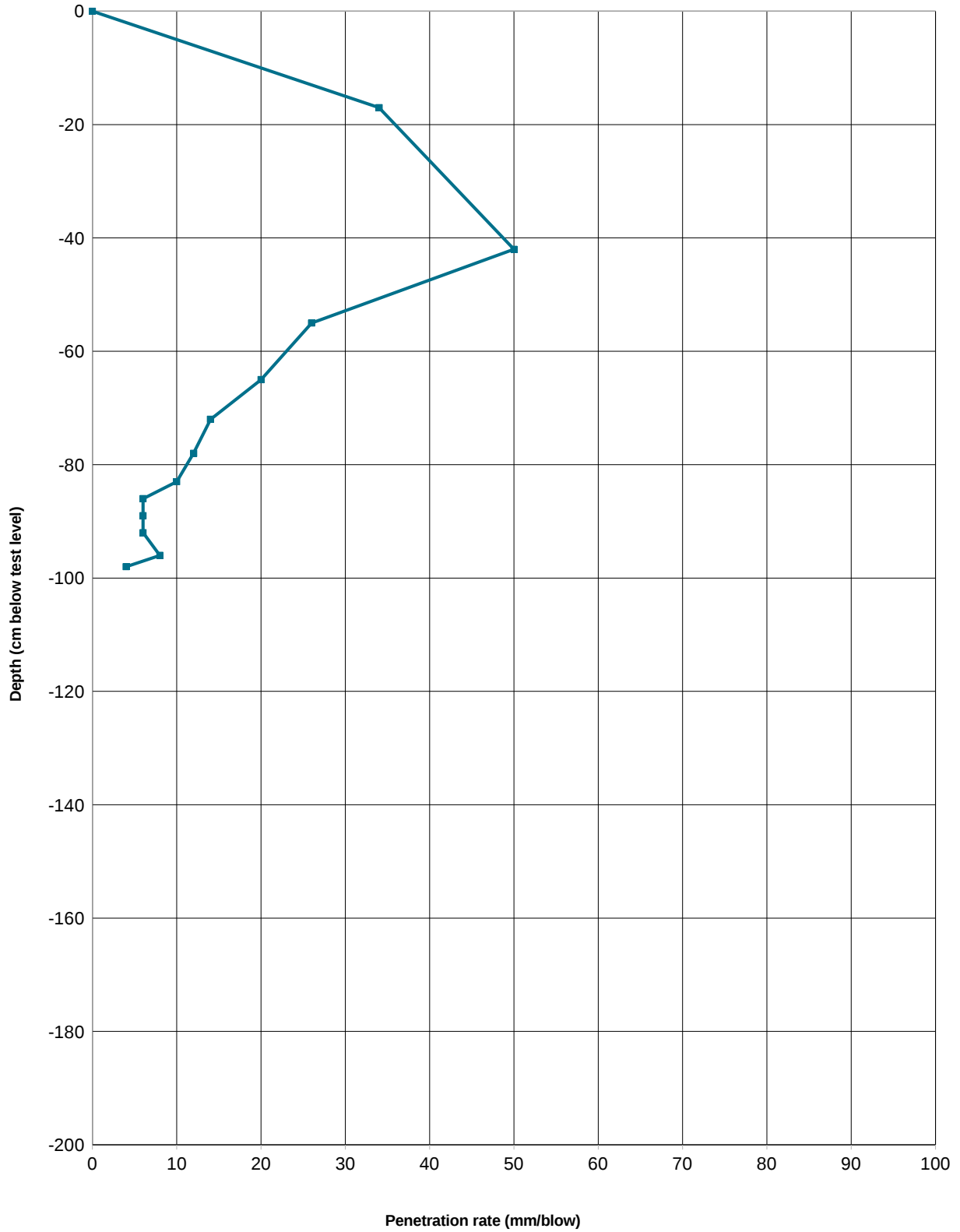












APPENDIX D
Laboratory test results

CLIENT: Core Geotechnical Postnet Suite 177 Private Bag X3 Plumstead 7801	PROJECT: Stellenbosch-100866	DATE: 20-06-2014
ATT: John Yates	REF: L140635	

ASTM D422 SIEVE ANALYSIS

DESCRIPTION : olive silty sand	SAMPLE NO. : 23557
POSITION : TH 2 @ 0.4m	CLIENT SAMPLE NO. :

Sieve Analysis	Sieve Size (mm)	Percent Passing
	75.00	
	63.00	
	53.00	
	37.50	
	26.50	
	19.00	
	13.20	
	9.50	
	6.70	
	4.75	
	2.36	
	2.00	100
	1.18	98
	0.600	87
	0.425	78
	0.300	68
	0.150	52
	0.0750	37

