GIST Limited

Albion Road, Barnsley

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OS Grid Ref : **SE 362 094**

Client : **GIST Limited**

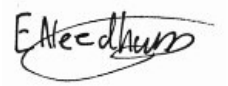
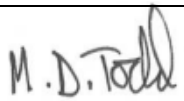
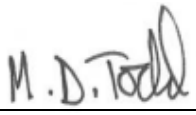
Issue Date : **29/06/2023**

SOAKAWAY TEST REPORT

HBPW
CONSULTING ENGINEERS

This report is to be regarded as confidential to our Client and it is intended for his use only and may not be assigned. Consequently, and in accordance with current practice, any liability to any third party in respect of the whole or any part of its contents is hereby expressly excluded. Before the report or any part of it is reproduced or referred to in any document, circular or statement and before its contents or the contents of any part of it are disclosed orally to any third party, our written approval as to the form and context of such a publication or disclosure must be obtained.

Document Control Sheet

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Issue Record

Issue No.	Description	Date
P01	Soakaway Test Report, First Issue	05/07/2023

Prepared For:	Prepared By:
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1.0 Introduction, Report Purpose and Objectives

HBPW LLP (HBPW) were instructed by GIST Limited to undertake percolation tests and prepare a factual report for the purpose of soakaway drainage.

The report provides test results and calculations deriving the soil infiltration rate in general accordance with the procedure outlined in BRE Digest 365.

2.0 Existing Information

The expected geology for the site is described on the British Geological Survey Geology (BGS) of Britain Viewer at 1:50,000 scale mapping and can be summarised as follows:

- Superficial Geology: Glaciofluvial Deposits, described as sand and gravel.
- Bedrock: Pennine Middle Coal Measures (PMCM) which comprises interbedded mudstone and sandstone with coal seams.

The BGS Hydrogeology viewer classifies the underlying bedrock formation as a “moderately productive aquifer”.

The DEFRA Magic Map indicates that the Glaciofluvial Deposits and PMCM are classified as a ‘Secondary – A’ Aquifer, described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The Environment Agency website indicates that the Site is not located in a groundwater Source Protection Zone (SPZ) or Drinking Water Protected Area.

3.0 Site Works and Calculations

Soakaway testing was completed on 28th June 2023 and comprised:

- 1 No. trial pit (TP1) measuring 1.6m by 0.8m.

The ground profile encountered generally comprised 0.55m of made ground described as sand and gravel of mixed lithology (Type 1 or similar) with a basal geotextile layer overlying brown silty peat (possible relic topsoil) to 0.7m, followed by Glaciofluvial Deposits described as gravelly slightly clayey medium to coarse sand with gravel of rounded to sub-rounded sandstone and mixed lithology with occasional cobbles to 1.6m where the pit was terminated. The trial pit log is presented within **Appendix I**.

The pit was dry during excavation.

Percolation (soakaway) testing comprised filling the open trial pit with water to a level of approximately 0.7m bgl and measuring the water level at set intervals. This process was repeated 3No. times within TP1. The results and calculations of the associated infiltration rate are presented in **Appendix II**.

Calculations were performed in accordance with BRE Digest 365 in order to attain values for the soil infiltration rate as measured between 75% full and 25% full. Soil infiltration rates are presented below.

Table 1 - Percolation Test Details

Test	Soil Infiltration Rate (m/second)	Depth of Pit (m)	Depth to Initial Water Level (m)	Initial Depth of Water (m)
TP1 Test 1	7.92×10^{-5}	1.55*	0.70	0.85
TP1 Test 2	5.64×10^{-5}	1.55*	0.72	0.83
TP1 Test 3	4.20×10^{-5}	1.55*	0.70	0.85

*note: Depth taken after test was completed.

The percolation test was performed within the glaciofluvial deposits, yielding infiltration rates between 4.20×10^{-5} and 7.92×10^{-5} m/second, with an average value of approximately 6×10^{-5} m/second. It is advised that a characteristic infiltration rate between 5×10^{-5} and 10×10^{-5} m/second is selected for design.

The approximate percolation test location is presented in Figure 1 below (TP1 shown in red) and provided on the drawing appended to this report. Site photographs are provided within **Appendix III**.

