

3 October 2011

Your ref:
Planning ref:
Our ref: J11145/DB/c01

Mr J Shakespeare
Barratt David Wilson Southampton
Tollbar House
Tollbar Way
Hedge End
Southampton
Hampshire
SO30 2UH

Dear Mr Shakespeare,

RE: HAVANT ROAD SITE, WARBLINGTON, EMSWORTH
DESK STUDY & GROUND INVESTIGATION LETTER REPORT FOR THE
PROPOSED RESIDENTIAL REDEVELOPMENT

Further to instruction from BDW Southampton, we have carried out desk study research and subsequently attended the above site and carried out a walkover survey and ground investigation to provide information to assist with the redevelopment of the site through the construction of 169 new houses, together with driveways, access roads, hardstanding for car parking, soft landscaping and areas of private domestic gardens.

The comments made in this letter are limited to those that can be made on the basis of the information obtained by Wilson Bailey Partnership as part of the limited research and site walkover visit carried out to date. Our comments should be viewed in the context of the limited scope of the investigation, the locations of the accessible sampling points and the range of data sources consulted, no liability can be accepted for information in other data sources. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by Wilson Bailey Partnership.

Scope of Work

A desk study has been carried out in accordance with current guidelines for best practice to establish the environmental site setting and development history of the site and the surrounding area.

The desk study has been followed by a pre-purchase ground investigation to provide information to assist with the design of new foundations, pavements, soakaways and facilitate the inspection of soils and recovery of soil samples for contaminated land assessment.

The ground investigation has been carried out in a single phase and comprised a series of 6 small diameter boreholes drilled by means of an open drive percussive soil sampling rig to a depth of up to 5.45 m together with a series of 12 trial pits excavated using a rubber tyred mechanical excavator. Groundwater monitoring standpipes have been installed into each of the boreholes located across the site to facilitate future monitoring of the groundwater levels to inform the design of the proposed redevelopment and the flood risk assessment required by the Environment Agency. Falling head borehole percolation testing has been carried out in a number of the boreholes together with shallow

trial pit soakage testing to assess the potential for soil soakage and the viability of soakaways as part of the proposed redevelopment. A programme of monthly monitoring visits has been established for a 12 month period and the results of this ongoing monitoring will be reported in the form of addendum letter reports in as the programme of monitoring progresses.

The soils encountered in the boreholes were inspected by a Chartered Geologist and representative soil samples were recovered for subsequent laboratory testing for geotechnical properties and for contaminated land soil analyses to determine the presence of a wide range of potential soil contaminants. The scope of the ground investigation was restricted by the known presence of a strategic high pressure gas main that is located within the southeastern site boundary. The ground investigation was required to observe the associated exclusion zone surrounding the gas main and observed a cautious approach in this regard.

In accordance with current best practice, the findings of the desk study and ground investigation have been used to formulate a conceptual model for the site and facilitate a preliminary qualitative risk assessment and discussion of the implications of any identified issue of potential concerns with regards to ground contamination. On the basis of this assessment, the requirement for any further assessment or remedial action as part the redevelopment of this site for residential purposes has been determined.

Site Description

The site is irregular in shape with approximate maximum dimensions of 545 m by 200 m, forming an area measuring approximately 6 hectares. The site is currently in use as a number of grass paddocks that provide grazing for cattle, which are subdivided by a series of poorly maintained hedgerows and barbed wire fences. The northwestern site boundary is formed by a post and rail fence, beyond which is an area of screen planted deciduous trees and the embankment of the A27 Emsworth bypass. The embankment rises to a height of about 5m at the northern corner of the site where it forms a bridge to carry the A27 over the mainline railway that forms the northern boundary to the site. The northeastern boundary to the site is formed by an area of open land adjacent to the railway, whilst the remainder of the eastern boundary to the site is marked by hedges and fences that form the extent of adjoining residential rear gardens to the houses and bungalows that front onto Selangor Avenue to the south and east of the site. The southern boundary to the site is formed by a mature hedgerow and Havant Road beyond. Access to the site is provided by a steel five-bar gate off Selangor Avenue.

The site is sensibly level although there are a number of undulations within the ground surface and a maximum change in level of about 1.50 m across the site, with the southern part of the site being slightly raised above the remainder of the site. Within the central eastern part of the site a single dilapidated timber building is present, together with overgrown small piles of demolition rubble and possible remnants of an area of hardstanding / building ground floor slab. Within the central western part of the site there is a single large round water trough for livestock.

As part of the walkover survey no indications of the storage or use of chemicals was noted, with no indications of distressed vegetation noted. The site may be additionally located using National Grid Reference 473456,106233.

Site History

The history of the site and immediate surrounding area has been researched by reference to publically available historical Ordnance Survey (OS) maps together with supplementary information inspected at the Havant Local Studies Library and information contained within the Archaeological Desk Based Assessment carried out by L P Archaeology on behalf of BDW Southampton (report reference LP1211L-DBA-v.1.5, dated August 2011) a copy of which was provided by the Client for review.

The archaeological appraisal indicates that whilst there have been indications of various Roman, pre-Roman and Mediaeval occupations within the vicinity of the site, the site has not been developed in antiquity and is considered to hold a low potential for archaeological finds of significance. During the post Mediaeval period the Havant Road to the south of the site is considered to present a major thoroughfare with an associated slightly raised potential for archaeology.

The Ordnance Survey earliest map studied, dated 1870 indicates the site to be in use as open agricultural land within a predominantly rural setting. Subsequent maps dating up to the later 1940s indicate the site to have remained essentially unchanged, forming an area of open agricultural land between Havant to the west and Emsworth to the east. The next available map studied, dated 1952 indicates that by that time residential development of the fields to the east of the site had commenced through the construction of the initial parts of Selangor Avenue and associated houses to the east. This map also indicates a limited number of farm buildings to have been constructed within the central eastern part of the site, in the vicinity of current dilapidated timber building identified during the site walkover.

Subsequent maps indicate the ongoing development of the land to the east of the site through the 1950s and 1960s, together with the construction of additional ancillary buildings within the central eastern part of the site. The next available map studied dates from 1961 and indicates that by that time the buildings on site are likely to have been disused and construction of the A27 Emsworth Bypass is shown to have commenced to the west of the site. The next available map studied dates from 1971 and indicates that by that time the redevelopment to the east of the site and the construction of the A27 had been completed. The farm buildings shown to have been located within the central eastern part of the site are shown to have remained to the present day, although clearly they have fallen into disrepair during more recent years.

