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Nantwich Waterlogged Deposits
Cheshire

Phase 2 Interim Report

English Heritage HEEP 3839 Main

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Cheshire East Council

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1.0 INTRODUCTION

In November 2010, SLR Consulting Limited (SLR) was commissioned by English Heritage and Cheshire East Council to undertake Phase 2 of the Nantwich Waterlogged Deposits Project. The purpose of the project is to develop an effective methodology to monitor the condition of the waterlogged deposits in Nantwich over a three year period and to update the strategy to manage these remains effectively, within the context of the need for continuing economic development within the historic centre.

The details relating to Phase 2 of the Nantwich Waterlogged Deposits project are recorded in a separate report[1] completed in October 2010 which should be read in conjunction with this report.

This report presents a summary of the fieldwork undertaken as part of the project during 2011, which comprised the following key elements:

- Advancing seven additional boreholes and installing dipwells at each of these locations to provide additional coverage across Nantwich, and to provide multilevel monitoring and sampling at three of these locations;
- Acquiring soil samples for geochemical and palaeoenvironmental analysis;
- Installing a rain gauge at Nantwich Museum and six pressure transducers in key dipwells in order to take daily rainfall and groundwater measurements;
- Collecting groundwater samples from each of the fourteen separate dipwell locations for geochemical laboratory analysis;
- Undertaking in situ permeability testing at twelve of the fifteen separate dipwell locations; and
- Completing quarterly monitoring at all of the seventeen dipwells for depth to groundwater, water quality parameters and ground gas concentrations.

Drawings are presented in Appendix A. Appendix B presents borehole logs and a summary of the palaeoenvironmental recording, Appendix C presents the analytical chemistry results, Appendix D presents the transducer and rain gauge data and Appendix E contains the permeability testing analyses.

[1] SLR Consulting Limited (January 2010): *Nantwich Waterlogged Deposits Report No 2: The Character and Extent of Archaeological Preservation*

2.0 BOREHOLE INVESTIGATION

2.1 Background

SLR completed the installation of seven additional groundwater dipwells on the 10th and 11th January 2011. Three wells were located to focus on specific organic-rich levels within the cultural horizon, whilst three extra wells were installed to provide additional spatial coverage on the west side of the River Weaver. In addition there was one extra at location F, because the original borehole had not included a dipwell. The scope of work included the following:

- drilling seven boreholes (F1, F2, N1, P1, AE, AF and AG) in January 2011 to a maximum depth of 4m, located to provide additional coverage and target specific cultural horizons containing organic material, using a window sampling drilling rig provided and operated by Sherwood Drilling under the supervision of SLR. The boreholes were completed as 'permanent' 50mm diameter groundwater monitoring wells;
- transporting the soil cores to the Palaeoecology Research Services Laboratory in Hull on the 12th January 2011 to log, sample and record the cores; and
- retaining and analysing seven soil samples for Sulphur, Ammoniacal Nitrogen, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, Loss on Ignition and Sulphide. All laboratory analyses were undertaken by Jones Environmental Forensics of Deeside.

The results of the soil investigations are described below.

2.2 Sediment sampling

2.2.1 Coring methodology

For Phase 2, additional boreholes were augered at three new locations: Boreholes AE and AF were to the west of the River Weaver whilst Borehole AG was to the east. All are in the Weaver floodplain and therefore preservation zone 1. Each metre core section was sealed and shipped to PRS in Hull for processing and sub-sampling. Seven sub-samples were stored in airtight plastic containers at 5°C before despatch to Jones Environmental Forensics Laboratory for processing and analyses. Additional boreholes were augered at original locations F, N and P to allow for multi-level sampling, but no geochemical or palaeoenvironmental assessment has been undertaken on the sediment samples.

2.2.2 Borehole Locations

A total of seven boreholes were advanced on the 10th and 11th January 2011 at the following locations:

F1: Church Lane Car Park

F2: Church Lane Car Park

N1: Rear of Boots Store

P1: Rear of Pinnington's Opticians

AE: First Wood Street Car Park

AF: First Wood Street Car Park

AG: Bowers Row Car Park

The locations of the new boreholes are shown in Appendix A.

The borehole locations were selected to focus on specific levels within the cultural horizon and provide additional spatial coverage and to provide additional coverage on both sides of the river, so that significant deposits can be monitored effectively.

2.3 Recording of Sediment Stratigraphy, Microfossil and Macrofossil Preservation

A total of 18 subsamples were collected from the three cores taken at the three new borehole locations (AE, AF and AG) to investigate microfossil and macrofossil preservation. The multilevel boreholes completed at three locations previously investigated – designated as boreholes F1, F2, N1 and P1 – were not studied further in the current round of works although each, again, revealed waterlogged organic preservation within some parts of the sediment sequences.

The sediment types and macrofossils encountered in the three new locations at AE, AF and AG are shown in Appendix B.

2.4 Palaeoenvironmental Assessment

2.4.1 Borehole AE

Preserved organic remains were noted in varying quantities in each of the six subsamples from Borehole AE. Variable states of preservation were evident, with upper samples possibly containing debris from wood-working. However, given that 0.79m to 1.00m was recorded as over burden, the composition of subsamples 1, 2 and 3 also suggest that these intervals contain similar material, due to abundance of brick/tile and comminuted charcoal. Aside from the comminuted wood, possible wood-working debris and occasional remains of moss, twigs, buds and bark, very little else was present in terms of plant macrofossils. The sampled intervals between 1.00m and 2.41m produced a total of seven 'seeds', of which only five were identifiable, together with a two fragments of hazel nutshell.

The three subsamples from the lower half of the core (Samples 4 to 6, depth 2.41m to 4.00m) contained very degraded vegetative detritus, although the interval between 2.41m-2.78m yielded a relatively large 'seed' assemblage, but which consisted of species that produce more robust seeds that may preferentially survive within the deposit. The suite of wild/weed species from the sample interval 2.41-2.78 m indicates areas of disturbed rough ground or scrubland (i.e. nettle, goosefoot/orache, cabbage/mustard-type, bramble and elder) as well as damp habitats, from the presence of blinks and sedges.

Traces of heavily fragmented invertebrate remains (including of beetle sclerites) were present in samples 4 and 5 but none of these were identifiable. A single quite complete mite from Sample 1 (lacking antennae and most leg parts) was almost certainly a modern contaminant.

