SHIELDS WILSON
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STRUCTURAL AND CIVIL ENGINEERING

PERCOLATION TEST REPORT

UPON

LAND OFF

COBGATE, WHAPLODE,

LINCOLNSHIRE, PE12 6UL

PROJECT No: SW 20-142

DOCUMENT REF: SW 20-142-REP-03



Mr Adrian Brotherton
Highgrove Homes (Spalding) Ltd.,
Ashgrove Lodge,
Austendyke Road,
Weston Hills,
PE12 6BX

HIGHGROVE HOMES

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1. INTRODUCTION

Acting upon the instruction of Mr Adrian Brotherton of Highgrove Homes, we attended site on 04th March 2021, the purpose being to observe the underlying ground conditions and determine the percolation characteristics and infiltration rates of the soil strata.

Percolation tests were undertaken in accordance with the method described within BRE digest 365 (2007 edition)

The opinions and comments expressed within this report are based upon ground conditions encountered in the trial pits excavated at the time of our visit.

Shields Wilson have previously undertaken geotechnical ground investigation upon the site and further details on the plots history and ground conditions can be found within this report, reference SW20-142-GI-01.

This report has been prepared for the named client above and should not be relied upon by any other parties, with the exception of the client's professional advisors, for any use without the express written permission of Shields Wilson Limited.

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2. LOCATION & DESCRIPTION OF SITE

2.1. Site Location

The site is situated to the south of Cobgate, Whaplode. Appropriate national grid reference TF 320 237.

A Location plan is contained with Appendix A.

2.2. Site Description

The site currently stands as multiple rear gardens off Cobgate.

The North of the site will be bound by existing properties off Cobgate.

The Eastern Boundary is boarded by dense hedgerow and a close boarded fence, which separates the proposed site with an existing haulage yard.

The West of the site is boarded by a well-established hedge line and trees, along with close boarded fencing, separating the proposed site from existing neighbouring gardens and residential properties.

The Southern boundary is formed with a line of established trees and shared with a neighbouring field that is used for arable farming.

At the time of our visit the weather was dry and clear, however there had been some precipitation in the days leading up to the visit.

2.3. Geological Description

Desktop study of the area has been undertaken using the British Geological Society Maps.

The maps indicate the site to be underlain by superficial tidal flat deposits of Sand and Silt over the Ampthill Clay (Mudstone) formation.

This information is based upon publicly available records. An extract is contained with Appendix C.

The site is underlain by slightly silty fine sand as described in our report SW20-142-GI-01.

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3. PERCOLATION TESTS

Two No. percolation tests were undertaken in accordance with the test methodology within BRE digest 365 (2007 edition).

The ground conditions are proven to be consistent across the site by the original ground investigation report and as such two test holes one either side of the site was deemed an appropriate test sample.

SA01 was Undertaken adjacent the Eastern Boundary of the site and SA02 was undertaken to the West of the site.

In accordance with BRE 365 the test pits were refilled 3 times. This could not be achieved on the same day and as such the third test was undertaken early the morning following the first two.

Logs of the test and subsequent result calculations are contained within Appendix D, Appendix E contains a photographic record.

4. INFILTRATION TEST RESULTS

Results are summarised and tabulated below

Test Pit	Test 1	Test 2	Test 3
Eastern Pit	4.6×10^{-6}	5.3×10^{-6}	6.3×10^{-6}
Western Pit	8.0×10^{-6}	5.3×10^{-6}	6.4×10^{-6}

The results are average for infiltration in the South Holland area and demonstrate that the underlying geology on the site is suitable for infiltration.

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5. DISCUSSIONS

The development proposes to dispose of its run-off surface water utilising, as outlined with our drainage strategy report, reference SW21-142-REP-02.

Within the drainage strategy report there is an example surface water soakaway calculation. This calculation utilised an assumed worst case infiltration rate of $1x10^{-6}$.

An updated calculation utilising the worst case calculated Infiltration rate is contained within Appendix F. This calculation demonstrates that a reasonably sized shallow garden soakaway will provide ample drainage in accordance with BRE 365 for the roof run-off.

The value determined by calculation is over 4 times better than this assumed value, as such the testing has validated the proposals within the drainage strategy.

For and on behalf of **SHIELDS WILSON LIMITED**

A.P.Wilson CEng MIStructE **11th March 2021**.

