

Appendix A Trial Pit Logs

KEY TO BOREHOLE, TRIAL PIT AND WINDOW SAMPLE LOGS

SOIL STRATA

SAMPLES

U100	Open Drive Tube Sample (100mm nominal diameter) - UNR denotes 'no recovery'.
UT100	Open Drive Thin Wall Tube Sample (100mm nominal diameter) - UNR denotes 'no recovery'.
U38	Open Drive Tube Sample (38mm nominal diameter)
P	Piston Sample (100mm nominal diameter unless noted otherwise) - PNR denotes 'no recovery'.
D	Small Disturbed Sample
B	Bulk Disturbed Sample
BLK	Block Sample
C	Rotary Core Sample (taken for laboratory testing)
G	Gas Sample
J	Jar Sample
TUB	Tub Sample
ES	Environmental Sample
W	Water Sample
SS	Split Spoon Sample
CSS	Cutting Shoe Sample
L	Liner Sample

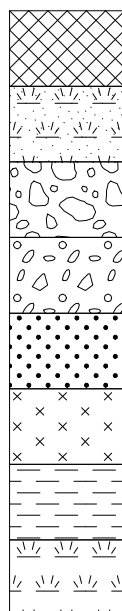
IN SITU TESTING

S	Standard Penetration Test using the Split Spoon Sampler.
C	Standard Penetration Test using a solid cone.

Where a test has been completed the type of test and the N-value will be reported. Where the full 300mm penetration of the main drive has not been completed, the number of blows (not an N-value) will be reported. The Field Records column on the log will show each set of blow counts per 75mm of penetration including seating blows and will also indicate the partial penetration achieved (mm) for incomplete tests.

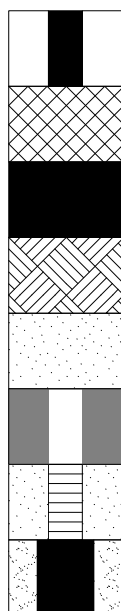
V	Field vane test, vane shear strength quoted for peak (P) and remoulded (R) tests in kPa.
PP	Pocket Penetrometer measurements (kN/m ²).
k	Field Permeability Test, R denotes Rising Head, F denotes Falling Head, C Constant Head.
So	Field Soakage Test in a borehole.
PID	Photo Ionisation Detector (PID) readings for volatile hydrocarbon screening (ppm).
cu	Undrained shear strength triaxial test result (kN/m ²)

STRATA



Made Ground / Fill
Topsoil
Cobbles and Boulders
Gravel
Sand
Silt
Clay
Peat

BACKFILL / INSTALLATIONS



Top Cap
Backfill With Arisings
Bentonite Seal
Cement
Filter
Grout
Slotted Pipe
Piezo Tip

WATER

Initial Level of Water Strike
 Level of Water Strike Rise After 20 Mins

Composite soil types shown by combined symbols
(primary + secondary constituents)



AECOM

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Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
	Co-ordinates: E: 298335.157 N: 168941.925	Ground Level (m): 44.96 AOD	Date Started: 23/11/2016 Date Completed: 23/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES V	38 kPa(P) 27 kPa(R)		TOPSOIL: Grass Over: Soft dark brown slightly gravelly sandy CLAY with frequent roots. Gravel is subangular to rounded fine to coarse of limestone. Sand is fine to coarse (TOPSOIL)	44.71		0.25
0.25-0.65		B			MADE GROUND: Soft becoming firm brown slightly gravelly silty CLAY with rare rootlets. Gravel is subrounded to rounded fine to medium brick and limestone (MADE GROUND)			0.40
0.50		ES V	36 kPa(P) 21 kPa(R)			44.31		0.65
0.75		ES			Medium strong to weak grey weathered crystalline LIMESTONE Recovered as: Grey angular to subangular cobbles with soft orangish brown silty clay infill (DISTINCTLY WEATHERED PORKERRY MEMBER)			
0.65-1.40		B				43.56		1.40
End of Trial Pit 1.40 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located within Third Party Land in Plot 17 Boverton Court Farm towards the west of the field. 2. Machine-Excavated Trial Pit completed to 1.40m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater not encountered. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
	Co-ordinates: E: 298511.703 N: 169002.432	Ground Level (m): 44.76 AOD	Date Started: 23/11/2016 Date Completed: 23/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES V	38 kPa(P) 31 kPa(R)		TOPSOIL: Grass Over: Soft dark brown slightly gravelly silty sandy CLAY with frequent roots. Gravel is subangular to rounded fine to medium of limestone, mudstone and rare brick. Sand is fine to medium (TOPSOIL)	44.51		(0.25)
0.35-0.70		B			Soft becoming firm orangish brown slightly gravelly silty CLAY. Gravel is angular to subrounded medium of limestone (PROBABLE ALLUVIUM)	44.41		(0.10)
					Medium strong to very weak grey weathered LIMESTONE with subhorizontal and subvertical closely spaced, planar rough, open fractures with orange surface staining and soft brown clay infill Recovered as: Grey very angular to subangular cobbles with soft brown clay infill (DISTINCTLY WEATHERED PORTHKERRY MEMBER)			(0.35)
					End of Trial Pit 0.70 m (Thickness of basal layer not proven)	44.06		0.70

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located within Third Party Land in Plot 16 Tremains Field adjacent to the northern boundary fence. 2. Machine-Excavated Trial Pit completed to 0.70m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Gently sloping. 5. Groundwater not encountered. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4_0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX		Project Name: St. Athan Northern Access Road		Job No: 60509148	
		Project Location: St. Athan			
		Client: Welsh Government			
Co-ordinates: E: 298759.892 N: 169081.211		Ground Level (m): 44.18 AOD		Date Started: 25/11/2016 Date Completed: 25/11/2016	

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES V	20 kPa(R)		TOPSOIL: Grass Over: Soft locally firm slightly sandy slightly gravelly silty CLAY with roots and rootlets. Gravel is subrounded medium of brick, limestone and mudstone. Sand is fine (TOPSOIL)	43.88		0.30
0.30-0.70 0.50		B ES			Firm locally soft dark brown slightly sandy silty CLAY with medium cobble content. Cobbles are subangular of limestone. Sand is fine (PROBABLE ALLUVIUM)			0.45
0.7 0.75		V ES	12 kPa(R)		Medium strong to weak grey weathered crystalline LIMESTONE with extremely closely spaced (~2-5mm), planar rough, open fractures infilled with orangish brown clay Recovered as: Grey angular to subangular cobbles of limestone (DISTINCTLY WEATHERED PORTHKERRY MEMBER)	43.43		0.75
						42.88		1.30
End of Trial Pit 1.30 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located within Third Party Land in the central field of Plot 14 Millands Farm. 2. Machine-Excavated Trial Pit completed to 1.30m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater encountered at 1.30m bgl rising to 1.20m bgl after 20mins. 6. No visual or olfactory evidence of contamination. 7. Backfilled with arisings upon completion.
1.30	20.00	1.20	Rising		

Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan Client: Welsh Government		
Co-ordinates: E: 298881.314 N: 169149.165		Ground Level (m): 43.26 AOD	Date Started: 25/11/2016 Date Completed: 25/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30 0.30-0.40		ES V B	8 kPa(R)		TOPSOIL: Grass Over: Very soft to soft dark brown slightly sandy silty CLAY with abundant rootlets and low cobble content. Cobbles are angular to rounded of limestone. Sand is fine (TOPSOIL)	42.86		(0.40)
0.50 0.50-0.75		ES V B	23 kPa(R)		Soft light yellowish brown slightly sandy silty CLAY with medium cobble content. Cobbles are angular to rounded of limestone (PROBABLE ALLUVIUM)	42.51 42.46		0.40 (0.35)
					Medium strong locally weak light grey locally yellowish orange weathered LIMESTONE (PARTIALLY WEATHERED PORTHERRY MEMBER)			0.75 (0.05) 0.80
End of Trial Pit 0.80 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		
0.80	20.00	0.71	Rising		1. Machine-Excavated Trial Pit located within Third Party Land in the eastern field of Plot 14 Millands Farm. 2. Machine-Excavated Trial Pit completed to 0.80m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater encountered at 0.80m bgl rising to 0.71m bgl after 20mins. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4_0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan Client: Welsh Government		
Co-ordinates: E: 299067.672 N: 169210.291		Ground Level (m): 43.03 AOD	Date Started: 24/11/2016 Date Completed: 24/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES V	27 kPa(P) 15 kPa(R)		MADE GROUND: Grass Over: Very soft to soft dark brown slightly sandy silty CLAY with numerous roots. Sand is fine (TOPSOIL)	42.63		(0.40)
0.50		ES V	32 kPa(P) 19 kPa(R)		MADE GROUND: Soft light orangish brown slightly sandy silty CLAY with rare gravel and frequent rootlets. Gravel is rounded fine of brick and limestone (MADE GROUND)	42.38		(0.25)
0.65-0.90		B			Medium strong to weak light grey locally mottled yellowish orange weathered LIMESTONE with extremely closely spaced (~2-5mm), rough planar, open (~1-2mm) fractures infilled with soft dark brown slightly sandy silty clay (DISTINCTLY WEATHERED PORKHERRY MEMBER)	42.13		(0.25)
End of Trial Pit 0.90 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		
					1. Machine-Excavated Trial Pit located within Third Party Land in the western field of Plot 12 Froglands Farm. 2. Machine-Excavated Trial Pit completed to 0.90m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater not encountered. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

Notes: For explanation of symbols and abbreviations, see Key Sheet.	Scale: 1:12.5	Logged By: EW	Checked By: MB
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Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4_0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
Client: Welsh Government		Co-ordinates: E: 299152.675 N: 169307.883	Ground Level (m): 42.97 AOD
		Date Started: 24/11/2016	Date Completed: 24/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES	32 kPa(P) 18 kPa(R)		TOPSOIL: Grass Over: Very soft to soft slightly sandy silty CLAY with frequent roots. Sand is fine (TOPSOIL)	42.62		0.35
0.50		ES			Medium strong to extremely weak grey weathered LIMESTONE with subhorizontal and subvertical closely spaced, planar rough, open fractures with orangish brown surface staining and soft to firm orangish brown silty clay infill Recovered as: Grey angular to subangular cobbles of limestone with soft to firm orangish brown silty clay infill (DISTINCTLY WEATHERED PORKHERRY MEMBER)			0.85
0.35- 1.20		B				41.77		1.20
End of Trial Pit 1.20 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		
					1. Machine-Excavated Trial Pit located within Third Party Land in the eastern field of Plot 12 Froglands Farm. 2. Machine-Excavated Trial Pit completed to 1.20m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater not encountered. 6. No visual or olfactory evidence of contamination. 7. Backfilled with arisings upon completion.

Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4_0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
Client: Welsh Government		Co-ordinates: E: 299452.038 N: 169293.941	Ground Level (m): 42.02 AOD
		Date Started: 23/11/2016	Date Completed: 23/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES			TOPSOIL: Grass Over: Soft dark brown slightly sandy CLAY with abundant roots (TOPSOIL)	41.77		(0.25)
0.35		V	30 kPa(P) 20 kPa(R)		Soft becoming firm light brown mottled light grey slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to medium of limestone and mudstone (PROBABLE ALLUVIUM)			0.25
0.30-0.55		B						(0.45)
0.50		ES						
0.55		V	32 kPa(P) 20 kPa(R)					
0.70-0.80		B			Firm light grey mottled light orangish brown CLAY (PROBABLE ALLUVIUM)	41.32		0.70
0.75		ES V	30 kPa(P) 10 kPa(R)			41.22		(0.10) 0.80
					Medium strong light grey weathered crystalline LIMESTONE (PARTIALLY WEATHERED PORTHKERRY MEMBER)	41.12		(0.10) 0.90
End of Trial Pit 0.90 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located within Third Party Land in centre of Plot 6 Great House Farm adjacent to hedgerow. 2. Machine-Excavated Trial Pit completed to 0.90m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater encountered at 0.80m bgl rising to 0.70m after 20mins. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.
0.80	20.00	0.80	Standing		

Notes: For explanation of symbols and abbreviations, see Key Sheet.	Scale: 1:12.5	Logged By: MC	Checked By: MB
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Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
	Co-ordinates: E: 299678.218 N: 169171.911	Ground Level (m): 41.97 AOD	Date Started: 22/11/2016 Date Completed: 23/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES			TOPSOIL: Grass Over: Soft brown slightly gravelly sandy CLAY with abundant roots. Gravel is angular to subangular firm to medium of limestone. Sand is fine to medium (TOPSOIL)	41.77		(0.20)
0.20-0.50		B V	56 kPa(P) 34 kPa(R)		Firm friable brown mottled light grey slightly sandy gravelly CLAY with very frequent roots. Gravel is subangular to subrounded firm to medium of limestone and mudstone. Sand is fine to medium (PROBABLE ALLUVIUM)			0.20 (0.30)
0.50		ES			Firm becoming stiff orangish brown mottled light grey slightly gravelly CLAY. Gravel is angular to subrounded firm to medium of mudstone and limestone (PROBABLE ALLUVIUM)	41.47		0.50
0.6		V	68 kPa(P) 34 kPa(R)					
0.50-0.95		B			Medium strong locally weak light grey locally yellowish orange weathered LIMESTONE (DISTINCTLY WEATHERED PORTHKERRY MEMBER)	41.03 41.02		0.94 (0.01) 0.95
End of Trial Pit 0.95 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located within Third Party Land in Plot 9 Great House Farm adjacent to access road. 2. Machine-Excavated Trial Pit completed to 0.95m bgl after encountering natural rock (Medium Strong Mudstone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater encountered at 0.95m bgl rising to 0.60m bgl after 20mins. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.
0.95	20.00	0.60	Rising		

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Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
	Co-ordinates: E: 299981.456 N: 169255.033	Ground Level (m): 41.71 AOD	Date Started: 22/11/2016 Date Completed: 23/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.00-0.30		B			TOPSOIL: Grass Over: Soft becoming firm dark brown slightly gravelly CLAY with frequent roots. Gravel is subangular medium of limestone and mudstone (TOPSOIL)			(0.35)
0.30		ES V	37 kPa(P) 22 kPa(R)			41.36		0.35
0.50		ES V B	34 kPa(P) 30 kPa(R)		Soft becoming firm light yellowish brown slightly gravelly CLAY. Gravel is subangular firm of limestone and mudstone (PROBABLE ALLUVIUM)			(0.45)
0.35-0.80								
0.75		ES				40.91		0.80
0.80-1.30		B			Firm becoming stiff greyish brown slightly gravelly CLAY. Gravel is subangular fine to medium of limestone and mudstone (PROBABLE ALLUVIUM)			(0.50)
					Medium strong locally weak brown weathered thinly laminated MUDSTONE interbedded with medium strong grey LIMESTONE Recovered as: Brown and grey medium to coarse angular to subangular gravel of mudstone and limestone with medium cobble content. Cobbles are subangular of mudstone and limestone (DISTINCTLY WEATHERED PORKHERRY MEMBER)	40.41 40.39		1.30 (0.02) 1.32
End of Trial Pit 1.32 m (Thickness of basal layer not proven)								

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		
1.20	20.00	1.10	Rising		1. Machine-Excavated Trial Pit located in the St. Athan Ministry of Defence (MoD) base north of the Eglwys Brewis Road. 2. Machine-Excavated Trial Pit completed to 1.32m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater encountered at 1.20m bgl rising to 1.10m bgl after 20mins. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

Report ID: STANDARD TRIAL PIT LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Equipment & Methods: JCB 3CX		Project Name: St. Athan Northern Access Road		Job No: 60509148	
		Project Location: St. Athan			
		Client: Welsh Government			
Co-ordinates: E: 300129.129 N: 169202.376		Ground Level (m): 41.53 AOD		Date Started: 22/11/2016 Date Completed: 22/11/2016	

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.00-0.30		B			TOPSOIL: Grass Over: Firm greyish brown sandy very gravelly CLAY with frequent roots. Gravel is fine to coarse angular to subangular of crystalline limestone. Sand is fine to medium (TOPSOIL)	41.18		(0.35)
0.30		ES V	76 kPa(P) 32 kPa(R)		Medium strong to weak grey weathered crystalline LIMESTONE with subhorizontal and subvertical closely spaced, planar rough, partly open with firm orangish brown clay infill Recovered as: Grey clayey fine to coarse angular to subangular gravel of limestone with high cobble content. Cobbles are angular to subangular of limestone (DISTINCTLY WEATHERED PORTHKERRY MEMBER)			0.35
0.35-0.60		B ES				40.13		(1.05)
0.6		V	82 kPa(P) 31 kPa(R)					1.40
					At 1.40m bgl hard layer of strong grey limestone present.			
					End of Trial Pit 1.40 m (Thickness of basal layer not proven)			

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		1. Machine-Excavated Trial Pit located in the St. Athan Ministry of Defence (MoD) base south of the Eglwys Brewis Road. 2. Machine-Excavated Trial Pit completed to 1.40m bgl after encountering natural rock (Medium Strong Limestone). 3. Soakaway Test undertaken (see separate report sheet for results). 4. Topography: Level ground. 5. Groundwater not encountered. 6. No evidence of contamination. 7. Backfilled with arisings upon completion.

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Equipment & Methods: JCB 3CX	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
	Co-ordinates: E: 300313.446 N: 169301.712	Ground Level (m): 41.66 AOD	Date Started: 22/11/2016 Date Completed: 22/11/2016

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		ES V	35 kPa(P) 32 kPa(R)		TOPSOIL: Grass Over: Soft brown gravelly sandy CLAY with frequent roots (TOPSOIL)	41.46		0.20
0.20-0.65		B			Firm brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse gravel of limestone. Sand is fine to coarse (PROBABLE ALLUVIUM)			0.45
0.50		ES						
0.6		V	69 kPa(P) 37 kPa(R)		Medium strong to weak grey weathered crystalline LIMESTONE with fossil fragments (~2-5mm Ø) and subhorizontal and subvertical extremely closely spaced, planar rough, partly open fractures with orange surface staining Recovered as: Grey subangular cobbles of limestone with firm orangish brown clay infill (DISTINCTLY WEATHERED PORTHKERRY MEMBER)	41.01		0.65
0.65-1.40		B						0.75
					End of Trial Pit 1.40 m (Thickness of basal layer not proven)	40.26		1.40

Groundwater Observations				Plan View	Remarks
Strike Depth	Post Mins	Post Depth	Flow		
					1. Machine-Excavated Trial Pit located in the St. Athan Ministry of Defence (MoD) base south of the Eglwys Brewis Road. 2. Machine-Excavated Trial Pit completed to 1.40m bgl after encountering natural rock (Medium Strong Limestone). 3. Topography: Level ground. 4. Groundwater not encountered. 5. No evidence of contamination. 6. Backfilled with arisings upon completion.

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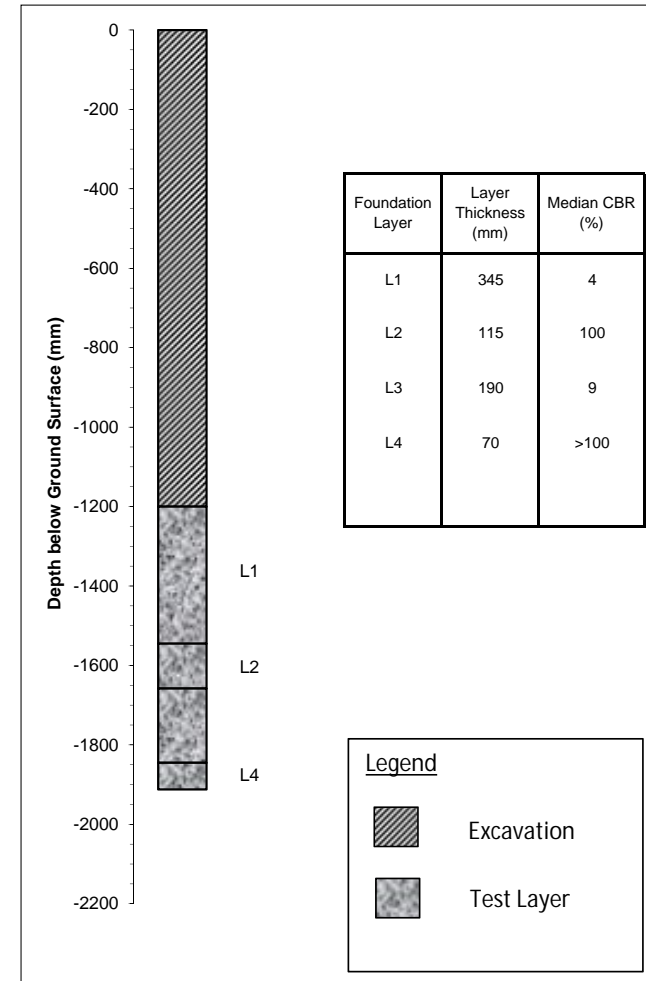
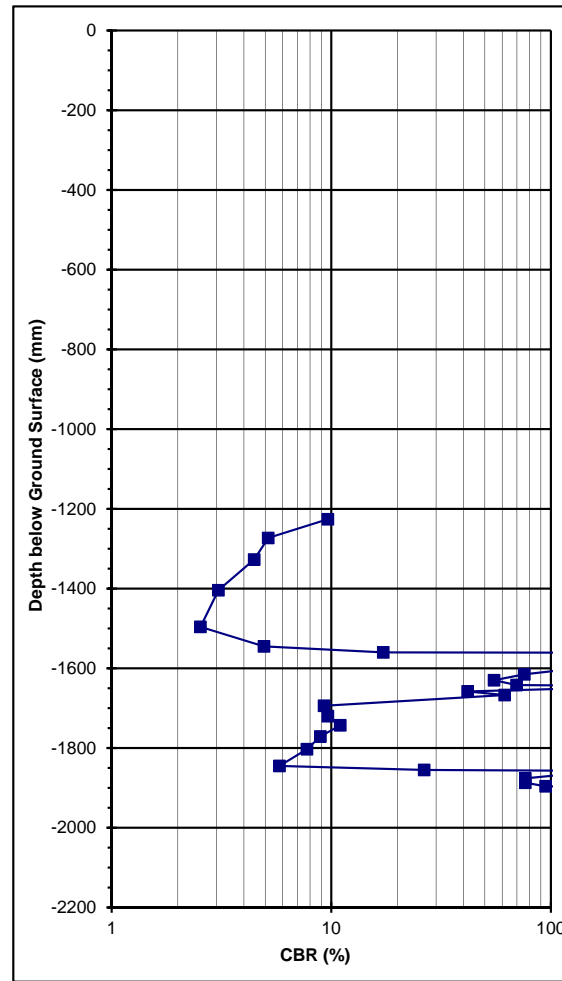
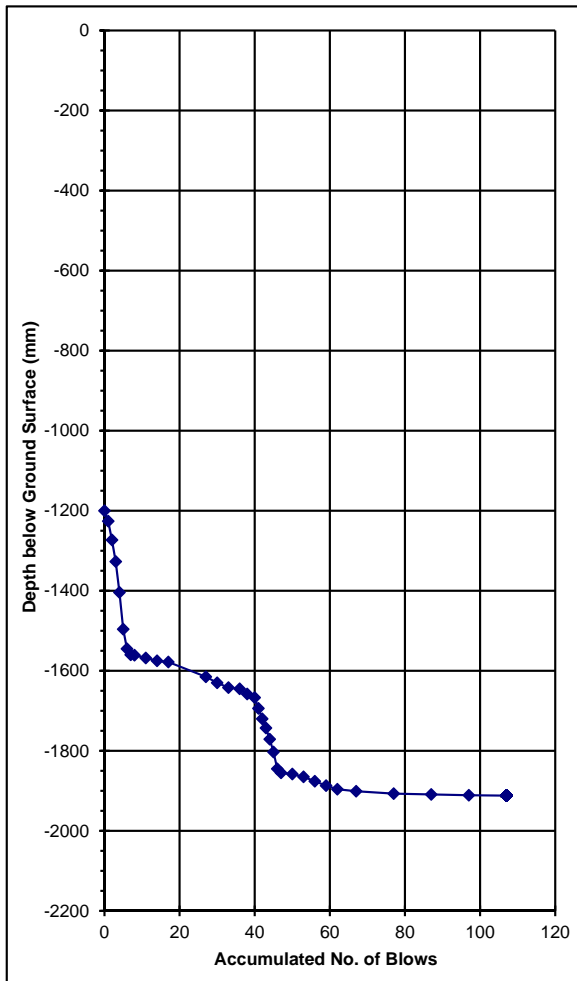
Appendix B TRL Probe Results

Job Number : 60509148
 DCP/Core Number : SK501
 DCP Operator : CC/WH
 Date Tested : 23/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 298335.157, 168941.925

Notes: Test commenced from the base of top soil in SK501 machine-excavated trial pit