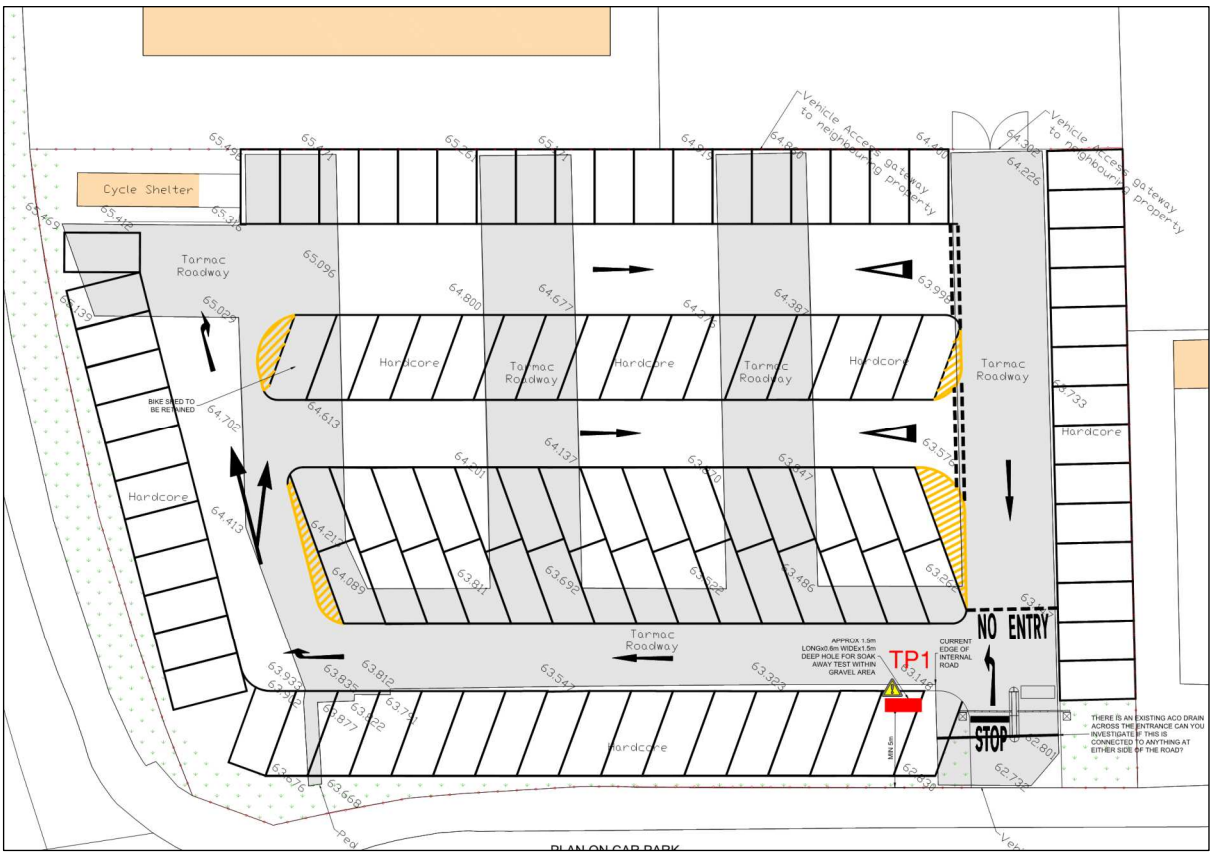