There was a trace indication of faecal material (from single *Trichuris* egg – consistent in size with the whipworm of pigs or humans) from Sample 4 (2.41-2.78 m depth).

2.4.2 Borehole AF

The sediment sequence in borehole AF between 2.27-3.00m is the most organic-rich with the greatest density of plant macrofossils, most notably at interval 2.27m-2.48m. Frequent inclusions of cultural material such as brick/tile, slag, cinder, mortar, coal and sand were present in washovers up to 2.7m indicating that this could also be overburden material.

Between 2.70 and 3.00 m, plant macrofossils indicate scrubland/rough ground with elder, hazel, brambles. Traces of charred hazel nutshell suggest that these were potentially exploited. This theory is supported by the suite of ruderal species (those of disturbed or cultivated ground) present, such as stinking chamomile, goosefoot/oraches and knotweeds. Damp/wet ground is also evident due to the presence of sedges, spike-rush and celery-leaved buttercup. The consistent presence of comminuted charcoal throughout the core and

the traces of charred hazelnut shell indicate some level of anthropogenic activity within the locality, with likely activities involving the processing of locally available gathered resources.

In terms of information relating to the state of preservation of the organic remains, despite relative abundance of organic material in the lower section of Borehole AF, recovery was still quite poor with quite small 'seed' assemblages that again tended to be predominantly of robust or 'woody' seeds.

Invertebrate preservation also best in this borehole in Samples 16 to 19 (1.70-3.00m depth) but particularly in Sample 19 (2.48-3.00m depth).

Trace level indications of faecal material (from single *Trichuris* egg – consistent in size with the whipworm of pigs or humans) were found in Sample 17 (2.00-2.27 m depth).

2.4.3 Borehole AG

The four subsamples taken from Borehole AG produced extremely small washovers that were dominated by comminuted charcoal and/or coal, sand and stone, with negligible quantities of preserved organic material. The lowest sampled intervals (between 2.50 and 3.00m depth) produced a total of nine identifiable seeds offering some very limited scope for analysis and interpretation. The species identified suggests areas of disturbed scrubland (due to the presence of common nettle and elder) and damp habitats (on the basis of the presence of celery-leaved buttercup and marsh lousewort) but, overall, rather a dearth of organic material.

The consistent presence of comminuted charcoal and frequent occurrence of coal, cinder and brick/tile throughout the core suggests that the borehole is located on an area that been 'made up' using hard core or, perhaps more likely, that such material has been transported into lower deposits from overlying hard core as part of the coring process.

Small numbers of invertebrate remains were recovered from Samples 8 and 9 (1.90-2.70 m depth). The beetle remains were heavily fragmented but showing relatively little chemical erosion, although these may be modern contaminants. A small number of *Daphnia* ephippia were also rather suspiciously well preserved (when compared to the plant material).

No useful microfossil remains were present.

2.4.4 Summary of Palaeoecology Assessment

Clearly some three additional boreholes are located within the floodplain where there is potential for fairly good organic preservation. This was most evident in Borehole AF, although even here it would appear that there is some bias towards more robust remains. It is possible that there are some areas/depths were the deposits remain permanently saturated and have allowed anaerobic conditions to develop with consequent good organic preservation. However, there are also some influxes of oxygenated ground water and micro-organisms (percolating into the deposits on its way to the River Weaver) which have either been ongoing since deposit formation and allowed steady slow decay or perhaps been caused or accelerated more recently by the canalisation of the river resulting in relatively rapid decay of previously very well preserved organic remains.

2.4.5 Analytical Chemistry Results

SLR retained seven soil samples for chemical analysis for Sulphur, Ammoniacal Nitrogen, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, Loss on Ignition and Sulphide. All laboratory analyses were undertaken by Jones Environmental Forensics of Deeside.

The results for the chemical analysis are detailed in Appendix C and key results summarised in Table 1.

Table 1
Soils Analytical Chemistry Results

Sample ID	BHAE/2	BHAE/4	BHAF/13	BHAF/15	BHAE/17	BHAF/20	BHAG/10
Depth	2.17-2.26	2.55-2.78	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2	2.70-3.00
Sulphur	1.02	0.45	0.14	0.32	1.12	0.49	0.02
Ammoniacal Nitrogen	11.2	5.7	4.8	4.9	5.0	12.8	1.3
Chloride	428	78	134	197	743	81	108
Nitrate	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Nitrite	<0.05	0.07	<0.05	0.15	<0.05	0.11	0.13
Phosphate	6.5	8.9	1.1	2.2	<0.3	19.5	1.7
Sulphate	468.8	52.8	30.7	88.5	139.7	<1.5	42.0
Loss on Ignition	27.6	2.5	5.4	12.8	23.5	2.2	2.0
pH	7.37	7.99	7.60	6.93	7.30	8.12	8.21
Sulphide	<10	<10	23	<10	55	<10	<10

All values in reported in mg/kg, except pH

Borehole AE

Two samples were collected from this sequence, one from a charcoal rich coarse silt containing wood fragments (33.02 to 32.64m OD) and one from a sandy coarse silt beneath also containing charcoal (32.64 to 32.41m OD). Both silts have near neutral pH values, sulphate and sulphur present, but no sulphide detected. Ammoniacal nitrogen was present in both samples as were sodium and chlorides and phosphates but nitrates were absent and a trace of nitrite was detected in the lower silts. The uppermost silt sample had a higher organic content than the lower one (27.6% and 2.5% LOI values), and a higher conductivity reading.

Borehole AF

Four samples were collected from this sequence: from two predominantly clay deposits (between 34.06 to 33.89m OD and 33.50 to 33.19m OD) and two silt deposits (between 32.89 to 32.62m OD and 31.89 to 31.69m OD). The pH values are near neutral although the deepest silt is more alkaline (pH 8.12), whereas the lower clay is slightly acidic (pH 6.93). Again sulphur and sulphate were detected and sulphide too from the upper silt sample (between 32.89 and 32.62m OD). Coincidently, this sample produced an overpowering stench of hydrogen sulphide gas during processing. Other species detected included phosphates, ammoniacal nitrogen and traces of nitrite, but no nitrates. The chloride and sodium contents were quite high as were three of the conductivity readings. The zero conductivity value obtained from the uppermost sample (from 34.06 to 33.89m OD) is probably erroneous as both sodium and chloride was detected. Organic contents were low, with the highest concentration (23.5% LOI) from the uppermost silt sample.