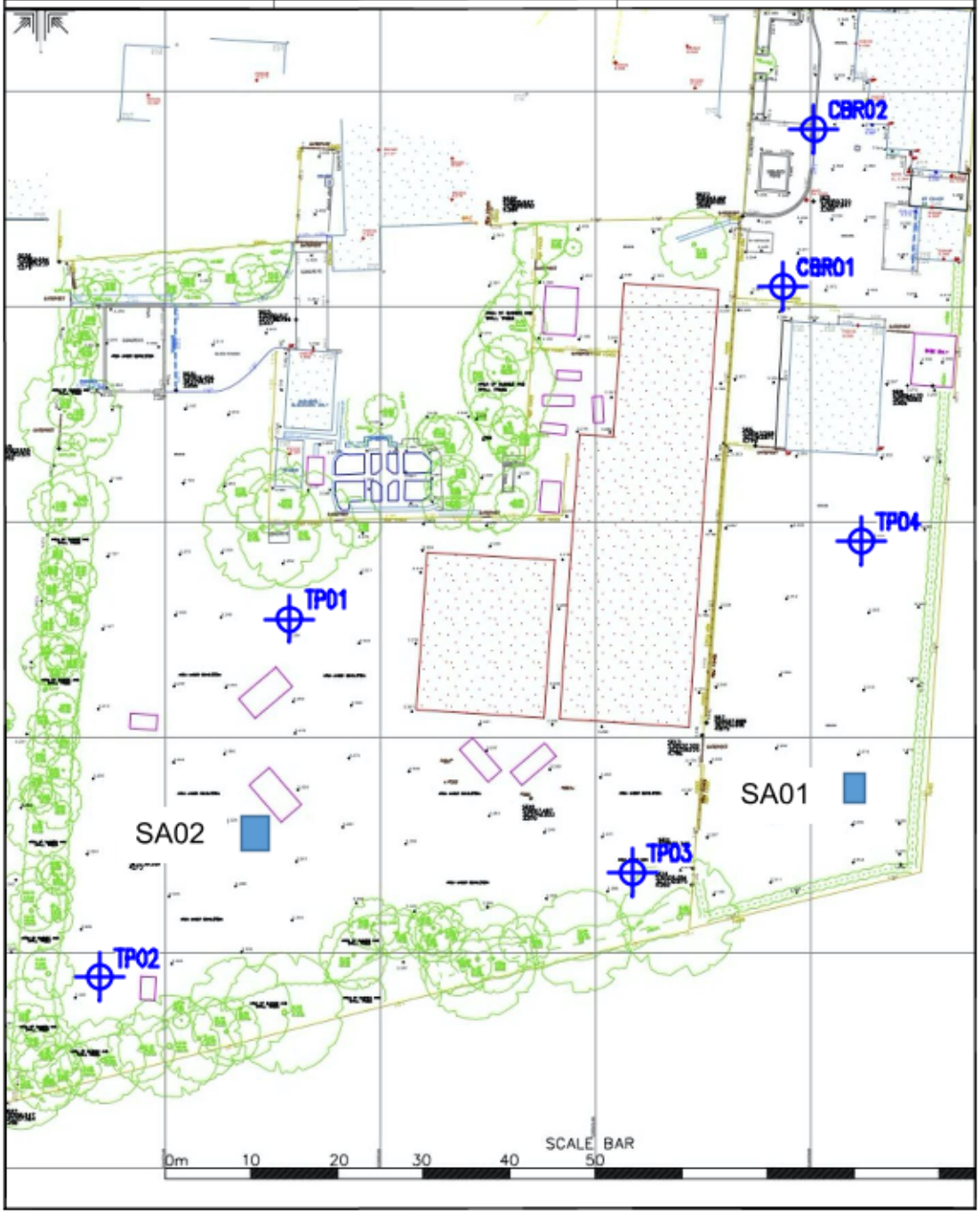
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APPENDIX A

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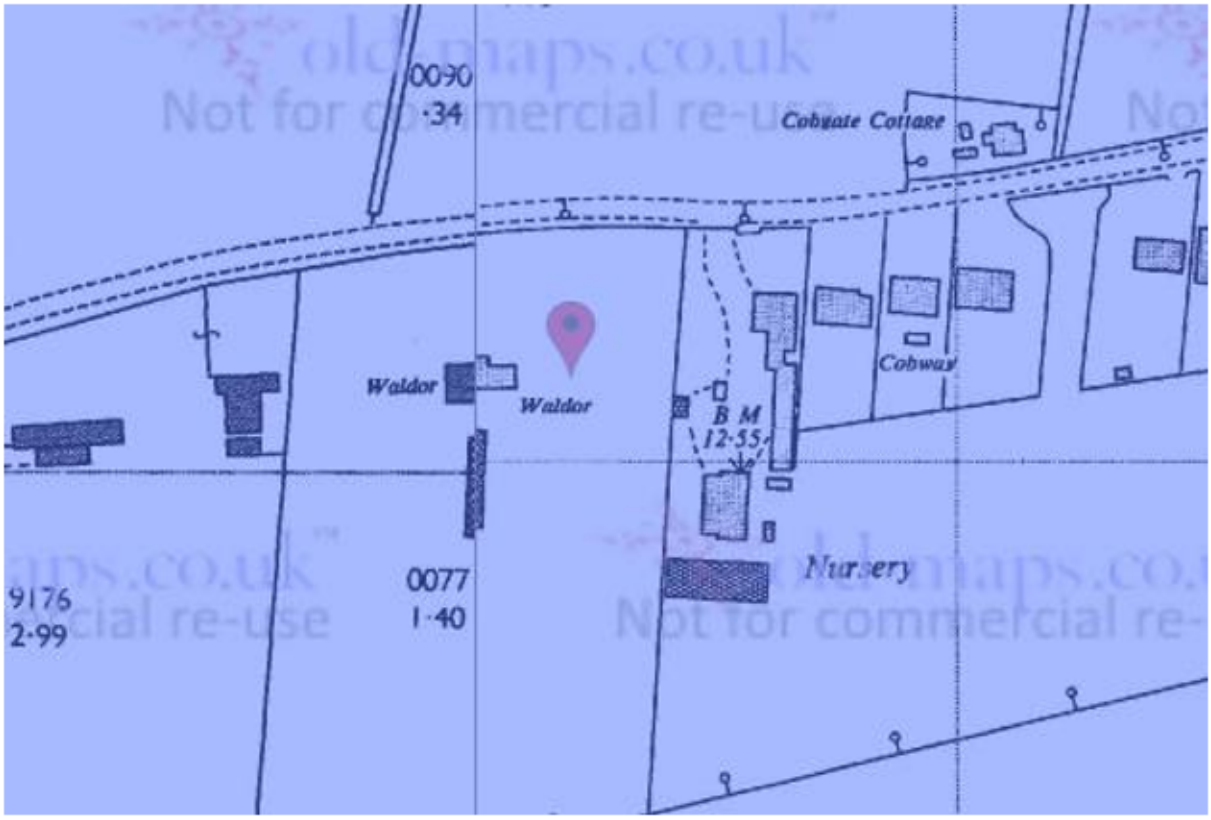
Site Investigations	Project: Land off Cobgate, Whaplode	Date: 16/12/2020	Designer: APW
Project No: SW 20-142	Subject: Borehole Location Plan	Sheet No: 1	Rev: -