The map dating from 1966 indicates that at that time, two disused clay pits are shown to have been present within the extreme northeastern part of the site, and whilst these are not shown on previous or more recent maps of this part of the site, the locations of these pits have subsequently been developed through the construction of the A27 and houses fronting onto Selangor Avenue.

Environmental Site Setting

Information provided by the British Geological Survey indicates the site to be underlain by Aeolian Deposits 'Brickearth' overlying Head Gravel and subsequently the London Clay. The Reading Beds and subsequently the Upper Chalk are shown to be present beneath the Aeolian Deposits a short distance to the south of the site.

Information provided by the Environment Agency indicates the Aeolian Deposits to be classified as a Secondary Class A Superficial Aquifer, with the underlying London Clay not classified as a productive stratum. The site is not shown to be located within any class of Source Protection Zone associated with any licensed groundwater abstraction points, although the Inner Source Protection Zone associated with the Portsmouth Water Havant Springs abstraction points is shown to be located approximately 450 m to the southwest of the site.

Further information provided by the Environment Agency does not indicate the presence of any active or historical landfill sites or other indications of any other potentially contaminative land uses such as waste processing sites, fuel filling stations or pollution incidents have been recorded within 500 m of the site.

Information provided by the Health Protection Agency (HPA) indicates the site to be located in an area where between 1% and 3% of houses are above the action level for radon emissions, although the HPA does not stipulate a requirement for the incorporation of radon protective measures as part of the construction of new buildings in this area. The HPA does however advise that radon levels should be

monitored in any buildings constructed within radon affected areas in order to determine the requirement for protection measures on a site by site basis. Whilst technically viable, this approach may not be viable for the proposed development at this site such that basic radon protection measures should be installed as a precaution.

Preliminary Conceptual Site Model Summary and Risk Assessment

The historical and current use of the site for open grazing for livestock is not considered to present a potentially contaminative history. No indicators of potential contaminative activities have been identified within the vicinity of the site.

Ground Conditions

Underlying the generally nominal thickness of topsoil present across the site, the Aeolian Deposits have been found to comprise a firm silty clay to depths of between 0.80 m and 2.20 m below ground level. These clay soils have been found to be locally desiccated with visible rootlets encountered to a depth of up to 1.20 m and desiccation indicated to a depth of at least 1.30 m below ground level. Underlying these clay soils, Head Gravel comprising a generally medium dense clayey gravel was encountered to the full depth in the trial pits, which terminated due to trial pit instability upon encountering groundwater at a maximum depth of 2.30 m below ground level.

Where proved in the deeper small diameter boreholes at depths of between 1.60 m and 3.80 m, these variably sandy and clayey gravels were found to be underlain by a fine silty sand / sandy silt which was encountered to depths of between 3.40 m and 3.70 m where proved within the central part of the site. The base of these sand soils was not however proved to a depth of up to 4.00 m below ground level across the majority of the site. Underlying the fine silty sand soils, where proved, stiff grey fissured clay of the London Clay was encountered and proved to the maximum depth of investigation at 5.45 m below ground level.

The results of laboratory index testing carried out on selected soil samples indicates the near surface silty clay soils of the Aeolian Deposits to be of medium plasticity, with the underling clay soils of the London Clay to be of medium to high plasticity.

Groundwater was encountered within each of the boreholes and within a number of the trial pits at depths of between about 1.60 m and 2.30 m within the Head Gravel. The presence of groundwater within the Head Gravel and the underlying fine silty sand soils resulted in both the collapse of trial pits and difficulties in drilling with the collapse of boreholes and silting up of casings.

The results of the initial round of groundwater monitoring carried out as part of a proposed programme of monitoring are presented below. It is proposed that this table will be updated and issued as part of addendum letter reports in due course.

Date	BH No 1	BH No 2	BH No 3	BH No 4	BH No 5	BH No 6
15/09/2011	2.96 m bgl	2.12 m bgl	2.00 m bgl	1.98 m bgl	2.32 m bgl	2.03 m bgl

No visual or olfactory indications of ground contamination were noted as part of the fieldwork phase of the ground investigation.

Foundation Design Advice

Shallow spread foundations should be viable for the support of the envisaged light to moderate foundation loads anticipated to be associated with the proposed low rise residential redevelopment of this site.

Spread foundations should be designed to found within the medium dense clayey gravel of the Head Gravel at a minimum depth of 0.90 m below ground level and designed on the basis of a net allowable bearing capacity of 125 kPa and a minimum foundation width of 0.60 m. Within the central and northern parts of the site these clayey gravel soils have been encountered at a depth of less than about 1.00 m below ground level, although within the southern part of the site the gravel has been encountered at a depth of up to about 2.30 m below ground level, at which depth groundwater inflows have also been encountered. On this basis it is considered that foundations designed to bear within the gravel soils at depth may be both uneconomical and difficult to form within this part of the site.

Within the southern part of the site, where the increased thickness of superficial clay soils has been encountered, shallow spread foundations at a minimum depth of 1.00 m below ground level may be designed on the basis of an assumed net allowable bearing capacity of 75 kPa within the firm normally consolidated clay soils. Any such foundations designed to found within clay soils will need to be deepened in the vicinity of existing and proposed trees and National House Building Council (NHBC) guidelines should be followed in this respect; medium shrinkability clays should be assumed. In view of the apparently widespread desiccation of these near surface clay soils it would be prudent to have any foundations designed to found within clay soils inspected by a suitably qualified and experienced engineer. Further testing within the southern part of the site would also be prudent to confirm the extent of desiccation in these soils.

Where trees are to be removed the required founding depth should be determined on the basis of the existing tree height if it is less than 50% of the mature height and on the basis of full mature height if the current height is more than 50% of the mature height. Where a tree is to be retained the final mature height should be adopted and due allowance should be made for future growth of trees, with particular reference to the relatively dense additional planting that is proposed as part of the ecological mitigation measures. Notwithstanding NHBC guidelines, all foundations should extend beyond the zone of desiccation; in this respect it would be prudent to have all foundation excavations inspected by a suitably experienced engineer. The requirement for compressible material alongside foundations should be determined by reference to the NHBC guidelines.