Borehole AG

As this sequence was predominantly gravel only one sample was collected – a sample of the stiff clay (from between 34.33m OD to 34.03m OD). The clay is characterised by being slightly alkaline (pH 8.21) low in organic content (LOI 2%), redox sensitive species suggest reducing conditions predominate (low concentrations of nitrogen and nitrite, zero for nitrate, and whilst no sulphide was detected, low concentrations of both sulphur and sulphate were recorded). Other elements detected include iron, chloride, sodium and phosphate. The sample exhibited a high conductivity value.

Overall, these results suggest reducing conditions exist in the floodplain sediments, although there are conflicting data sets which, at first glance, suggest otherwise. The absence of appreciable levels of sulphide, coupled with the high concentrations of sulphate would indicate that conditions are more oxidising than reducing. However, the source of the sulphate could either be from oxidation of the samples or, more likely, resulting from an influx of salt-laden groundwater from natural brine-runs. The high conductivity values, along with the appreciable quantities of sodium and chloride from the sediment samples support this hypothesis. The presence of ammoniacal nitrogen also indicates anaerobic conditions as ammonium is only broken down in the presence of oxygen.

The methodology of sealing the cores immediately after retrieval and despatching to PRS at Hull had no detrimental impact upon sediment integrity or geochemical analyses.

2.5 C14 Dating

Six samples from Boreholes AE and AF have been submitted for radiocarbon dating. The samples are mainly twigs and hazelnut shell fragments and should help to date the flooding episodes from the Weaver.

3.0 RESULTS OF HYDROGEOLOGICAL ASSESSMENT

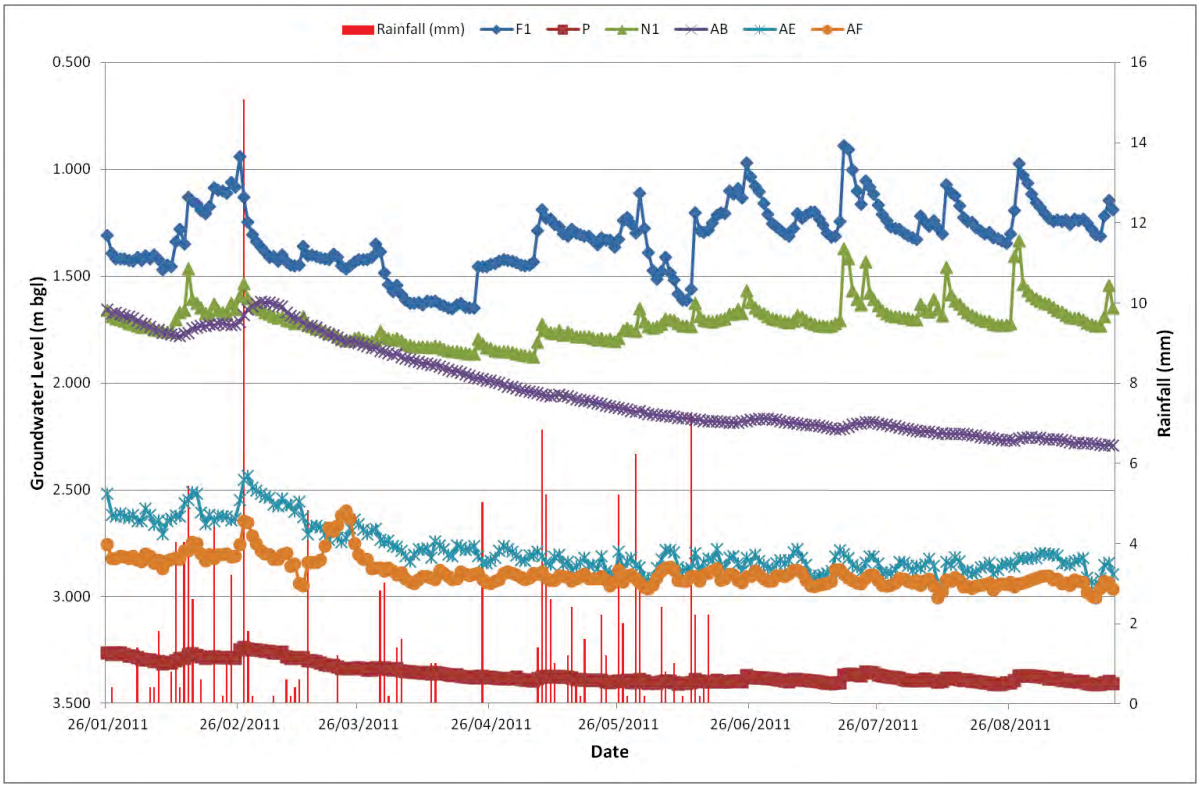
3.1.1 Transducer Data: Rainfall and Groundwater Levels

SLR completed the installation of the transducers at six locations to monitor particularly sensitive areas within the waterlogged deposits and provide a minimum of three transducer points on each side of the River Weaver. Therefore the six transducers were installed in dipwells F1, N1, P, AB, AE and AF. The transducer was installed in dipwell P instead of P1, because P1 contained insufficient water. The transducer that was intended for installation in dipwell AG was moved to AB because no waterlogged deposits were recorded in Bowers Row Car Park. The locations of the transducers are shown on a plan in Appendix A.

A rain gauge connected to a digital data logger was installed to the rear of Nantwich Museum. Unfortunately nesting insects and larvae blocked the rain gauge between the 17th June and 19th September 2011 and therefore there is gap in the rainfall information for this period.

The results of water level measurement from the transducers and rainfall gauge are shown in Appendix D and summarised in Figure 1 below.

Figure 1
Groundwater Level and Rainfall Data Graph



The results from the pressure transducer monitoring show a direct correlation between rainfall and groundwater level. However, this relationship is less pronounced to the west of the River weaver in dipwells AB, AE and AF.

3.1.2 Groundwater Monitoring Data

In situ monitoring has been undertaken at the seventeen dipwells at quarterly intervals since February 2011. In addition to groundwater depth measurements, dissolved oxygen,

conductivity, pH and REDOX potential were also measured using a YSI 556™ water quality meter. The dissolved oxygen results are missing from the May 2011 monitoring round because of a fault with the sensor, however, there were no problems with the other sensors on the probe (conductivity, redox and pH), and the instrument has since been repaired.

The in situ monitoring results are presented in Table 2. No water has ever been recorded in dipwell P1 because it is too shallow and therefore it has been excluded from the results table.