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APPENDIX B

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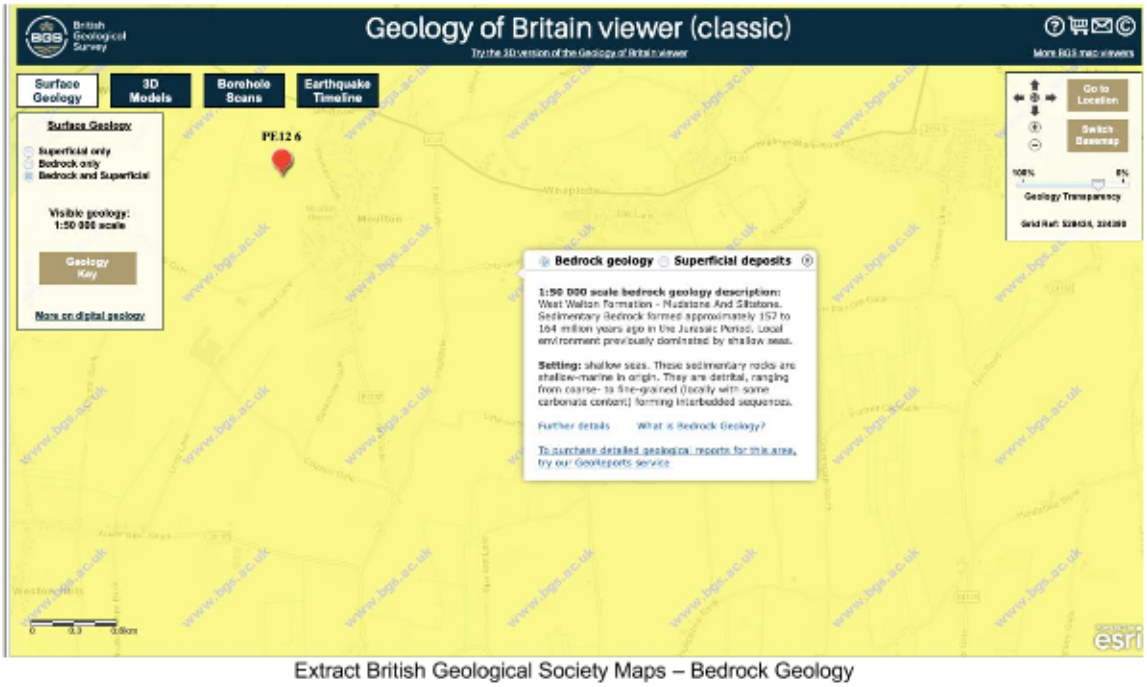


Extract of OS County Series 1968-1970

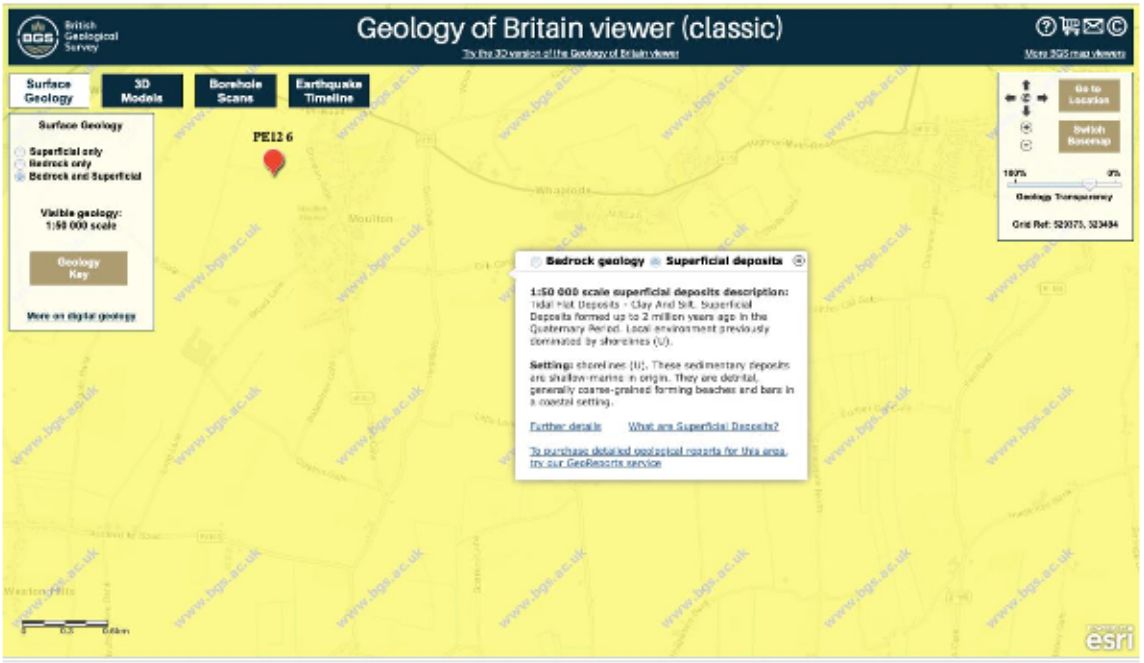
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APPENDIX C

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Extract British Geological Society Maps – Bedrock Geology



Extract British Geological Society Maps – Superficial Deposits

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APPENDIX D

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SA01			
TIME (Mins)	DEPTH mm (d)		
0	550		
15	540		
30	530		
50	520		
70	515		
90	510		
120	500		
150	490		
180	480		
210	475		
240	465		

Trial Dimensions

A =	1.4	m
B =	0.6	m
C =	1.1	m
C.S.Area of		
SA01 =	0.84	m^2
Total Volume =	0.071	m^3
75% Volume =	0.054	m^3
25%Volume =	0.018	m^3

