CIVIL TEST PTY LTD
ABN 91 006 855 689
SOIL TESTING & GEOTECHNICAL CONSULTANTS
ACN 006 855 689

A REPORT ON THE SOIL INVESTIGATION AND PAVEMENT DESIGN FOR

CARPARK & ACCESS ROADS

LYSTERFIELD LAKE COLLEGE 19-23 HORSWOOD ROAD

NARRE WARREN NORTH

Report N°: 1191040-3 Issue 3

TABLE OF CONTENTS

CLIENT	**:**	Pared Victoria T/A Lysterfield Lake College C/- HWL Ebsworth Lawyers Level 8, 447 Collins Street MELBOURNE VIC 3000
AUTHORISED BY	**:**	Mr Damien Burger
PROJECT	**:**	Carpark & Access Roads Lysterfield Lake College 19-23 Horswood Road NARRE WARREN NORTH
COMMISSION	**:**	Carry out appropriate insitu soil tests and observations at eight locations as shown on the attached plan (Appendix A). Recommend a pavement composition for the carpark and access roads in accordance with the method outlined in AUSTROADS (2012): 'Guide to Pavement Technology Part 2: Pavement Structural Design' using the indicative traffic loading provided in the above design guide.

1 INTRODUCTION:

1.1 Aim

This report discusses the field investigation carried out on 11 October 2019 and the subsequent laboratory tests for the proposed construction of a carpark and access roads.

The report closes with a recommendation for the pavement composition and any other treatment that may be appropriate for the construction process based on the field and laboratory data.

1.2 Statement of Expected Pavement Performance

The pavements recommended in this report have been designed using state of the art technology in pavement design. The essential part of the design is to ensure that each layer within the pavement is compatible - in terms of characteristics and strength - with those of the adjacent layers, so that the overall pavement performance criteria can be met. The pavements recommended in this report may not meet specific standardisation requirements of some local authorities and therefore such standard pavements may not be applicable for the project reported on herein.

It is expected that the subgrade will exhibit a characteristic deflection - that is a rebound deflection of the mean plus 1.5 times the standard deviation - of up to 4mm on completion of preparation as detailed. It is also expected that prior to asphalting the base course will have similar deflections of up to 2mm after preparation.

The pavement has been designed for a theoretical life of 20 years based on the traffic loadings nominated. At the end of its life, a pavement is expected to have deviations (ruts) and surface cracking (crazing).

2 SOURCE OF INFORMATION:

2.1 Civiltest Pty Ltd - Field and Laboratory data collected and recorded.

2.2 AUSTROADS (2012): 'Guide to Pavement Technology Part 2: Pavement Structural Design'

2.3 VICROADS - Code of Practice RC 500.22 “Selection and Design of Pavements and Surfacings”.

3 INVESTIGATION:

3.1 Field Work

The field work was carried out on 11 October 2019 by mechanically augering test bores at the approximate locations as shown on the attached plan (Appendix A).

California Bearing Ratio (CBR) values were obtained at each bore site using a 9kg Dynamic Cone. Insitu moisture contents were also obtained throughout each bore to assist in the assessment of the CBR values.

Insitu moisture contents were determined on the bulk samples.

All the field data is presented on the engineering logs (Appendix B).

3.2 Laboratory Work

Representative subgrade samples of the predominant subgrade material types were remoulded in a CBR mould using standard compactive effort at approximately the optimum moisture content. The samples were then soaked for four days under a 4.5kg surcharge before being tested to determine the laboratory soaked CBR value.

The tests mentioned above were repeated on two of the samples with 3% lime added.

Classification tests (Plasticity Index and Sieve Analysis) were carried out on the predominant subgrade material types to assess the reactivity and the drainage characteristics for the site.

All the engineering data is attached (Appendix C).

4 FINDINGS:

4.1 Field Work

The test bores revealed that the natural soil profile consisted of silty SAND overlying sandy CLAY followed by silty CLAY.

4.2 Laboratory Work

The results of the laboratory tests are set out in the table below:

Bore Hole No.	Material Description	Sample No.	CBR %	Density t/m^3	Moisture %	Reactivity	PI %	%Pass 0.075mm
9	Silty CLAY	191-4474L	5.0	1.67	20.0	Moderate	36	70
12	Silty CLAY	191-4474N	5.0	1.54	25.5	Moderate	47	77
14	Silty CLAY	191-4474O	6.0	1.95	10.5	Low	12	62
9	Silty CLAY + 3% lime	191-4474M	25.0	1.54	25.0	Low	28	-
14	Silty CLAY + 3% lime	191-4474P	30.0	1.84	13.5	Low	4	-

5 DESIGN SUBGRADE VALUE AND SUBGRADE DELINEATION:

After reviewing the soil profiles in the field and the laboratory test results, it was considered that a subgrade design CBR value of 5.0% should be adopted for silty CLAY subgrade materials for the pavements in this project.