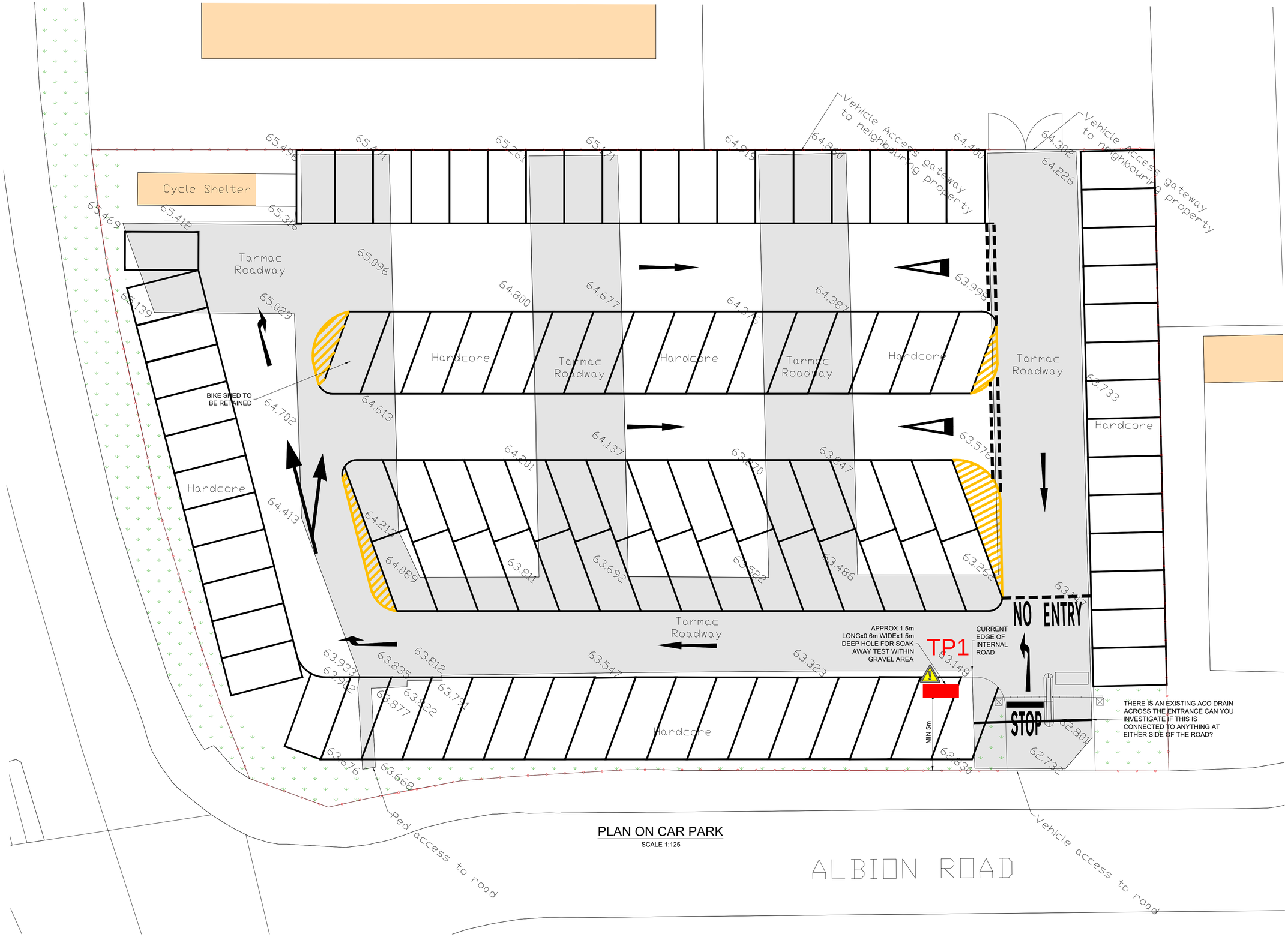