Time Taken From 75% Volume to 25% Volume

128	Mins

Effective Depth From 75% Volume to 25% Volume

0.0425	m

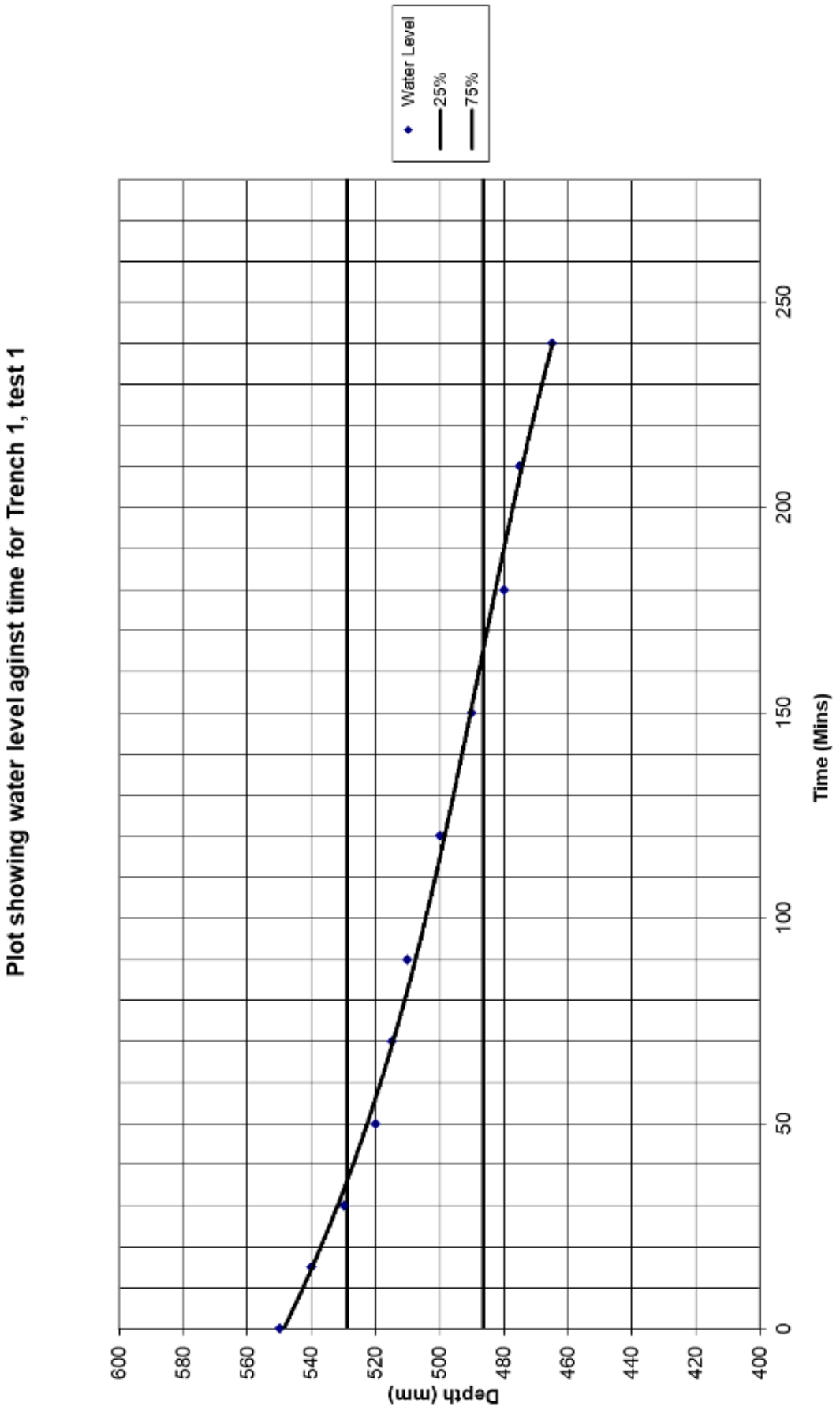
50% Effective Internal Surface Area Including Base area

1.01	m^2

Soil Infiltration rate, f

4.602E-06	m/s

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SA01	
TIME (Mins)	DEPTH mm (d)
0	600
15	590
30	580
50	570
70	565
90	560
120	545
150	540
180	530

Trial Dimensions

A =	1.4	m
B =	0.6	m
C =	1.1	m
C.S.Area of SA01 =	0.84	m^2
Total Volume =	0.059	m^3
75% Volume =	0.044	m^3
25%Volume =	0.015	m^3