6 TRAFFIC LOADINGS:

In the absence of site specific traffic data, Table 12.2 of AUSTROADS (2017) has been used to estimate the design traffic loading for the proposed carpark and access road with bus access pavements for approximately 16 buses per day. By adapting the case of 'Local access with buses', the design traffic loading is adopted as 2.1×10^5 Equivalent Standard Axles (ESA). This loading is adopted in the design of the pavements on this site.

7 DISCUSSION:

It has been established that the subgrade design CBR value is 5.0% and the design traffic loading is 2.1×10^5 Equivalent Standard Axles (ESA). Therefore, for a 95% reliability level in pavement performance, the overall pavement depth should be at least 360mm.

However, it is likely that the subgrade material at the time of construction will have CBR values at or just below the design value. This will not cause any premature failure in the pavement system as the CBR values will gradually reach equilibrium but at a faster rate than the increase in traffic loadings. A lower CBR value at the time of construction will cause difficulties in the construction process, particularly when compacting the crushed rock layers to the required density.

In this case, by mixing the subgrade material with Calcium Oxide (Lime) and a small amount of cement, an amelioration of the material will occur by increasing the plastic limit of the CLAY subgrade material and consequently the CBR value will increase at the same moisture content.

8 RECOMMENDATIONS:

8.1 Unbound Granular Pavements:

Pavement Layer	Layer Thickness (mm)	
	Option A	Option B
Wearing Course Asphalt Type N (14mm Stone, C320 Binder)	40	40
Base 20mm Class 2 Fine Crushed Rock compacted to not less than 98% of AS 1289, 5.2.1 (Modified Compaction)	110	110
Subbase 20mm Class 3 Crushed Rock Compacted to not less than 95% of AS 1289, 5.2.1 (Modified Compaction)	110	100
Lower Subbase 40mm Class 4 Crushed Rock, Soft Ripped Rock, or better Compacted to not less than 95% of AS 1289, 5.2.1 (Modified Compaction)	-	110
Stabilised Subgrade Material as Found stabilised with 3% Lime and 2% Cement compacted to not less than 95% of AS 1289 5.1.1(Standard Compaction)	150	-
Subgrade Where subgrade is not stabilised, subgrade is to be Silty CLAY subgrade material. Additional excavation may be required to expose the underlying silty CLAY subgrade material. Material as found Compacted to 98% of AS 1289 5.1.1 (Standard Compaction) at a moisture content between 90% and 120% of Optimum Moisture Content for a depth of 150mm	-	-
Total Pavement Thickness (mm)	410	360

The pavement recommended above are based on the pavement design guides mentioned at the front of this report. The thickness of asphalt nominated may not be what is preferred by the local authority, but the local authority preferred depth of asphalt may not fit well with the appropriate design guide for this project.

The soft rock recommended in the above pavements should have the physical properties as set out below:

Plasticity Index of not more than 15.

California Bearing Ratio after compaction on the road bed, not less than 15.

The product of the percentage passing 0.425mm and the plasticity index should not be greater than 600.

8. RECOMMENDATIONS (CONT.):

The grading after compaction on the road bed (i.e. soft ripped rock and/or Class 4 crushed rock) should be within the following limits:

Sieve Size mm	75	4.75	0.075
Percentage Passing %	100	40-60	20-40

The pavements in this report will be difficult to construct if the insitu subgrade CBR value at the time of compacting the crushed rock layers is any less than that set out below, even though it is anticipated that after construction the untreated subgrade material will have a CBR value of 5.0% in the upper 100.

Depth Below Subgrade Level	00 - 100 mm	100-200 mm	200-400 mm	400-600 mm
Insitu CBR Value (%)	6.0	5.5	5.0	3.0

For the purposes of determining spread rates, calcium oxide can be taken to be DME Quicklime, cement to be ordinary Portland Cement and the insitu material to have a density of 1.60t/m^3.