Consideration could be given to the use of alternative foundation such as 'Insulslab' or other proprietary waffle raft foundation solutions at this site, although further investigation, testing and discussion may however be required in order for the use of alternative foundation solutions to be sanctioned by the NHBC at this site.

Excavations

Shallow excavations for services and foundations within the near surface soils are likely to remain dry and broadly stable in the short term. Groundwater is unlikely to be encountered within shallow excavations for foundations and services, although excavations below a depth of about 1.50 m may be expected to encounter groundwater that may result in excavation instability. Where personnel are required to enter excavations, a risk assessment should be carried out and temporary lateral support or battering of the excavation sides considered in order to comply with normal safety requirements.

Ground Floor Slabs

On the basis of apparently widespread desiccation of the near surface medium shrinkability clay soils across much of the site, proposed new buildings should be designed to incorporate suspended ground floor slabs over a void in accordance with NHBC guidelines.

Pavement Design

Depending upon the finalised design of the development and the proposed ground levels, the formation level for hardstandings and access roads across the majority of the site is likely to be within the near surface clay soils such that pavements may be designed on the basis of an assumed California

Bearing Ratio (CBR) of "about 2%". Insitu CBR testing may be of assistance in the detailed design of new pavements.

Surface Water Drainage

In view of the shallow depth to groundwater indicated by the limited programme of monitoring carried out to date, trial pit soakage testing has been carried out within the upper levels of the Head Gravel deposits to assist with the design of shallow soakaways, with supplementary borehole falling head testing carried out within a number of the small diameter boreholes to aid the selection of overall permeability rates and transmissivity for the purposes flood risk assessment, as necessary.

The results of the trial pit soakage testing within the upper levels of the Head Gravel are enclosed and indicate relatively consistent assessed soil infiltration rates of between 4 E-5 m/s and 8.4 E-5 m/s across the majority of the site, with a reduced rate of 2.5 E-6 m/s assessed within the southwestern part of the site where the depth to the base of the clay was deeper and the gravel noted as being very clayey.

Shallow soakaways may be expected to be viable at this site, although discussions should be held with the local Environment Agency office with regards to the depth below the base of any shallow soakaway to winter ground water levels, once the results of the groundwater monitoring programme are available.

The results of the borehole falling head tests carried out in a number of the boreholes indicate assessed soil infiltration rates of in excess of 5 E-4 m/s with the water levels in the boreholes falling to the level of groundwater within less than 25 seconds.

Effect of Sulphates

Chemical analyses of selected soil samples have revealed generally low concentrations of soluble sulphate, corresponding to Class DS-1 AC-1 of Table 2 of BRE Special Digest 1: SD1 Part 1 (August 2001). The guidelines contained in the above digest should be followed in the design of foundation concrete.

Potable Water Supply

The requirement for protection of underground sections of potable water supplies will need to be confirmed through discussions with the proposed statutory provider of mains water to the site, although precautions are not likely to be required for the development at this site.

Soil Contamination Test Results

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

The results of comprehensive laboratory analyses carried out by an MCERTS accredited laboratory on a limited number of soil samples recovered from this site are enclosed. At the time of reporting only a relatively limited selection of Soil Guideline Values have been released following the withdrawal of the previous guidance. The significance of the measured concentrations of any chemicals of concern has therefore been assessed in relation to the available SGVs together with the revised and updated values that have been adopted by the Chartered Institute of Environmental Health (CIEH)¹. Whilst the values that have been adopted by the CIEH are not statutory, they are widely accepted as providing a suitable initial screening value against which measured concentrations of potential contaminants can be assessed to determine the requirement for site specific quantitative risk assessment.

1 *The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition) July 2009.*

From a review of the enclosed results it is apparent that elevated concentrations of a wide range of potential soil contaminants have not been detected within the selected representative soil samples submitted to laboratory analyses.

Contaminated Land Discussion

The historical and current use of the site as open agricultural land and grazing is not considered to present a potentially contaminative history or current use and the walkover survey has not revealed any signs of storage or use of potentially contaminative chemicals and no indications of distressed vegetation were noted.

The ground investigation carried out to date has not indicated the presence of elevated concentrations of a wide range of potential contaminants, and whilst unlikely, it is conceivable that localised pockets of contamination could be present. It is therefore considered that the ground works for the proposed redevelopment at this site should be carried out under a geo-environmental watching brief in order that should any suspicious or contaminated soils be encountered, they can be appropriately investigated by a geo-environmental engineer and appropriately dealt with in consultation with the regulatory authorities.

Site workers should be made aware of the site history and the potential for contamination to be present and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE² and CIRIA³ and the requirements of the Local Authority Environmental Health Officer (EHO).

Further work

Further investigation within the southern part of the site may be prudent in order to determine the variation of the depth to the base of the superficial clay soils and further refine the extent of where foundations may be economically designed to found within the underlying Head Gravel. Further testing of the clay soils may also be necessary in order to confirm the extent of desiccation of these clay soils to aid the detailed design of foundations.

The results of the ongoing programme of groundwater monitoring will be issued in due course and will be of assistance in the detailed design of the site drainage system and the flood risk assessment.

We trust that this letter provides sufficient information although please do not hesitate to contact me should you have any queries or questions.

Yours sincerely
Wilson Bailey Partnership

Dominic Brightman
BSc MSc DIC FGS CGeol ARSM
Principal Engineer

² HSE (1992) HS(G)66 Protection of workers and the general public during the development of contaminated land HMSO

³ CIRIA (1996) A guide for safe working on contaminated site Report 132, Construction Industry Research & Information Association

Project Name
 Havant Road Site

 Project No.
 J11145

Co-ords: -

 Hole Type
 WLS

Location: Havant Road, Warblington, Emsworth

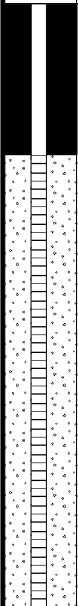
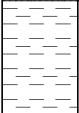
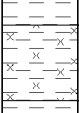
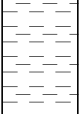
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Client: BDW Southampton

Dates: 23/08/2011

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Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	D		0.20			TOPSOIL	
		0.50	D					Firm orange-brown sandy silty CLAY - desiccated	
		1.00	SPT	N=10 (1,2/ 2,2,3,3)	1.10			Firm pale green and orange-brown mottled silty CLAY with occasional fine to medium flint gravel	1
		1.00	D						
		1.50	D		1.60			Loose orange-brown silty SAND with fine flint gravel	
		2.00	SPT	N=8 (5,4/ 3,2,2,1)					2
		3.00	SPT	N=8 (1,1/ 1,2,2,3)					3
					4.00				
								End of Borehole at 4.00 m	4
									5
									6
									7
									8
									9

Remarks: Ground water at 1.60 m. Standpipe installed with a response zone 1.00 m to 4.00 m.