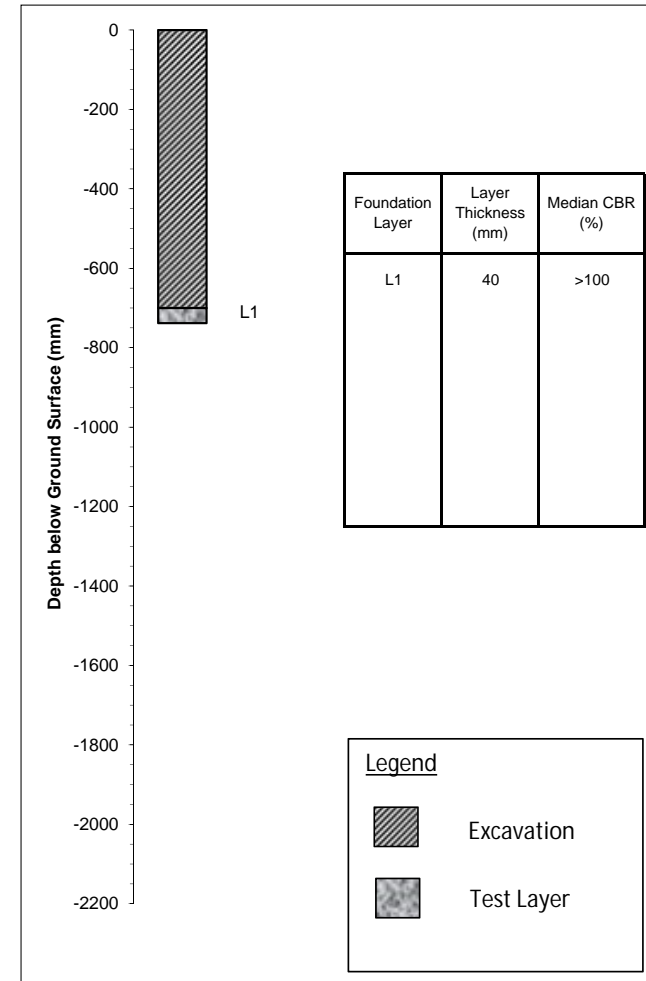
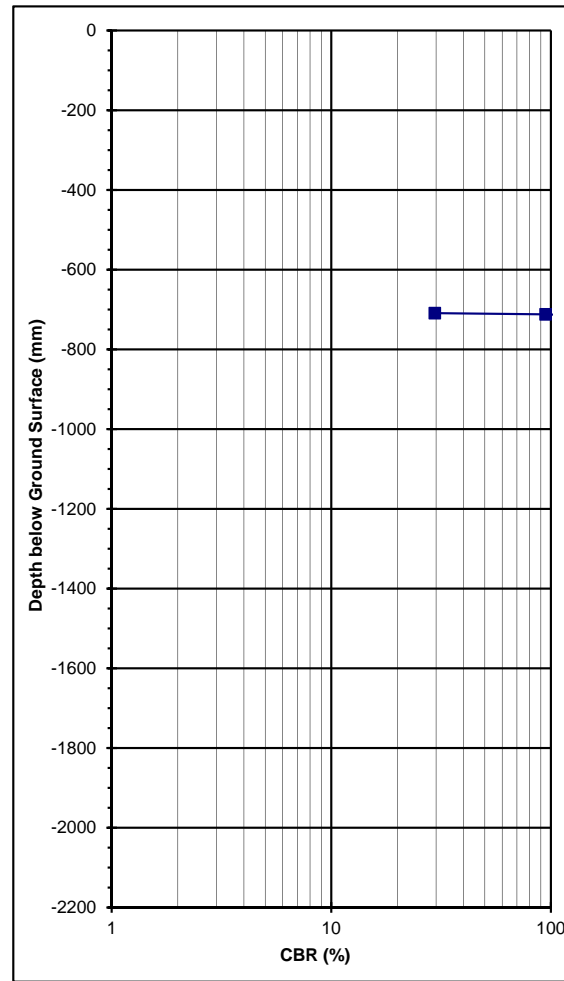
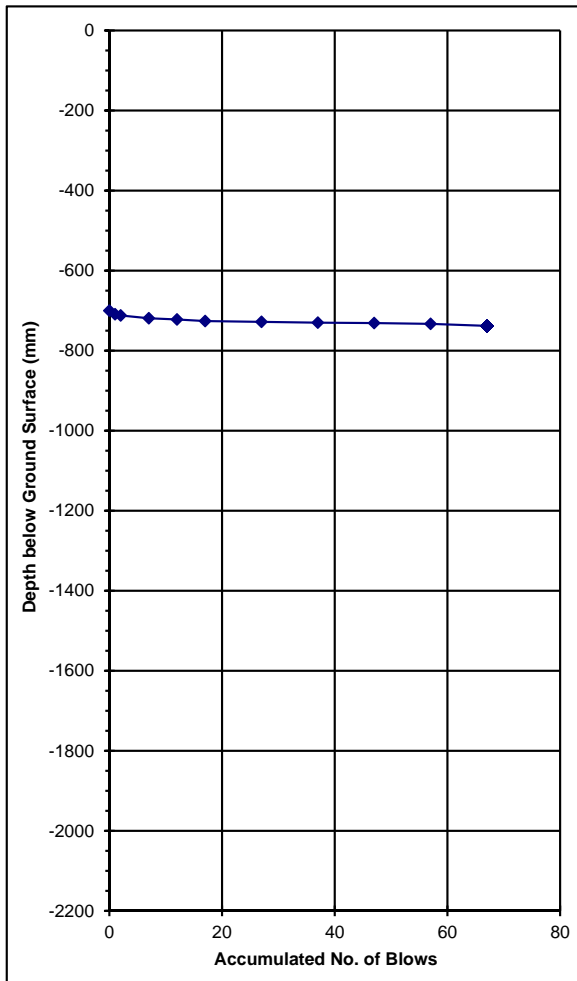


Job Number : 60509148
 DCP/Core Number : SK502
 DCP Operator : CC/WH
 Date Tested : 23/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 298511.703, 169002.432

Notes: Test commenced from the base of top soil in SK502 machine-excavated trial pit

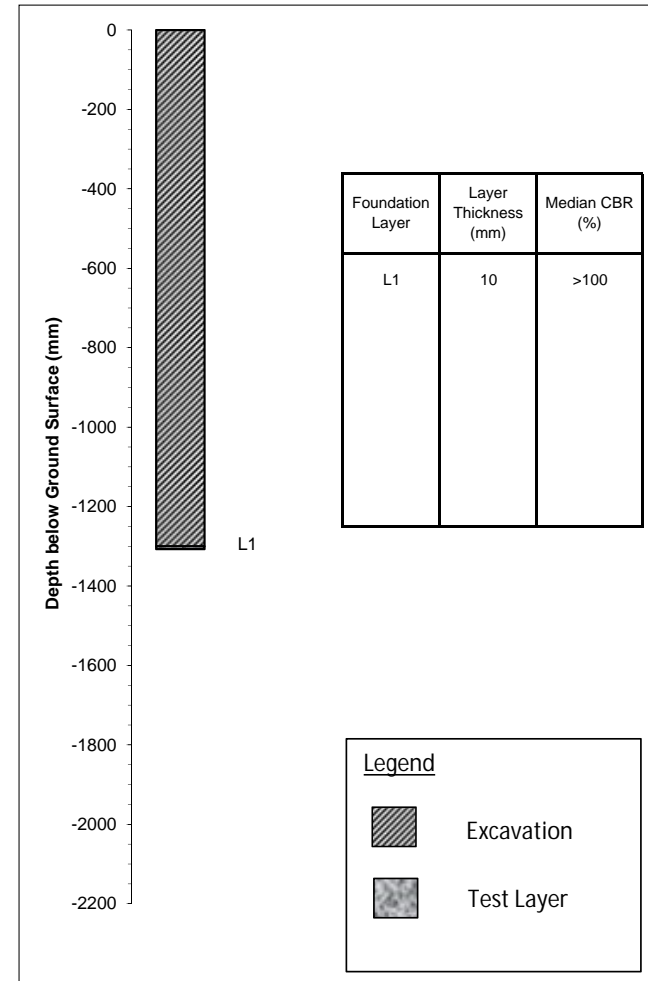
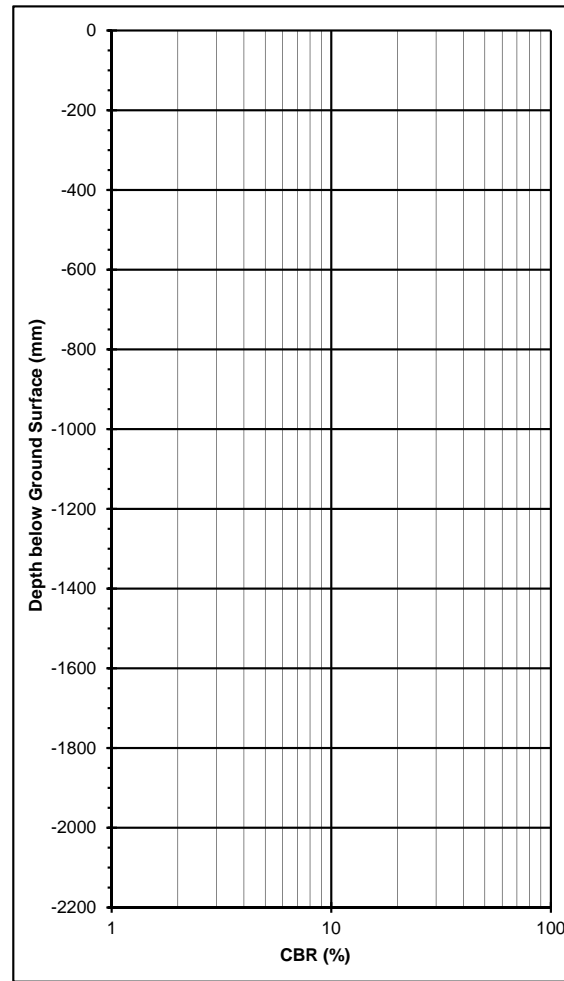
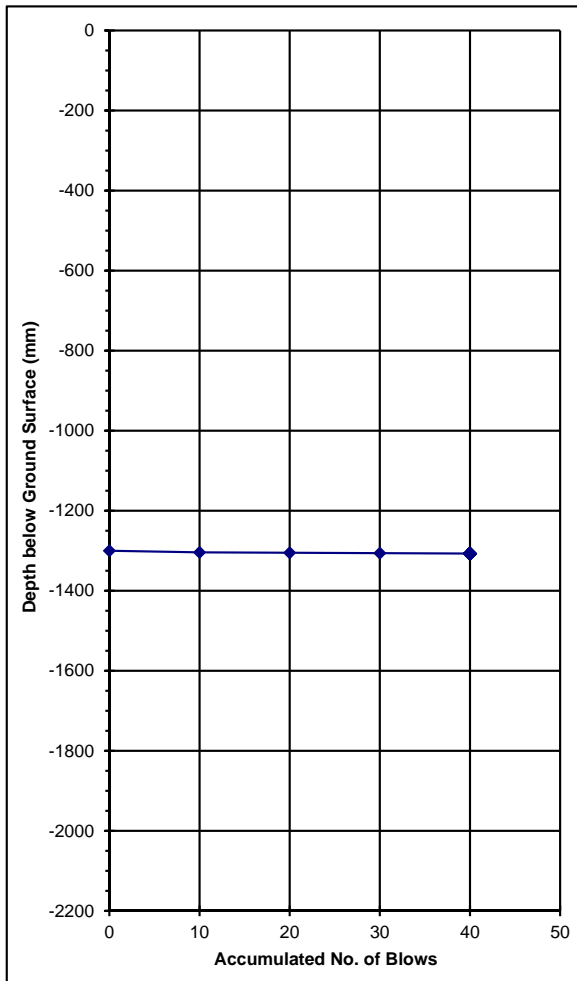


Job Number : 60509148
 DCP/Core Number : SK503
 DCP Operator : CC/WH
 Date Tested : 25/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 298759.892, 169081.211

Notes: Test commenced from the base of top soil in SK503 machine-excavated trial pit

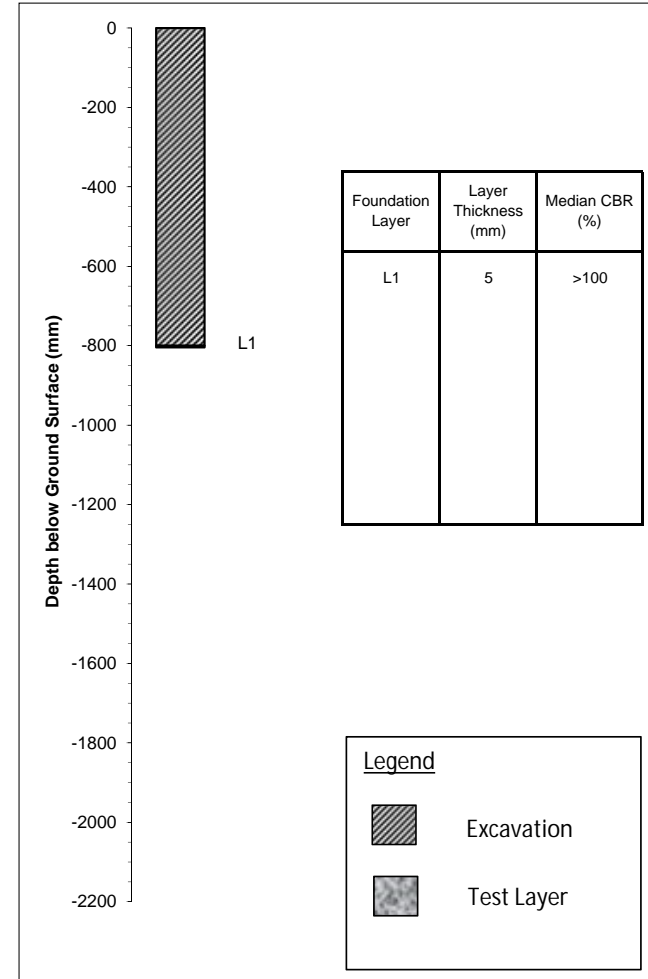
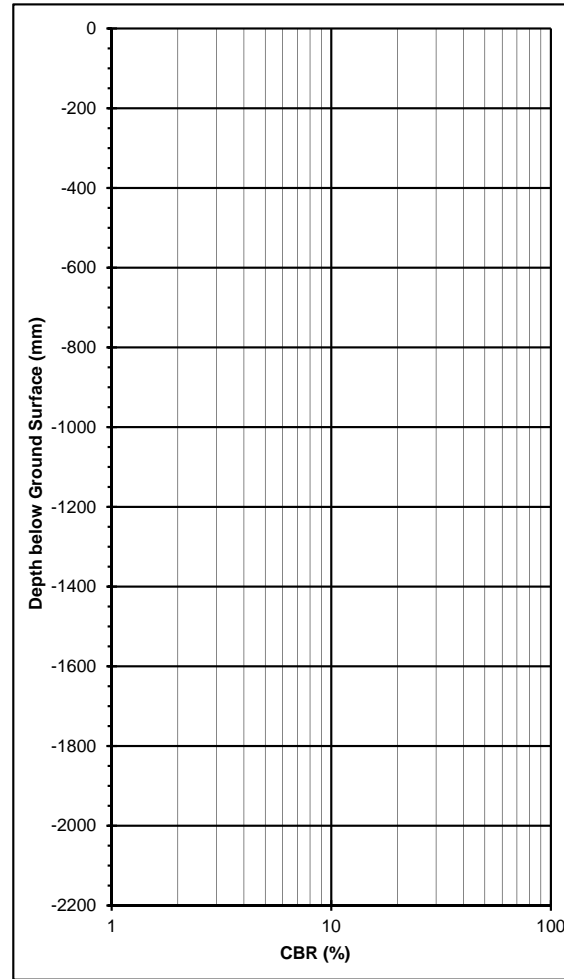
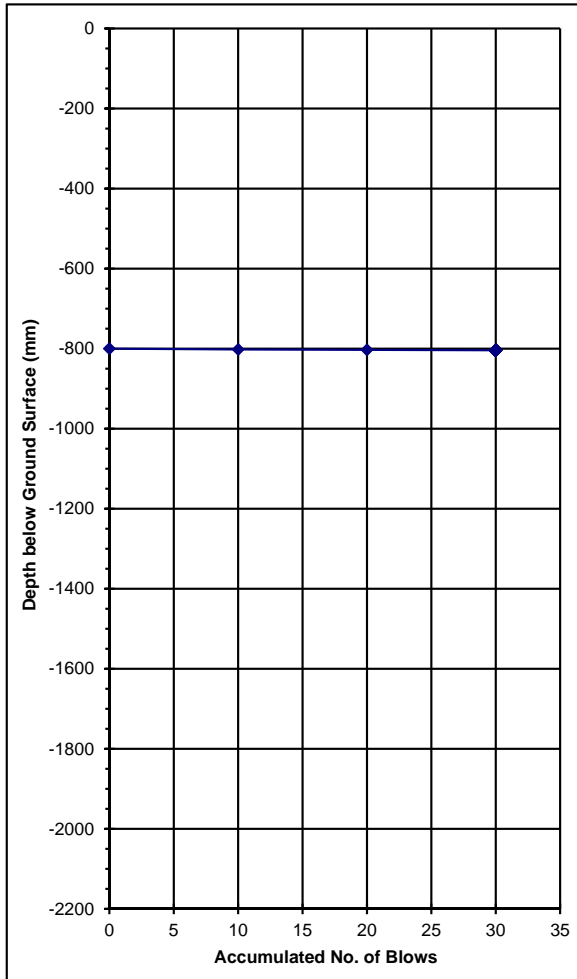


Job Number : 60509148
 DCP/Core Number : SK504
 DCP Operator : CC/WH
 Date Tested : 25/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 298881.314, 169149.165

Notes: Test commenced from the base of top soil in SK504 machine-excavated trial pit

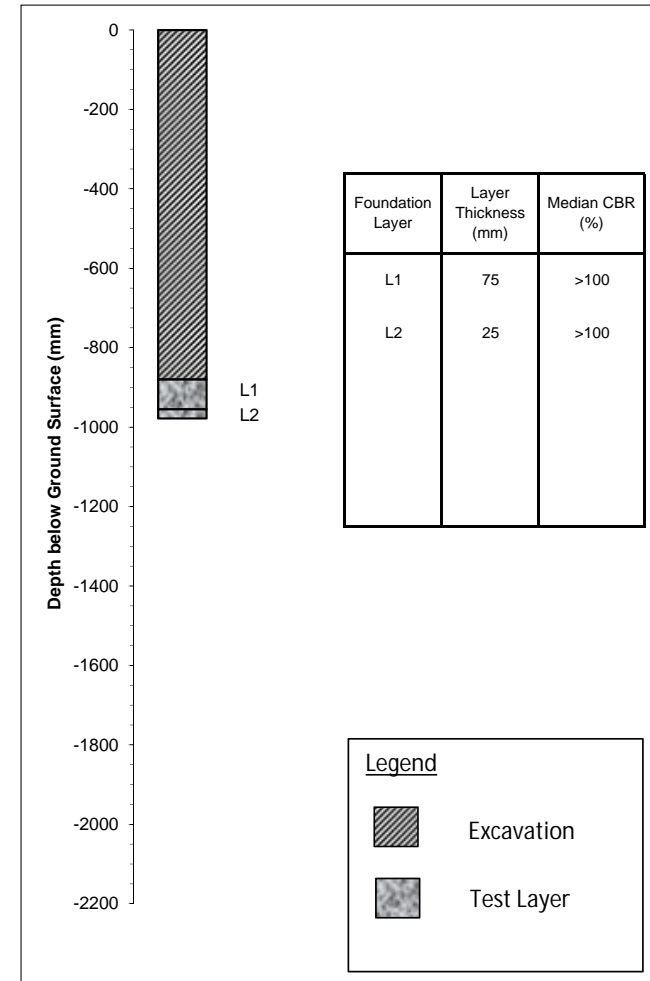
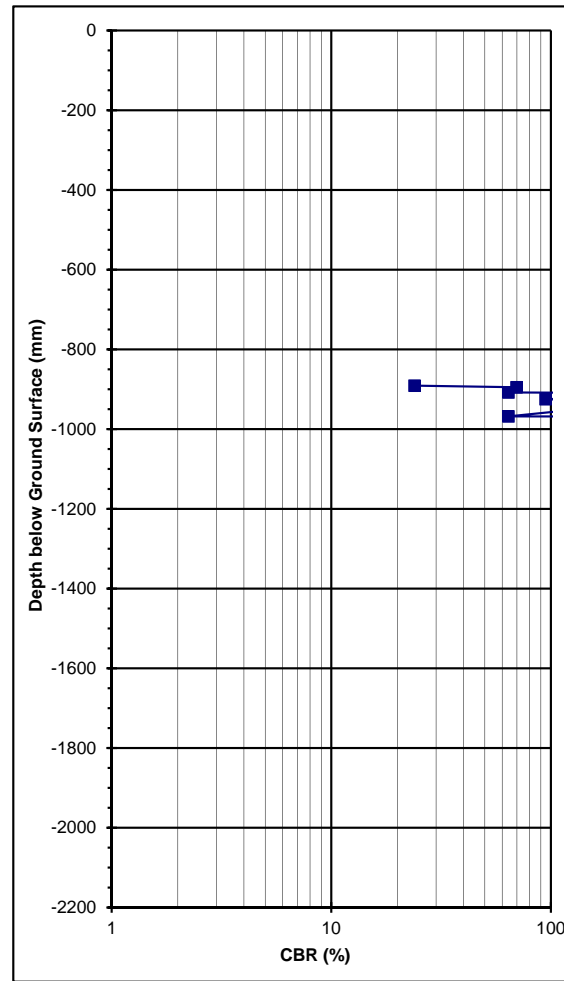
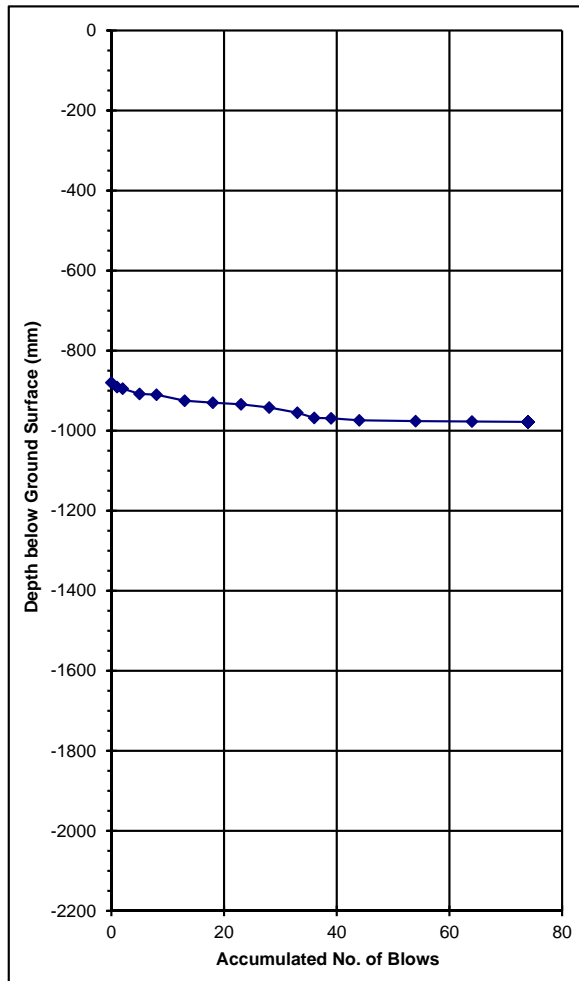


Job Number : 60509148
 DCP/Core Number : SK505
 DCP Operator : CC/WH
 Date Tested : 24/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 299067.672, 169210.291

Notes: Test commenced from the base of top soil in SK505 machine-excavated trial pit