Figure 1 - Extract from drawing No, 7442-HBPW-XX-XX-DR-C-0006

References

- BRE Digest 365 – Soakaway Design, Revised 2016

Drawings



PLAN ON CAR PARK
SCALE 1:125

0 10 20 30 40 50 60 70 80 90 100
MILLIMETRES AT ORIGINAL DRAWING SCALE

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SAFETY, HEALTH AND ENVIRONMENTAL

IN ADDITION TO THE HAZARDS OR RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, THE FOLLOWING SIGNIFICANT RESIDUAL RISKS SHOULD BE NOTED.

CONSTRUCTION:

1.TRAFFIC MANAGEMENT/ BARRIERS IN THE CARPARK TO ENSURE RISK OF PERSONS OR VEHICLES ENTERING THE HOLE IS MINIMISED
2. RISK OF LIVE SERVICES

MAINTENANCE, CLEANING AND OPERATION :

DECOMMISSIONING OR DEMOLITION :

NOTES

1. DO NOT SCALE OFF THIS DRAWING.
2. SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
3. ALL DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXECUTE THE WORKS AT ALL TIMES IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND CDM REGULATIONS 2015.
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
6. ALL WORKS TO BE IN ACCORDANCE WITH SPECIFICATIONS FOR HIGHWAY WORKS
7. SOAKAWAY TEST TO BE COMPLETED IN ACCORDANCE WITH BRE365 AND THE TEST PROCEDURE OUTLINED IN HBPW SOAKAGE TEST PROCEDURE DOCUMENT.