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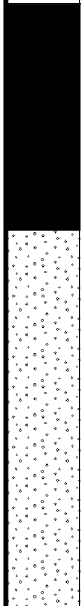
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Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.30			TOPSOIL	
		0.60	D					Stiff brown sandy CLAY with abundant roots and rootlets and occasional flint and gravel - desiccated	
		1.00	SPT	N=28 (5,6/ 8,8,6,6)	0.90			Firm orange-brown sandy firm CLAY with flint gravel	1
		1.20	D						
		2.00	SPT	N=4 (1,1/ 1,1,1,1)	1.70			Loose yellowish brown silty fine SAND	2
		2.00	D						
		3.00	SPT	N=8 (1,1/ 2,1,2,3)					3
		3.50	D		3.40			Firm becoming stiff green fissured clay with occasional fine shell fragments	
					4.00				4
								End of Borehole at 4.00 m	
									5
									6
									7
									8
									9

Remarks: Ground water encountered at 1.70 m. Standpipe installed with a response zone from 1 m to 4 m.

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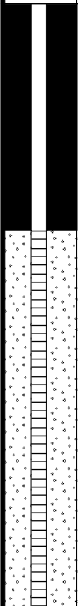
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Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.40			TOPSOIL	
		0.50	D					Firm and brown pale grey mottled sandy CLAY with scattered flint gravel	
		1.00	SPT	N=11 (1,1/ 2,1,3,5)	0.80			Firm orange-brown sandy CLAY with flint gravel	1
		1.00	D		1.30			Soft pale grey and pale orange-brown silty CLAY with occasional fine chalk fragments	
		1.50	D					Loose becoming medium dense pale grey yellowish brown silty fine SAND	2
		2.00	SPT	N=8 (1,1/ 2,2,2,2)	1.90			Firm dark bluish grey CLAY	
		2.00	D					Firm dark bluish grey CLAY	
		3.00	SPT	N=10 (3,4/ 3,3,2,2)				Firm dark bluish grey CLAY	3
		4.00	D		3.80			Firm dark bluish grey CLAY	
		4.00	D		4.00			Firm dark bluish grey CLAY	4
								End of Borehole at 4.00 m	
									5
									6
									7
									8
									9

 Remarks: Ground water encountered at 1.30
 m.Standpipe installed with a response zone from 1.00 m to 4.00
 m.Falling head percolation testing carried out in borehole - results reported seperately.

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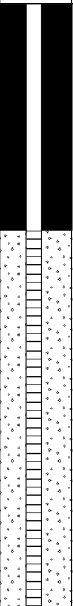
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		Depth (m)	Type	Results					
					0.30			TOPSOIL	
		0.60	D					Firm pale brown sandy CALY with scattered fine flint gravel	
		1.00	SPT	N=20 (4,5/	1.00				1
		1.20	D	5,5,5,5)				Medium dense brown clayey SAND with fine flint gravel	
		2.00	SPT	N=8 (2,2/	2.30				2
		2.00	D	2,2,2,2)					
		3.00	SPT	N=6 (1,1/				Loose orange-brown sandy GRAVEL	3
		3.00	D	1,1,1,3)					
		4.00	D		3.80			Soft pale brown yellowish brown fine sandy SILT	4
					4.00			End of Borehole at 4.00 m	

Remarks: Ground water encountered at 2.10 m rising to 2.30 m. Standpipe installed with a response zone from 1.00 m to 4.00 m.

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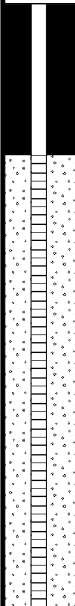
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		Depth (m)	Type	Results					
		0.30	D		0.45			TOPSOIL	1
		0.50	D					Stiff becoming firm orange-brown silty sandy CLAY with occasional fine flint gravel	
		0.90	D					desiccated with rootlets to 1.10 m	
		1.00	SPT	N=20 (2,2/ 2,4,6,8)	1.60			Orange-brown clayey sandy GRAVEL	2
		1.30	D					Loose orange-brown and yellow brown sandy silty GRAVEL	
		1.80	D						
		2.00	SPT	N=4 (2,2/ 1,1,1,1)	3.60			Pale yellow brown silty fine SAND	4
		2.50	D						
		3.00	SPT	N=4 (1,1/ 1,1,1,1)					
		4.00	D		4.00			End of Borehole at 4.00 m	4

Remarks: Ground water encountered at 2.50 m . Standpipe insalled with a response zone from 1.00 m to 4.00 m.

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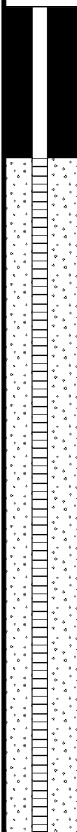
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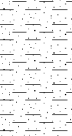
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 DB

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.10	D		0.20			TOPSOIL		
		0.50	D		0.70			Firm soft pale orange-brown silty sandy CLAY with scatterd flint gravel		
		1.00 1.00	SPT D		N=23 (5,5/ 5,6,6,6)			Medium dense orange brown very clayey sandy GRAVEL		1
		2.00	SPT	N=5 (2,1/ 1,1,1,2)	2.10		Loose becoming medium dense orange-brown sandy SILT	2		
		2.50	D				Firm becoming stiff bluish grey fissured CLAY			
		3.00	SPT			N=18 (4,5/ 5,6,4,3)			3.70	
		4.00 4.00	SPT D			N=12 (2,2/ 3,3,3,3)			5.45	
		5.00	SPT	N=17 (3,3/ 4,4,4,5)	End of Borehole at 5.45 m					6
										7
										8
								9		

Remarks: Ground water encountered at 2.00 m. Standpipe installed with a response zone from 1.00 m to 6.00 m.

Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: - Depth 2.30m	Scale 1:25
Client: BDW Southampton				Logged By DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.30			TOPSOIL	
0.50	D					Firm brown sandy CLAY with abundant rootlets	
1.05	D					desiccated to 0.80 m	1
1.50	D					rootlets to 1.30 m	
			1.80			Firm brown sandy CLAY with abundant flint gravel	
2.00	D		2.00			Orange brown clayey flint GRAVEL	2
			2.30			Trialpit Complete at 2.30 m	
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage tests carried out - test results reported seperately.

Groundwater: Not encountered



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: -	Scale 1:25
Client: BDW Southampton			Depth 2.20m	Logged By DPB

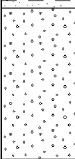
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.25						TOPSOIL	
0.50	D					Firm locally stiff sark brown sandy CLAY -	
1.00	D					desiccated to 0.80 m rootlets to 1.00 m	1
1.50	D					Orange brown and grey sandy clayey GRAVEL	2
2.20						Trialpit Complete at 2.20 m	3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600mm bucket. Trial pit sides stable. Soakage testing carried out - results reported seperately

Groundwater: Groundwater encountered at 2.20 m



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: - Depth 1.30m	Scale 1:25
Client: BDW Southampton				Logged By DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.20			TOPSOIL	
0.50	D					Stif dark orange-brown sandy CLAY with rootlets - desiccated	
			0.80				
1.00	B					Orange-brown clayey sandy flint GRAVEL	1
			1.30				
						Trialpit Complete at 1.30 m	
							2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excvator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage testing carried out - results reported seperately

Groundwater: Not encountered



Project Name
Havant Road Site

Project No.
J11145

Co-ords: -
Level: -

Date
15/09/2011

Location: Havant Road, Warblington, Emsworth

Dimensions: -

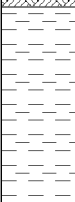
Scale
1:25

Client: BDW Southampton

Depth
1.30m



Logged By
DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
						TOPSOIL	
0.50	D		0.30			Stif brown and orange-brown sandy CLAY with rootlets - dessicated	
1.00	D		1.00			Orange-brown sandy clayey GRAVEL	1
			1.30			Trialpit Complete at 1.30 m	
							2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage testing carried out - results reported seperately

Groundwater: Not encountered



Project Name
Havant Road Site

Project No.
J11145

Co-ords: -
Level: -

Date
15/09/2011

Location: Havant Road, Warblington, Emsworth

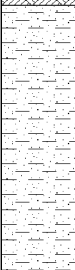
Dimensions: -

Scale
1:25

Client: BDW Southampton

Depth
1.40m

Logged By
DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.20			TOPSOIL	
0.50	D					Stiff brown sandy CLAY	
1.00	D		1.10			rootlets to 0.80 m desiccated to 0.90 m	1
1.30	B		1.40			Orange-brown sandy clayey GRAVEL	
Trialpit Complete at 1.40 m							
							2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage testing carried out - results reported seperatley

Groundwater: Not encountered



Project Name
Havant Road Site

Project No.
J11145

Co-ords: -
Level: -

Date
15/09/2011

Location: Havant Road, Warblington, Emsworth

Dimensions: -

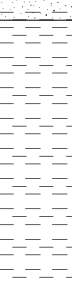
Depth
2.00m



Scale
1:25

Client: BDW Southampton

Logged By
DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.25			TOPSOIL	
0.70	D					Stiff dark orange-brown sandy CLAY with rootlets - dessicated	
1.00	D		0.90			Stiff pale grey CLAY with occasional gravel and rootlets - dessictaed	1
1.50	D					Ornage-brown clayey sandy flint GRAVEL	
			1.80				
			2.00			Trialpit Complete at 2.00 m	2
							3
							4

Remarks: Trial pit excavated sing a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage testing carried out - results reported seperately.

Groundwater: Not encountered



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: -	Scale 1:25
Client: BDW Southampton			Depth 1.30m	Logged By DPB

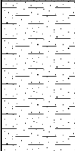
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
1.00	D		0.20			TOPSOIL	1
						Stiff dark orange-brown sandy CLAY	
			1.10			Brown sandy GRAVEL	
			1.30			Trialpit Complete at 1.30 m	
							2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable.

Groundwater: Not encountered



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: -	Scale 1:25
Client: BDW Southampton			Depth 2.30m	Logged By DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50	D		0.30			TOPSOIL	
						Stiff brown sandy CLAY with rootlets - dessicated to full depth	
			0.80			Brown and dark orange-brown clayey sandy GRAVEL	
			2.30			Trialpit Complete at 2.30 m	

Remarks:	Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable to groundwater at 2 m, collapsed below.	
Groundwater:	Groundwater encountered at 2.00 m.	

Project Name Havant Road Site			Project No. J11145		Co-ords: - Level: -		Date 15/09/2011	
Location: Havant Road, Warblington, Emsworth					Dimensions: -		Scale 1:25	
Client: BDW Southampton					Depth 1.50m		Logged By DPB	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.10	D		0.30			TOPSOIL		
0.50	D					Stiff brown sandy CLAY with rootlets - dessicated		
			1.50			Trialpit Complete at 1.50 m 1 2 3 4		
Remarks:						Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable.		
Groundwater:						Not detected.		



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: - Depth 1.80m	Scale 1:25
Client: BDW Southampton				Logged By DPB

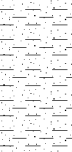
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50	D		0.30			TOPSOIL	
1.00	D					Stiff sandy CLAY with rootlets - dessicated	1
			1.80			Trialpit Complete at 1.80 m	2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable. Soakage testing carried out - results reported separately

Groundwater: Not encountered



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: - Depth 1.60m	Scale 1:25
Client: BDW Southampton				Logged By DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
			0.30			TOPSOIL	
0.50	D					Stiff Brown sandy CLAY	
1.00	D					rootlets and desiccated to 0.90 m	1
			1.40			Orange-brown sandy clayey GRAVEL	
			1.60			Trialpit Complete at 1.60 m	
							2
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pitsides stable.