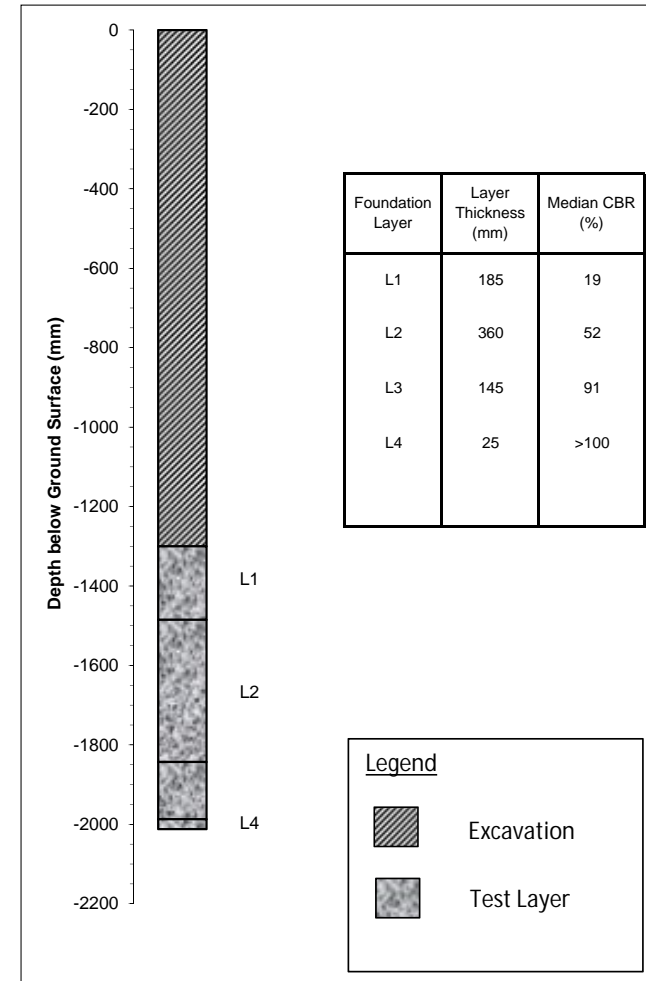
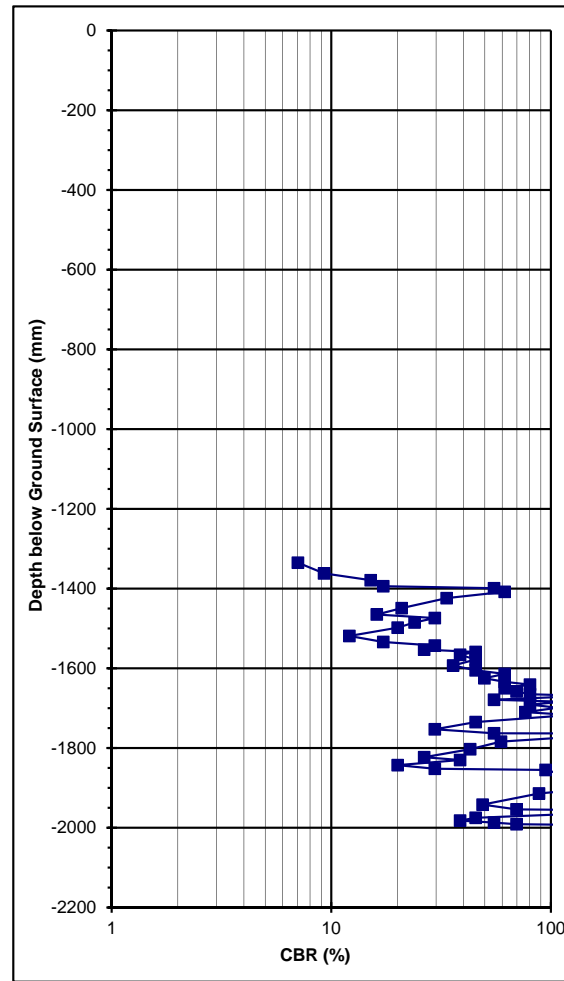
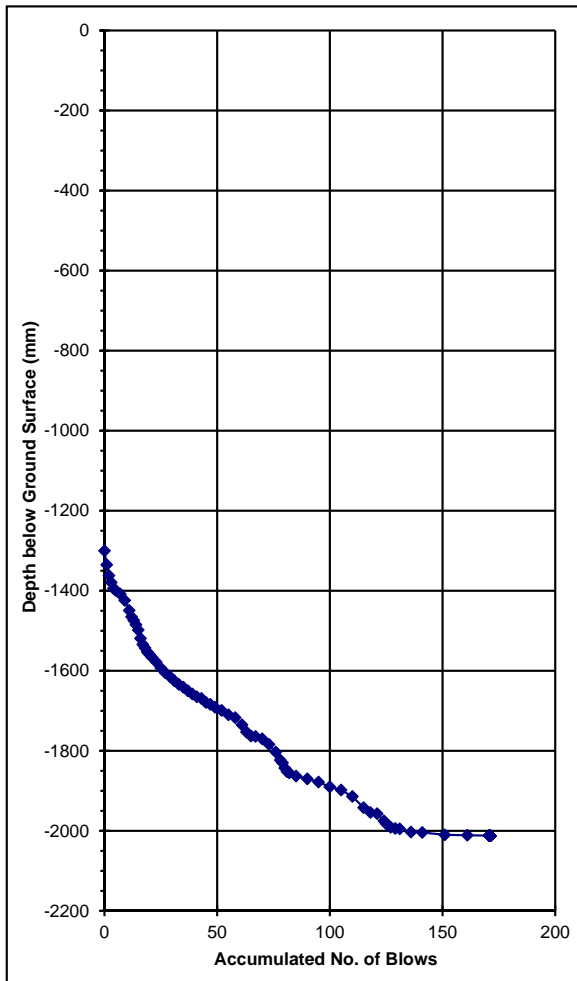


Job Number : 60509148
 DCP/Core Number : SK506
 DCP Operator : CC/WH
 Date Tested : 24/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 299152.675, 169307.883

Notes: Test commenced from the base of top soil in SK506 machine-excavated trial pit

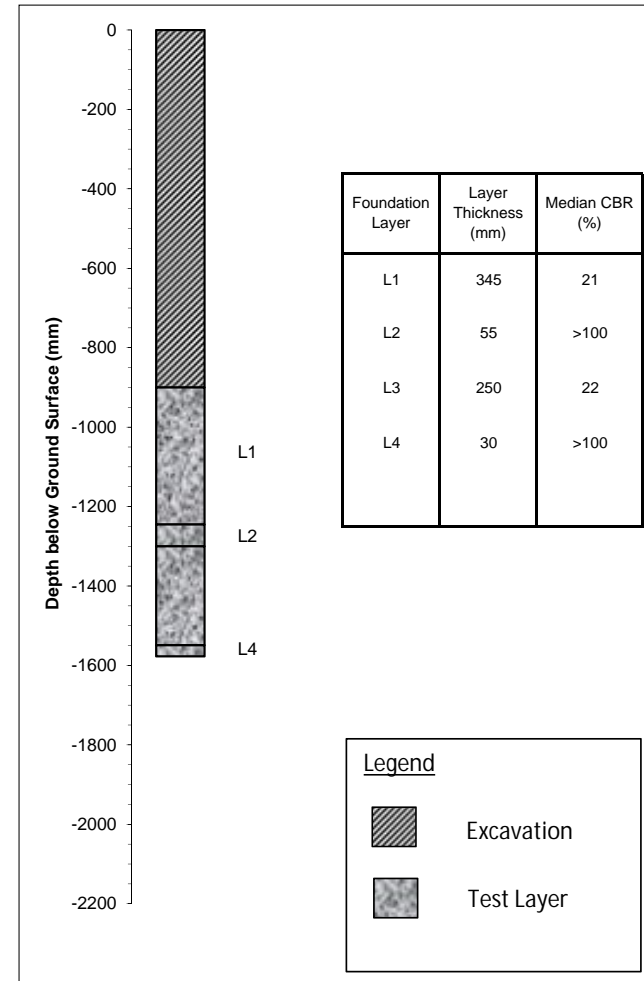
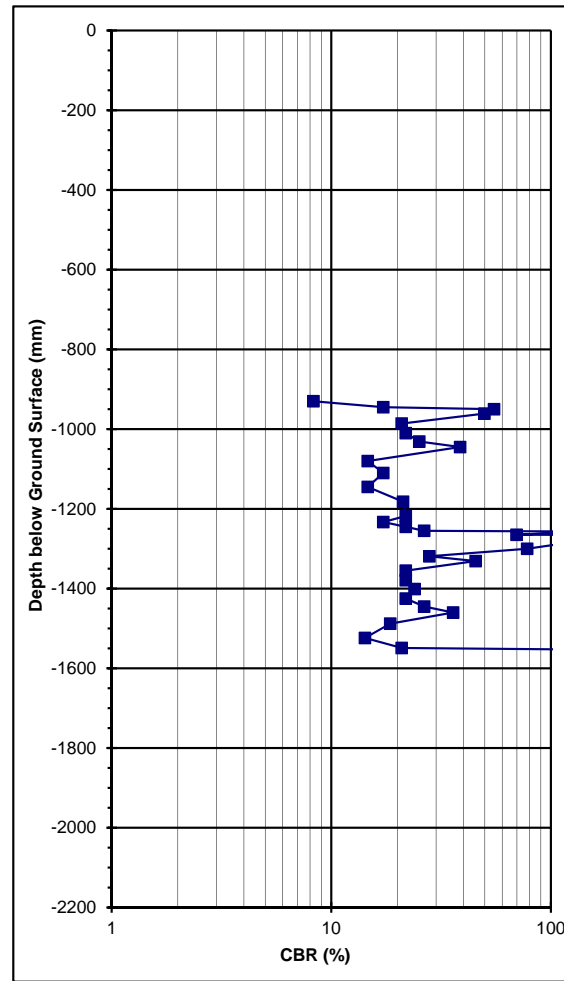
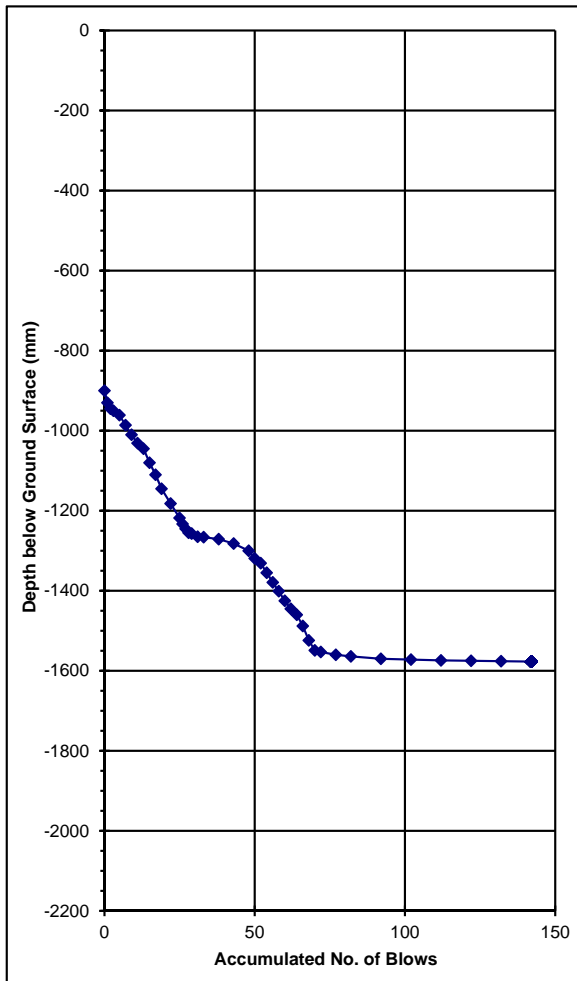


Job Number : 60509148
 DCP/Core Number : SK507
 DCP Operator : CC/WH
 Date Tested : 23/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 299452.038, 169293.941

Notes: Test commenced from the base of top soil in SK507 machine-excavated trial pit

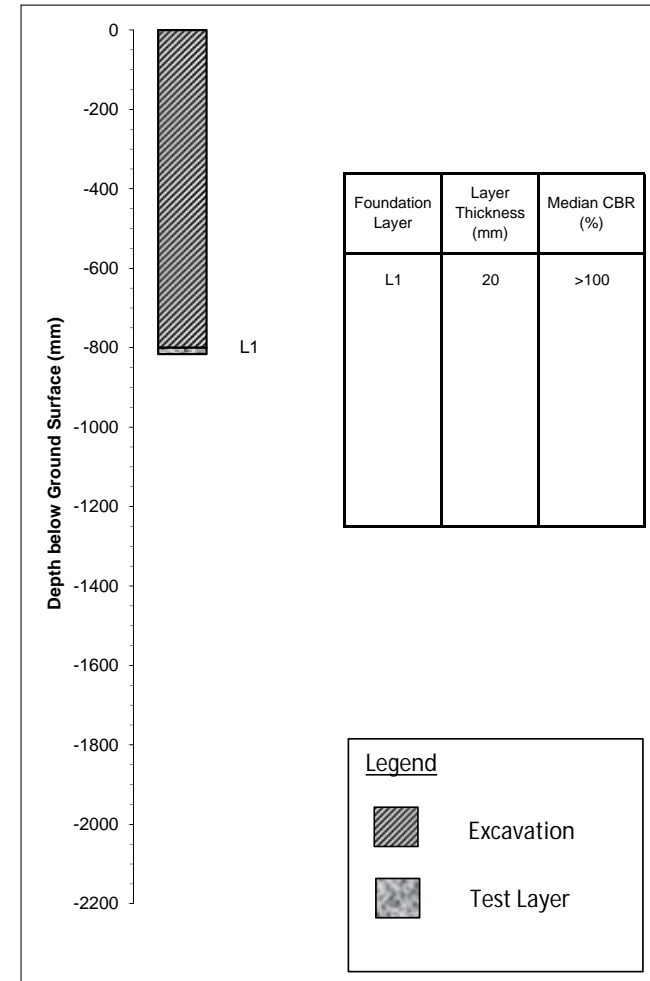
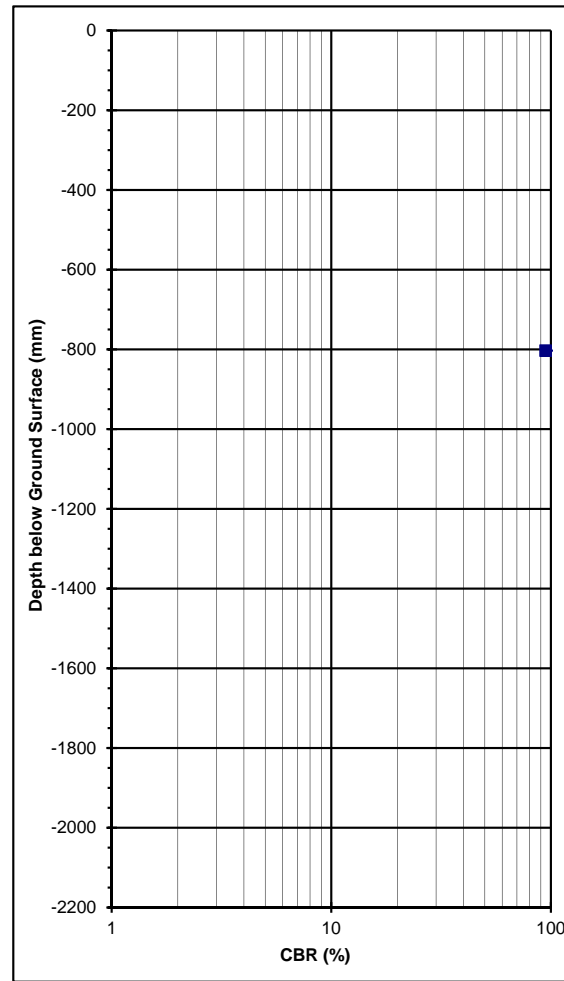
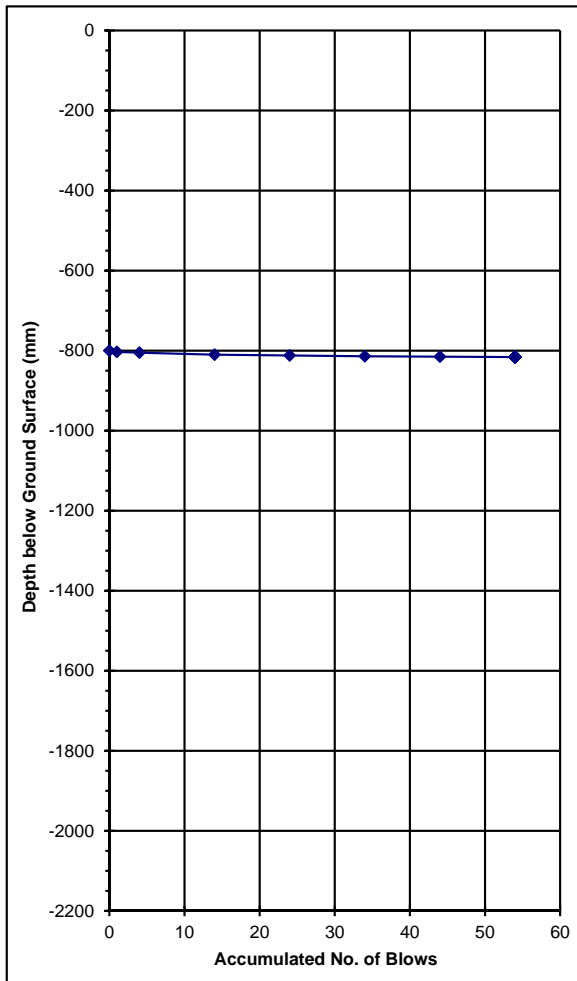


Job Number : 60509148
 DCP/Core Number : SK508
 DCP Operator : CC/WH
 Date Tested : 22/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 299678.218, 169171.911

Notes: Test commenced from the base of top soil in SK508 machine-excavated trial pit

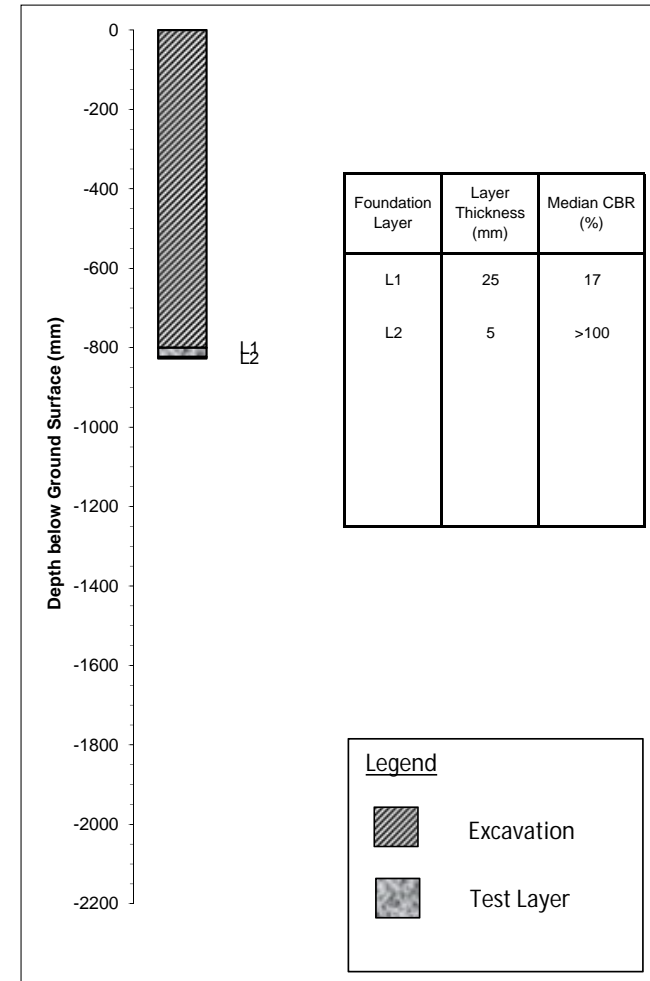
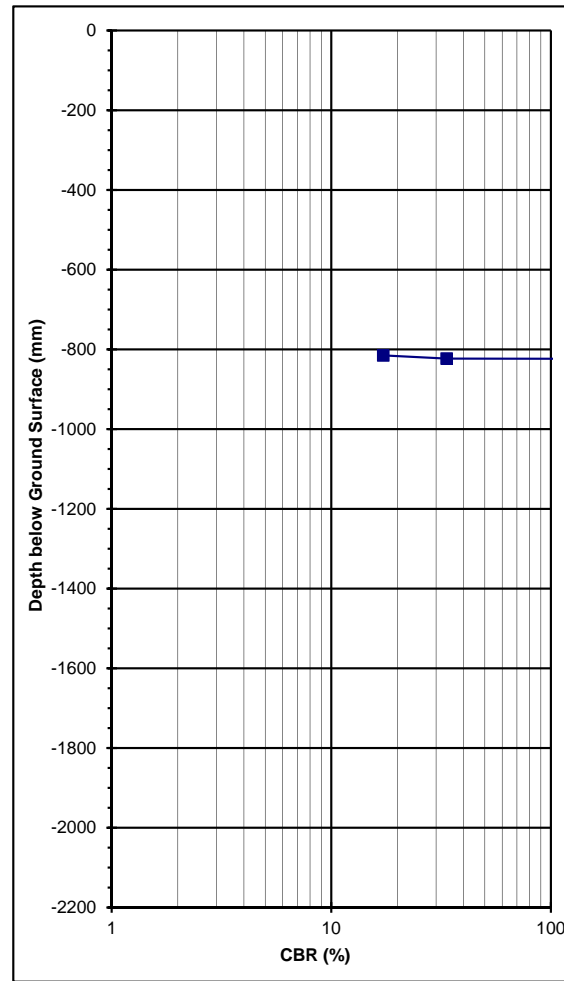
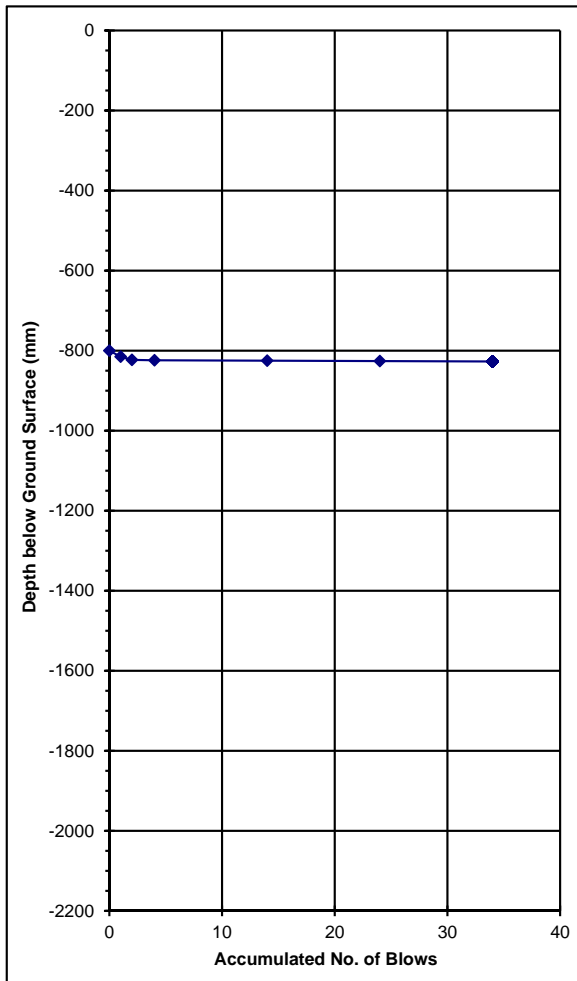


Job Number : 60509148
 DCP/Core Number : SK509
 DCP Operator : CC/WH
 Date Tested : 22/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 299981.456, 169255.033

Notes: Test commenced from the base of top soil in SK509 machine-excavated trial pit

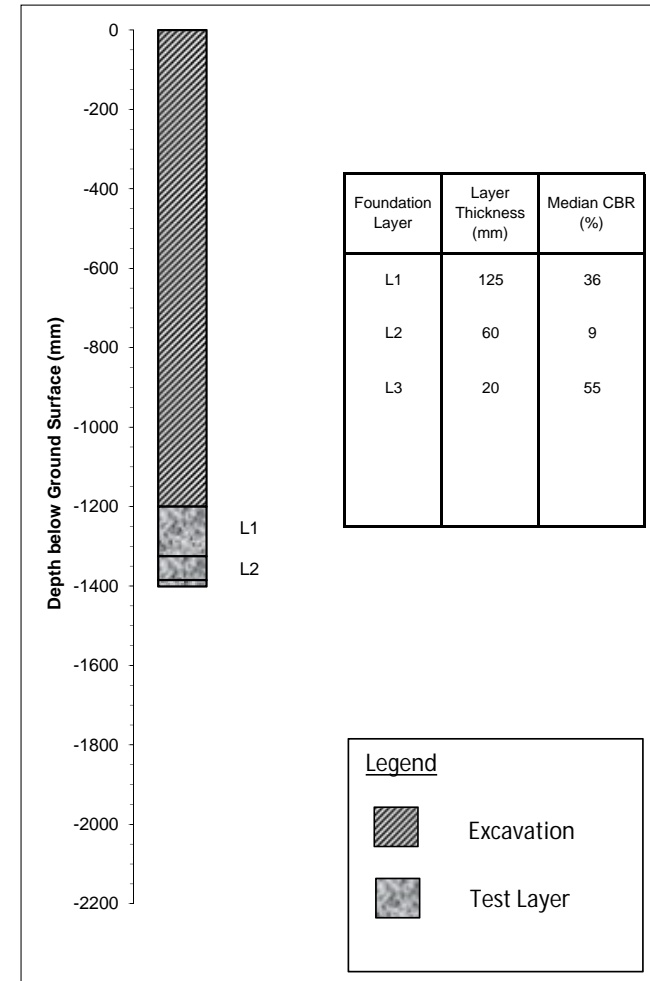
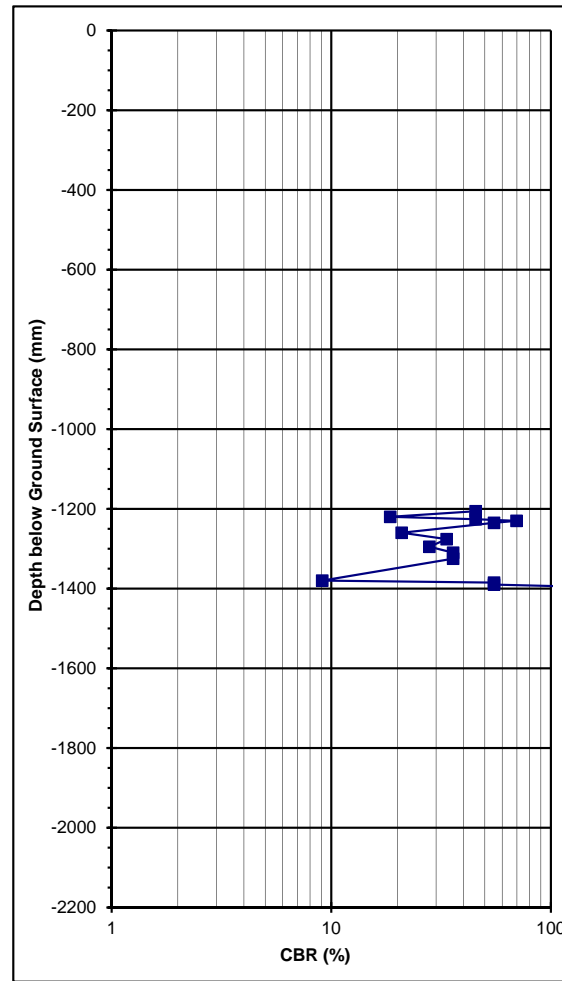
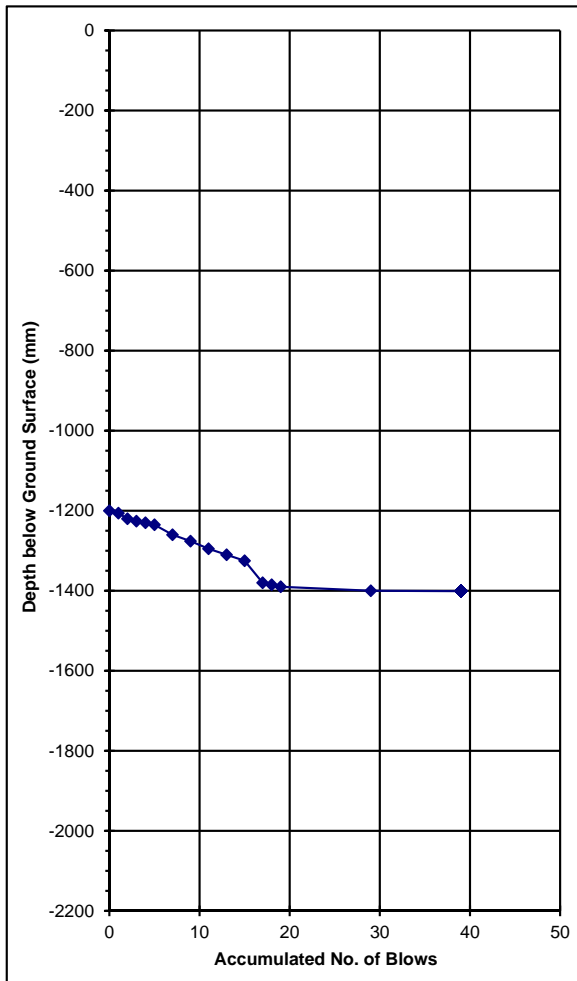