Table 2
Groundwater Monitoring Data

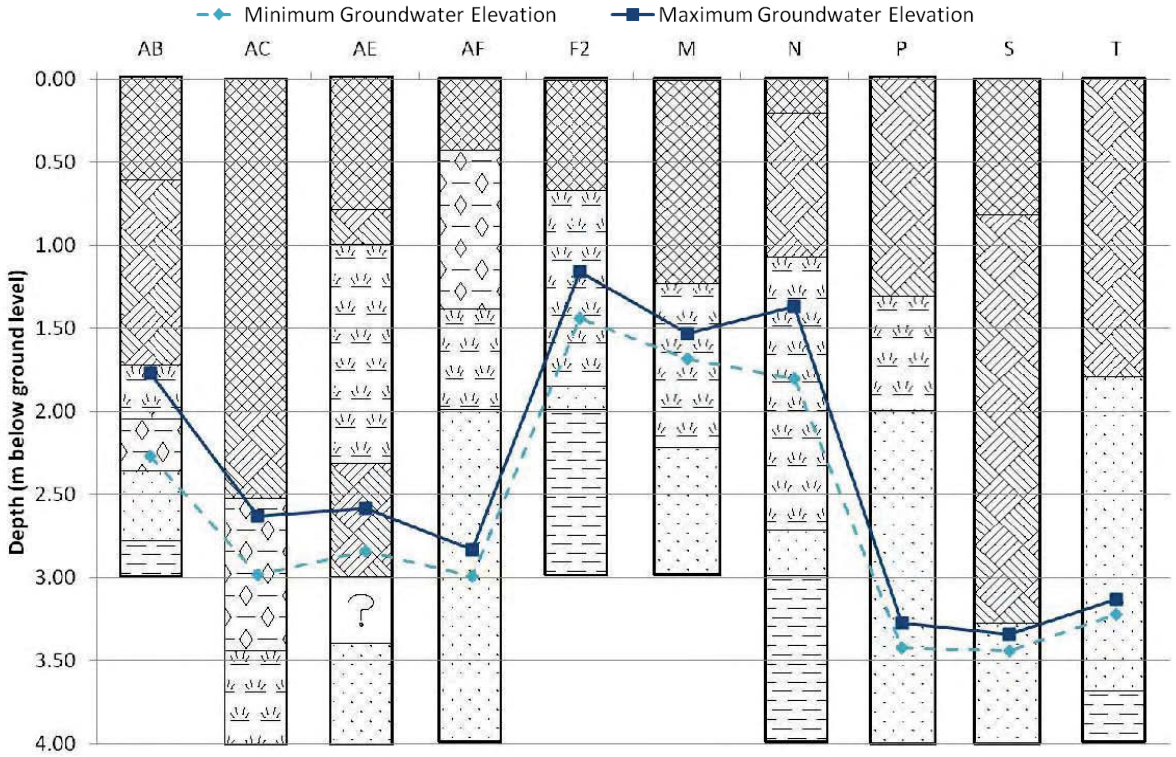
Well No	Screened interval (m)	Surface elevation (m AOD)	Water Depth (m)	Water elevation (m AOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV)	pH	Conductivity (µS/CM)	Temp (C)
AB	1.0-3.0	37.93	2.13	35.80	20/11/2007	0	-105.6	7.08	1253	12.1
AB	1.0-3.0	37.93	1.77	36.16	01/02/2011	1.85	51.7	7.09	706	7.89
AB	1.0-3.0	37.93	2.08	35.85	12/05/2011	-	111	7.52	344	9.33
AB	1.0-3.0	37.93	2.24	35.69	18/08/2011	0.24	-92.6	7.12	1086	12.4
AB	1.0-3.0	37.93	2.27	35.66	15/11/2011	2.22	70	6.73	443	11.15
AC	1.0-4.0	36.42	2.83	33.59	20/11/2007	0	-131.7	6.69	3505	14.5
AC	1.0-4.0	36.42	2.63	33.79	01/02/2011	0.77	-54.6	6.37	2455	9.83
AC	1.0-4.0	36.42	2.98	33.44	12/05/2011	-	129.4	6.84	1489	10.85
AC	1.0-4.0	36.42	2.85	33.57	18/08/2011	0.32	-53.9	6.7	2614	14.9
AC	1.0-4.0	36.42	2.79	33.63	15/11/2011	0.64	36.2	6.9	1343	13.69
AE	1.0 – 4.0	35.19	2.58	32.61	01/02/2011	0.86	-18.9	6.66	1405	10.87
AE	1.0 – 4.0	35.19	2.84	32.35	12/05/2011	-	61.4	7.11	950	11.22
AE	1.0 – 4.0	35.19	2.8	32.39	18/08/2011	0.28	-70.4	6.91	2018	14.5
AE	1.0 – 4.0	35.19	2.77	32.42	15/11/2011	0.51	-33.6	7	990	13.78
AF	1.0 – 4.0	34.89	2.84	32.05	01/02/2011	0.82	-43	6.55	2337	10.7
AF	1.0 – 4.0	34.89	2.99	31.90	12/05/2011	-	162.1	7.82	1319	11.07
AF	1.0 – 4.0	34.89	2.83	32.06	18/08/2011	0.36	-84.5	6.86	2122	15.2
AF	1.0 – 4.0	34.89	2.89	32.00	15/11/2011	0.76	205.4	7.14	1117	13.55
AG	1.0 – 4.0	37.03	2.61	34.42	01/02/2011	1.05	270.8	6.64	3336	9.4
AG	1.0 – 4.0	37.03	2.07	34.96	12/05/2011	-	68.7	7.55	3186	11.28
AG	1.0 – 4.0	37.03	1.54	35.49	18/08/2011	0.46	-55	6.61	4424	14.3
AG	1.0 – 4.0	37.03	1.57	35.46	15/11/2011	0.85	12.4	6.68	2355	13.07
F1	1.3 – 2.0	39.69	1.31	38.38	12/05/2011	-	115.1	7.33	700	12.33
F1	1.3 – 2.0	39.69	1.29	38.40	18/08/2011	1.45	-93.4	6.97	1076	16.5
F1	1.3 – 2.0	39.69	1.14	38.55	15/11/2011	1.86	-62.4	7.21	421	12.57
F2	1.0 – 4.0	39.69	1.44	38.25	01/02/2011	0.94	379.4	6.55	1421	7.44
F2	1.0 – 4.0	39.69	1.34	38.35	12/05/2011	-	106.9	7.38	847	12.17
F2	1.0 – 4.0	39.69	1.32	38.37	18/08/2011	0.24	-72.2	6.8	1918	13.8
F2	1.0 – 4.0	39.69	1.16	38.53	15/11/2011	0.76	-41.6	7.32	354	11.72
L	1.0-4.0	38.71	2.28	36.43	20/11/2007	0.95	-123.7	7.6	1644	12.8
L	1.0-4.0	38.71	2.26	36.45	01/02/2011	121	55.6	6.7	1275	8.34
L	1.0-4.0	38.710	2.35	36.36	12/05/2011	-	140.6	6.99	260	9.88
L	1.0-4.0	38.710	2.28	36.43	18/08/2011	0.39	-59.2	6.78	1807	13.3
L	1.0-4.0	38.710	2.21	36.50	15/11/2011	1.44	135.1	6.52	491	11.81
M	1.0-3.0	37.81	1.58	36.23	20/11/2007	0	25.4	6.56	1577	12.9
M	1.0-3.0	37.81	1.55	36.26	01/02/2011	1.17	46	6.71	1259	7.66