The above recommendations have been made based on (I) the field investigations for the project, (2) the laboratory work detailed within this report, (3) information received from Gallagher Jeffs & HWL Ebsworth Lawyers and (4) information from the references mentioned in Section 2. SOURCE OF INFORMATION. Therefore if it is found that during construction, conditions differ widely to those described in this report or information received is found to be incorrect, then the recommendations made in this report may need to be amended.

The recommendations given in this report have been based largely on the soil conditions encountered at the time of the field investigation. Under inclement weather or prolonged wet weather conditions, the soil conditions noted and reported in this report could vary. It is advisable to undertake construction during and following good weather conditions - i.e., dry weather conditions - not during or following inclement weather or prolonged wet weather conditions.

It is also assumed that the pavements will be using established sound engineering practices by a contractor experienced in this field of work using purpose built equipment.

LIAM COX
SENIOR GEOTECHNICAL ENGINEER
CIVILTEST PTY LTD

REF: MC/MR/DO/*LC*/th/mg/*sb*

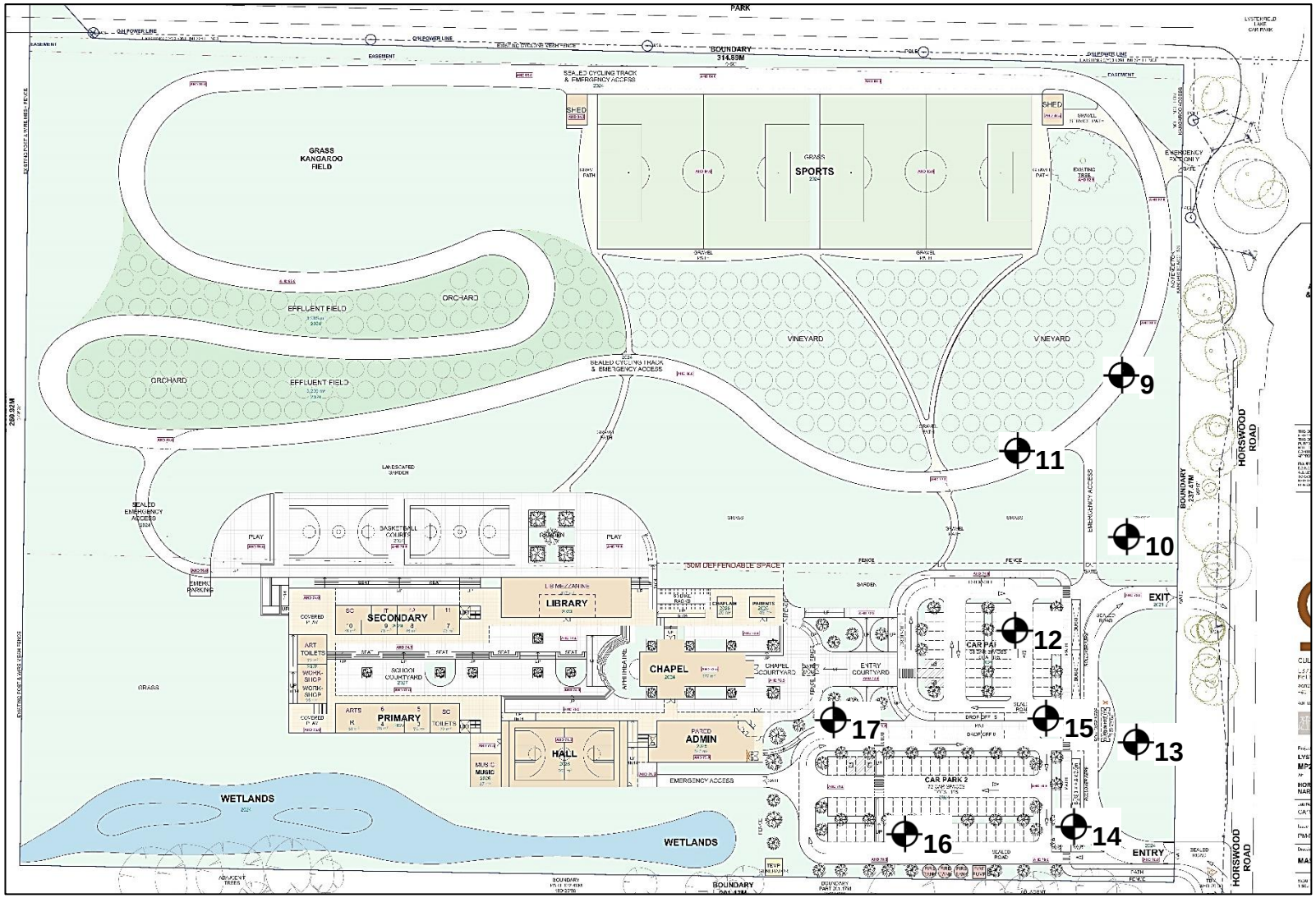
30 May 2023

AMENDMENT: *This report was first issued on 31 October 2019. Sections of this report were amended on 04 May 2023 and 30 May 2023, and consequently this revised report now takes precedence over any previously dated report.*