Job Number : 60509148
 DCP/Core Number : SK510
 DCP Operator : CC/WH
 Date Tested : 22/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 300129.129, 169202.376

Notes: Test commenced from the base of top soil in SK510 machine-excavated trial pit

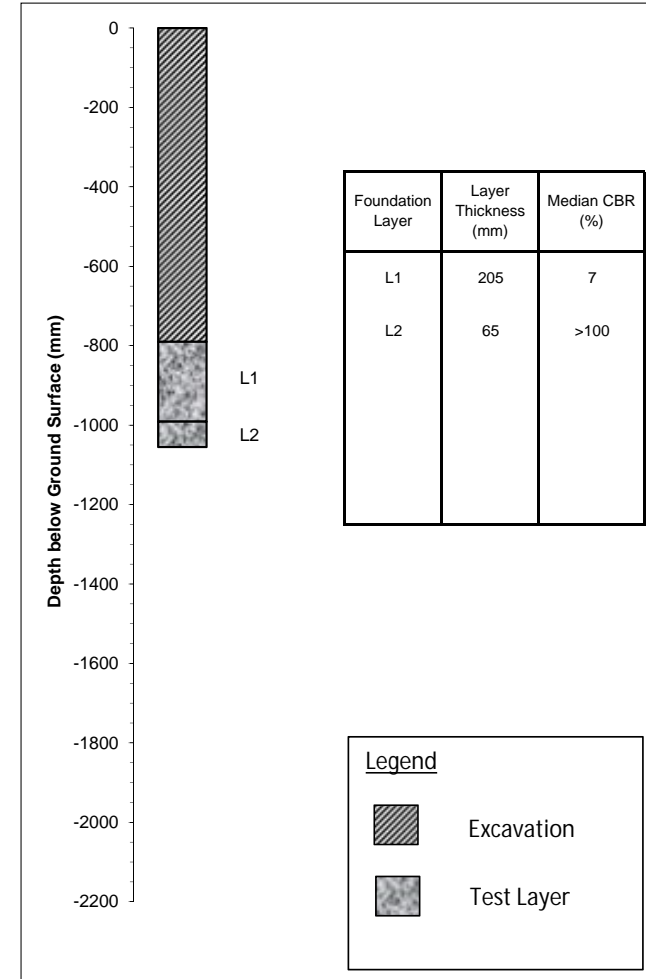
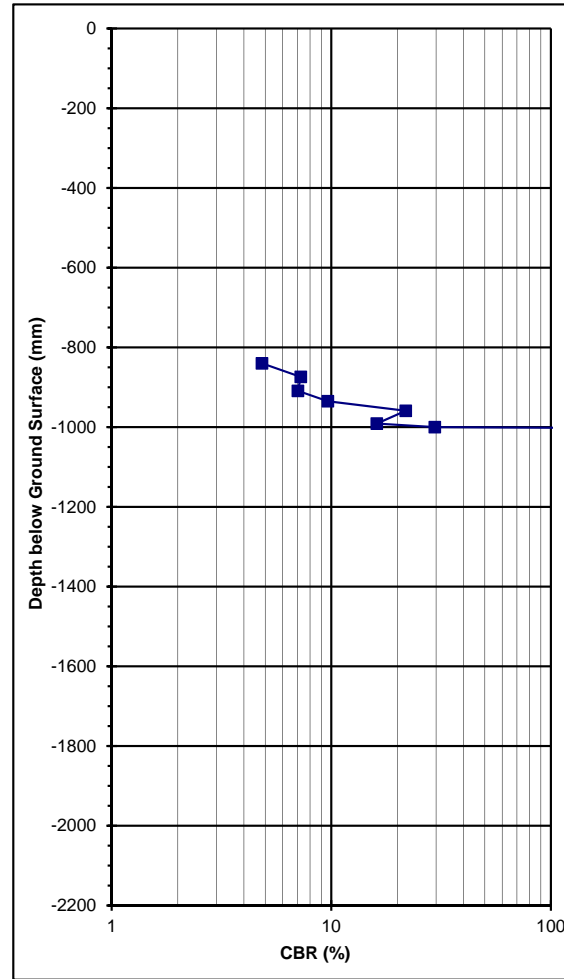
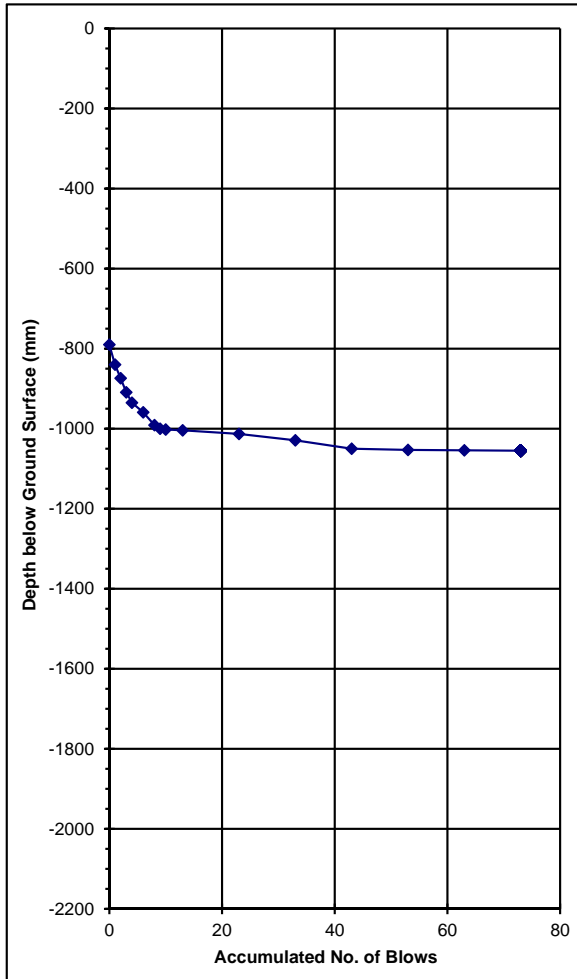


Job Number : 60509148
 DCP/Core Number : TP501
 DCP Operator : CC/WH
 Date Tested : 22/11/16
 Plot Prepared By : LT
 Plot Checked By : MB
 Date Prepared : 05/12/16

Location : St. Athan Northern Access Road

OSGR: 300313.446, 169301.712

Notes: Test commenced from the base of top soil in TP501



Appendix C Soakaway Test Results

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

Test Location ID:	SK501	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	23-Nov-16

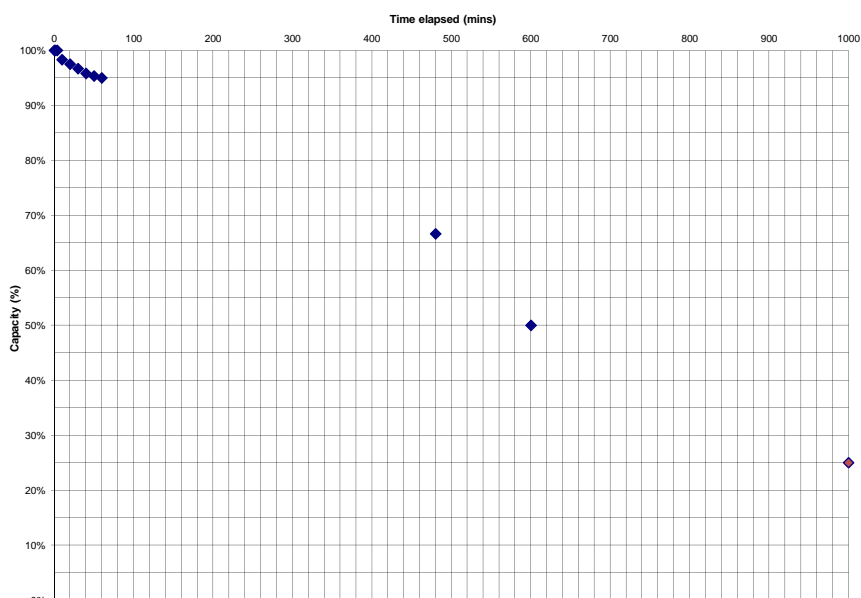
TRIAL PIT DIMENSIONS:

Width (m):	0.70	Length (m):	1.80
Depth (m bgl):	1.40	Start level (m bgl):	0.80

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.800	100.00%	0
0.800	100.00%	2
0.800	100.00%	4
0.810	98.33%	10
0.815	97.50%	20
0.820	96.67%	30
0.825	95.83%	40
0.828	95.33%	50
0.830	95.00%	60
1.000	66.67%	480
1.100	50.00%	600
1.250	25.00%	1000*

*Extrapolated 25% value



Test duration (mins): 600

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.378000	m ³ **	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	2.7600	m ²		
Tp75-25	=	680.00	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s) ***
0.800 to 1.100	3.36E-06

** Trial Pit stable - granular fill not required

*** Indicative unfactored infiltration rate (75% - 25%).

Departures from BRE365 test method:	Only 1no. Test was undetaken due to length of time taken for drainage.
--	--

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit dry during excavation and preparation of the Soakaway Test. 2. Water level brought to 0.80m bgl using water from towed bowser. 3. Water level recorded using tape measure (measured in m bgl). 4. Soakaway Test incomplete due to drainage time exceeding 8 hours. 5. Trial Pit backfilled with arisings upon completion.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

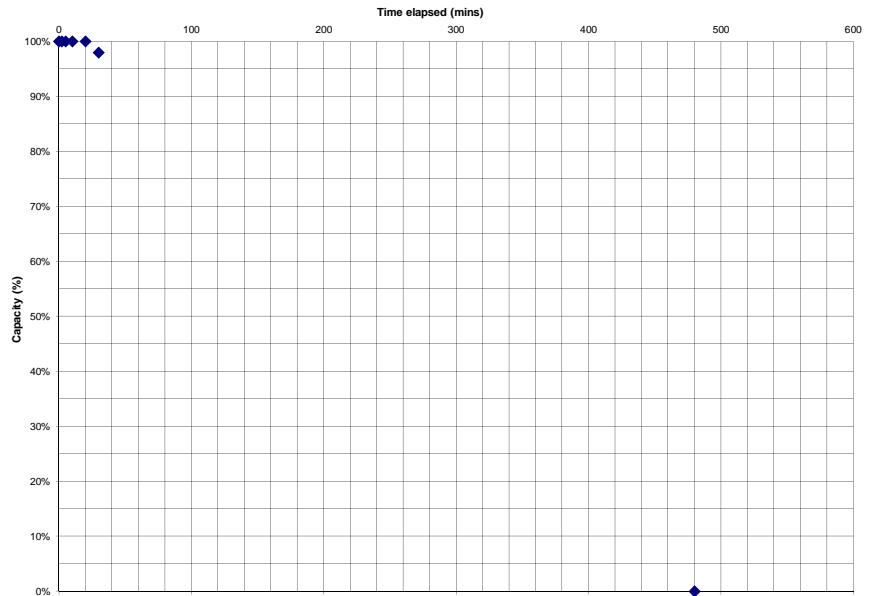
Test Location ID:	SK502	Test No:	1 of 2
Weather Conditions:	Dry	Test Date:	23-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.70	Length (m):	1.40
Depth (m bgl):	0.70	Start level (m bgl):	0.20

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.200	100.00%	0
0.200	100.00%	2
0.200	100.00%	5
0.200	100.00%	10
0.200	100.00%	20
0.210	98.00%	30
0.700	0.00%	480



Test drainage time (mins): 480

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.245000	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	2.0300	m ²		
Tp75-25	=	230.00	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s) **
0.200 to 0.700	8.75E-06

* Trial Pit stable - granular fill not required
 ** Indicative unfactored infiltration rate (75% - 25%).

Departures from BRE365 test method:	1. Test commenced late PM, run for 30 mins, then left open over night. Pit dry AM 2. Approximate 25% and 75% points determined from graph.
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Remarks:	1. Trial Pit dry during excavation and preparation of the Soakaway Test. 2. Water level recorded using tape measure (measured in m bgl). 3. Water level in trial pit raised rapidly to 0.20m bgl using water from towed bowser. 4. Soakaway Test ran overnight - dry AM.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

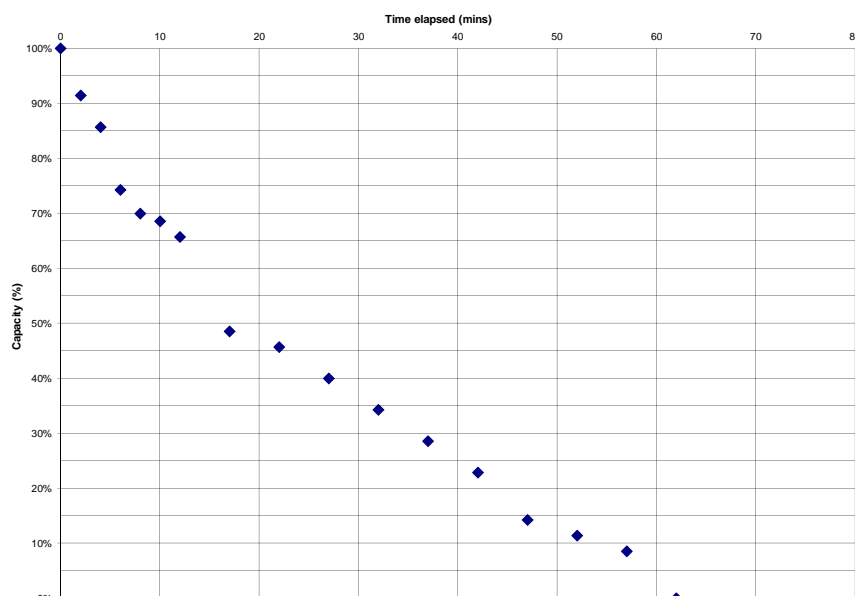
Test Location ID:	SK502	Test No:	2 of 2
Weather Conditions:	Dry	Test Date:	24-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.70	Length (m):	1.40
Depth (m bgl):	0.70	Start level (m bgl):	0.35

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.350	100.00%	0
0.380	91.43%	2
0.400	85.71%	4
0.440	74.29%	6
0.455	70.00%	8
0.460	68.57%	10
0.470	65.71%	12
0.530	48.57%	17
0.540	45.71%	22
0.560	40.00%	27
0.580	34.29%	32
0.600	28.57%	37
0.620	22.86%	42
0.650	14.29%	47
0.660	11.43%	52
0.670	8.57%	57
0.700	0.00%	62



Test drainage time (mins): 62

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.171500	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	1.7150	m ²		
Tp75-25	=	34.25	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s)
0.350 to 0.700	4.87E-05

* Trial Pit stable - granular fill not required

Departures from BRE365 test method: Test 3 not undertaken due to time taken for initial test runs.

Remarks:

1. Trial Pit dry during excavation and preparation of the Soakaway Test.
2. Water level in trial pit raised rapidly to 0.35m bgl using water from towed bowser.
3. Water level recorded using tape measure (measured in m bgl).
4. Soakaway Test complete after 62mins.
5. Trial Pit backfilled with arisings upon completion.

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

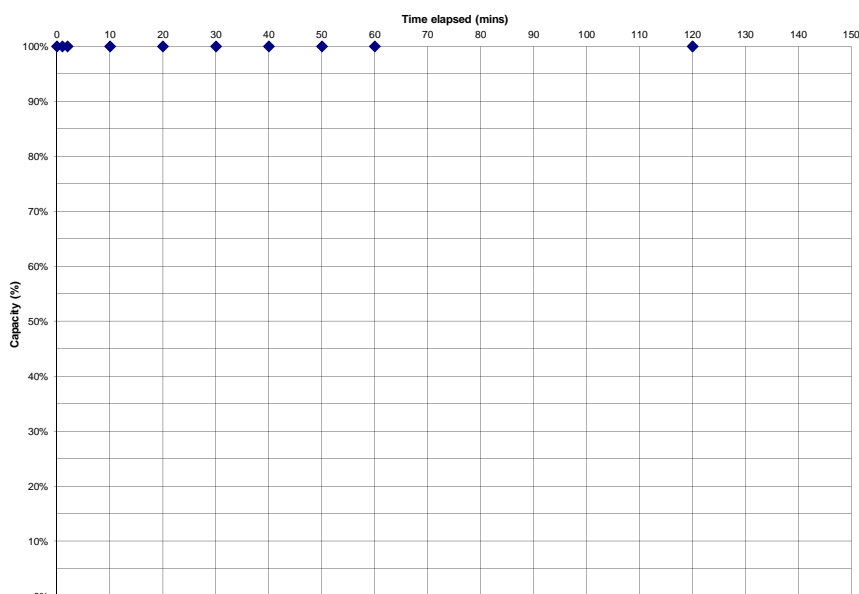
Test Location ID:	SK503	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	25-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.70	Length (m):	1.40
Depth (m bgl):	1.30	Start level (m bgl):	0.50

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.500	100.00%	0
0.500	100.00%	1
0.500	100.00%	2
0.500	100.00%	10
0.500	100.00%	20
0.500	100.00%	30
0.500	100.00%	40
0.500	100.00%	50
0.500	100.00%	60
0.500	100.00%	120



Test duration (mins): 120

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	N/A	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	N/A	m ²		
Tp75-25	=	N/A	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s) **
0.500 to 0.500	N/A

* Trial Pit stable - granular fill not required

** No infiltration recorded during test - possibly rising groundwater level

Departures from BRE365 test method:	Only 1no. Test was undertaken due to negligible infiltration rate.
-------------------------------------	--

Remarks:	<ol style="list-style-type: none"> 1. Ground water strike in trial pit at 1.30m bgl, rising to 1.10m bgl after 30 mins. 2. Water level brought to 0.50m bgl using water from towed bowser. 3. Water level recorded using tape measure (measured in m bgl). 4. Soakaway Test terminated after 120 mins due to static water level. 5. Trial Pit backfilled with arisings upon completion.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

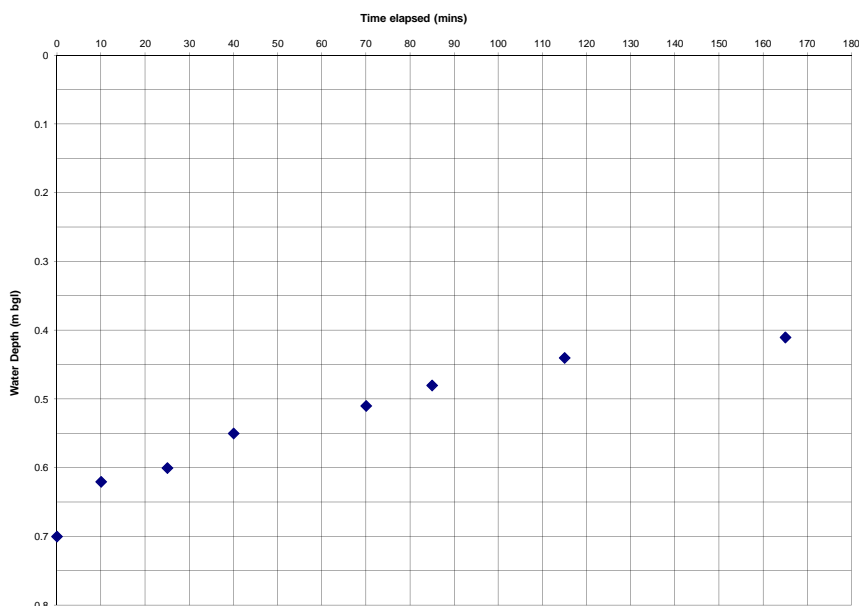
Test Location ID:	SK504	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	25-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.70	Length (m):	1.50
Depth (m bgl):	0.80	Start level (m bgl):	0.70

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.700	100.00%	0
0.620	180.00%	10
0.600	200.00%	25
0.550	250.00%	40
0.510	290.00%	70
0.480	320.00%	85
0.440	360.00%	115
0.410	390.00%	165



Test duration (mins): 165

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	N/A	m^3		Soil Infiltration Rate, f =		$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	N/A	m^2				
Tp75-25	=	N/A	mins				

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s)
0.700 to 0.410	N/A**

* Trial Pit stable - granular fill not required
 ** Ground water level rising - no infiltration

Departures from BRE365 test method:	No infiltration test undertaken due to rising ground water level.
--	---

Remarks:	<ol style="list-style-type: none"> 1. Ground water strike in trial pit at 0.80m bgl, steadily rising to 0.41m bgl after 165 mins. 2. No water added to test pit as water level was rising. 3. Water level monitored using tape measure for 165mins (measured in m bgl). 4. Soakaway Test terminated due to rising ground water. 5. Trial Pit backfilled with arisings upon completion.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

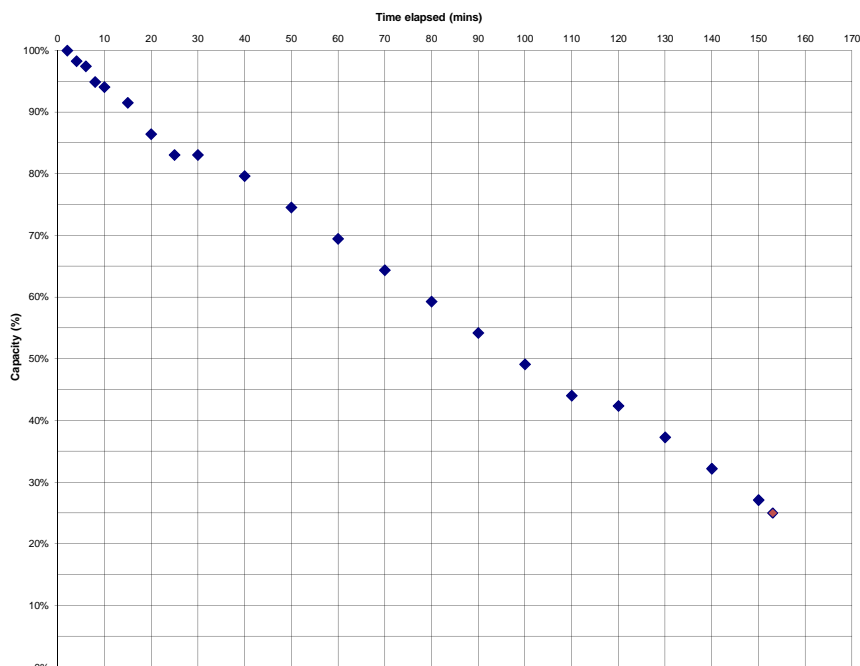
Test Location ID:	SK505	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	25-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.65	Length (m):	1.50
Depth (m bgl):	0.90	Start level (m bgl):	0.31

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.310	100.00%	2
0.320	98.31%	4
0.325	97.46%	6
0.340	94.92%	8
0.345	94.07%	10
0.360	91.53%	15
0.390	86.44%	20
0.410	83.05%	25
0.410	83.05%	30
0.430	79.66%	40
0.460	74.58%	50
0.490	69.49%	60
0.520	64.41%	70
0.550	59.32%	80
0.580	54.24%	90
0.610	49.15%	100
0.640	44.07%	110
0.650	42.37%	120
0.680	37.29%	130
0.710	32.20%	140
0.740	27.12%	150
0.753	25.00%	153*



*Extrapolated 25% value

Test duration (mins): 150

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.287625	m ³ **	Soil Infiltration Rate, f =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	2.2435	m ²		
Tp75-25	=	102.82	mins		

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s) ***
0.310 to 0.740	2.08E-05