Well No	Screened interval (m)	Surface elevation (m AOD)	Water Depth (m)	Water elevation (m AOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV)	pH	Conductivity (µS/CM)	Temp (C)
M	1.0-3.0	37.810	1.68	36.13	12/05/2011	-	130.2	7.2	865	10.74
M	1.0-3.0	37.810	1.63	36.18	18/08/2011	0.93	-12.9	6.62	1464	13.2
M	1.0-3.0	37.810	1.53	36.28	15/11/2011	1.49	208.2	6.52	664	11.82
N	1.0-4.0	39.17	1.37	37.80	20/11/2007	1.08	-158.3	6.94	731	13.4
N	1.0-4.0	39.165	1.8	37.37	12/05/2011	-	148.8	6.92	533	11.13
N	1.0-4.0	39.16	1.67	37.49	18/08/2011	0.3	-47	6.98	7939	14.1
N	1.0-4.0	39.16	1.57	37.59	15/11/2011	0.75	159.4	6.52	286	12.8
N	1.0-4.0	39.16	1.71	37.45	01/02/2011	0.97	-18.2	7.2	1204	9.59
N1	1.0 – 3.0	39.16	1.73	37.43	01/02/2011	1.22	4.4	7.05	1023	9.65
N1	1.0 – 3.0	39.16	1.81	37.35	12/05/2011	-	144.7	7.14	645	11.53
N1	1.0 – 3.0	39.165	1.71	37.46	18/08/2011	0.28	-91.2	6.92	1183	14.9
N1	1.0 – 3.0	39.165	1.53	37.64	15/11/2011	2.34	185.1	6.51	355	11.54
O	1.0-4.0	39.64	1.44	38.20	20/11/2007	0.07	-134	7.01	1981	13.5
O	1.0-4.0	39.64	1.49	38.15	01/02/2011	2.37	57.2	6.84	1026	9.39
O	1.0-4.0	39.642	1.57	38.07	12/05/2011	-	130.1	7.3	352	11.6
O	1.0-4.0	39.642	1.51	38.13	18/08/2011	0.35	-70.4	6.89	1557	14
O	1.0-4.0	39.642	1.48	38.16	15/11/2011	1.19	50.2	6.6	348	12.51
P	1.0-3.8	39.93	3.33	36.60	20/11/2007	0.00	-76.0	6.47	1284	14.17
P	1.0-3.8	39.93	3.29	36.64	01/02/2011	0.82	252.1	5.83	885	10.35
P	1.0-3.8	39.925	3.42	36.51	12/05/2011	-	135	7.01	698	12.12
P	1.0-3.8	39.925	3.38	36.55	18/08/2011	0.5	-46.2	6.28	1055	14.4
P	1.0-3.8	39.925	3.27	36.66	15/11/2011	0.94	67.2	6.66	565	13.06
Q	1.0-4.0	39.22	1.71	37.51	20/11/2007	0.51	-66.1	6.87	1030	13.21
Q	1.0-4.0	39.22	1.86	37.36	01/02/2011	1.14	15.7	6.5	2430	8.53
Q	1.0-4.0	39.215	1.88	37.34	12/05/2011	-	112.5	7.16	684	11.34
Q	1.0-4.0	39.215	1.85	37.37	18/08/2011	0.17	-83.4	6.82	3246	15.5
Q	1.0-4.0	39.215	1.82	37.40	15/11/2011	0.77	59.7	6.63	653	13.48
S	1.0-4.0	39.77	3.34	36.43	20/11/2007	0.00	-3.1	6.76	828	13.02
S	1.0-4.0	39.77	3.35	36.42	01/02/2011	0.91	235.8	6.48	9.44	8.67
S	1.0-4.0	39.770	3.44	36.33	12/05/2011	-	144.5	6.77	781	10.27
S	1.0-4.0	39.770	3.42	36.35	18/08/2011	0.52	-85.1	7.06	1372	14.2
S	1.0-4.0	39.770	3.36	36.41	15/11/2011	0.95	82	6.64	501	12.55
T	1.0-3.0	39.50	3.16	36.34	20/11/2007	0.04	-139.8	6.81	784	12.56
T	1.0-3.0	39.50	3.14	36.36	01/02/2011	0.9	254.2	6.38	548	8.38
T	1.0-3.0	39.495	3.22	36.28	12/05/2011	-	130.9	7.23	466	9.23
T	1.0-3.0	39.495	3.22	36.28	18/08/2011	0.74	-60.8	6.85	853	12.3
T	1.0-3.0	39.495	3.13	36.37	15/11/2011	2.81	66.1	6.63	304	10.97
V	1.0-3.0	39.39	1.95	37.44	20/11/2007	0.00	-108.7	6.52	471	12.68
V	1.0-3.0	39.39	1.75	37.64	01/02/2011	1.23	12.1	5.68	740	6.99
V	1.0-3.0	39.390	2.09	37.30	12/05/2011	-	98.3	6.54	274	9.75
V	1.0-3.0	39.390	2.25	37.14	18/08/2011	0.24	-63.8	6.71	979	12.3
V	1.0-3.0	39.390	2.04	37.35	15/11/2011	1.16	52.9	6.62	335	11.59

The groundwater monitoring results indicate that groundwater is present between 1.14m and 3.44m below ground level. The hydraulic gradient indicates that flow direction is toward the River Weaver from both sides of Nantwich, as shown on the groundwater contour plot in

Appendix A. Figure 2 shows the maximum and minimum groundwater elevations plotted against selected borehole logs. This suggests that the Phase 1 conclusions were accurate in suggesting that the saturation of shallow sands overlying gault clay is a contributing factor to the waterlogging of deposits, whereas areas with deeper sand deposition contribute to rapid drainage.