8. ENSURE THAT ADEQUATE WATER IS AVAILABLE TO COMPLETE THE TEST. THIS WILL REQUIRE IN EXCESS OF 5000ltrs OF WATER TO COMPLETE THE 3 TESTS.
9. HOLE TO BE BACKFILLED AND RETURNED TO ORIGINAL STATE FOLLOWING COMPLETION OF THE TEST BY THE CONTRACTOR.
10. TEST HOLE SHALL BE LOCATED AT LEAST 5m AWAY FROM THE SITE BOUNDARY

INFORMATION

REV	DESCRIPTION	BY	CHK	APP	DATE
P01	1ST ISSUE	MDT	PW	PW	31/05/23

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CONTRACTOR: N/A

HBPW PROJECT NUMBER: SL07442

PROJECT: GIST BARNSLEY
LAND SALE

DRAWING: SOAK AWAY TEST LOCATION

PROJECT ENGINEER:	DRAWN:
M TODD	M TODD
CHECKED:	APPROVED:
P WITHERS	P WITHERS

DATE:	SCALE:	SIZE:	SUITABILITY:	REVISION:
31.05.23	1:125	A1	S4	P01

DOCUMENT REFERENCE NUMBER: 7442-HBPW-XX-XX-DR-C-0006

APPENDIX I

Trial Pit Exploratory Hole Log

0.00m – 0.55m
MADE GROUND. Yellow sandy gravel of subangular to angular limestone and mixed lithology (Type 1).

0.55m
Geotextile layer.

0.55m – 0.70m
Dark brown sandy very clayey PEAT (relic topsoil).

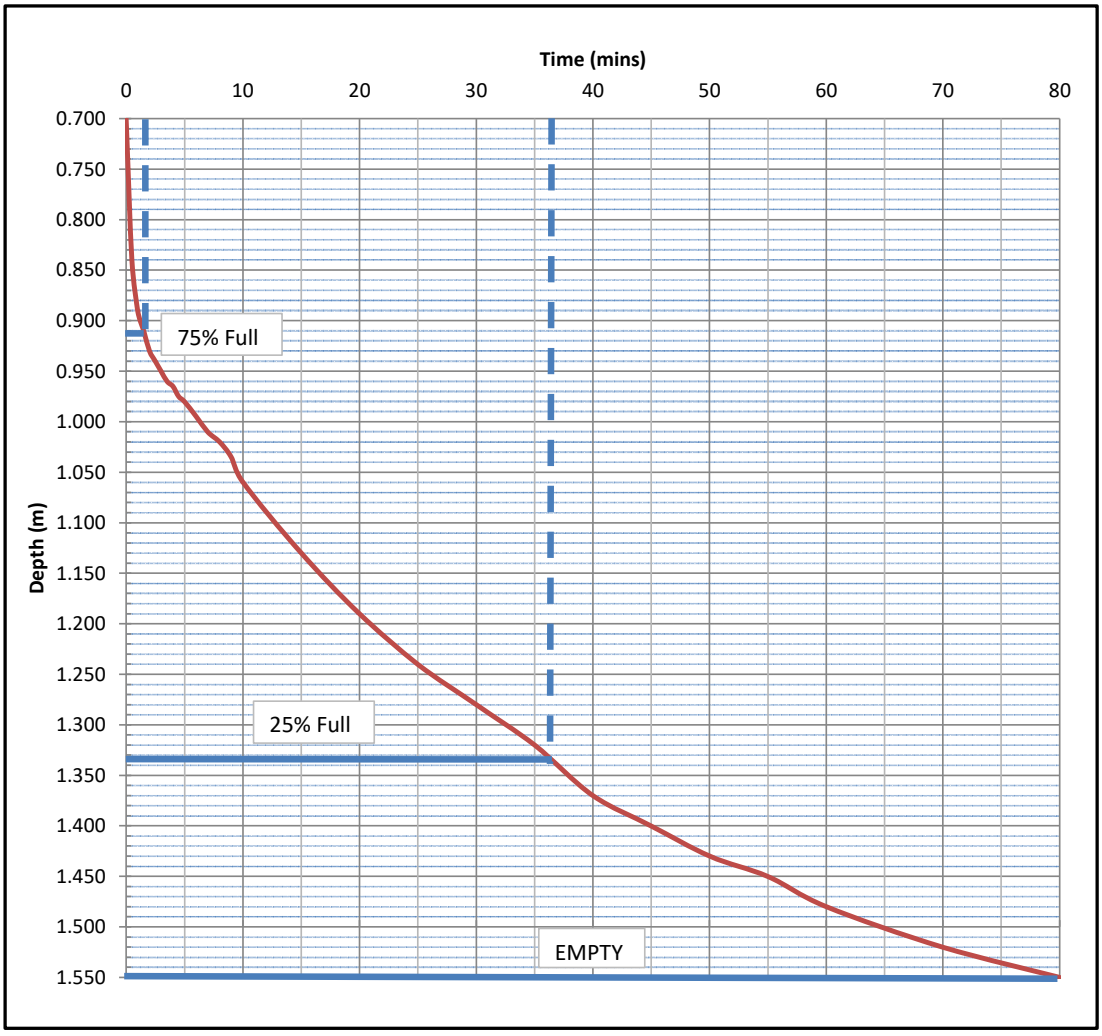
0.70m – 1.60m
Reddish brown slightly clayey very gravelly medium to coarse SAND (glaciofluvial deposits). Gravel is of medium to coarse rounded to subangular mixed lithology with occasional cobble sized fragments.