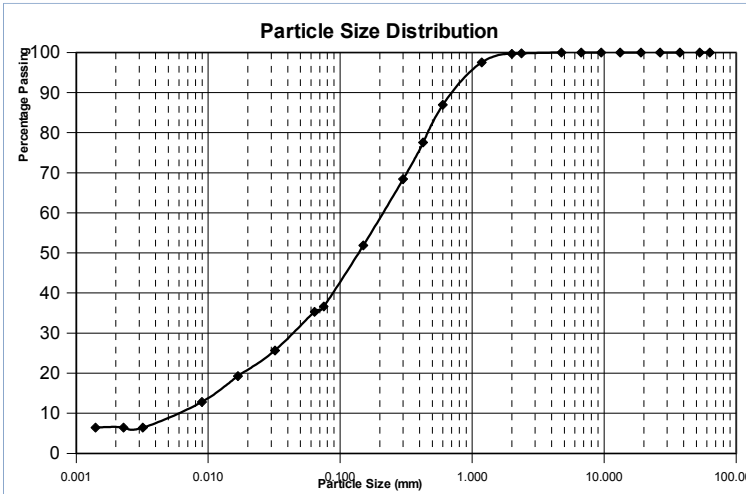
Hydrometer Analysis	
Diameter of particle (mm)	Percentage of soil suspension (%)
0.0707	35
0.0364	26
0.0185	19
0.0097	13
0.0035	6
0.0025	6
0.0014	6

SCS Dispersion Test	
Diameter of particle (mm)	Percentage of soil suspension (%)

% SCS Dispersion:	
Initial Moisture Content (%) :	
pH:	4.30
Conductivity mS/m:	28

Atterberg Limits :	
Liquid Limit	
Plastic Index	S-P
Linear Shrinkage	

MOD AASHTO ; C.B.R. :	
MOD AASHTO (Kg/m ³)	2062
O.M.C. (%)	7.8
C.B.R. @ 100% Comp.	78
C.B.R. @ 98 % Comp.	44
C.B.R. @ 95 % Comp.	20
C.B.R. @ 93 % Comp.	13
C.B.R. @ 90 % Comp.	5
Swell (max) %	0.00



Tabulated Summary	Percentage
Gravel : Percentage - 4.75 mm	0
Sand : Percentage - 4.75mm and + 0.075mm	63
Silt : Percentage - 0.075mm and + 0.002mm	30
Clay : Percentage - 0.002mm	7

The above test results are pertinent to the samples received and tested only. For Geoscience:
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CLIENT: Core Geotechnical Postnet Suite 177 Private Bag X3 Plumstead 7801	PROJECT: Stellenbosch-100866	DATE: 20-06-2014
ATT: John Yates	REF: L140635	

ASTM D422 SIEVE ANALYSIS

DESCRIPTION : dark brown clayey sand	SAMPLE NO. : 23558
POSITION : TH 7 @ 0.3m	CLIENT SAMPLE NO. :

Sieve Analysis	Sieve Size (mm)	Percent Passing
	75.00	
	63.00	
	53.00	
	37.50	
	26.50	
	19.00	
	13.20	
	9.50	
	6.70	
	4.75	
	2.36	
	2.00	100
	1.18	98
	0.600	92
	0.425	88
	0.300	84
	0.150	75
	0.0750	68

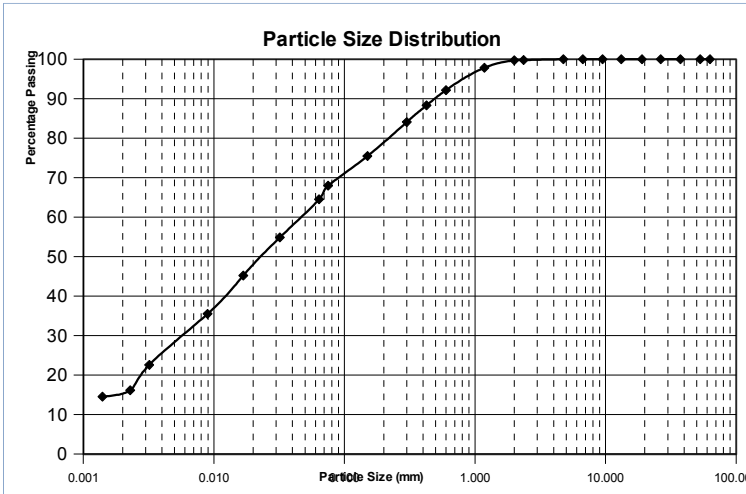
Hydrometer Analysis	
Diameter of particle (mm)	Percentage of soil suspension (%)
0.0640	65
0.0332	55
0.0171	45
0.0091	36
0.0033	23
0.0024	16
0.0014	15

SCS Dispersion Test	
Diameter of particle (mm)	Percentage of soil suspension (%)

% SCS Dispersion:	
Initial Moisture Content (%) :	20.3
pH:	4.60
Conductivity mS/m:	12

Atterberg Limits :	
Liquid Limit	27
Plastic Index	8
Linear Shrinkage	3.0

MOD AASHTO ; C.B.R. :	
MOD AASHTO (Kg/m ²)	
O.M.C. (%)	
C.B.R. @ 100% Comp.	
C.B.R. @ 98 % Comp.	
C.B.R. @ 95 % Comp.	
C.B.R. @ 93 % Comp.	
C.B.R. @ 90 % Comp.	
Swell (max) %	



Tabulated Summary	Percentage
Gravel : Percentage - 4.75 mm	0
Sand : Percentage - 4.75mm and + 0.075mm	32
Silt : Percentage - 0.075mm and + 0.002mm	48
Clay : Percentage - 0.002mm	20

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APPENDIX E
VARIANCE CALCULATOR

NATIONAL HOUSING PROGRAMM The adjustment of the subsidy amount to cater for extraordinary development conditions.