Figure 2
Groundwater elevations plotted against borehole logs



For key refer to borehole logs in Appendix B

Redox Potential and Dissolved Oxygen

There is a broad positive correlation between Oxidation Reduction Potential (ORP) and dissolved oxygen (Figure 3). ORP values increase as dissolved oxygen levels increase, a trend that is to be expected and validates the method of monitoring (i.e. the results are not a product of oxygen ingress into the dipwell tubes). Dipwells F and P are in Preservation Zone 2, and Borehole P exhibited evidence for active decay when investigated in 2007. As already alluded to above Borehole N in Zone 1 produced the best preserved specimens. Borehole AF is in the River Weaver floodplain and hence in Preservation Zone 1 as well.

Figure 3
Redox v. Dissolved Oxygen graph

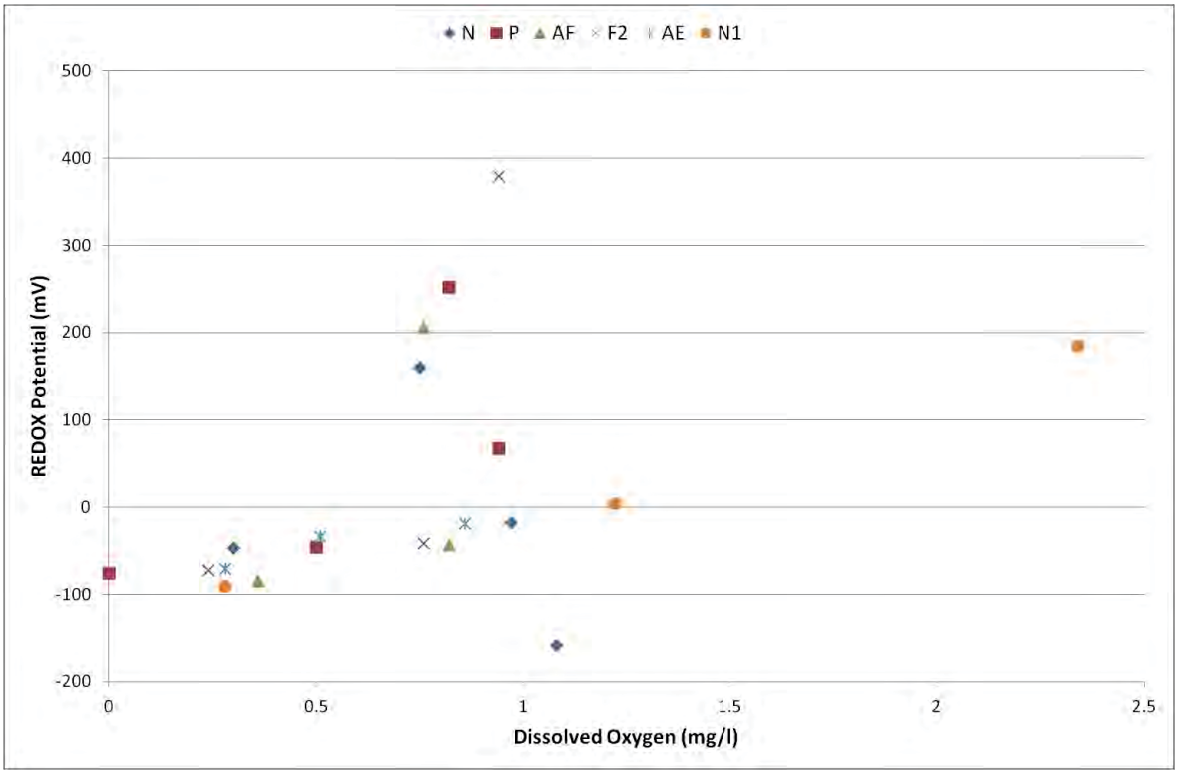


Table 3 below shows all recorded ORP values to date, which suggest the following broad trends:

20/11/07 – tending towards reducing conditions

01/02/11 – oxidising conditions

12/05/11 – oxidising conditions

18/08/11 – reducing conditions

15/11/11 – oxidising conditions

One possible reason for this trend could be the influx of oxygenated rainfall or other hydrological influences.

Table 3
Redox data summary

BH	Nov '07	Feb '11	May '11	Aug '11	Nov '11
AB	-105.6	51.7	111	-92.6	70
AC	-131.7	-54.6	129.4	-53.9	36.2
AE	-	-18.9	61.4	-70.4	-33.6
AF	-	-43	162.1	-84.5	205.4
AG	-	270.8	68.7	-55	12.4

F1	-	-	115.1	-93.4	-62.4
F2	-	379.4	106.9	-72.2	-41.6
L	-123.7	55.6	140.6	-59.2	135.1
M	25.4	46	130.2	-12.9	208.2
N	-158.3	-18.2	148.8	-47	159.4
N1	-	4.4	144.7	-91.2	185.1
O	-134	57.2	130.1	-70.4	50.2
P	-76.0	252.1	135	-46.2	67.2
Q	-66.1	15.7	112.5	-83.4	59.7
S	-3.1	235.8	144.5	-85.1	82
T	-139.8	254.2	130.9	-60.8	66.1
V	-108.7	12.1	98.3	-63.8	52.9

Cells highlighted in **RED** indicate **OXIDISING** conditions
Cells highlighted in **GREEN** indicate **REDUCING** conditions

Conductivity

Conductivity measurements provide a reliably accurate idea of the source of the water. Values recorded to date are all quite high suggesting an influx of chemical-laden groundwater into the deposits. Rainwater probably has a negligible influence. Very high readings probably indicate salt-rich groundwater from natural brine runs. These results complement the geochemical analyses that indicate the presence of sodium and chlorides.

pH

Overall the groundwater samples are near neutral or mildly acidic.