The borehole remained dry throughout the investigation.

APPENDIX II

Soakaway Test Results and Infiltration Rate Calculations

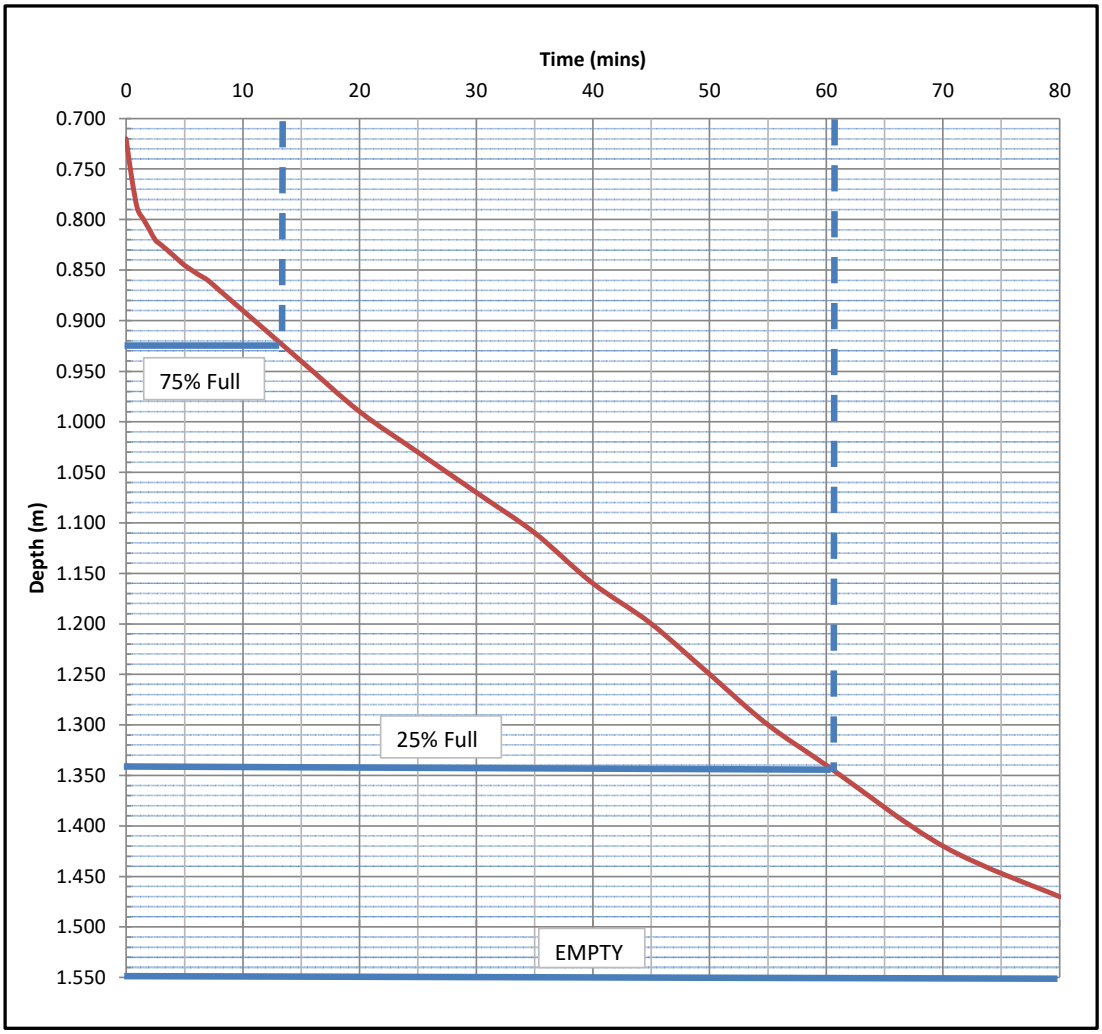
HBPW CONSULTING ENGINEERS 43 Bridgegate, Retford Nottinghamshire DN22 7UX Tel: 01777 869896	Project	GIST - Barnsley				Job Reference	
						SL07442	
	Section	Soil Percolation Test TP1 - Test 1					
	Calc By	EN	Checked:	AM	Revision	A	Sheet A 1
	Date:	Jun-23	Date:	Jun-23			