Time Taken From 75% Volume to 25% Volume

95 Mins

Effective Depth From 75% Volume to 25% Volume

0.035 m

50% Effective Internal Surface Area Including Base area

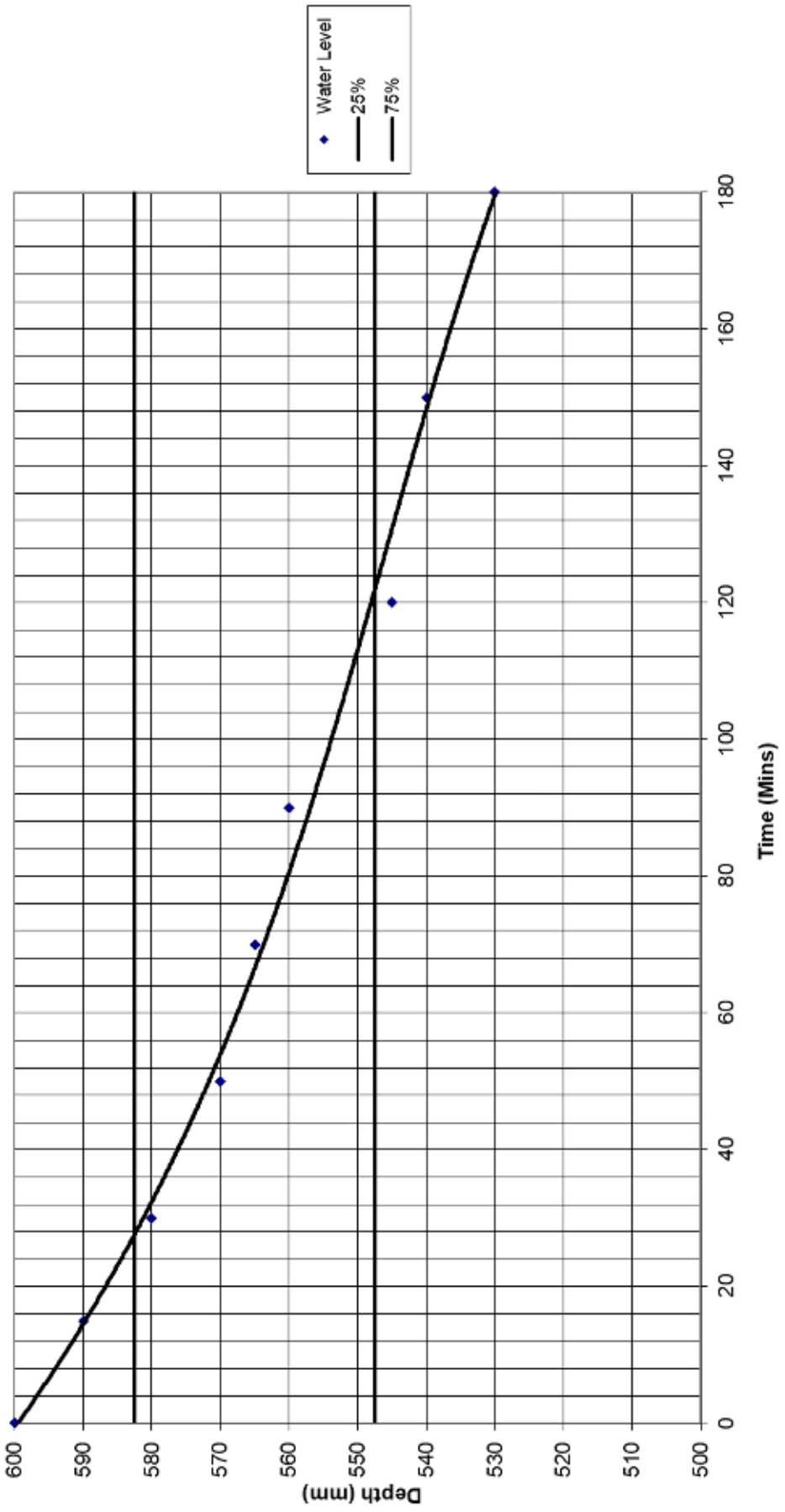
0.98 m^2

Soil Infiltration rate, f

5.26E-06 m/s

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Plot showing water level aginst time for Trench 1, test 2



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SA01	
TIME (Mins)	DEPTH mm (d)
0	580
15	570
30	565
50	560
70	550
90	540
120	530
150	520
180	520

Trial Dimensions

A =	1.4	m
B =	0.6	m
C =	1.1	m
C.S.Area of SA01 =	0.84	m^2
Total Volume =	0.050	m^3
75% Volume =	0.038	m^3
25%Volume =	0.013	m^3