3.1.3 Groundwater Geochemical Laboratory Analysis

SLR retained fifteen groundwater samples (5 from Preservation Zone 1 and the remainder in Zone 2) and completed a suite of laboratory tests to characterise the geochemistry of the groundwater. Sampling was conducted in February 2011 using a peristaltic low flow pump and each dipwell was purged of stagnant water until the water quality parameters stabilised. Samples were despatched to Jones Environmental Forensics of Deeside for analysis,

The results of the chemical analysis undertaken on the collected samples of groundwater are presented in Appendix C and key dissolved phase contaminants are summarised in Table 4. The groundwater geochemical analysis will be repeated on an annual basis.

Table 4
Water Analytical Chemistry Results

BH	Date	Fe	Mn	$CaCO_3$	NO_3	SO_4	PO_4	S^{2-}	CH_4	Na	C^-	N	pH
AB	Feb '11	0	0.007	434	25.3	44.94	9.91	0	0	64.7	90.6	0.03	8.1
AC	Feb '11	13.55	3.516	480	5.4	171.73	<0.06	0	0	505.9	1051.9	1.52	7.43
AE	Feb '11	0.25	1.663	708	0	62.12	11.78	0	1.981	145.1	228.6	21.36	7.82
AF	Feb '11	0.1	0.92	868	0	12.39	10.95	0	3.396	467.2	787	46.22	7.73
AG	Feb '11	0.24	0.543	552	0	311.67	<0.06	0	0.009	604.4	1488.6	5.27	7.49
F2	Feb '11	0	1.353	476	0	222.3	0.82	0	0	176	325.3	4.71	7.7
L	Feb '11	0	0.643	476	9.7	153.7	0.89	0	0.032	151.5	298.5	21.52	7.93
M	Feb '11	0	0.148	352	3.1	104.96	7.79	0	0	196.5	368.1	0.23	7.54
N1	Feb '11	0.07	0.476	466	1.2	86.18	0.41	0	8.107	114.3	176.5	4.48	7.93

BH	Date	Fe	Mn	$CaCO_3$	NO_3	SO_4	PO_4	S^{2-}	CH_4	Na	C^-	N	pH
O	Feb '11	0	1.365	592	3.4	41.96	1.24	0	0	141.2	201.6	10.19	7.78
P	Feb '11	0	1.313	246	16.5	468.4	16.26	0	0.007	14.9	16.9	0.12	6.98
Q	Feb '11	0	0.154	282	6	59.37	6	0	0	661.9	1075	0.15	7.45
S	Feb '11	0	0.213	342	2	56.09	7.73	0	0.017	104.8	202.1	0.29	7.31
T	Feb '11	0	0.786	304	1.8	20.25	12.44	0	2.97	31	68.6	3.99	7.36
V	Feb '11	0	4.041	78	0	396.3	<0.06	0	0.094	18.3	15.5	1.24	6.36

All concentrations are measured in mg/l, except pH.

Most samples had near-neutral pH values apart from BH AB which was alkaline (pH 8.1) and BHV which was mildly acidic (pH 6.36). Borehole AB is towards the westernmost limit of the Weaver floodplain whilst Borehole V is at the eastern extremity of the medieval core of Nantwich. Assays for the principal redox reactive species proved negative for sulphides, but sulphates were present in all samples, whilst nitrates were absent from boreholes AB, AC, AE, AF and V. Dissolved iron was low too but appreciable concentrations of both sodium and chloride were recorded in all samples. Interestingly methane was also detected from 9 samples, with the highest concentration recorded from BH N1. It will be remembered that the best level of preservation was recorded from samples from N during the Phase 1 work completed in 2007.

A low level concentration of methane was recorded for BH P which was described as being in active decay when assessed in 2007. This borehole also exhibited the highest concentration of sulphate (468.44 mg/L).

3.1.4 Permeability of Deposits

In Situ permeability testing was undertaken in twelve of the dipwells in May 2011 in order to assess the differences in permeability within the varying soil types encountered during the previous borehole investigations. The remaining three dipwells are due to be tested in December 2011. The tests used a plastic cylindrical slug that had been lowered into the water column to displace a fixed volume from the dipwell as quickly as possible. The rate of groundwater recharge was then measured using a pressure transducer to calculate the length time that the water level took to stabilise. The results were then analysed to calculate the permeability of the deposits at each location.

The details of the permeability analysis are shown in Appendix E and the results of the permeability testing are summarised in Table 5 below.

Table 5
Permeability Results

BH Ref.	Permeability (m/day)	Soil Type
AB	0.5	SILT & SAND
AC	0.1	Clayey SAND
AE	0.3	Very sandy SILT
AF	0.2	Sandy SILT
AG	0.01	CLAY
F2	0.1	Sandy SILT & CLAY
N	0.02	SILT & CLAY
P	2	SAND
Q	0.7	Silty SAND
S	3	SAND

BH Ref.	Permeability (m/day)	Soil Type
T	6	SAND
V	4	Slightly clayey SAND

The results of permeability testing show that the rates of permeability fall within the typical values for the relevant soil types, and therefore can be considered to be appropriate. The soil types and permeability values show that there is an area of high permeability in the vicinity of St Mary's church which may have a significant drainage effect on the surrounding locality.

Therefore, the dipwells in this area tend to have a lower water table and this is confirmed in the groundwater monitoring data. In general the inverse is true at other locations where less permeable sediments are present, and the dipwells in these locations tend to have a water table at a shallower depth.

4.0 RESULTS OF GROUND GAS MONITORING

Quarterly ground gas monitoring was undertaken in each of the installed seventeen dipwells using a Geotechnical Instruments GA2000 gas analyser. The Gas Analyser is used to measure the concentration of hydrogen sulphide, methane, oxygen, carbon monoxide and dioxide through the gas taps which have been fitted to all dipwells. Methane and hydrogen sulphide are indicators of anaerobic conditions. Oxygen, carbon monoxide and carbon dioxide are indicators of oxygen-rich deposits.

The results of the ground gas monitoring are shown in Table 6 below.