Groundwater: Not encountered



Project Name Havant Road Site		Project No. J11145	Co-ords: - Level: -	Date 15/09/2011
Location: Havant Road, Warblington, Emsworth			Dimensions: - Depth 2.20m	Scale 1:25
Client: BDW Southampton				Logged By DPB

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.20	D		0.25			TOPSOIL	
1.00	D					Stiff becoming firm brown CLAY	
						desiccated with rootlets to 1.20 m	1
			1.90			Brown clayey sandy GRAVEL	2
			2.20			Trialpit Complete at 2.20 m	
							3
							4

Remarks: Trial pit excavated using a rubber tyred excavator (JCB 3cx) with a 600 mm bucket. Trial pit sides stable.

Groundwater: Not encountered.



Site Havant Road, Site, Warblington

Client BDW Southampton

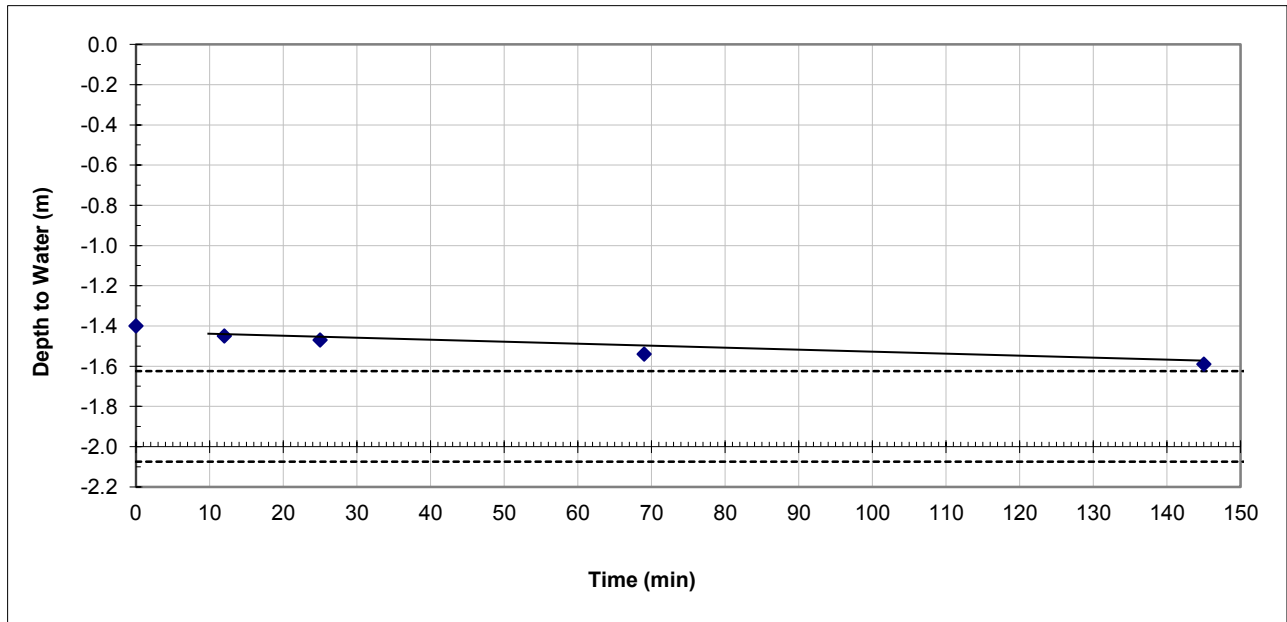
Job Number
J11145

Sheet
1 / 3

Trial Pit No. 1

Soakage Test No. 1

Pit Length (m) 1.9 Pit Width (m) 0.65 Pit Depth (m) 2.3

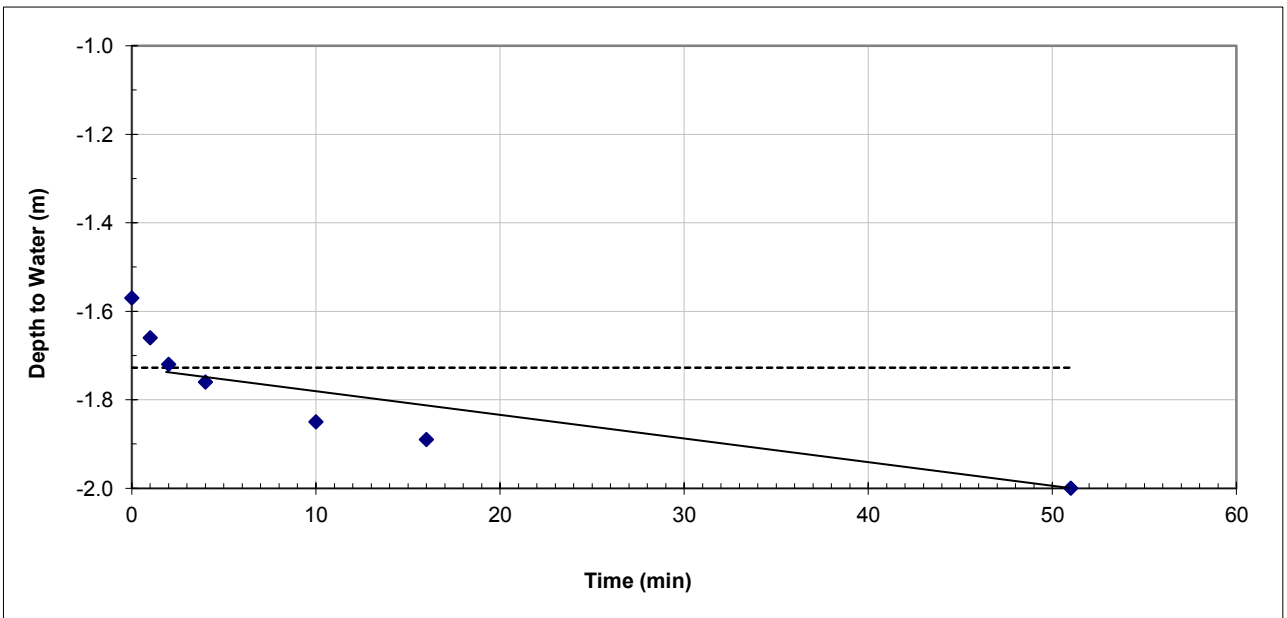


Design Soakage Rate 2.5E-06 m/s (based on linear portion of graph as shown)
0.22 m/day