Time Taken From 75% Volume to 25% Volume

70 Mins

Effective Depth From 75% Volume to 25% Volume

0.03 m

50% Effective Internal Surface Area Including Base area

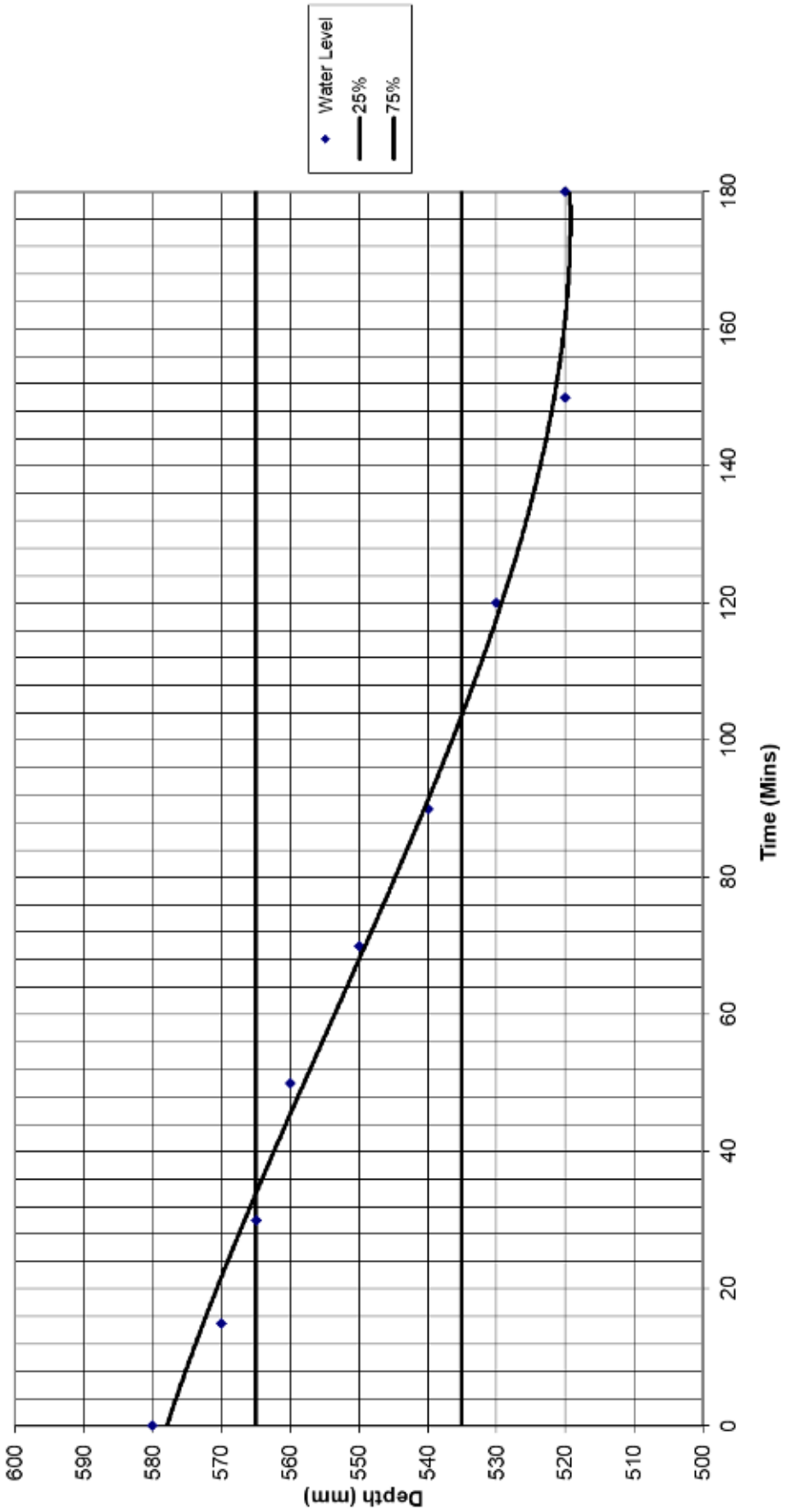
0.96 m^2

Soil Infiltration rate, f

6.250E-06 m/s

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Plot showing water level aginst time for Trench 1, test 3



© Shields Wilson Limited.

SA02	Test 1
TIME (Mins)	DEPTH mm (d)
0	585
15	565
30	550
50	535
70	510
90	495
120	495
150	490
180	430
210	410
240	395

Trial Dimensions

A =	1.8	m
B =	0.6	m
C =	1.1	m
C.S.Area of SA01 =	1.08	m^2
Total Volume =	0.205	m^3
75% Volume =	0.154	m^3
25%Volume =	0.051	m^3

Time Taken From 75% Volume to 25% Volume

140 Mins

Effective Depth From 75% Volume to 25% Volume

0.095 m

50% Effective Internal Surface Area Including Base area

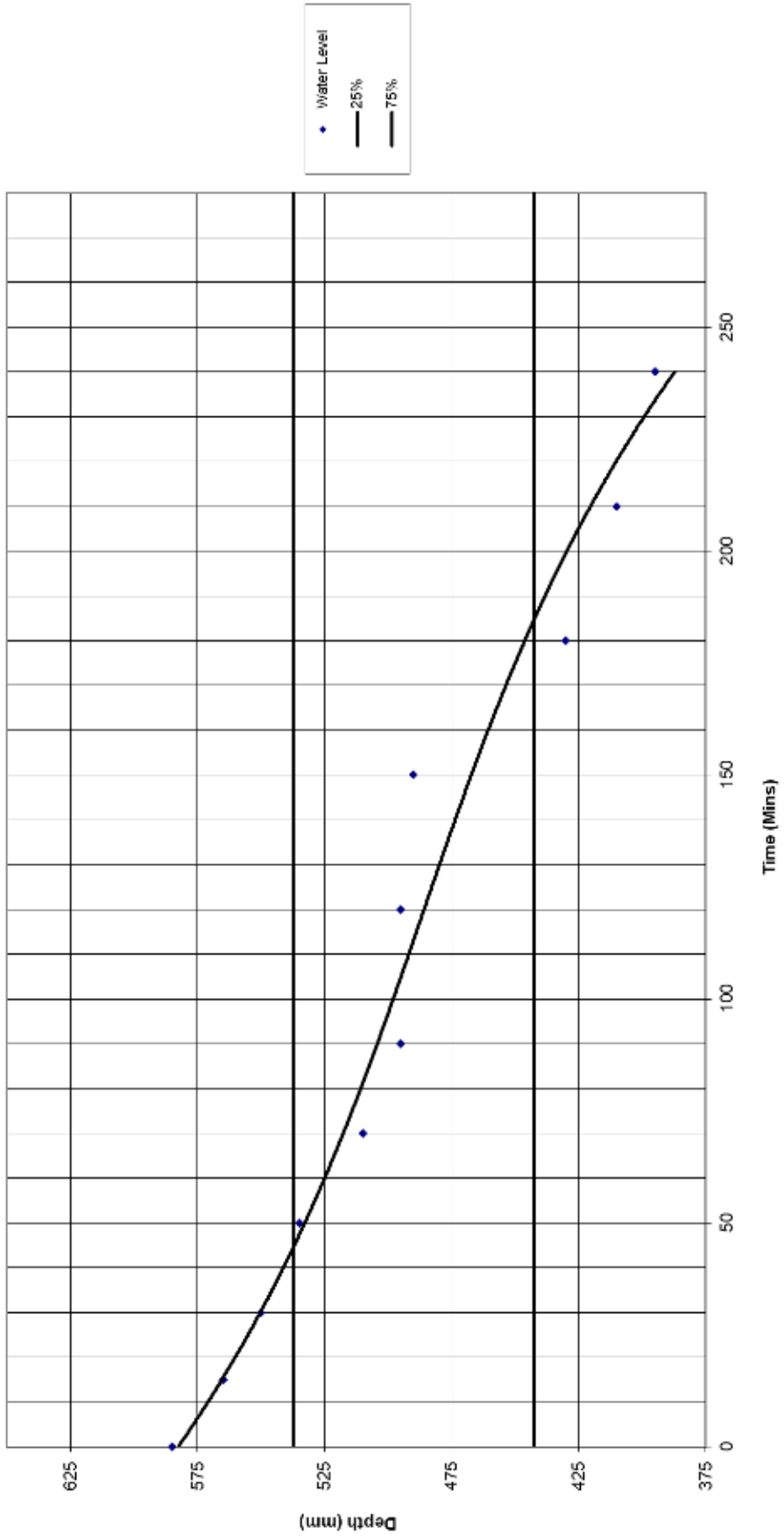
1.536 m^2

Soil Infiltration rate, f

7.952E-06 m/s

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Plot showing water level aginst time for Trench 2, test 1