** Trial Pit stable - granular fill not required

*** Indicative unfactored infiltration rate (75% - 25%).

Departures from BRE365 test method:	<ol style="list-style-type: none"> 1. Only 1no. Test undertaken due to low infiltration rate in 1st test. 2. 25% point extrapolated from graph.
--	---

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit was dry during excavation and preparation of the soakaway test. 2. Water level in trial pit raised rapidly to 0.31m bgl using water from bowser. 3. Water level monitored using tape measure (measured in m bgl). 4. Trial Pit backfilled with arisings upon completion.
-----------------	--

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

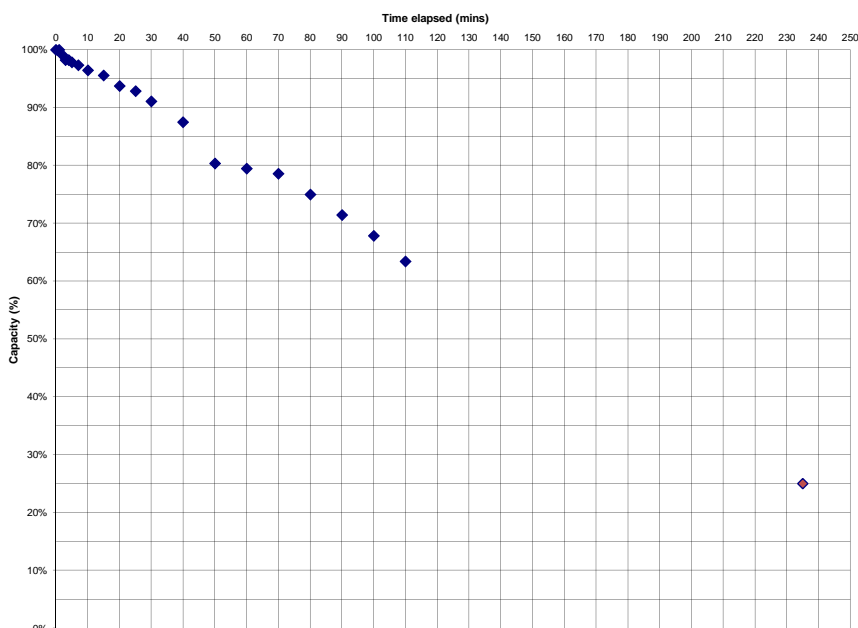
Test Location ID:	SK506	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	24-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.76	Length (m):	1.60
Depth (m bgl):	1.20	Start level (m bgl):	0.64

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.640	100.00%	0
0.640	100.00%	1
0.645	99.11%	2
0.650	98.21%	3
0.650	98.21%	4
0.652	97.86%	5
0.655	97.32%	7
0.660	96.43%	10
0.665	95.54%	15
0.675	93.75%	20
0.680	92.86%	25
0.690	91.07%	30
0.710	87.50%	40
0.750	80.36%	50
0.755	79.46%	60
0.760	78.57%	70
0.780	75.00%	80
0.800	71.43%	90
0.820	67.86%	100
0.845	63.39%	110
1.060	25.00%	235*



Test duration (mins): 110

*Extrapolated 25% value

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.340480	m ³ **	Soil Infiltration Rate, f =	
aP50	=	2.5376	m ²	$\frac{Vp75-25}{aP50 \times Tp75-25}$	
Tp75-25	=	155.00	mins		

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s) ***
0.640 to 0.845	1.44E-05

** Trial Pit stable - granular fill not required

*** Indicative unfactored infiltration rate (75% - 25%).

Departures from BRE365 test method:	<ol style="list-style-type: none"> 1. Only 1no. Test undertaken due to low infiltration rate in 1st test. 2. 25% point extrapolated from graph.
--	---

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit was dry during excavation and preparation of the soakaway test. 2. Water level in trial pit raised rapidly to 0.64m bgl using water from towed bowser. 3. Water level monitored using a dipmeter (measured in m bgl). 4. Trial Pit backfilled with arisings upon completion.
-----------------	--

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

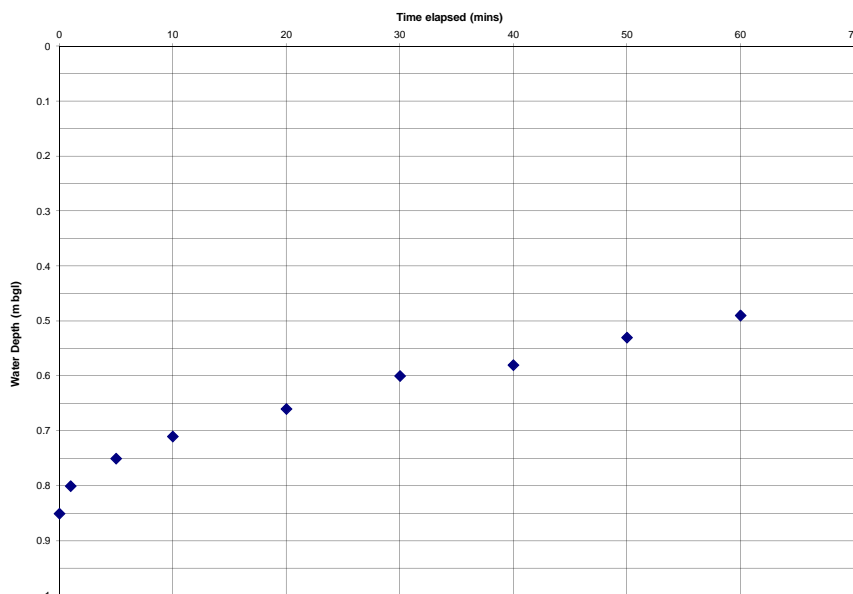
Test Location ID:	SK507	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	23-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.60	Length (m):	2.10
Depth (m bgl):	0.90	Start level (m bgl):	0.85

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.850	100.00%	0
0.800	200.00%	1
0.750	300.00%	5
0.710	380.00%	10
0.660	480.00%	20
0.600	600.00%	30
0.580	640.00%	40
0.530	740.00%	50
0.490	820.00%	60



Test duration (mins): 60

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	N/A	m^3		Soil Infiltration Rate, f =		$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	N/A	m^2				
Tp75-25	=	N/A	mins				

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s)
0.850 to 0.490	N/A**

* Trial Pit stable - granular fill not required

** Ground water level rising - no infiltration

Departures from BRE365 test method:	No infiltration test undertaken due to ground water level rising.
--	---

Remarks:	<ol style="list-style-type: none"> 1. Ground water strike in trial pit at 0.85m bgl, rising to 0.49m bgl after 60 mins. 2. No water added to test pit as water level was rising. 3. Water level monitored using tape measure for 60mins (measured in m bgl). 4. Soakaway Test terminated due to rising ground water. 5. Trial Pit backfilled with arisings upon completion.
-----------------	--

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

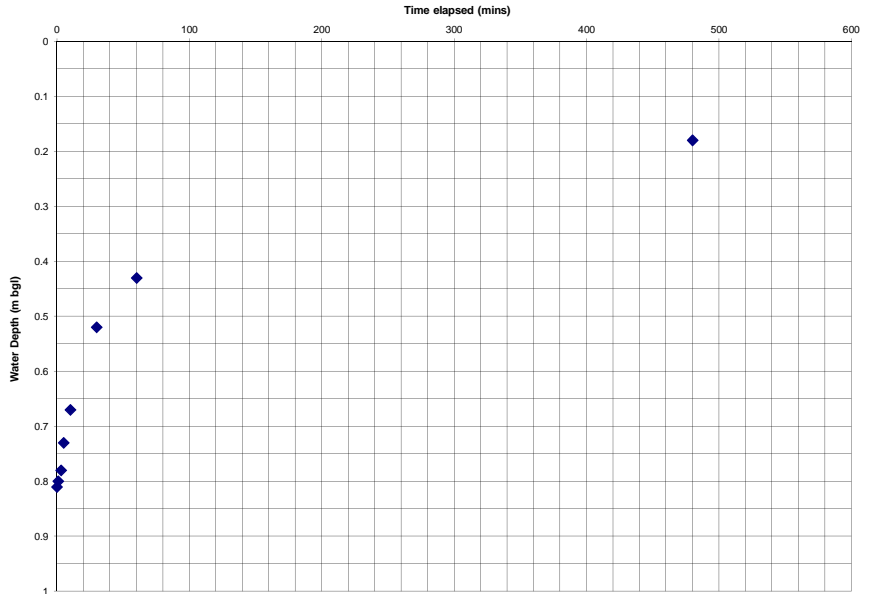
Test Location ID:	SK508	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	23-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.80	Length (m):	1.60
Depth (m bgl):	0.95	Start level (m bgl):	0.81

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.810	100.00%	0
0.800	107.14%	1
0.780	121.43%	3
0.730	157.14%	5
0.670	200.00%	10
0.520	307.14%	30
0.430	371.43%	60
0.180	550.00%	480



Test drainage time (mins): 480

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	N/A	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	N/A	m ²		
Tp75-25	=	N/A	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s)
0.810 to 0.180	N/A

* Trial Pit stable - granular fill not required
 ** Water level rising - no infiltration

Departures from BRE365 test method:	No infiltration test undertaken due to ground water level rising.
--	---

Remarks:	<ol style="list-style-type: none"> 1. Ground water strike in trial pit at 0.95m bgl, rising to 0.18m bgl after 480 mins. 2. No water added to test pit as water level was naturally rising steadily. 3. Water level monitored using tape measure for 60mins (measured in m bgl). 4. Soakaway Test terminated due to rising ground water. 5. Trial Pit backfilled with arisings upon completion.
-----------------	--

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

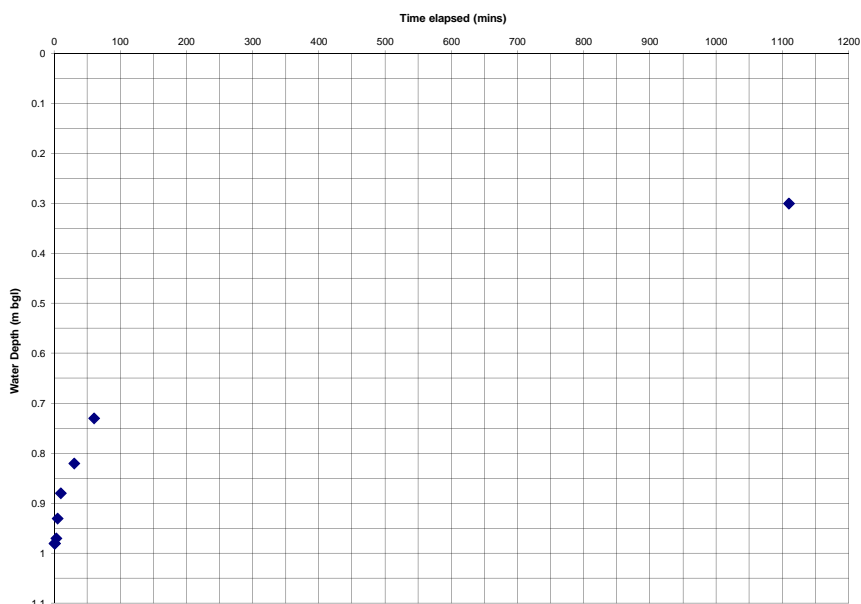
Test Location ID:	SK509	Test No:	1 of 1
Weather Conditions:	Dry	Test Date:	23-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.80	Length (m):	2.00
Depth (m bgl):	1.32	Start level (m bgl):	0.98

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
0.980	100.00%	0
0.980	100.00%	1
0.970	102.94%	3
0.930	114.71%	5
0.880	129.41%	10
0.820	147.06%	30
0.730	173.53%	60
0.300	300.00%	1110



Test duration (mins): 1110

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	N/A	m^3		Soil Infiltration Rate, f =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	N/A	m^2			
Tp75-25	=	N/A	mins			

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s)
0.980 to 0.300	N/A**

* Trial Pit stable - granular fill not required
 ** Ground water level rising - no infiltration

Departures from BRE365 test method:	No infiltration test undertaken due to ground water level rising.
--	---

Remarks:	1. Ground water strike in trial pit at 1.20m bgl, rising to 1.10m bgl after 20 mins, and continuing to rise after 1110 mins. 2. No water added to test pit as water level was naturally rising steadily. 3. Water level monitored using tape measure for 60mins and after 1110 mins (measured in m bgl). 4. Soakaway Test terminated due to rising ground water. 5. Trial Pit backfilled with arisings upon completion.
-----------------	---

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

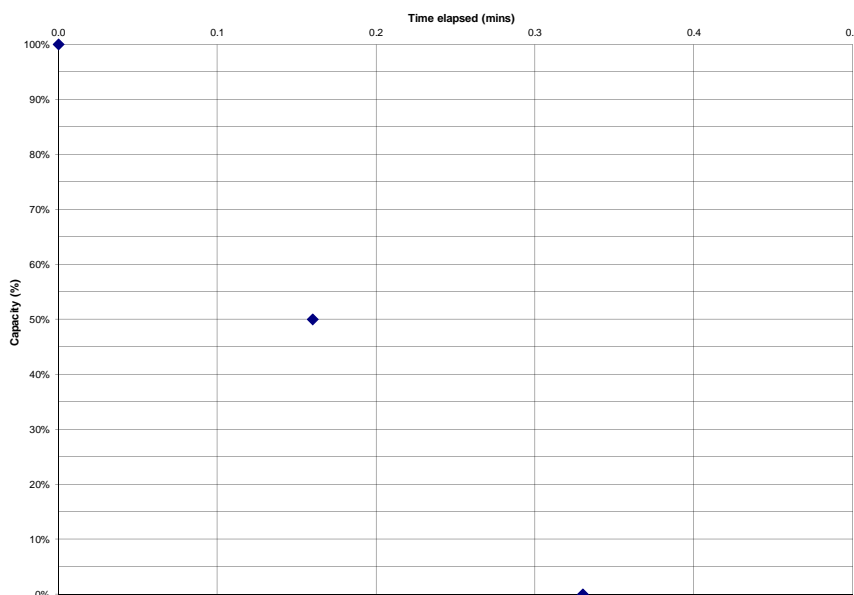
Test Location ID:	SK510	Test No:	1 of 3
Weather Conditions:	Dry	Test Date:	22-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.80	Length (m):	1.60
Depth (m bgl):	1.40	Water level (m bgl):	1.30

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
1.300	100.00%	0
1.350	50.00%	0.16
1.400	0.00%	0.33



Test drainage time (mins): 0.33

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.064000	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	1.5200	m ²		
Tp75-25	=	0.10	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s) **
1.300 to 1.400	7.02E-03

* Trial Pit stable - granular fill not required

Departures from BRE365 test method:	None
-------------------------------------	------

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit dry during excavation and preparation of the Soakaway Test. 2. Water level in trial pit raised rapidly to 1.30m bgl using water from towed bowser. 3. Water level recorded using tape measure (measured in m bgl). 4. Soakaway Test complete after 20 seconds - rapid infiltration rate observed. 5. Trial Pit backfilled with arisings upon completion.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

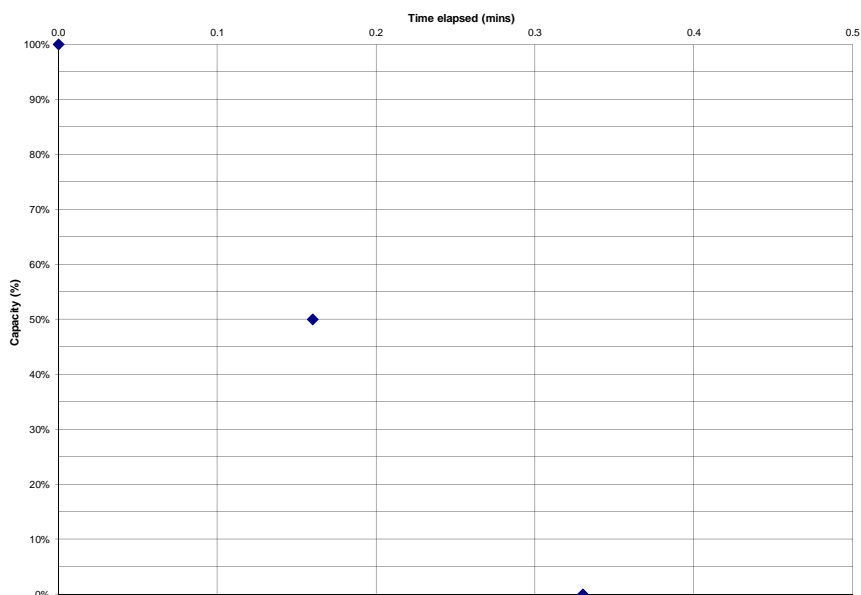
Test Location ID:	SK510	Test No:	2 of 3
Weather Conditions:	Dry	Test Date:	22-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.80	Length (m):	1.60
Depth (m bgl):	1.40	Water level (m bgl):	1.30

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
1.300	100.00%	0
1.350	50.00%	0.16
1.400	0.00%	0.33



Test drainage time (mins): 0.33

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.064000	m ³ *	Soil Infiltration Rate, <i>f</i> =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	1.5200	m ²		
Tp75-25	=	0.10	mins		

Test depth range (m bgl)	Soil Infiltration Rate, <i>f</i> (m/s) **
1.300 to 1.400	7.02E-03

* Trial Pit stable - granular fill not required

Departures from BRE365 test method:	None
-------------------------------------	------

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit dry during excavation and preparation of the Soakaway Test. 2. Water level in trial pit raised rapidly to 1.30m bgl using water from towed bowser. 3. Water level recorded using tape measure (measured in m bgl). 4. Soakaway Test complete after 20 seconds - rapid infiltration rate observed. 5. Trial Pit backfilled with arisings upon completion.
----------	---

Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

INFILTRATION TEST RESULTS

Project Name:	St. Athan Northern Access Road		
Site Location:	St. Athan		
Client:	Welsh Government		

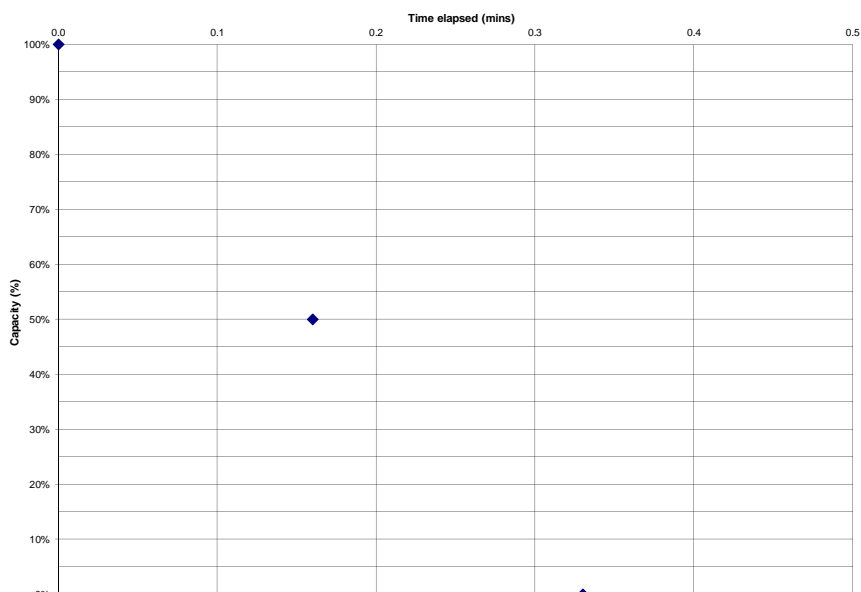
Test Location ID:	SK510	Test No:	3 of 3
Weather Conditions:	Dry	Test Date:	22-Nov-16

TRIAL PIT DIMENSIONS:

Width (m):	0.80	Length (m):	1.60
Depth (m bgl):	1.40	Water level (m bgl):	1.30

SOAKAGE RESULTS:

Depth to Water (m bgl)	Capacity (%)	Time elapsed (min)
1.300	100.00%	0
1.350	50.00%	0.16
1.400	0.00%	0.33



Test drainage time (mins): 0.33

INFILTRATION RATE CALCULATIONS:

Vp75-25	=	0.064000	m ³ *	Soil Infiltration Rate, f =	$\frac{Vp75-25}{aP50 \times Tp75-25}$
aP50	=	1.5200	m ²		
Tp75-25	=	0.10	mins		

Test depth range (m bgl)	Soil Infiltration Rate, f (m/s) **
1.300 to 1.400	7.02E-03

* Trial Pit stable - granular fill not required

Departures from BRE365 test method:	None
-------------------------------------	------

Remarks:	<ol style="list-style-type: none"> 1. Trial Pit dry during excavation and preparation of the Soakaway Test. 2. Water level in trial pit raised rapidly to 1.30m bgl using water from towed bowser. 3. Water level recorded using tape measure (measured in m bgl). 4. Soakaway Test complete after 20 seconds - rapid infiltration rate observed. 5. Trial Pit backfilled with arisings upon completion.
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Prepared	MC	INFILTRATION TEST RESULTS St. Athan Northern Access Road Welsh Government	
Checked	AEL		
Job No.	60509148		
Date	Jan-17		

Appendix D Borehole Logs

KEY TO BOREHOLE, TRIAL PIT AND WINDOW SAMPLE LOGS

SOIL STRATA

SAMPLES

U100	Open Drive Tube Sample (100mm nominal diameter) - UNR denotes 'no recovery'.
UT100	Open Drive Thin Wall Tube Sample (100mm nominal diameter) - UNR denotes 'no recovery'.
U38	Open Drive Tube Sample (38mm nominal diameter)
P	Piston Sample (100mm nominal diameter unless noted otherwise) - PNR denotes 'no recovery'.
D	Small Disturbed Sample
B	Bulk Disturbed Sample
BLK	Block Sample
C	Rotary Core Sample (taken for laboratory testing)
G	Gas Sample
J	Jar Sample
TUB	Tub Sample
ES	Environmental Sample
W	Water Sample
SS	Split Spoon Sample
CSS	Cutting Shoe Sample
L	Liner Sample

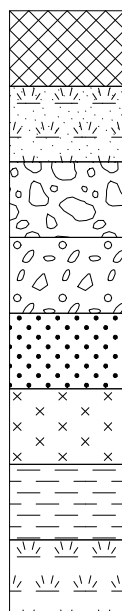
IN SITU TESTING

S	Standard Penetration Test using the Split Spoon Sampler.
C	Standard Penetration Test using a solid cone.

Where a test has been completed the type of test and the N-value will be reported. Where the full 300mm penetration of the main drive has not been completed, the number of blows (not an N-value) will be reported. The Field Records column on the log will show each set of blow counts per 75mm of penetration including seating blows and will also indicate the partial penetration achieved (mm) for incomplete tests.