APPENDIX A

SITE PLAN

LOCATION OF TEST SITES: LYSTERFIELD LAKE COLLEGE, 19-23 HORSWOOD RD, NARRE WARREN NTH



⌖ Denotes Boreholes

For boreholes 1-8 & 18-38 see reports 1191040-1 & -5

NOT TO SCALE

THIS PLAN IS NOT INTENDED TO REPRESENT AN ACCURATE DEPICTION OF THE NUMBER, SIZE OR LOCATION OF TREES AND/OR SHRUBS

APPENDIX B

ENGINEERING LOGS

For borelogs 1-8 & 18-38 see reports 1191040-1 & -5

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 9
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
				DEPTH (m)	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0	SAND, silty, with clay Grey								
0.20	Moist, Medium dense CLAY, sandy, trace gravel Pale brown mottled orange								
0.50	Moist, Firm More moist with depth CLAY, silty, trace gravel Pale brown mottled orange grey Moist, Stiff								
1									
1.50	END OF BORE (11-Oct-2019)								
2									
3									
4									

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 10
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
				DEPTH (m)	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0	SAND, silty, with clay								
	Grey								
0.20	Moist, Medium dense								
	CLAY, sandy, trace gravel								
	Pale brown mottled orange								
0.50	Moist, Firm								
	More moist with depth								
	CLAY, silty, trace gravel								
	Pale brown mottled orange grey								
	Moist, Stiff								
1									
1.50	END OF BORE (11-Oct-2019)								
2									
3									
4									

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 11
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)		STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
					DEPTH (m)	RESULTS				
						DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0		SAND, silty, with clay								
	0.10	Grey								
		Moist, Medium dense								
	0.30	CLAY, sandy, trace gravel								
		Pale brown mottled orange								
		Moist, Firm								
		CLAY, silty, trace gravel								
		Pale brown mottled orange grey								
		Moist, Stiff								
1										
	1.50	END OF BORE (11-Oct-2019)								
2										
3										
4										

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 12
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
				DEPTH (m)	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0	SAND, silty, with clay								
	Grey								
0.20	Moist, Medium dense								
	CLAY, sandy, trace gravel								
	Pale brown mottled orange								
0.50	Moist, Firm								
	More moist with depth								
	CLAY, silty, trace gravel								
	Pale brown mottled orange grey								
	Moist, Stiff								
1									
1.50	END OF BORE (11-Oct-2019)								
2									
3									
4									

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 13
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)		STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
					DEPTH (m)	RESULTS				
						DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0		SAND, silty, with clay Grey Moist, Medium dense								
	0.40	CLAY, silty, with sand Pale brown mottled orange Moist to wet, Firm								
1										
	1.40	CLAY, silty, trace gravel								
	1.50	Pale brown mottled orange grey Moist, Stiff								
		END OF BORE (11-Oct-2019)								
2										
3										
4										

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 14
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)		STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
					DEPTH (m)	RESULTS				
						DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0		SAND, silty, with clay								
	0.10	Grey								
		Moist, Medium dense								
	0.30	CLAY, sandy, trace gravel								
		Pale brown mottled orange								
		Moist, Firm								
		CLAY, silty, trace gravel								
		Pale brown mottled orange grey								
		Moist, Stiff								
1										
	1.50	END OF BORE (11-Oct-2019)								
2										
3										
4										

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 15
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)		STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
					DEPTH (m)	RESULTS				
						DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0		SAND, silty, with clay								
	0.10	Grey								
		Moist, Medium dense								
	0.30	CLAY, sandy, trace gravel								
		Pale brown mottled orange								
		Moist, Firm								
		CLAY, silty, trace gravel								
		Pale brown mottled orange grey								
		Moist, Stiff								
1										
	1.50	END OF BORE (11-Oct-2019)								
2										
3										
4										