Trial Pit No. 2

Soakage Test No. 1

Pit Length (m) 1.9 Pit Width (m) 0.65 Pit Depth (m) 2.2



Design Soakage Rate 4.0E-05 m/s (based on linear portion of graph as shown)
3.42 m/day

Site Havant Road, Site, Warblington

Job Number

Client BDW Southampton

Sheet

2 / 3

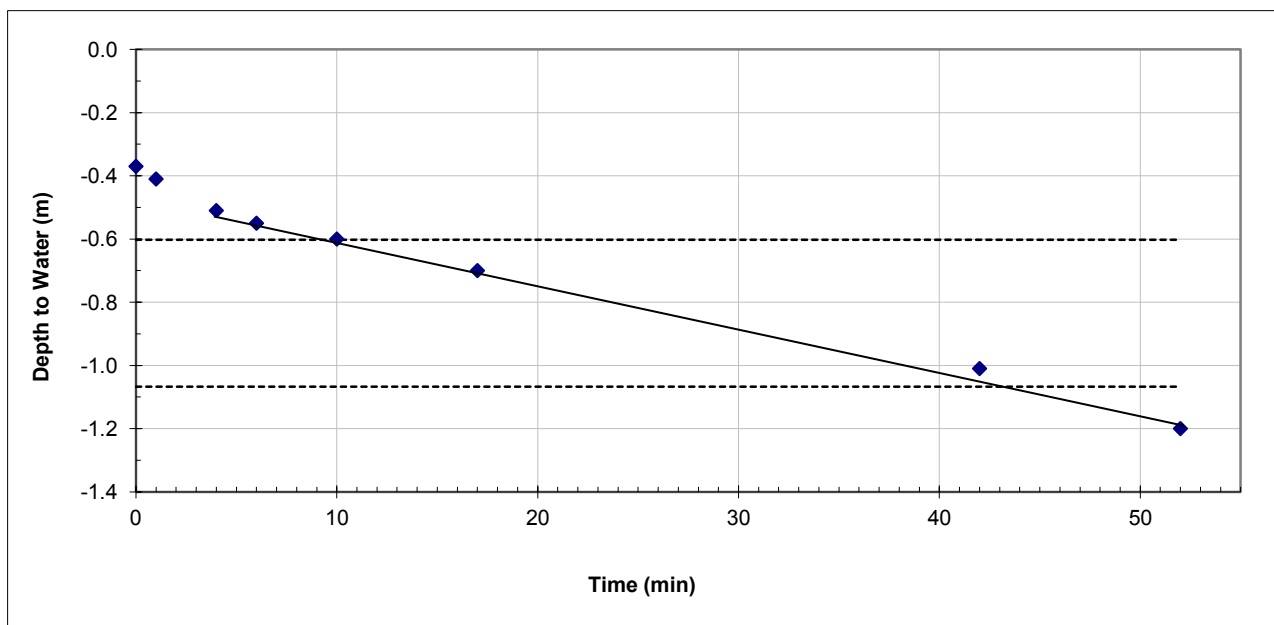
Trial Pit No. 3

Soakage Test No. 1

Pit Length (m) 1.8

Pit Width (m) 0.65

Pit Depth (m) 1.3



Design Soakage Rate

8.4E-05

m/s

(based on linear portion of graph as shown)

7.23

m/day

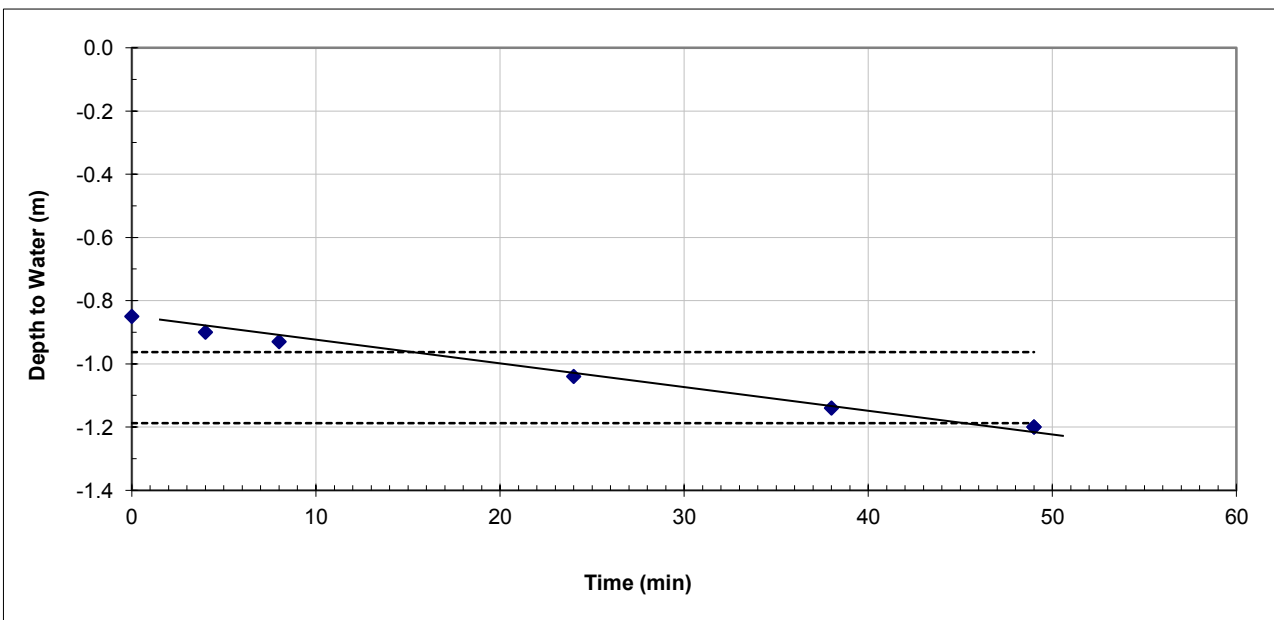
Trial Pit No. 4

Soakage Test No. 1

Pit Length (m) 1.8

Pit Width (m) 0.65

Pit Depth (m) 1.3



Design Soakage Rate

5.5E-05

m/s

(based on linear portion of graph as shown)