Depth	D	=	1.55 m
Length	L	=	1.60 m
Width	W	=	0.80 m
Depth of water at 100% full	d100	=	0.850 m
Depth from surface at 25% full	D25	=	1.338 m
Depth from surface at 75% full	D75	=	0.913 m
Time at 25% full (from graph)	t25	=	36.0 mins
Time at 75% full (from graph)	t75	=	1.5 mins
Volume outflowing between 75% and 25% depth	Vp75-25	=	0.544 m3
Mean surface area between 75% and 25% depth (50% depth)	as50	=	3.320 m2
Time for outflow between 75% and 25% depth	tp75-25	=	34.5 mins
Soil infiltration rate	**f75-25**	=	**4.75E-03 m/min**
	f75-25	=	**7.92E-05 m/sec**

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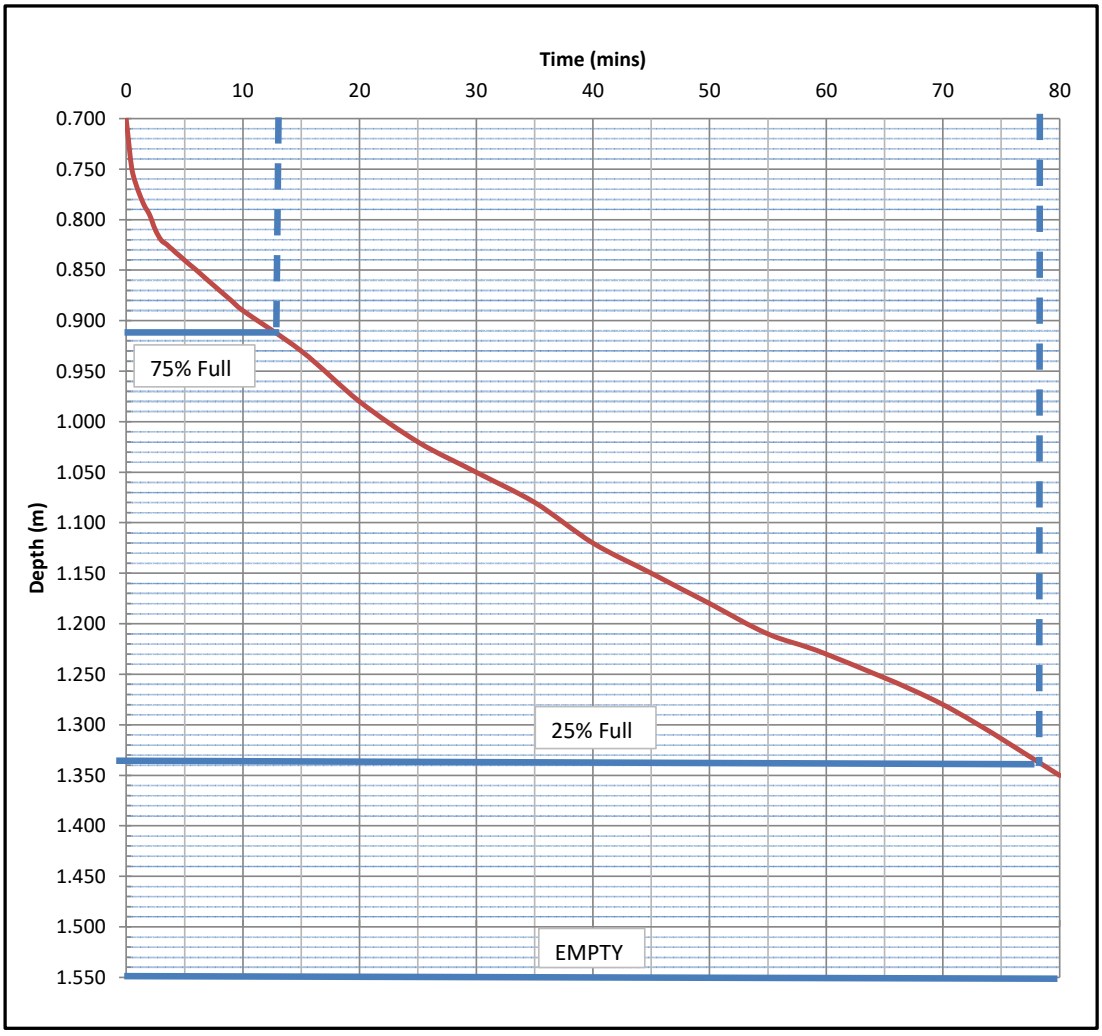
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Section	Soil Percolation Test TP1 - Test 2						
Calc By	EN	Checked:	AM	Revision	A	Sheet	
Date:	Jun-23	Date:	Jun-23			A	2



Depth	D	=	1.55 m
Length	L	=	1.60 m
Width	W	=	0.80 m
Depth of water at 100% full	d100	=	0.830 m
Depth from surface at 25% full	D25	=	1.343 m
Depth from surface at 75% full	D75	=	0.928 m
Time at 25% full (from graph)	t25	=	61.0 mins
Time at 75% full (from graph)	t75	=	13.0 mins
Volume outflowing between 75% and 25% depth	Vp75-25	=	0.531 m3
Mean surface area between 75% and 25% depth (50% depth)	as50	=	3.272 m2
Time for outflow between 75% and 25% depth	tp75-25	=	48.0 mins
Soil infiltration rate	**f75-25**	=	**3.38E-03 m/min**
	f75-25	=	**5.64E-05 m/sec**

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Project	GIST - Barnsley				Job Reference	SL07442	
Section	Soil Percolation Test TP1 - Test 3						
Calc By	EN	Checked:	AM	Revision	A	Sheet	
Date:	Jun-23	Date:	Jun-23			A	3



Depth	D	=	1.55 m
Length	L	=	1.60 m
Width	W	=	0.80 m
Depth of water at 100% full	d100	=	0.850 m
Depth from surface at 25% full	D25	=	1.338 m
Depth from surface at 75% full	D75	=	0.913 m
Time at 25% full (from graph)	t25	=	78.0 mins
Time at 75% full (from graph)	t75	=	13.0 mins
Volume outflowing between 75% and 25% depth	Vp75-25	=	0.544 m3
Mean surface area between 75% and 25% depth (50% depth)	as50	=	3.320 m2
Time for outflow between 75% and 25% depth	tp75-25	=	65.0 mins
Soil infiltration rate	**f75-25**	=	**2.52E-03 m/min**
	f75-25	=	**4.20E-05 m/sec**

APPENDIX III

Site Photographs



Photograph 1 - TP1 excavation to 1.6m bgl



Photograph 2 - TP1 water infill for Test No.1



Photograph 3 - TP1 arisings