Questionnaire



Name of project:

IDAS VALLEY 10866-11008

Project number:

ERF NRS:

		Size of House	40
1. GROUNDWATER		YOU MAY HAVE ONLY ONE "Y" IN THIS SECTION	
CATEGORY 1 - Permanent or perched water table equal to or less than 1.0m below ground level.			Y
CATEGORY 2 - Permanent or perched water table more than 1.0 but less than 1.5m below ground level.			N
2. ERODIBILITY OF SOIL		YOU MAY HAVE ONLY ONE "Y" IN THIS SECTION	
CATEGORY 1 - High risk- Erodibility index 1-8			N
CATEGORY 2- Meduim risk - Erodibility index 9-15			Y
3. HARD EXCAVATION		YOU MAY COMPLETE ONLY GATEGORY	
CATEGORY 1 - Hard rock excavation	10% - 100%		
CATEGORY 2 - Boulder excavation	10% - 100%		
4. DOLOMITE (Site Class D)		*YOU MAY HAVE ONLY ONE "Y" IN SECTIONS 4-7*	
CATEGORY 1 - Class P and anticipated inherent risk Class 1 and 2: Dolomite area Class D2			N
CATEGORY 2 - Class P and anticipated inherent risk Class 3, 4 and 5: Dolomite area Class D3			N
5. EXPANSIVE CLAYS (Site Class H)		*YOU MAY HAVE ONLY ONE "Y" IN SECTIONS 4-7*	
CATEGORY 1 - Meduim - Class H1			N
CATEGORY 2 - High - Class H2	Low PE: 5 < CDS < 20		N
	OR Medium PE: 20 < CDS < 40		N
CATEGORY 3 - Very high - Class H3	High PE: 40 < CDS < 60		N
	OR Very High PE: CDS < 60		N
6. COLLAPSING SANDS (Site Class C)		*YOU MAY HAVE ONLY ONE "Y" IN SECTIONS 4-7*	
CATEGORY 1 - Class C1	Modified normal foundations		N
	OR Compaction below footings		N
CATEGORY 2 - Class C2	Compaction below footings		N
	OR Light raft		N
	OR Medium raft		N
	OR Heavy raft		N
	OR Special raft		N
7. COMPRESSIBLE SOILS (Site Class S)		*YOU MAY HAVE ONLY ONE "Y" IN SECTIONS 4-7*	
CATEGORY 1 - Class S1	Modified normal foundations		Y
	OR Compaction below footings		Y
CATEGORY 2 - Class S2	Light raft		N
	OR Medium raft		N
	OR Heavy raft		N
	OR Special raft		N
8. MINING SUBSIDENCE		YOU MAY HAVE ONLY ONE "Y" IN THIS SECTION	
CATEGORY 1 - Old under-mining depth 90m-240m below surface	Compaction below footings		N
	OR Medium raft		N
CATEGORY 2 - Mining within a depth of between 90m-240m below surface	Additional earthworks		N
	OR Soil mattress		N
9. SEISMIC ACTIVITY		YOU MAY HAVE ONLY ONE "Y" IN THIS SECTION	
CATEGORY 1 - Mining induced seismic activity >100 cm/s ²	Stiffened strip footings		N
	OR Heavy raft		N
CATEGORY 2 - Natural induced seismic activity >100 cm/s ²	Stiffened strip footings		N
	OR Heavy raft		N
10. TOPOGRAPHY OF THE SITE		YOU MAY HAVE ONLY ONE "Y" IN THIS SECTION	
CATEGORY 1 - Average ground slope flatter than 1:100			Y
CATEGORY 2 - Average ground slope of between 1:11 and 1:20			N
CATEGORY 3 - Average ground slope of between 1:7.5 and 1:10			N
CATEGORY 4 - Average ground slope of between 1:5 and 1:7.5			N
CATEGORY 5 - Average ground slope of more than 1:5			N
11. SOUTHERN CAPE COASTAL CONDENSATION AREAS			
Housing in the designated area is subject to severe condensation conditions.			N
12. LOCATION ADJUSTMENT			
Major Centre			
Distance from identified major centre (measured in ONE direction)			
% allowance on material cost			
13. PHYSICAL DISABILITIES AND SPECIAL HOUSING NEEDS			
CATEGORY A- Needs walking aids			
CATEGORY B - Partial usage of wheel chair.			
CATEGORY C - Full-time usage of wheel chair.			
CATEGORY D- Partially/profoundly deaf			
CATEGORY E- Partially/totally blind.			
CATEGORY F - Partially/ total movement loss/paralysis in the uper body limbs.			
Number of houses:			