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SA02	Test 2		
TIME (Mins)	DEPTH mm (d)		
0	590		
15	590		
30	580		
50	570		
70	565		
90	560		
120	545		
150	540		
180	530		

Trial Dimensions

A =	1.8	m
B =	0.6	m
C =	1.1	m
C.S.Area of		
SA01 =	1.08	m^2
Total Volume =	0.065	m^3
75% Volume =	0.049	m^3
25%Volume =	0.016	m^3

Time Taken From 75% Volume to 25% Volume

84	Mins

Effective Depth From 75% Volume to 25% Volume

0.03	m

50% Effective Internal Surface Area Including Base area

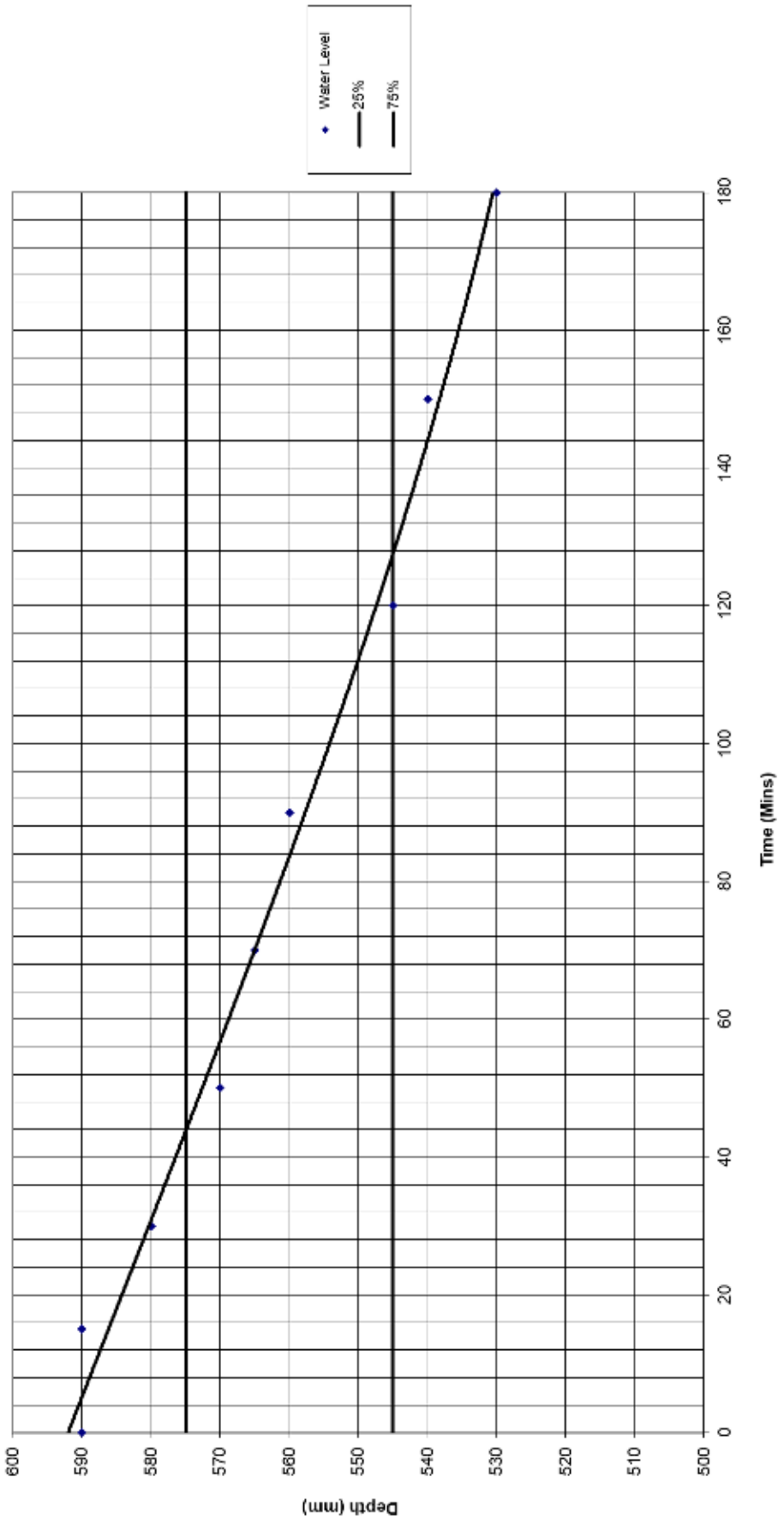
1.224	m^2

Soil Infiltration rate, f

5.25E-06	m/s

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Plot showing water level aginst time for Trench 2, test 2



© Shields Wilson Limited.