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 16
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
				DEPTH (m)	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0	SAND, silty, with clay								
	Grey								
0.20	Moist, Medium dense								
	CLAY, sandy, trace gravel								
	Pale brown mottled orange								
0.50	Moist, Firm								
	More moist with depth								
	CLAY, silty, trace gravel								
	Pale brown mottled orange grey								
	Moist, Stiff								
1									
1.50	END OF BORE (11-Oct-2019)								
2									
3									
4									

ENGINEERING LOG

REPORT NO. 1191040
FIELD TECHNICIAN: MC,MR,DO

BOREHOLE NO. 17
DATE: 11-OCT-2019

CIVIL TEST PTY. LTD.

DEPTH (m)	STRATA DESCRIPTION	NOTES	GRAPHIC LOG	IN SITU TESTING					
				DEPTH (m)	RESULTS				
					DCP Blows/100mm	FIELD CBR (%)	SPT	MC (%)	PP (kg/cm²)
0	SAND, silty, with clay								
	Grey								
0.20	Moist, Medium dense								
	CLAY, sandy, trace gravel								
	Pale brown mottled orange								
0.50	Moist, Firm								
	More moist with depth								
	CLAY, silty, trace gravel								
	Pale brown mottled orange grey								
	Moist, Stiff								
1									
1.50	END OF BORE (11-Oct-2019)								
2									
3									
4									

APPENDIX C

ENGINEERING DATA

Material Test Report

Civiltest Pty Ltd
Mornington Laboratory
10 Latham Street Mornington Vic 3931
Phone: (03) 5975 6644
Fax: (03) 5975 9589
Email: scott.walsh@civiltest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Walsh
Lab Manager
NATA Accredited Laboratory Number: 1407

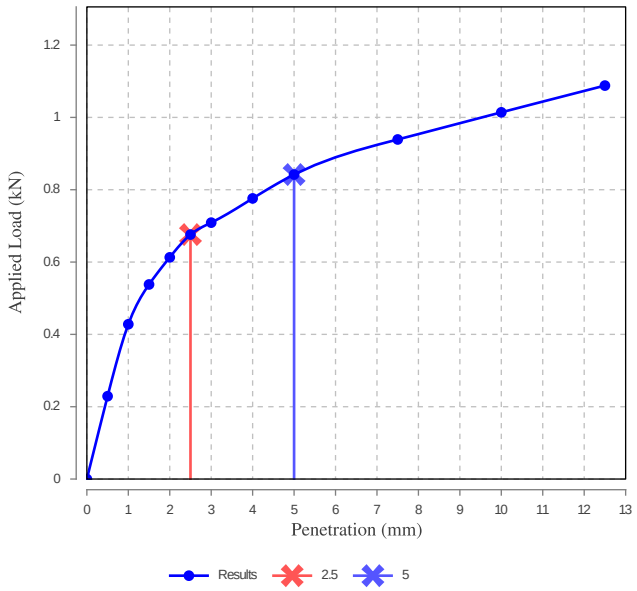
Report Number: **1191040-2**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *mdr's reported*
Date Issued: 31/10/2019
Client: Pared VIC T/A Harkaway Hills College
PO Box 420, NARRE WARREN NORTH VIC 3806
Project Number: 1191040
Project Name: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Project Location: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Work Request: 4474
Sample Number: 191-4474L
Date Sampled: 11/10/2019
Dates Tested: 11/10/2019 - 24/10/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH9 (400mm-600mm)**
Material: CLAY silty

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.67		
Optimum Moisture Content (%)	20.0		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	102.0		
Dry Density after Soaking (t/m^3)	1.66		
Field Moisture Content (%)	24.8		
Moisture Content at Placement (%)	20.4		
Moisture Content Top 30mm (%)	22.5		
Moisture Content Rest of Sample (%)	21.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	139		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	54		
Plastic Limit (%)	18		
Plasticity Index (%)	**36**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	Curling		

California Bearing Ratio



Particle Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**100**			0		
2.36 mm	**99**			1		
1.18 mm	**96**			3		
0.6 mm	**86**			9		
0.425 mm	**82**			5		
0.3 mm	**78**			4		
0.15 mm	**73**			5		
0.075 mm	**70**			3		