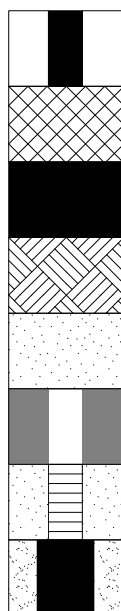
V	Field vane test, vane shear strength quoted for peak (P) and remoulded (R) tests in kPa.
PP	Pocket Penetrometer measurements (kN/m ²).
k	Field Permeability Test, R denotes Rising Head, F denotes Falling Head, C Constant Head.
So	Field Soakage Test in a borehole.
PID	Photo Ionisation Detector (PID) readings for volatile hydrocarbon screening (ppm).
cu	Undrained shear strength triaxial test result (kN/m ²)

STRATA



Made Ground / Fill
Topsoil
Cobbles and Boulders
Gravel
Sand
Silt
Clay
Peat

BACKFILL / INSTALLATIONS



Top Cap
Backfill With Arisings
Bentonite Seal
Cement
Filter
Grout
Slotted Pipe
Piezo Tip

WATER

Initial Level of Water Strike
 Level of Water Strike Rise After 20 Mins

Composite soil types shown by combined symbols
(primary + secondary constituents)



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Borehole No. BH501

Sheet: 1 of 2

Equipment & Methods: 0.00 - 8.50 Hand Tools - Comacchio 205	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
Co-ordinates: E: 298644.305 N: 169054.476		Ground Level (m): 43.01 AOD	Date Started: 30/11/2016 Date Completed: 30/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
0.00-0.35	B					TOPSOIL: Grass Over: Soft slightly reddish brown slightly gravelly sandy CLAY with abundant roots. Gravel is subangular to rounded fine of limestone and rare brick. Sand is fine to medium (TOPSOIL)	42.66		(0.35)	
0.30	ES								0.35	
0.50	ES					Soft locally firm slightly reddish brown silty CLAY with occasional roots and low cobble content. Cobbles are subangular of limestone (PROBABLE ALLUVIUM)	42.31		(0.35)	
0.35-0.70	B									
0.70	SPT (C)	N>50 8,17 for 40mm/35,15 for 40mm				Strong grey partially weathered medium bedded LIMESTONE with occasional shell fragments and two sets of irregular fractures infilled with firm clay. First set: Subhorizontal, closely spaced, planar rough, open infilled with firm greenish yellowish brown silty clay. Second set: Subvertical (~50°), closely spaced, planar rough, tight with orange surface staining (PARTIALLY WEATHERED PORTHERRY MEMBER)				
					1.00					
1.00-2.50	C		93 57 57	6		At 2.00m bgl: Soft orangish brown clay fracture infill (~6cm thick) present.				
					2.50	At 2.50m bgl: Soft orangish brown clay fracture infill (~4cm thick) present. At 2.60m bgl: Assumed clay fracture infill washed out (~10cm thick). At 3.00m bgl: Assumed clay fracture infill washed out (~10cm thick).				
2.50-4.00	C		86 65 65	7		At 4.00m bgl: Infill of soft to firm greenish greyish brown clay (~10cm thick) present. From 4.00m bgl: Subvertical (~80°) calcite veins present (~2mm thin).				
					4.00					
4.00-5.50	C		100 93 86	5					(7.80)	

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
1.30	Standing	300	0.70	30-11-2016	14:30	8.50	1.00	1.30	1. Borehole located in third party field north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.70m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.70m - 8.50m bgl. 4. Borehole completed to 8.50m bgl. 5. Topography: Gently sloping. 6. Standing water encountered at 1.30m bgl. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 4.00m bgl and backfilled with bentonite from 4.00m to 8.50m bgl upon completion, as instructed by the engineer.
		140	1.00	01-12-2016	15:30	8.50		1.37	

Report ID: STANDARD COREHOLE LOG - SWINDON | Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ | Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB | Date: 10 January 2017



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Borehole No. BH501

Sheet: 2 of 2

Equipment & Methods: 0.00 - 8.50 Hand Tools - Comacchio 205	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
Co-ordinates: E: 298644.305 N: 169054.476		Ground Level (m): 43.01 AOD	Date Started: 30/11/2016 Date Completed: 30/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
5.50-7.00	C		100 93 87	5	5.50					
7.00-8.50	C		87 87 76	6	7.00					
8.50	SPT (C)	N>50 25 for 25mm/50 for 5mm				At 8.10m bgl: Assumed clay fracture infill washed out. At 8.30m bgl: Assumed clay fracture infill washed out.	34.51		8.50	
End of Borehole 8.50 m (Thickness of basal layer not proven)										

Water Strikes		Hole Diameter		Progress				Remarks			
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)			
		120	8.50	30-11-2016	14:30	8.50	1.00	1.30	1. Borehole located in third party field north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.70m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.70m - 8.50m bgl. 4. Borehole completed to 8.50m bgl. 5. Topography: Gently sloping. 6. Standing water encountered at 1.30m bgl. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 4.00m bgl and backfilled with bentonite from 4.00m to 8.50m bgl upon completion, as instructed by the engineer.		
				01-12-2016	15:30	8.50		1.37			

Report ID: STANDARD COREHOLE LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017



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Borehole No. BH502

Sheet: 1 of 2

Equipment & Methods: 0.00 - 8.00 Hand Tools - Comacchio205		Project Name: St. Athan Northern Access Road			Job No: 60509148	
		Project Location: St. Athan				
		Client: Welsh Government				
		Co-ordinates: E: 299568.328 N: 169207.301		Ground Level (m): 41.89 AOD		Date Started: 23/11/2016
						Date Completed: 01/12/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
0.30	ES					TOPSOIL: Grass Over: Soft to firm dark brown slightly gravelly CLAY with frequent roots. Gravel is subangular medium of limestone (TOPSOIL)	41.69		(0.20) 0.20	
0.50	ES					Firm brown slightly gravelly sandy CLAY. Gravel is angular to rounded fine to medium of limestone. Sand is fine to medium (PROBABLE ALLUVIUM)	41.29		(0.40) 0.60	
0.75 0.60-0.95	ES B					Firm light grey mottled yellowish orange silty CLAY (PROBABLE ALLUVIUM)				
0.95-1.20	D					At 1.00m bgl: Becomes stiff.				
1.20	SPT (C)	N=10 2,2/ 2,3,2,3							(1.80)	
1.40-2.00	D					From 1.50m bgl: Becomes very stiff.				
2.00-2.40	D									
2.40	SPT (C)	N>50 16,9/50 for 35mm			2.50	Strong dark grey medium bedded shelly LIMESTONE with calcite veins and subvertical (~45°) closely spaced, planar rough, partly open with orange surface stained fractures. Interbedded with hard very dark grey CLAY with shell fragments and Gryphaea fossil (~30mm) (PORTHERRY MEMBER)	39.49		2.40	
2.50-4.00	C		100 56 56	6						
				8						
4.00-5.50	C		87 50 44	6	4.00	From 4.00m to 4.20m bgl: Clay washed out (core loss).				
						From 4.65m to 4.77m bgl: Fractured zone present. Recovered as angular medium to coarse gravel.				

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
0.70	Falling to 1.20m bgl after 20 mins	300 140	0.95 2.50	23-11-2016 01-12-2016	16:00 16:00	0.95 8.00	2.50	0.70	1. Borehole located in third party field north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.95m bgl on natural rock. 3. Borehole advanced by dynamic sampling: 0.95m-2.40m bgl; Rotary Coring with water recirculation: 2.40m-8.00m bgl. 4. Borehole completed at 8.00m bgl. 5. Topography: Level ground. 6. Groundwater encountered at 0.70m bgl falling to 1.20m bgl after 20mins. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 2.30m bgl and backfilled with bentonite from 2.30m to 8.00m bgl upon completion, as instructed by the engineer.

Report ID: STANDARD COREHOLE LOG - SWINDON | Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ | Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB | Date: 10 January 2017



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Borehole No. BH502

Sheet: 2 of 2

Equipment & Methods: 0.00 - 8.00 Hand Tools - Comacchio205		Project Name: St. Athan Northern Access Road		Job No: 60509148	
		Project Location: St. Athan			
		Client: Welsh Government			
		Co-ordinates: E: 299568.328 N: 169207.301		Ground Level (m): 41.89 AOD	
				Date Started: 23/11/2016 Date Completed: 01/12/2016	

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
5.50-7.00	C		100 100 100	2	5.50	From 5.50m bgl: Becomes thickly bedded interbedded with extremely weak black thinly laminated mudstone.	33.89		(5.60)	
7.00-8.00	C		100 73 56	3	7.00					
8.00	SPT (C)	N>50 25 for 25mm/50 for 5mm				End of Borehole 8.00 m (Thickness of basal layer not proven)				

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
		120	8.00	23-11-2016	16:00	0.95			1. Borehole located in third party field north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.95m bgl on natural rock. 3. Borehole advanced by dynamic sampling: 0.95m-2.40m bgl; Rotary Coring with water recirculation: 2.40m-8.00m bgl. 4. Borehole completed at 8.00m bgl. 5. Topography: Level ground. 6. Groundwater encountered at 0.70m bgl falling to 1.20m bgl after 20mins. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 2.30m bgl and backfilled with bentonite from 2.30m to 8.00m bgl upon completion, as instructed by the engineer.
				01-12-2016	16:00	8.00	2.50	0.70	

Report ID: STANDARD COREHOLE LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017



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Borehole No. BH503

Sheet: 1 of 2

Equipment & Methods: 0.00 - 0.80 Hand Tools	Project Name: St. Athan Northern Access Road	Job No: 60509148
	Project Location: St. Athan	
	Client: Welsh Government	
Co-ordinates: E: 299985.073 N: 169259.091	Ground Level (m): 41.83 AOD	Date Started: 21/11/2016 Date Completed: 29/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
0.00-0.35	D					TOPSOIL: Grass Over: Soft to firm dark brown slightly gravelly CLAY with frequent roots. Gravel is subangular medium of limestone (TOPSOIL)	41.48		(0.35)	
0.30	ES								0.35	
0.50	ES									
0.35-0.80	D					Soft becoming firm light yellowish brown slightly gravelly CLAY. Gravel is subangular fine of limestone (PROBABLE ALLUVIUM)			(0.45)	
0.80	SPT (C)	N>50 25 for 40mm/50 for 10mm								
0.80-1.00	D				1.00	Medium strong locally weak light grey weathered medium bedded LIMESTONE with occasional calcite-replaced shell fragments, calcite veins and two fracture sets. First fracture set: Subvertical (~45°), closely spaced, planar rough, open with orange surface straining. Second fracture set: Horizontal, closely to very closely spaced, planar rough, open with firm dark greenish brown clay infill (PARTIALLY WEATHERED PORTHKERRY MEMBER)	41.03		0.80	
1.00-2.50	C		91 59 49	11		At 1.20m bgl: Layer of weathered stiff dark greenish brown clay (~10cm thick) present. From 1.45m to 1.65m bgl: Layer of weathered stiff dark greenish brown clay present.				
2.50-4.00	C		87 79 67	6		From 2.96m to 3.04m bgl: Layer of weathered stiff dark greenish brown clay present.				
4.00-5.50	C		100 90 77	6					(7.70)	

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
1.20	Standing	300	0.80	21-11-2016	13:00	0.80			1. Borehole located in the St. Athan Ministry of Defence (MoD) base north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.80m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.80m - 8.50m bgl. 4. Borehole completed at 8.50m bgl. 5. Topography: Level ground. 6. Standing water encountered at 1.20m bgl. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 3.80m and backfilled with bentonite from 3.80m to 8.50m bgl upon completion, as instructed by the engineer.
		140	1.00	29-11-2016	16:00	8.50	1.00	1.20	
				30-11-2016	14:45	8.50		1.35	

Report ID: STANDARD COREHOLE LOG - SWINDON | Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ | Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB | Date: 10 January 2017



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Borehole No. BH503

Sheet: 2 of 2

Equipment & Methods: 0.00 - 0.80 Hand Tools	Project Name: St. Athan Northern Access Road	Job No: 60509148
	Project Location: St. Athan	
	Client: Welsh Government	
Co-ordinates: E: 299985.073 N: 169259.091	Ground Level (m): 41.83 AOD	Date Started: 21/11/2016 Date Completed: 29/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
5.50-7.00	C		100 82 65	6	5.50	At 5.10m bgl: Layer of weathered stiff dark greenish brown clay (~5cm thick) present. At 5.45m bgl: Layer of very stiff dark grey clay (~10cm thick) present.				
7.00-8.50	C		100 95 95	4	7.00					
8.50	SPT (C)	N>50 25 for 25mm/50 for 15mm				End of Borehole 8.50 m (Thickness of basal layer not proven)	33.33		8.50	

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
		120	8.50	21-11-2016	13:00	0.80			1. Borehole located in the St. Athan Ministry of Defence (MoD) base north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.80m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.80m - 8.50m bgl. 4. Borehole completed at 8.50m bgl. 5. Topography: Level ground. 6. Standing water encountered at 1.20m bgl. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 3.80m and backfilled with bentonite from 3.80m to 8.50m bgl upon completion, as instructed by the engineer.
				29-11-2016	16:00	8.50	1.00	1.20	
				30-11-2016	14:45	8.50		1.35	

Report ID: STANDARD COREHOLE LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017



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Borehole No. BH504

Sheet: 1 of 2

Equipment & Methods: 0.00 - 8.30 Hand Tools - Comacchio 205	Project Name: St. Athan Northern Access Road Project Location: St. Athan Client: Welsh Government	Job No: 60509148
Co-ordinates: E: 300052.146 N: 169282.685	Ground Level (m): 41.91 AOD	Date Started: 21/11/2016 Date Completed: 28/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
0.00-0.45 0.30	D ES					TOPSOIL: Grass Over: Soft to firm dark brown slightly gravelly CLAY with frequent roots. Gravel is subangular medium of limestone (TOPSOIL)	41.46		(0.45)	
0.45-0.80	D ES					Soft becoming firm orangish brown slightly gravelly CLAY. Gravel is subangular fine of limestone (PROBABLE ALLUVIUM)	41.11		(0.35)	
1.00-2.50	C		100 73 49	15 0	1.00	Medium strong to weak grey weathered thinly to thickly laminated LIMESTONE with orangish brown staining and closely spaced, planar rough, open with orange surface stained fractures (DISTINCTLY WEATHERED PORTHKERRY MEMBER)			(1.70)	
2.50-4.00	C		100 84 62	86	2.50	Strong locally medium strong grey partially weathered LIMESTONE with occasional shell fragments and two fracture sets. First fracture set: subhorizontal, closely spaced, planar rough, open with orange surface staining. Second fracture set: subvertical (~85°), undulating rough, tight with orange surface staining (PARTIALLY WEATHERED PORTHKERRY MEMBER)	39.41		2.50	
4.00-5.30	C		100 55 51	10	4.00	From 4.00m bgl: Becomes dark grey less weathered with very low persistent calcite veins and subvertical fractures become very close, rough stepped, partly open with pyrite and calcite mineralisation.				

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
0.80	Falling to 1.35m bgl after 20 mins	300 140	0.80 1.00	21-11-2016 28-11-2016 29-11-2016	15:00 16:00 15:30	0.80 8.30 8.30	1.00	1.30 1.47	1. Borehole located in the St. Athan Ministry of Defence (MoD) base north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.80m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.80m-8.30m bgl. 4. Borehole completed at 8.30m bgl. 5. Topography: Level ground. 6. Surface water at location. Groundwater encountered at 0.80m bgl falling to 1.35m bgl after 20 mins. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 8.30m bgl upon completion as instructed by the engineer.



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Borehole No. BH504

Sheet: 2 of 2

Equipment & Methods: 0.00 - 8.30 Hand Tools - Comacchio 205	Project Name: St. Athan Northern Access Road		Job No: 60509148
	Project Location: St. Athan		
	Client: Welsh Government		
Co-ordinates: E: 300052.146 N: 169282.685		Ground Level (m): 41.91 AOD	Date Started: 21/11/2016 Date Completed: 28/11/2016

In Situ Testing			Coring Information			DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)	Backfill/ Instrument
Depth (m)	Type	Result	TCR SCR RQD	FI	Core Run					
5.30-6.80	C		90 72 68	7	5.30	From 6.00m bgl: Fractures (~70°) are very closely and planar smooth with orange surface staining.			(5.80)	
6.80-8.30	C		100 100 91	6	6.80	From 6.80m to 6.87m bgl: Very weak thinly laminated black weathered orange mudstone present. At 7.45m to 7.52m bgl: Very weak thinly laminated black weathered orange mudstone present.				
						End of Borehole 8.30 m (Thickness of basal layer not proven)	33.61		8.30	

Water Strikes		Hole Diameter		Progress				Remarks	
Strike Depth	Flow Remarks	Hole Dia (mm)	Depth of Hole (m)	Date	Time	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	
		120	8.30	21-11-2016	15:00	0.80			1. Borehole located in the St. Athan Ministry of Defence (MoD) base north of the Eglwys Brewis Road. 2. Buried services inspection pit excavated by hand refused at 0.80m bgl on natural rock. 3. Borehole advanced by Rotary Coring with water recirculation: 0.80m-8.30m bgl. 4. Borehole completed at 8.30m bgl. 5. Topography: Level ground. 6. Surface water at location. Groundwater encountered at 0.80m bgl falling to 1.35m bgl after 20 mins. 7. No visual or olfactory evidence of contamination. 8. 50mm standpipe installed to 8.30m bgl upon completion as instructed by the engineer.
				28-11-2016	16:00	8.30	1.00	1.30	
				29-11-2016	15:30	8.30		1.47	

Report ID: STANDARD COREHOLE LOG - SWINDON || Project: ST. ATHAN ACCESS ROAD 10.01.2017 MC.GPJ || Library: AECOM AGS 4.0 LIBRARY V6_25102016.GLB || Date: 10 January 2017

Appendix E Geotechnical Laboratory Results



2788

Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 33562

Client's Reference: **60509148**

Report Date: **24-01-2017**

Client **AECOM**
12 Regan Way
Chetwynd Business Park
NG9 6RZ

Contract Title: **St Athan Northern Access Road GI**
For the attention of: **Michael Corlett**

Date Received: **19-12-2016**
Date Commenced: **19-12-2016**
Date Completed: **12-01-2017**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	7
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	7
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	5
BRE Suite D Ph Total Sulphate, Aqueous Sulphate, Total Sulphur, Aqueous Nitrate, Aqueous Mag, Chloride, - @ Non Accredited Test	4
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	2
CBR Remoulded BS1377 Part 4 - * UKAS	5
Natural Shear Strength by Hand Vane (3 measurements) - @ Non Accredited Test	3

Notes: Observations and Interpretations are outside the UKAS Accreditation
* - denotes test included in laboratory scope of accreditation
- denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Paul Evans (Quality/Technical Manager) - Vaughan Edwards (Managing Director)



2788

Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 33562

Test Description	Qty
Point load strength index test 10 Determinations. ISRM / BS 1377/2/3.3 Brock & Franklin 1972. - * UKAS	4
Part 1 - SM for Determination of the Uniaxial Compressive Strength of Rock Materials - @ Non Accredited Test	2
Determination of the slake durability index, two cycles. ISRM / BS 1377/2/3.3 2/2 - @ Non Accredited Test	4
Extra Over Items - Specimen Preparation. - @ Non Accredited Test	2
Disposal of Samples on Project	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

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- denotes test carried out by approved contractor

@ - denotes non accredited tests

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Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - Emma Sharp (Office Manager)

Paul Evans (Quality/Technical Manager) - Vaughan Edwards (Managing Director)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

Client ref: 60509148 - M001.002.003
Location: St Athan Northern Access Road GI
Contract Number: 33562-

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
SK503		B	0.30 - 0.70	Brown fine to coarse gravelly silty CLAY.
SK504		B	0.50 - 0.75	Brown fine to coarse gravelly clayey SILT.
SK507		B	0.30 - 0.55	Brown fine to coarse gravelly silty CLAY.
SK508		B	0.50 - 0.95	Brown fine to coarse gravelly clayey SILT.
BH501		B	0.35 - 0.70	Brown fine to coarse gravelly clayey SILT.
BH502		D	2.00 - 2.40	Brown fine to coarse gravelly silty CLAY.
BH503		D	0.35 - 0.80	Brown fine to coarse gravelly silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
 Date: 11.1.17



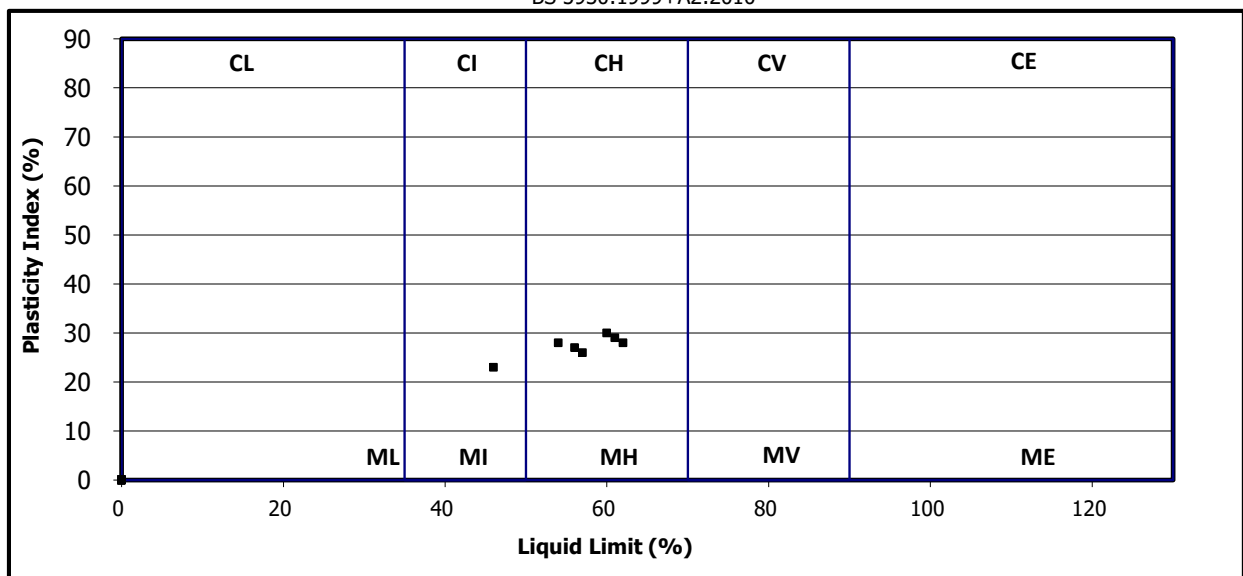
**Test Report: Method of the Determination of the plastic limit and plasticity index
BS 1377 : Part 2 : 1990 Method 5**

Client ref: 60509148 - M001.002.003
Location: St Athan Northern Access Road GI
Contract Number: 33562-

Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
SK503	B	0.30 - 0.70	31	56	29	27	80	CH High Plasticity
SK504	B	0.50 - 0.75	33	61	32	29	70	MH High Plasticity
SK507	B	0.30 - 0.55	30	54	26	28	78	CH High Plasticity
SK508	B	0.50 - 0.95	39	62	34	28	70	MH High Plasticity
BH501	B	0.35 - 0.70	33	57	31	26	75	MH High Plasticity
BH502	D	2.00 - 2.40	19	46	23	23	100	CI Intermediate Plasticity
BH503	D	0.35 - 0.80	36	60	30	30	100	CH High Plasticity

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
 Date: 11.1.17



Test Report:

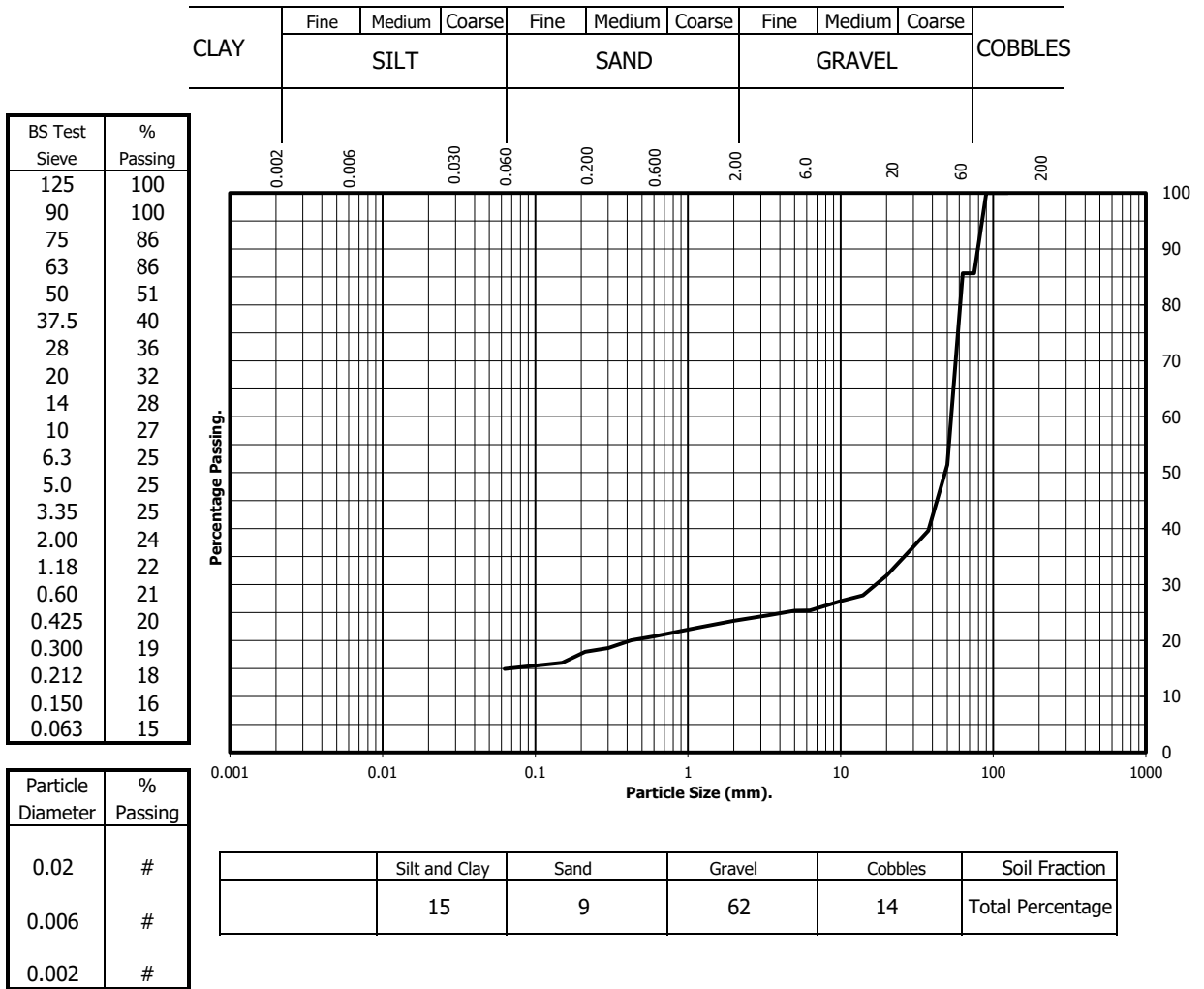
**Particle Size Distribution Test
BS 1377 Part 2:1990.**

Wet Sieve, Clause 9.2

Client ref: 60509418
Contract Number: 33562-
Hole Number: SK501

Sample Number: N/A
Depth from (m): 0.65
Depth to (m): 1.40
Sample Type: B

Location: St Athan Northern Access Road GI
Description: Brown fine to coarse sandy silty clayey GRAVEL with many cobbles.



Remarks:

- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 12.1.17



Test Report:

**Particle Size Distribution Test
BS 1377 Part 2:1990.**

Wet Sieve, Clause 9.2

Client ref: 60509418
Contract Number: 33562-
Hole Number: SK503

Sample Number: N/A
Depth from (m): 0.30
Depth to (m): 0.70
Sample Type: B

Location: St Athan Northern Access Road GI
Description: Brown fine to medium gravelly sandy silty CLAY.