4.78

m/day

Site Havant Road, Site, Warblington

Job Number

Client BDW Southampton

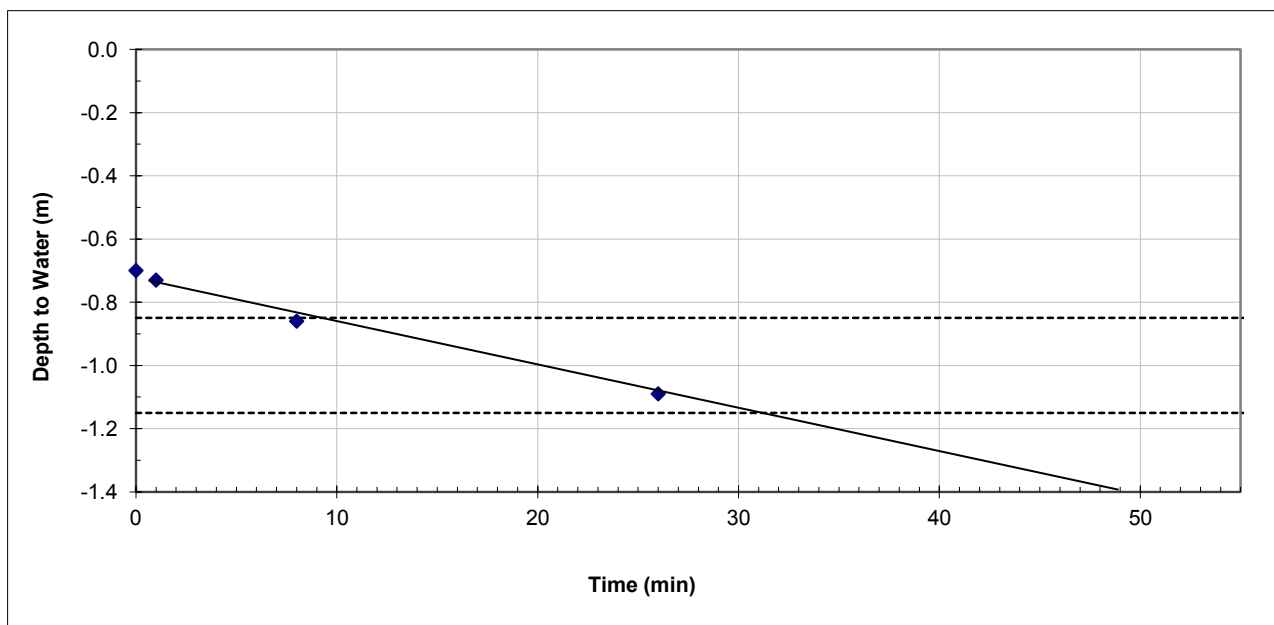
Sheet

2 / 3

Trial Pit No. 5

Soakage Test No. 1

Pit Length (m) 1.7 Pit Width (m) 0.65 Pit Depth (m) 1.3

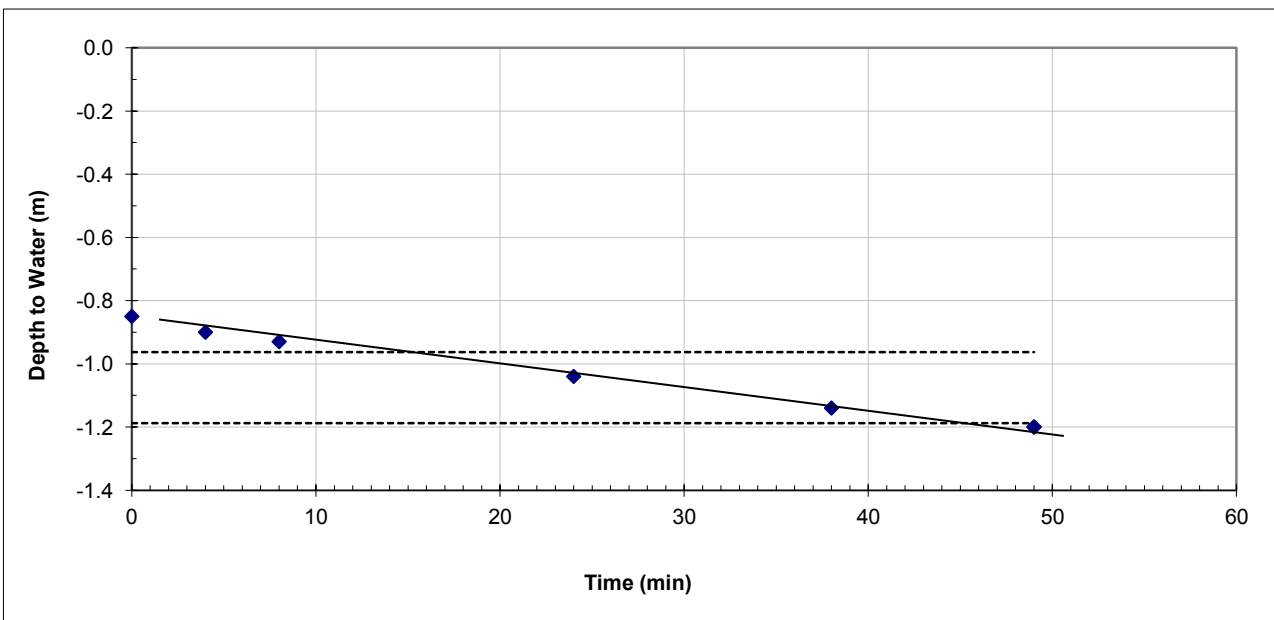


Design Soakage Rate 6.5E-05 m/s (based on linear portion of graph as shown)
5.58 m/day

Trial Pit No. 4

Soakage Test No. 1

Pit Length (m) 1.8 Pit Width (m) 0.65 Pit Depth (m) 1.3



Design Soakage Rate 5.5E-05 m/s (based on linear portion of graph as shown)
4.78 m/day

Site Havant Road Site, Warblington, Emsworth, Hampshire

Client BDW Southampton