Material Test Report

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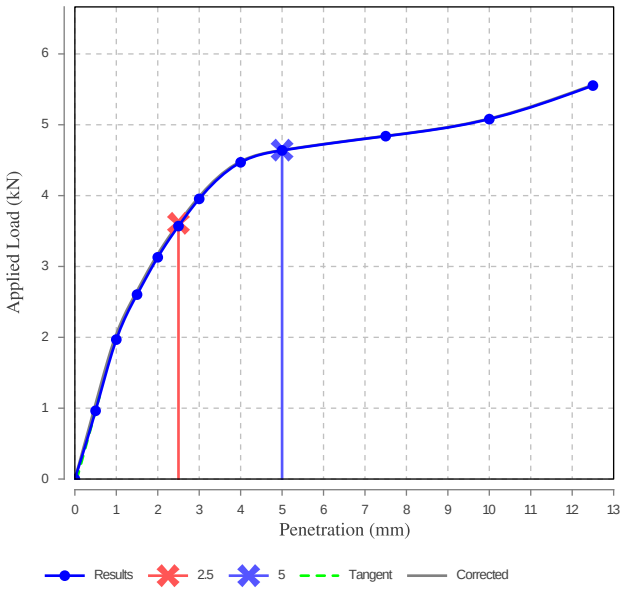
Project Number: 1191040
Project Name: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Project Location: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Work Request: 4474
Sample Number: 191-4474M
Date Sampled: 11/10/2019
Dates Tested: 11/10/2019 - 24/10/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH9 + 3% lime (400mm-600mm)**
Material: CLAY silty

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**25**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Additive Type	Hydrated Lime		
Additive Percent (%)	3		
Maximum Dry Density (t/m^3)	1.54		
Optimum Moisture Content (%)	25.0		
Laboratory Density Ratio (%)	99.0		
Laboratory Moisture Ratio (%)	99.5		
Dry Density after Soaking (t/m^3)	1.53		
Field Moisture Content (%)	25.9		
Moisture Content at Placement (%)	25.0		
Moisture Content Top 30mm (%)	30.6		
Moisture Content Rest of Sample (%)	27.4		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	162		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	53		
Plastic Limit (%)	25		
Plasticity Index (%)	**28**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	15.0		
Cracking Crumbling Curling	Curling		

California Bearing Ratio



Material Test Report

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Phone: (03) 5975 6644
Fax: (03) 5975 9589
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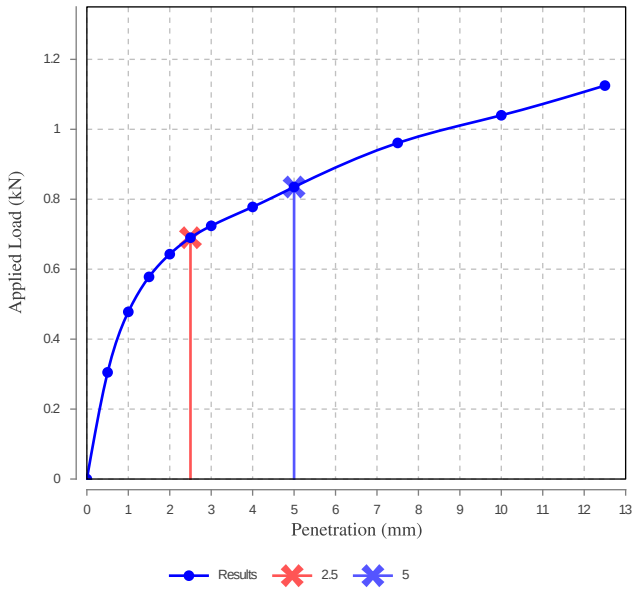
Project Number: 1191040
Project Name: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Project Location: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Work Request: 4474
Sample Number: 191-4474N
Date Sampled: 11/10/2019
Dates Tested: 11/10/2019 - 24/10/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH12 (400mm-600mm)**
Material: CLAY silty

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.54		
Optimum Moisture Content (%)	25.5		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	99.5		
Dry Density after Soaking (t/m^3)	1.54		
Field Moisture Content (%)	26.3		
Moisture Content at Placement (%)	25.4		
Moisture Content Top 30mm (%)	27.5		
Moisture Content Rest of Sample (%)	27.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	116		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	70		
Plastic Limit (%)	23		
Plasticity Index (%)	**47**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.0		
Cracking Crumbling Curling	Curling		