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	99
6.3	98
5.0	97
3.35	96
2.00	95
1.18	91
0.60	81
0.425	75
0.300	66
0.212	60
0.150	53
0.063	49



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	49	46	5	0	Total Percentage

Remarks:

- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 12.1.17



Test Report:

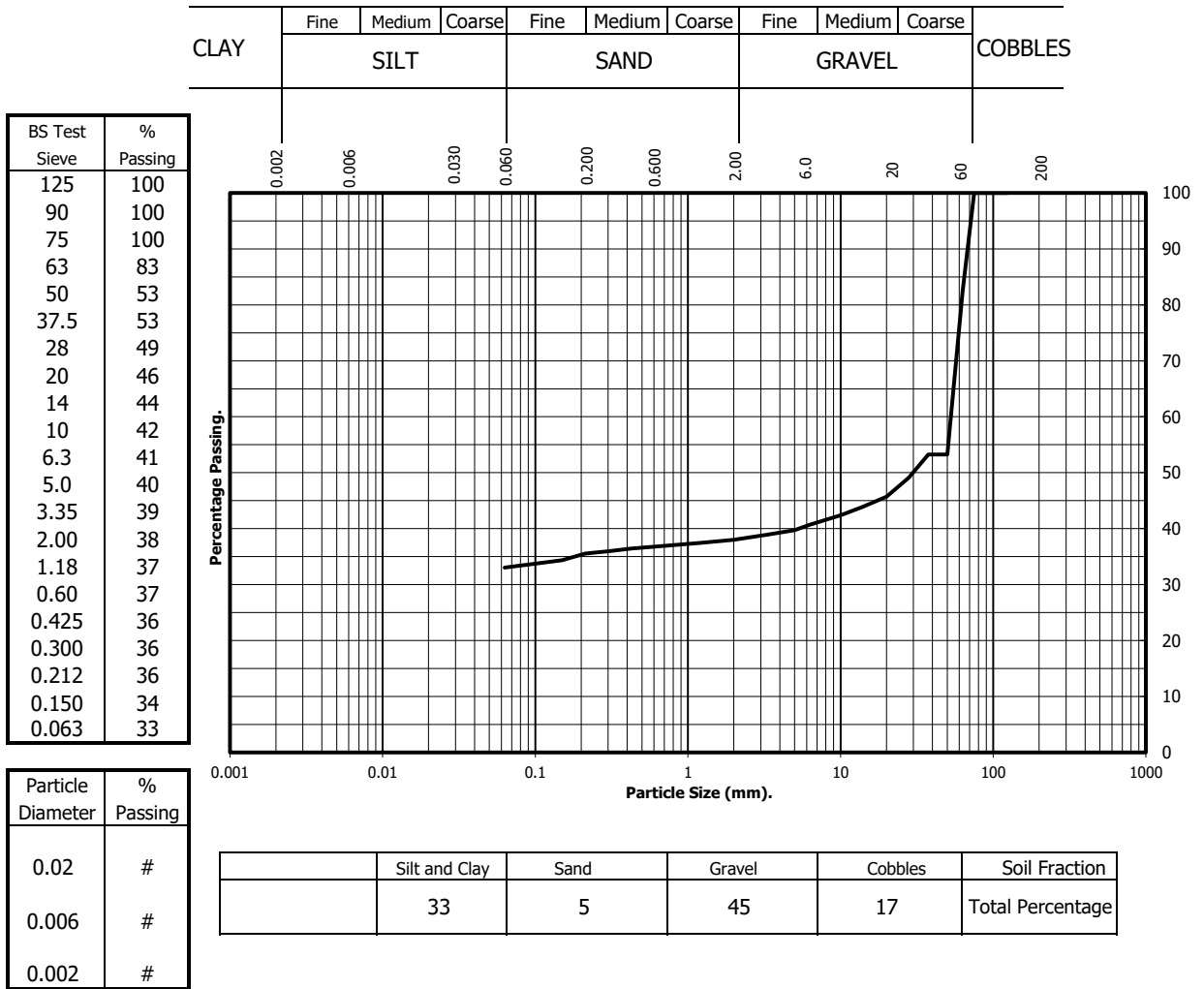
**Particle Size Distribution Test
BS 1377 Part 2:1990.**

Wet Sieve, Clause 9.2

Client ref: 60509418
Contract Number: 33562-
Hole Number: SK504

Sample Number: N/A
Depth from (m): 0.50
Depth to (m): 0.75
Sample Type: B

Location: St Athan Northern Access Road GI
Description: Brown fine to coarse sandy silty clayey GRAVEL with many cobbles.



Remarks:

- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 12.1.17



Test Report:

**Particle Size Distribution Test
BS 1377 Part 2:1990.**

Wet Sieve, Clause 9.2

Client ref: 60509418
Contract Number: 33562-
Hole Number: SK509

Sample Number: N/A
Depth from (m): 0.80
Depth to (m): 1.30
Sample Type: B

Location: St Athan Northern Access Road GI
Description: Brown fine to coarse sandy silty clayey GRAVEL.

CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	95
28	89
20	82
14	76
10	72
6.3	68
5.0	66
3.35	63
2.00	58
1.18	54
0.60	49
0.425	47
0.300	45
0.212	43
0.150	39
0.063	35



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	35	23	42	0	Total Percentage

Remarks:

- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 12.1.17



Test Report:

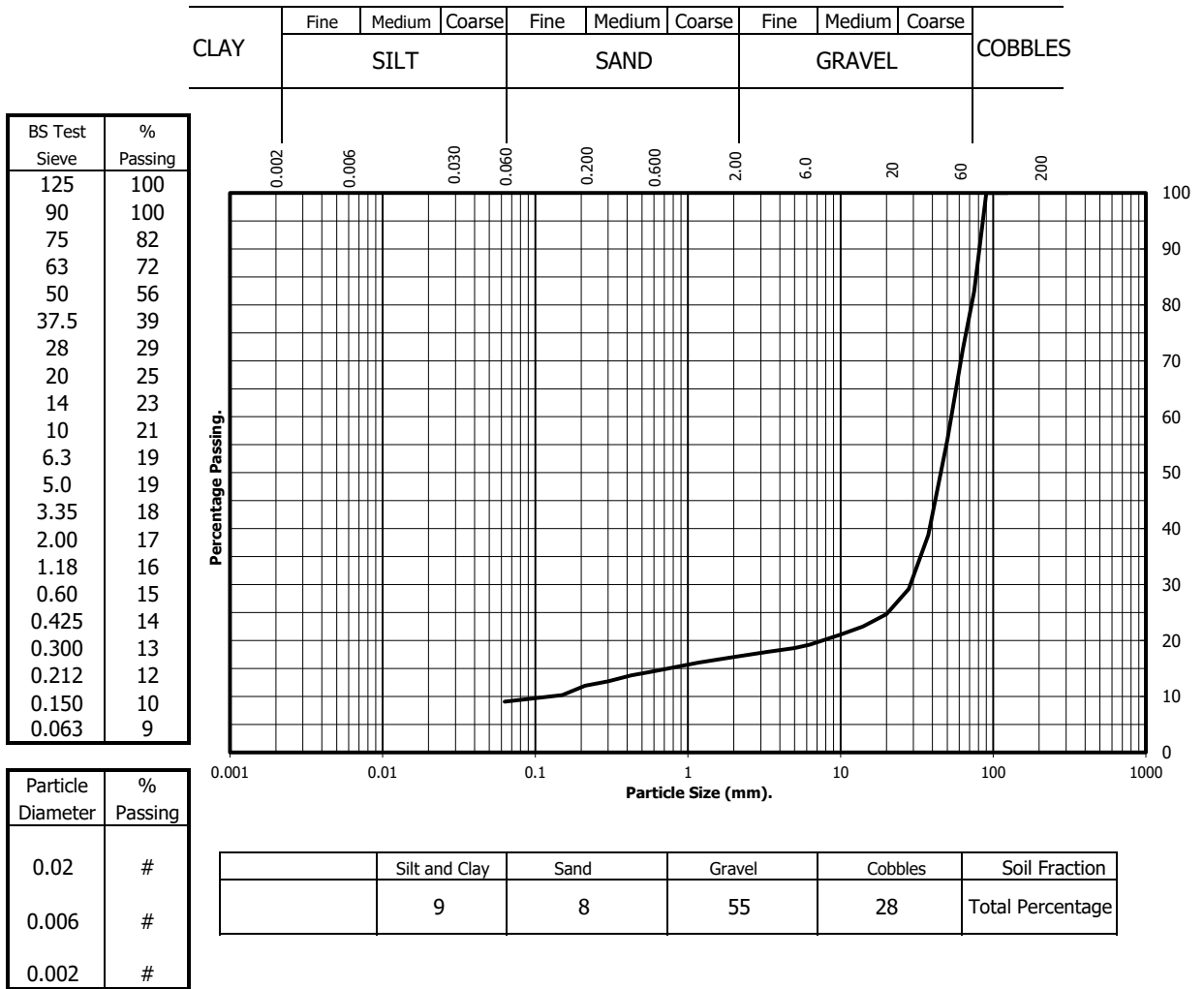
Particle Size Distribution Test BS 1377 Part 2:1990.

Wet Sieve, Clause 9.2

Client ref: **60509418**
Contract Number: **33562-**
Hole Number: **SK510**

Sample Number: **N/A**
Depth from (m): **0.35**
Depth to (m): **0.60**
Sample Type: **B**

Location: **St Athan Northern Access Road GI**
Description: **Brown fine to coarse sandy silty clayey GRAVEL with many cobbles.**



Remarks:

- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: **12.1.17**





Unit 4
Heol Aur
Dafen Ind EstateDafen
Carmarthenshire
SA14 8QN
Tel: 01554 784040
01554 750752
Fax: 01554 770529
01554 784041
Web: www.geo.uk.com

Certificate of Analysis

Date: 06-01-17

Client: Aecom

Our Reference: 33562

Client Reference:

Contract Title: ST.Athan

Description: (Total Samples) 4

Date Received:

Date Started: 04-01-17

Date Completed: 06-01-17

Test Procedures: (BRE BR 279)

Notes:

Solid samples will be disposed 1 month and liquids 2 weeks
after the date of issue of this test certificate

Approved By:

Authorised Signatories:

Emma Sharp
Laboratory Office Manager

Ben Sharp
Contracts Manager


Paul Evans
Quality Manager

Contract No: 33562
Client Ref:
Location: ST.Athan
Date: 06-01-2017

Summary of Chemical Analysis

(BRE BR 279)

Hole Number	Sample Number	Sample Type	Depth m	Sulphate Content as SO ₄			Chloride Content		pH Value @ 25°C	Total Sulphur % S	Magnesium g/l	Nitrate NO ₃ mg/l
				Acid Soluble Sulphate as % SO ₄	Aqueous Extract Sulphate as g/l SO ₄	Ground-water g/l	Semi Quantative Test Strip mg Cl/l	Quantative g/l				
				BR 279	BR 279	BR 279	BR 279	BR 279				
SK507		B	0.3-0.55	0.24	0.04		NCP		7.66	0.08	<1	10
SK508		B	0.50-0.95	0.14	0.03		NCP		7.91	0.06	<1	10-25
BH502		B	1.4-2.0	0.17	0.02		NCP		7.33	0.06	<1	10-25
BH504		D	0.45-0.8	0.14	0.02		NCP		8.05	0.06	<1	10

NCP - No Chloride present

Test Report: Point Load Test

Int. J. Rock Mech. Sci. & Geomech. Abstr. Vol. 22, No. 2, pp. 51 - 60, 1985.

Client: **Aecom**
 Location: **St Athan Northern Access Road GI**
 Client Ref: **60509148**
 Contract Number: **33562**
 Borehole Number: **As stated below**
 Core Box Number: **N/A**
 Depth (m): **As stated below**
 Date Tested: **07-12-16**

Borehole Number	Sample Number	Depth (m)	Type of Test		Width (W) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D _e) (mm)	Point Load (I _p) (MPa)	Size Factor (F)	Point Load Index (I _{p(50)}) (MPa)	Moisture Content (MC) (%)	Description (SC)	Angle between plane of anisotropy & core axis.	Type of anisotropy (Bedding or Cleavage).
			d	I //											
BH501		1.00 - 2.50	i		79.8	76.5	33.29	88	4.28	1.29	5.53				
			i		75.8	48.7	15.02	69	3.20	1.15	3.68				
			i		82.1	65.1	21.68	82	3.19	1.25	3.99				
			i		66.7	46.2	19.23	63	4.90	1.11	5.43				
			i		78.8	44.2	11.85	67	2.67	1.14	3.04				
			d			82.2	30.06		4.45	1.25	5.56				
			i		70.4	63.8	18.32	76	3.20	1.20	3.86				
			i		78.2	68.4	24.02	83	3.53	1.25	4.42				
			i		62.9	47.7	19.57	62	5.12	1.10	5.63				
			i		64.5	58	15.39	69	3.23	1.16	3.74				
		4.00 - 5.50	a		85.7	68.2	30.76	86	4.13	1.28	5.28				
			a		86.4	72.2	28.44	89	3.58	1.30	4.64				
			d			86.7	30.49		4.06	1.28	5.20				
			d			86.7	27.01		3.59	1.28	4.60				
			a		85.5	55.6	18.82	78	3.11	1.22	3.79				
			a		85.6	53.8	23.81	77	4.06	1.21	4.92				
			i		67.6	53.2	24.97	68	5.45	1.15	6.25				
			i		63.4	36.6	20.26	54	6.86	1.04	7.12				
			i		55.8	51.1	20.83	60	5.74	1.09	6.24				
			i		49.9	42.8	21.66	52	7.97	1.02	8.12				

Key : d = diametral; a = axial; b = block; i = irregular lump test; I = perpendicular; // = parallel to planes of weakness.

Remarks:



emma sharp
 Checked By
Emma Sharp
 Office Manager

12-01-17
 Date

Paul Evans
 Approved By
Paul Evans
 Quality/Technical Manager

12-01-17
 Date



Test Report: Point Load Test

Int. J. Rock Mech. Sci. & Geomech. Abstr. Vol. 22, No. 2, pp. 51 - 60, 1985.

Client: **Aecom**
 Location: **St Athan Northern Access Road GI**
 Client Ref: **60509148**
 Contract Number: **33562**
 Borehole Number: **As stated below**
 Core Box Number: **N/A**
 Depth (m): **As stated below**
 Date Tested: **07-12-16**

Borehole Number	Sample Number	Depth (m)	Type of Test		Width (W) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D _e) (mm)	Point Load (L _p) (MPa)	Size Factor (F)	Point Load Index (I _{p(50)}) (MPa)	Moisture Content (MC) (%)	Description (SC)	Angle between plane of anisotropy & core axis.	Type of anisotropy (Bedding or Cleavage).		
			d	I													
BH502		7.00 - 8.00	d	I	86	86	19.56		2.64	1.28	3.38						
			d			86	21.28		2.88	1.28	3.67						
			a			86	75.1	14.15	91	1.72	1.31	2.25					
			d				85.9	12.06		1.63	1.28	2.08					
			a		85.9	53.4	29.89	76	5.12	1.21	6.19						
			a		85.8	56.2	22.74	78	3.70	1.22	4.53						
			a		86	44.5	15.06	70	3.09	1.16	3.59						
			i		71	68.6	13.00	79	2.10	1.23	2.57						
			i		73.6	42.4	16.71	63	4.20	1.11	4.67						
			i		55.7	38.5	13.94	52	5.11	1.02	5.21						

Key : d = diametral; a = axial; b = block; i = irregular lump test; I = perpendicular; // = parallel to planes of weakness.

Remarks:



emma sharp
 Checked By
Emma Sharp
 Office Manager

12-01-17
 Date

DP Evans
 Approved By
Paul Evans
 Quality/Technical Manager

12-01-17
 Date



Test Report: Point Load Test
 Int. J. Rock Mech. Sci. & Geomech. Abstr. Vol. 22, No. 2, pp. 51 - 60, 1985.

Client: **Aecom**
 Location: **St Athan Northern Access Road GI**
 Client Ref: **60509148**
 Contract Number: **33562**
 Borehole Number: **As stated below**
 Core Box Number: **N/A**
 Depth (m): **As stated below**
 Date Tested: **07-12-16**

Borehole Number	Sample Number	Depth (m)	Type of Test		Width (W) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D _e) (mm)	Point Load (I _p) (MPa)	Size Factor (F)	Point Load Index (I _{p(50)}) (MPa)	Moisture Content (MC) (%)	Description (SC)	Angle between plane of anisotropy & core axis.	Type of anisotropy (Bedding or Cleavage).				
			d	I															
BH503		2.40 - 4.00	i	//	69.2	62.3	11.70	74	2.13	1.19	2.54								
					59	33	40.54	50	16.35	1.00	16.32								
					68.8	57.6	8.85	71	1.75	1.17	2.05								
					68.7	30.7	4.04	52	1.50	1.02	1.53								
					d		85.1	19.63		2.71	1.27	3.44							
					d		85.1	16.13		2.23	1.27	2.83							
					a		85	46.2	13.76	71	2.75	1.17	3.22						
					i		83.2	42.7	8.62	67	1.90	1.14	2.18						
					i		82.3	56.6	12.97	77	2.19	1.21	2.66						
					i		74.4	61.8	8.61	77	1.47	1.21	1.78						

Key : d = diametral; a = axial; b = block; i = irregular lump test; I = perpendicular; // = parallel to planes of weakness.

Remarks:



emma sharp
 12-01-17
 Checked By
 Emma Sharp
 Office Manager

DP Evans
 12-01-17
 Approved By
 Paul Evans
 Quality/Technical Manager



Test Report:

**Determination of Unconfined Compressive Strength.
ISRM Suggested Methods Vol 16, No. 2, pp. 135-140 1979..**

Date: 12-Jan-17
Contract Number: 33562-
Client reference: N/A
Location: St Athan Northern Access Road GI
Sample Type: Core
Sample Preparation: Sawing and Grinding
Operator: Jason Dawney

Borehole Number	Depth (m) from	Depth (m) to	Diameter (mm)	Length (mm)	Initial Mass (g)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Moisture Content (%)	Load Failure (kn)	Maximum Compressive Strength (mpa)	Date Tested
BH501	2.50	4.00	86.00	212.50	3286.7	2.66	2.64	0.90	889.2	153.1	11-Jan-17
BH504	6.80	8.30	86.10	212.50	3258.2	2.63	2.61	0.70	446.2	76.6	11-Jan-17

For and behalf of GEO Site & Testing Services Limited



Paul Evans - Technical/Quality Manager
 Emma Sharp - Office Manager
 Ben Sharp - Contracts Manager
 Wayne Honey - Quality/Office Assistant

Date Approved: 12.1.17



**Test Report: Method of the Determination of the Slake Durability index.
ISRM Part 2.2 (Page 104)**

Date: 12-Jan-17
Contract Number: 33562-
Location: St Athan Northern Access Road GI
Client Ref: 60509148
Hole Number: BH501
Sample Number:
Depth from (m): 1.00
Depth to (m): 2.50
Sample Type : B
Nature of slaking Fluid: Water
Temperature (°C): 20
Rock type: Light brown SILTSTONE
Date Tested: 20-10-15
Operator: Wayne Honey

Slake-Durability index (first cycle) % 98.67

Slake-Durability index (second cycle) % 98.11

Appearance of fragments retained in drum:

10 pieces of sub-angular to well-rounded rock core with many pieces with ground corners and edges

Appearance of material passing through the drum:

Sub-angular to well rounded of <2mm fragments to a silty CLAY

If there is any remaining samples it shall be retained for a period of one month from the above date, after which time all samples shall be disposed of.

For and behalf of GEO Site & Testing Ltd

Paul Evans - Quality Manager

DP Evans

Emma Williams - Office Manager

Date Approved: 12.1.17



Test Report: **Method of the Determination of the Slake Durability index.**
ISRM Part 2.2 (Page 104)

Date: 12-Jan-17
Contract Number: 33562-
Location: St Athan Northern Access Road GI
Client Ref: 60509148
Hole Number: BH502
Sample Number:
Depth from (m): 2.50
Depth to (m): 4.00
Sample Type : B
Nature of slaking Fluid: Water
Temperature (°C): 20
Rock type: Light brown SILTSTONE
Date Tested: 20-10-15
Operator: Wayne Honey

Slake-Durability index (first cycle) %	98.93
---	--------------

Slake-Durability index (second cycle) %	98.55
--	--------------

Appearance of fragments retained in drum:

10 pieces of sub-angular to well-rounded rock core with many pieces with ground corners and edges

Appearance of material passing through the drum:

Sub-angular to well rounded of <2mm fragments to a silty CLAY

If there is any remaining samples it shall be retained for a period of one month from the above date, after which time all samples shall be disposed of.

For and behalf of GEO Site & Testing Ltd

Paul Evans - Quality Manager

DP Evans

Emma Williams - Office Manager

Date Approved: 12.1.17



**Test Report: Method of the Determination of the Slake Durability index.
ISRM Part 2.2 (Page 104)**

Date: 12-Jan-17
Contract Number: 33562-
Location: St Athan Northern Access Road GI
Client Ref: 60509148
Hole Number: BH503
Sample Number:
Depth from (m): 0.80
Depth to (m): 1.00
Sample Type : B
Nature of slaking Fluid: Water
Temperature (°C): 20
Rock type: Light brown SILTSTONE
Date Tested: 20-10-15
Operator: Wayne Honey

Slake-Durability index (first cycle) % **98.09**

Slake-Durability index (second cycle) % **97.39**

Appearance of fragments retained in drum:

10 pieces of sub-angular to well-rounded rock core with many pieces with ground corners and edges

Appearance of material passing through the drum:

Sub-angular to well rounded of <2mm fragments to a silty CLAY

If there is any remaining samples it shall be retained for a period of one month from the above date, after which time all samples shall be disposed of.

For and behalf of GEO Site & Testing Ltd

Paul Evans - Quality Manager

Emma Williams - Office Manager

Date Approved: 12.1.17



**Test Report: Method of the Determination of the Slake Durability index.
ISRM Part 2.2 (Page 104)**

Date: 12-Jan-17
Contract Number: 33562-
Location: St Athan Northern Access Road GI
Client Ref: 60509148
Hole Number: BH504
Sample Number:
Depth from (m): 1.00
Depth to (m): 2.50
Sample Type : B
Nature of slaking Fluid: Water
Temperature (°C): 20
Rock type: Light brown SILTSTONE
Date Tested: 20-10-15
Operator: Wayne Honey

Slake-Durability index (first cycle) % 98.28

Slake-Durability index (second cycle) % 97.23

Appearance of fragments retained in drum:

10 pieces of sub-angular to well-rounded rock core with many pieces with ground corners and edges

Appearance of material passing through the drum:

Sub-angular to well rounded of <2mm fragments to a silty CLAY

If there is any remaining samples it shall be retained for a period of one month from the above date, after which time all samples shall be disposed of.

For and behalf of GEO Site & Testing Ltd

Paul Evans - Quality Manager

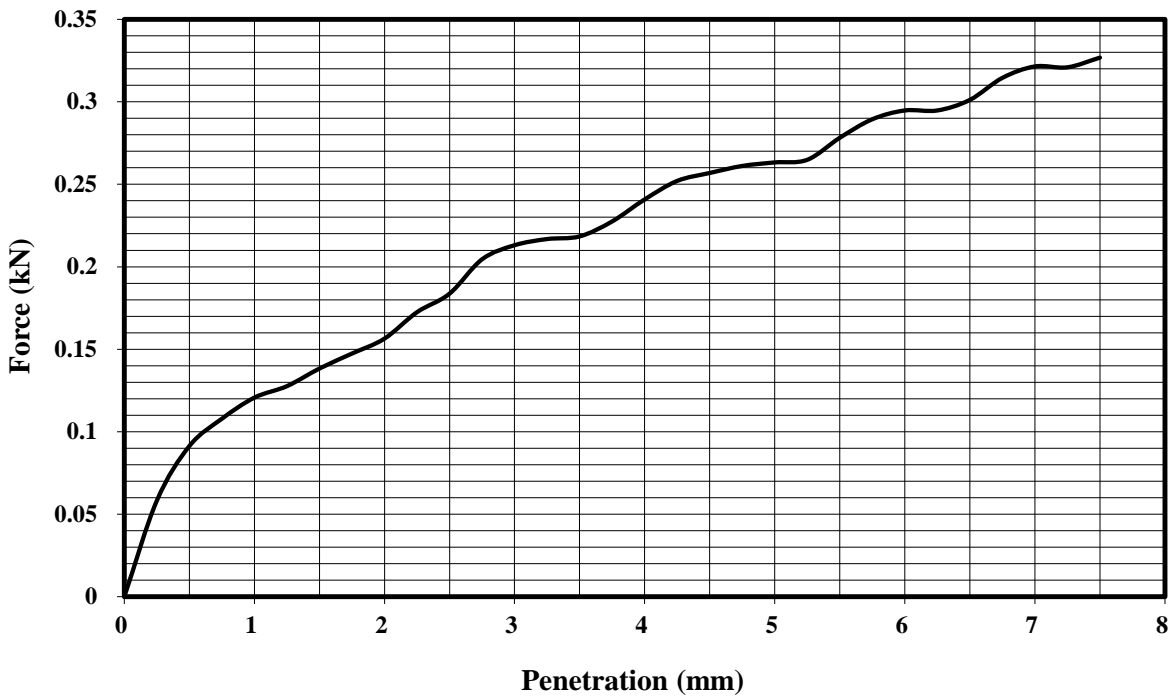
DP Evans

Emma Williams - Office Manager

Date Approved: 12.1.17

**Test Report: Determination of the California Bearing Ratio
BS 1377: Part 4: 1990 Clause 7**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-
Sample Type: B
Hole Number: SK502
Sample Number: N/A
Depth (m): 0.35 - 0.70
Description: Brown silty CLAY containing organic material.