SA02	Test 3		
TIME (Mins)	DEPTH mm (d)		
0	575		
15	570		
30	565		
50	560		
70	550		
90	540		
120	530		
150	520		
180	520		

Trial Dimensions

A =	1.4	m
B =	0.6	m
C =	1.1	m
C.S.Area of		
SA01 =	0.84	m^2
Total Volume =	0.046	m^3
75% Volume =	0.035	m^3
25%Volume =	0.012	m^3

Time Taken From 75% Volume to 25% Volume

63 Mins

Effective Depth From 75% Volume to 25% Volume

0.0275 m

50% Effective Internal Surface Area Including Base area

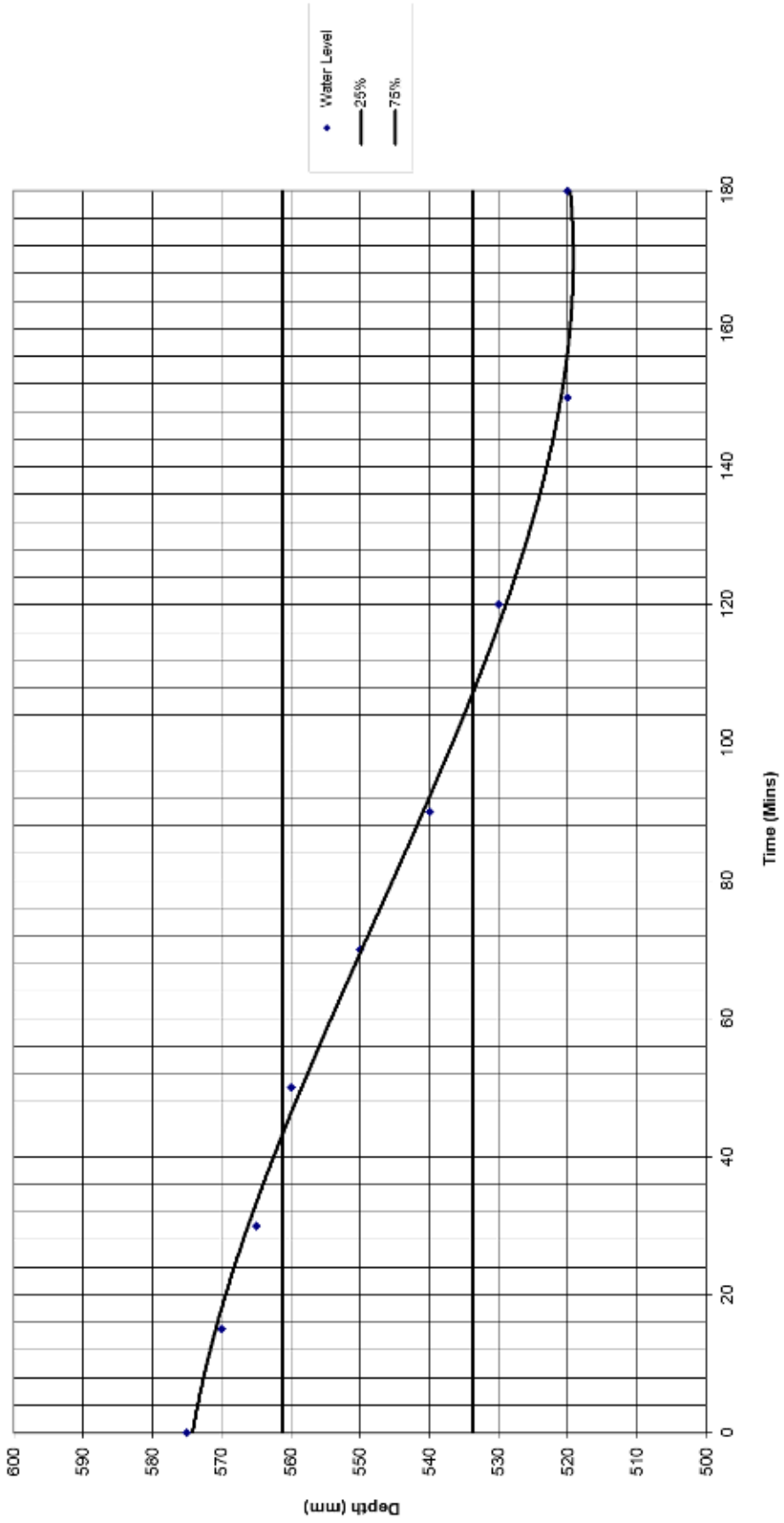
0.95 m^2

Soil Infiltration rate, f

6.433E-06 m/s

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Plot showing water level aginst time for Trench 2, test 3



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APPENDIX E

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APPENDIX F

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Job Details		SW20-142 - Residential development, Cobgate Whaplode							
Title		Individual Plot							
	Calculated Infiltration Rate (m/s)								
	0.0000046								
	Design Rainfall - R						Soakaway Dimensions		
	M5-60	Z1							
	0.02	1			Polystorm crates		Number	Total Lengths	Half Effective
	M10-D	Z2			Width	0.5	6	3	
	0.02	1.24			Length	1	3	3	
					Depth	0.4	1	0.4	0.2
R =	0.0248	m							
					Internal Surface Area Not Including Base (50% depth)				
	Inflow To Soakaway				11.4	m^2			
	Area (m^2)	x R			Storage Volume				
	110	0.0248			3.6	m^3			
Inflow =	2.728	m^3							
	Outflow From Soakaway								
	Internal SA (50%)		Infiltration Rate	Storm Duration (s)					
	11.4		0.0000046	60	60	3600			
Outflow =	0.188784	m^3							
	Storage Required								
					Soakaway Has Been Designed For A				
	Inflow -	Outflow			10 Year Storm Of 60 Minute Duration				
	2.728	0.188784	2.539216						
	Storage Volume With 30% Free (Required)								
	3.3009808								
					NB. Actual Storage Volume Needs To Be				
	Actual Storage Volume				Greater Than Storage Volume + 30%				
	3.6								

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