California Bearing Ratio



Particle Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
9.5 mm	**99**			1		
6.7 mm	**98**			1		
4.75 mm	**98**			0		
2.36 mm	**97**			1		
1.18 mm	**95**			3		
0.6 mm	**88**			7		
0.425 mm	**84**			3		
0.3 mm	**82**			3		
0.15 mm	**79**			3		
0.075 mm	**77**			2		

Material Test Report

Civiltest Pty Ltd
Mornington Laboratory
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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Scott Walsh
Lab Manager
NATA Accredited Laboratory Number: 1407

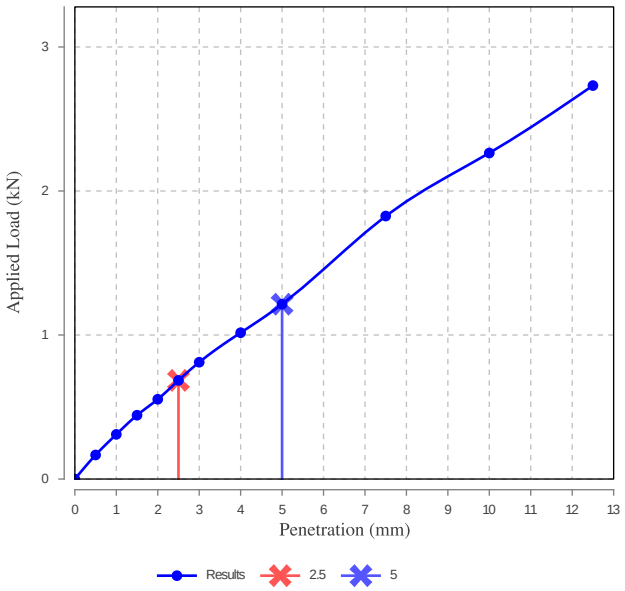
Report Number: **1191040-2**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *mdr's reported*
Date Issued: 31/10/2019
Client: Pared VIC T/A Harkaway Hills College
PO Box 420, NARRE WARREN NORTH VIC 3806
Project Number: 1191040
Project Name: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Project Location: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Work Request: 4474
Sample Number: 191-4474O
Date Sampled: 11/10/2019
Dates Tested: 11/10/2019 - 24/10/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH14 (400mm-600mm)**
Material: CLAY silty

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**6**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Maximum Dry Density (t/m^3)	1.95		
Optimum Moisture Content (%)	10.5		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	102.0		
Dry Density after Soaking (t/m^3)	1.94		
Field Moisture Content (%)	18.8		
Moisture Content at Placement (%)	10.6		
Moisture Content Top 30mm (%)	11.5		
Moisture Content Rest of Sample (%)	12.0		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	138		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	25		
Plastic Limit (%)	13		
Plasticity Index (%)	**12**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	5.0		
Cracking Crumbling Curling	Curling		

California Bearing Ratio



Particle Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
13.2 mm	**100**			0		
9.5 mm	**100**			0		
6.7 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**98**			1		
1.18 mm	**93**			5		
0.6 mm	**79**			14		
0.425 mm	**73**			6		
0.3 mm	**69**			4		
0.15 mm	**64**			4		
0.075 mm	**62**			3		

Material Test Report

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Report Number: **1191040-2**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *mdr's reported*
Date Issued: 31/10/2019
Client: Pared VIC T/A Harkaway Hills College
PO Box 420, NARRE WARREN NORTH VIC 3806
Project Number: 1191040
Project Name: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Project Location: Lysterfield Lake College, 19-23 Horswood Road NARRE WARREN NORTH
Work Request: 4474
Sample Number: 191-4474P
Date Sampled: 11/10/2019
Dates Tested: 11/10/2019 - 25/10/2019
Sampling Method: AS1289 1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH14 + 3% lime (400mm-600mm)**
Material: CLAY silty

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**30**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual		
Additive Type	Hydrated Lime		
Additive Percent (%)	3		
Maximum Dry Density (t/m^3)	1.84		
Optimum Moisture Content (%)	13.5		
Laboratory Density Ratio (%)	99.5		
Laboratory Moisture Ratio (%)	101.5		
Dry Density after Soaking (t/m^3)	1.83		
Field Moisture Content (%)	19.5		
Moisture Content at Placement (%)	13.9		
Moisture Content Top 30mm (%)	15.6		
Moisture Content Rest of Sample (%)	15.2		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	162		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	30		
Plastic Limit (%)	26		
Plasticity Index (%)	**4**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	2.5		
Cracking Crumbling Curling	Cracking		

California Bearing Ratio