Initial Sample Conditions

Test Conditions

Method of Compaction:

Moisture Content: **43**

Surcharge Kg: **2.0**

2.5kg Rammer

Bulk Density Mg/m³: **1.69**

Soaking Time (hrs):

Final Moisture Content %

Dry Density Mg/m³: **1.18**

Swelling mm: **1.39**

Sample Top **43**

C.B.R. Value % Sample Top

1.39

Sample Bottom **43**

Percentage retained on 20mm BS test sieve: **0**

Remarks:

Checked By:
Emma Sharp (Office Manager)

Approved By:
Paul Evans (Quality Manager)

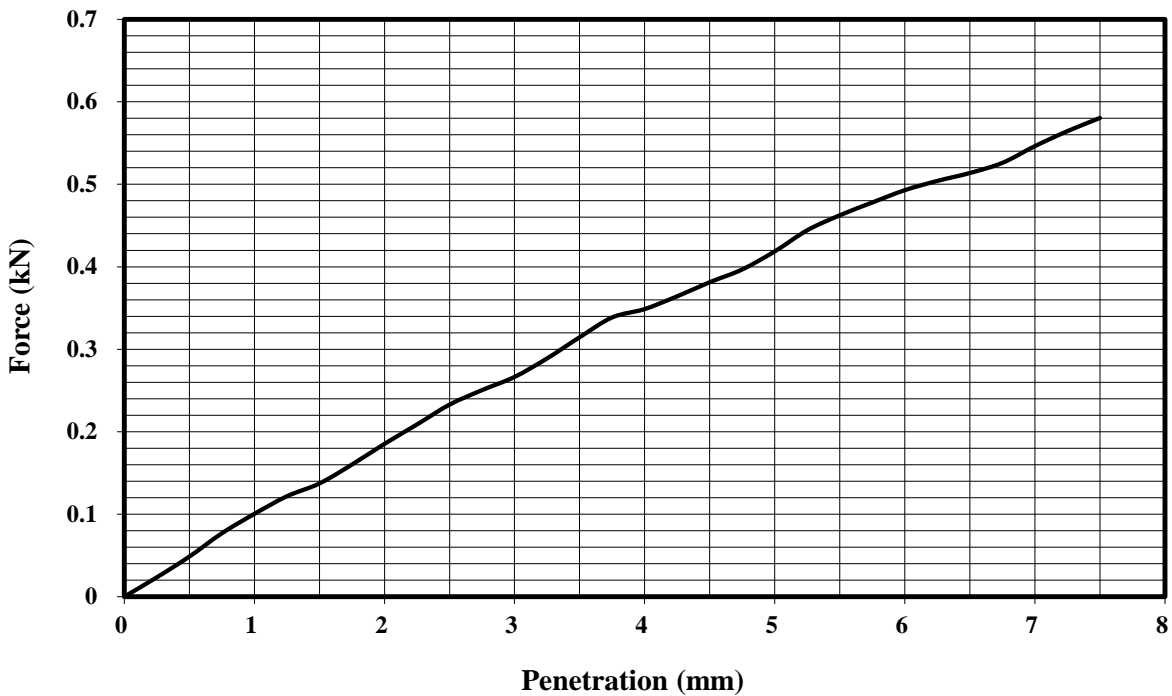


Date Approved: **11.1.17**



**Test Report: Determination of the California Bearing Ratio
BS 1377: Part 4: 1990 Clause 7**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-
Sample Type: B
Hole Number: SK503
Sample Number: N/A
Depth (m): 0.30 - 0.70
Description: Brown silty CLAY.



Initial Sample Conditions

Test Conditions

Method of Compaction:

Moisture Content: **32**

Surcharge Kg: **2.0**

2.5kg Rammer

Bulk Density Mg/m3: **1.85**

Soaking Time (hrs):

Final Moisture Content %

Dry Density Mg/m3: **1.40**

Swelling mm: **2.09**

Sample Top **32**

C.B.R. Value % Sample Top

Sample Bottom **32**

Percentage retained on 20mm BS test sieve: **0**

Remarks:

Checked By:
Emma Sharp (Office Manager)

Approved By:
Paul Evans (Quality Manager)



Emma Sharp

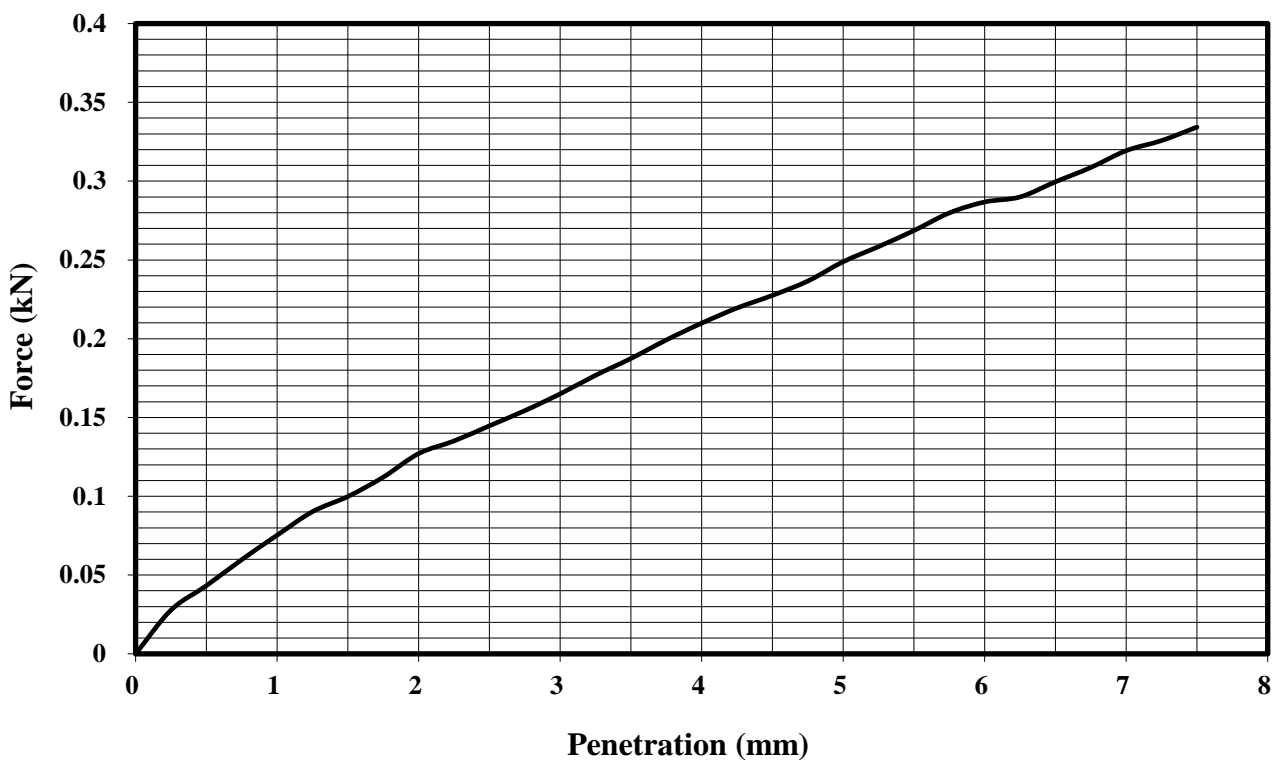
Paul Evans

Date Approved: **11.1.17**



**Test Report: Determination of the California Bearing Ratio
BS 1377: Part 4: 1990 Clause 7**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-
Sample Type: B
Hole Number: SK504
Sample Number: N/A
Depth (m): 0.50 - 0.75
Description: Brown silty CLAY.



Initial Sample Conditions

Test Conditions

Method of Compaction:

Moisture Content: **35**
 Bulk Density Mg/m³: **1.83**
 Dry Density Mg/m³: **1.36**
 C.B.R. Value %
 Percentage retained on 20mm BS test sieve: **54**

Surcharge Kg: **2.0**
 Soaking Time (hrs):
 Swelling mm:
1.24

2.5kg Rammer

Final Moisture Content %
 Sample Top **35**
 Sample Bottom **35**

Remarks:

Checked By:
Emma Sharp (Office Manager)

Approved By:
Paul Evans (Quality Manager)

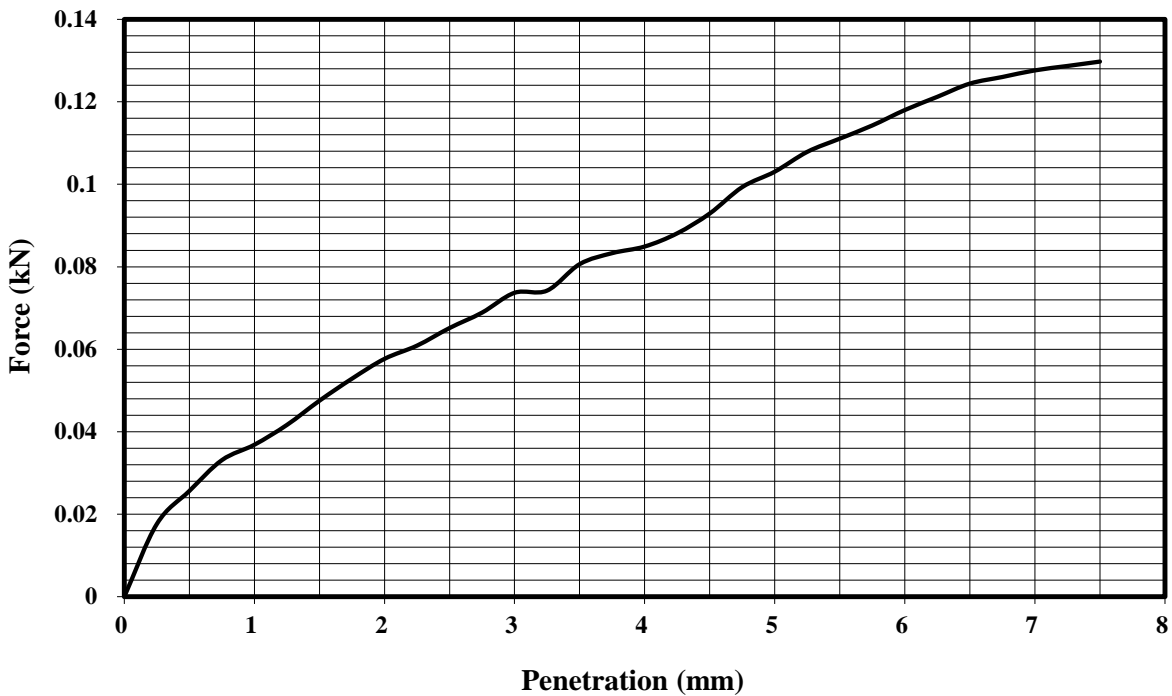


Date Approved: **16.1.17**



**Test Report: Determination of the California Bearing Ratio
BS 1377: Part 4: 1990 Clause 7**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-
Sample Type: B
Hole Number: SK508
Sample Number: N/A
Depth (m): 0.50 - 0.95
Description: Brown silty CLAY.



Initial Sample Conditions

Test Conditions

Method of Compaction:

Moisture Content: **38**

Surcharge Kg: **2.0**

2.5kg Rammer

Bulk Density Mg/m3: **1.79**

Soaking Time (hrs):

Final Moisture Content %

Dry Density Mg/m3: **1.30**

Swelling mm: **0.52**

Sample Top **38**

C.B.R. Value % Sample Top

Sample Bottom **38**

Percentage retained on 20mm BS test sieve: **0**

Remarks:

Checked By:
Emma Sharp (Office Manager)

Approved By:
Paul Evans (Quality Manager)



Emma Sharp

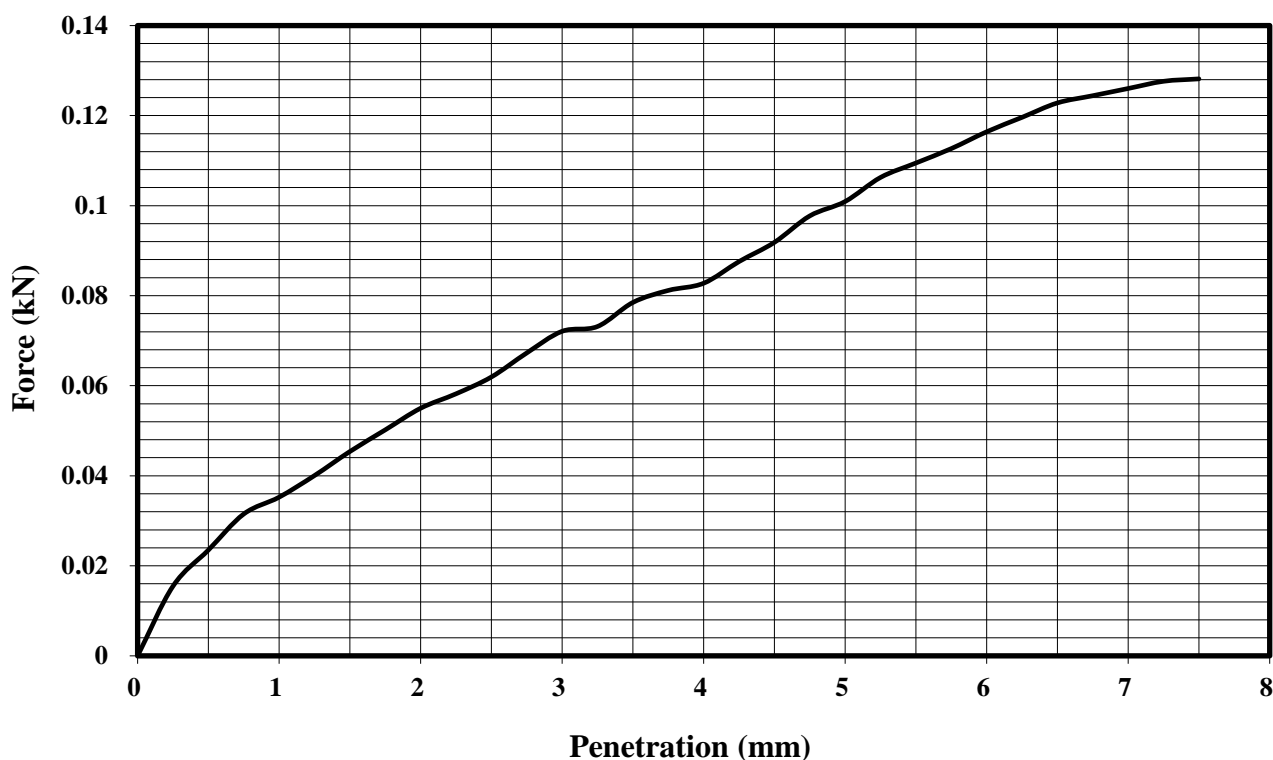
Paul Evans

Date Approved: **11.1.17**



**Test Report: Determination of the California Bearing Ratio
BS 1377: Part 4: 1990 Clause 7**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-
Sample Type: B
Hole Number: SK509
Sample Number: N/A
Depth (m): 0.80 - 1.30
Description: Brown silty CLAY.



Initial Sample Conditions

Test Conditions

Method of Compaction:

Moisture Content: **38**

Surcharge Kg: **2.0**

2.5kg Rammer

Bulk Density Mg/m³: **1.77**

Soaking Time (hrs):

Final Moisture Content %

Dry Density Mg/m³: **1.28**

Swelling mm:

Sample Top **38**

C.B.R. Value % Sample Top **0.50**

Sample Bottom **38**

Percentage retained on 20mm BS test sieve: **18**

Remarks:

Checked By:
Emma Sharp (Office Manager)

Approved By:
Paul Evans (Quality Manager)



Emma Sharp

Paul Evans

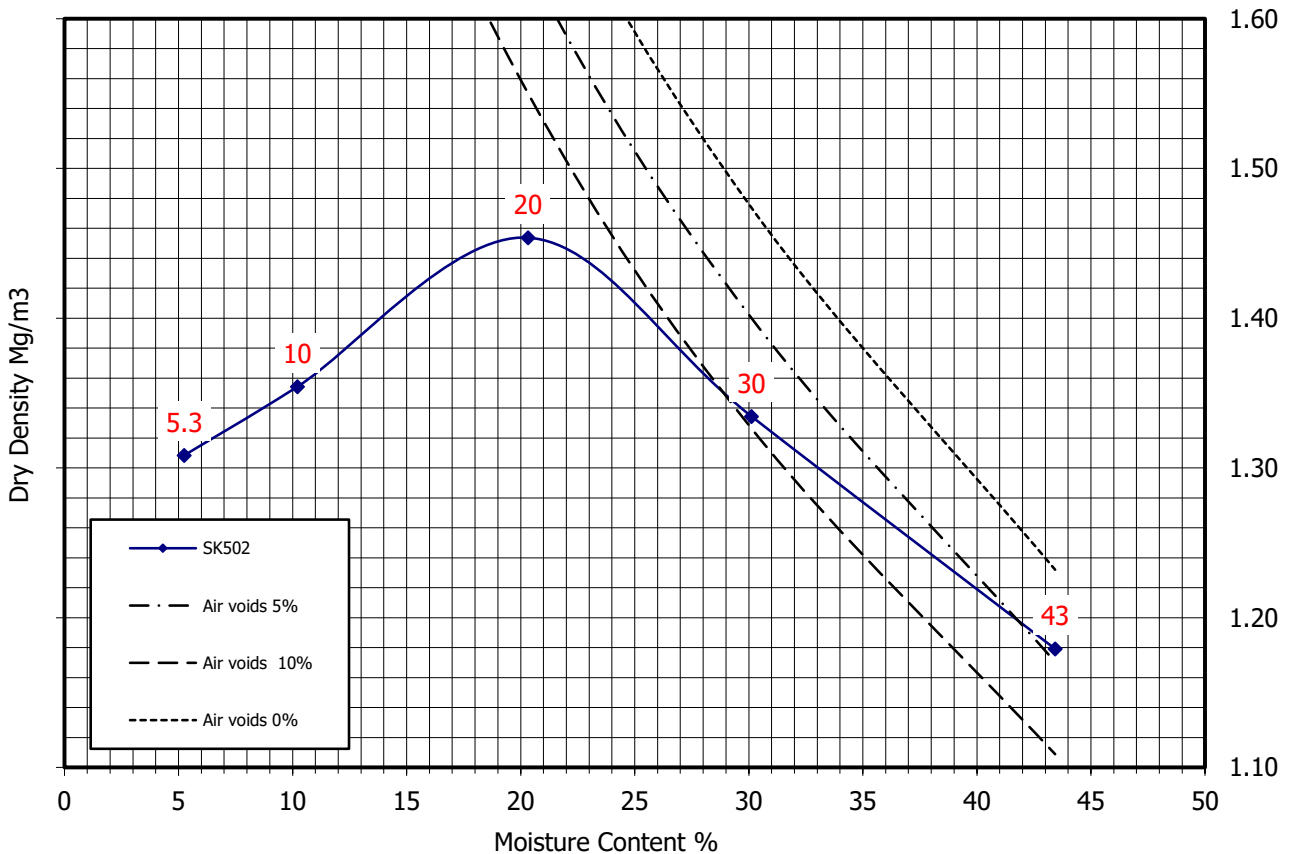
Date Approved: **16.1.17**



Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Client ref: **60509148**
 Location: **St Athan Northern Access Road GI**
 Contract Number: **33562-**
 Hole Number: **SK502**
 Sample Number: **N/A**
 Depth (m): **0.35 - 0.70**
 Sample Type: **B**
 Description: **Brown silty organic CLAY.**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.3	10	20	30.1	43.4
Bulk Density (Mg/m ³):	1.38	1.49	1.75	1.74	1.69
Dry Density (Mg/m ³):	1.31	1.35	1.45	1.33	1.18

Initial Moisture Content: **43** Method of Compaction: **2.5kg Rammer**
 Particle Density (Mg/m³): **2.65 Assumed** Material Retained on 37.5 mm Test Sieve (%): **0**
 Maximum Dry Density (mg/m³): **1.45** Material Retained on 20.0 mm Test Sieve (%): **0**
 Optimum Moisture Content (%): **20** Sample Preparation Clause: **3.2.4.1**

Remarks:

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **16.1.17**



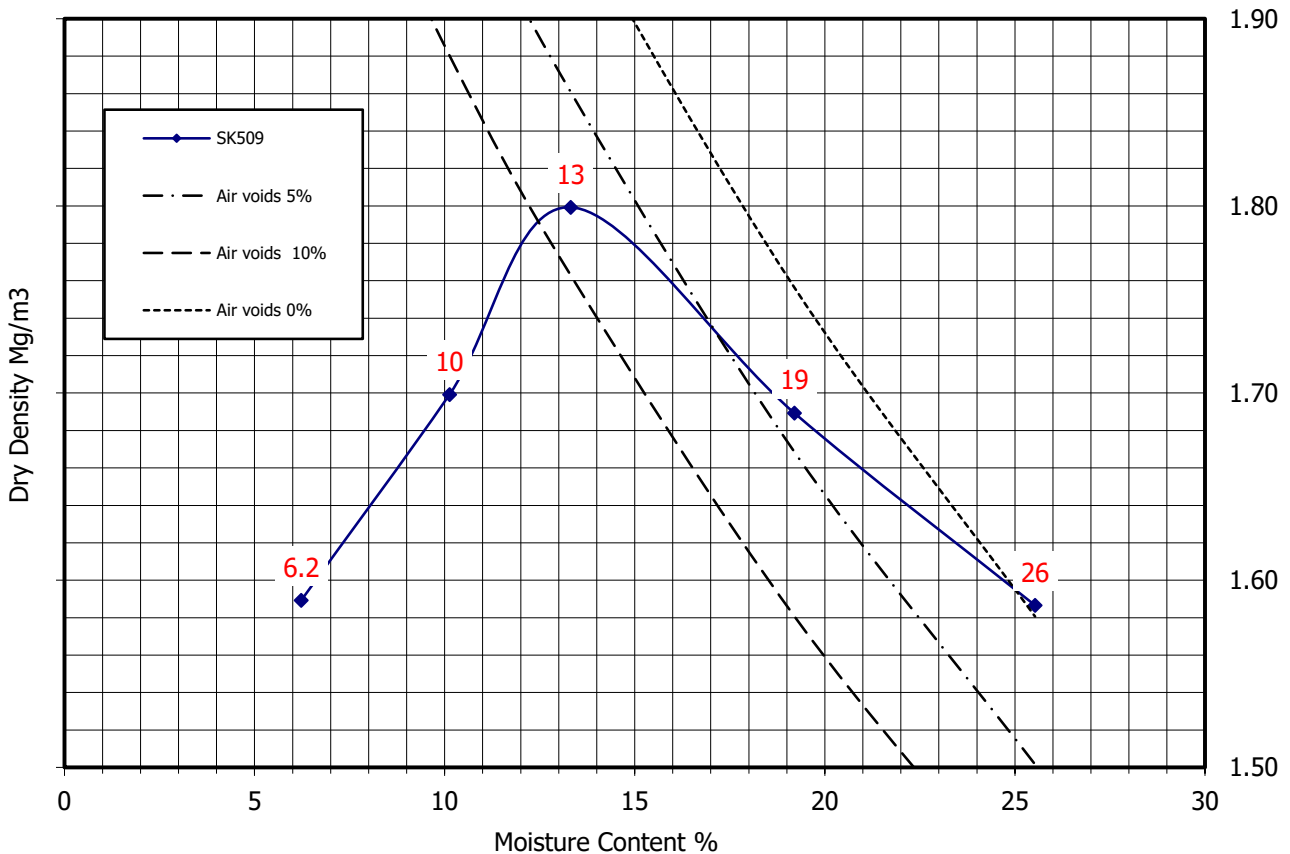
2788



Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Client ref: **60509148**
 Location: **St Athan Northern Access Road GI**
 Contract Number: **33562-**
 Hole Number: **SK509**
 Sample Number: **N/A**
 Depth (m): **0.35 - 0.80**
 Sample Type: **B**
 Description: **Brown gravelly silty CLAY.**



Compaction Point:	1	2	3	4	5
Moisture Content:	6.2	10	13	19.2	25.5
Bulk Density (Mg/m ³):	1.69	1.87	2.04	2.01	1.99
Dry Density (Mg/m ³):	1.59	1.70	1.80	1.69	1.59

Initial Moisture Content: **25** Method of Compaction: **2.5kg Rammer**
 Particle Density (Mg/m³): **2.65 Assumed** Material Retained on 37.5 mm Test Sieve (%): **8.2**
 Maximum Dry Density (mg/m³): **1.80** Material Retained on 20.0 mm Test Sieve (%): **4.6**
 Optimum Moisture Content (%): **13** Sample Preparation Clause: **3.2.4.2**

Remarks:

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **16.1.17**



2788



**SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)
(BS 1377 : PART 7 : 3 : 1990)**

Client ref: 60509148
Location: St Athan Northern Access Road GI
Contract Number: 33562-

Borhole Number	Sample Number	Sample Depth from m	Sample Depth to m	Sample Type	Moisture Content %	Bulk Density Mg/m ³	Dry Density Mg/m ³	Undrained Triaxial Compression Tests (Total Stress)						Hand Vane kPa		
								Size mm	Lateral Pressure s ₃ kPa	Cohesion 1/2(s ₁ -s ₃) kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual	
SK504		0.50	0.75	B											47	18
SK507		0.30	0.55	B											56	23
SK509		0.35	0.80	B											62	32

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 19mm/33



B Sharp
Checked by:

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