Table 6
Ground Gas Monitoring Results

BH	Date	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
AB	08/03/2011	0	0	20	0	0
	12/05/2011	0	0.3	19.7	5	0
	18/08/2011	0	0.3	20.2	0	0
	15/11/2011	0	0.2	20.9	0	0
AC	08/03/2011	4	2.9	2.7	3	0
	12/05/2011	4.7	4.6	1.7	5	0
	18/08/2011	4.4	4.2	7.8	0	5
	15/11/2011	1.8	1.6	14.7	0	0
AE	08/03/2011	0	4.4	14.9	0	0
	12/05/2011	0.1	10.1	8.9	7	0
	18/08/2011	0	11.7	7.4	0	0
	15/11/2011	0	3.6	18	0	0
AF	08/03/2011	0	0.9	17.2	1	0
	12/05/2011	0.1	3	16.4	4	0
	18/08/2011	0	4.2	14.7	0	0
	15/11/2011	0.8	7.4	11.9	0	0
AG	08/03/2011	0	4.3	15.3	0	0
	12/05/2011	0	8	10.9	0	0
	18/08/2011	0	10.3	5.2	0	0
	15/11/2011	0	7.4	9.6	0	0
F1	08/03/2011	0	2	17.7	0	0
	12/05/2011	0	2	18.3	0	0
	18/08/2011	0	3.2	16.8	0	0
	15/11/2011	0	0.6	20.5	0	0
F2	08/03/2011	0	0	20	1	0
	12/05/2011	0.1	0.8	19.6	3	0
	18/08/2011	0	1.9	18	0	0
	15/11/2011	0	2.1	18.3	0	0
L	08/03/2011	0	1	19.6	2	0
	12/05/2011	0	0.7	20.2	5	0
	18/08/2011	0	0.05	19.8	0	1
	15/11/2011	0	0.7	20.3	0	0
M	08/03/2011	0	0.4	20.3	0	0
	12/05/2011	0.1	2.1	17.9	0	0
	18/08/2011	0	1.4	20.4	0	0

BH	Date	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
	15/11/2011	0	1.3	19.8	0	0
N	08/03/2011	0	4.8	10.5	0	0
	12/05/2011	0.1	4.9	12.7	3	0
	18/08/2011	0	7.4	11.4	0	0
	15/11/2011	0	2.2	18.2	0	0
N1	08/03/2011	0	0.5	19.6	0	0
	12/05/2011	0.1	1.6	17.9	2	0
	18/08/2011	0	3.6	16.4	0	0
	15/11/2011	0	7.6	9.3	0	0
O	08/03/2011	0	0.2	20	0	0
	12/05/2011	0.1	0.1	20.6	0	0
	18/08/2011	0	0	20.6	0	0
	15/11/2011	0	0.2	20.8	0	0
P	08/03/2011	0	0	19.9	0	0
	12/05/2011	0	0.2	20.1	0	0
	18/08/2011	0	3.2	16.9	0	0
	15/11/2011	0	0.2	20.8	0	0
P1	08/03/2011	0	2.8	18	0	0
	12/05/2011	0	3.3	16.2	5	0
	18/08/2011	0	1.9	18.4	0	0
	15/11/2011	0	2.2	18.3	0	0
Q	08/03/2011	0	0.5	19.5	0	0
	12/05/2011	0.1	0.1	20.7	0	0
	18/08/2011	0.1	0.1	20.6	0	0
	15/11/2011	0	0.2	20.8	0	0
S	08/03/2011	0	0	20	0	0
	12/05/2011	0	4.3	16.4	3	0
	18/08/2011	0	2.5	17.8	0	0
	15/11/2011	0	3.6	18	0	0
T	08/03/2011	0	0.2	19.9	0	0
	12/05/2011	0	0.2	20.4	3	0
	18/08/2011	0	0.4	20.2	0	0
	15/11/2011	0	0.1	21	0	0
V	08/03/2011	0	2.2	18.5	0	0
	12/05/2011	0.1	1.8	18.9	0	0
	18/08/2011	0	0.4	20.2	0	0
	15/11/2011	0	2.7	18.6	0	0

The results of the ground gas monitoring indicate that as would be expected, oxygen is the principal gas present, followed by carbon dioxide, carbon monoxide, methane and lastly hydrogen sulphide. Borehole AC has consistently recorded the highest concentrations of methane and one of only two detections, to date, of hydrogen sulphide (the other was from borehole L). High levels of methane in BH AC also correspond with lower concentrations of oxygen which suggest reducing conditions exist at this location. However, methane gas can travel long distances underground following paths of less resistance and therefore the source of the gas might not be immediately adjacent to the dipwell at AC.

Furthermore as both methane and hydrogen sulphide can oxidise rapidly then an absence in detection does not necessarily imply the gas is not present within the deposits. For example, higher-than-average concentrations of carbon dioxide have been observed in borehole AE with corresponding lower-than-average levels of oxygen and zero levels of methane. Such high levels of carbon dioxide could have resulted from the aerobic conversion of methane gas and hence an absence of either methane or hydrogen sulphide does not indicate an absence of reducing conditions.

5.0 CONCLUSIONS

5.1 Summary

Although the project has less than a year of data collection it can be seen that some significant potential results are being obtained which will help to characterize the below ground conditions and the changing fluctuations to which the deposits are vulnerable. The equipment and monitoring interval appear to be working effectively, with the exception of a blockage to the rainfall gauge and a malfunction to the dissolved oxygen sensor on the multi-sensor probe with consequent loss of data in May 2011. It is proposed to introduce an alteration to the interval between download and testing, so that more regular maintenance of the rainfall gauge can be introduced.

The preliminary indicators could suggest that preservation conditions are not ideal for continuing survival of organic remains, with redox fluctuating between reducing and oxidising conditions. With only 9 months of data, however, it would be premature to draw conclusions, and the redox values could equally be attributable to rainwater influx. Conductivity and geochemical data show the presence of high levels of salinity, presumed to derive from brine sources rather than chemical content from rainwater ingress. In general the results suggest that the initial characterization from Phase 1 was accurate, with a well-preserved Zone 1 in proximity to the river, and a less well-preserved Zone 2 on the valley side prone to external influences.

5.2 Wider considerations

The effects of decay to organic remains and drying out of waterlogged deposits could be resulting in serious consequences for the built heritage and economic viability of the Conservation Area. A recent newspaper report has highlighted the continued problems with subsidence in the historic core of the town:

Crewe Chronicle

Nantwich town evacuated over dangerous building

By Jamie Oliver 18 September 2010: 4:11pm

Holland and Barrett

SHOPS and business in Nantwich town centre were evacuated on Friday (September 10) by police amid fears the Holland & Barratt building could collapse.

Structural engineers deemed the High Street building unsafe and closed off the area from St Mary's Church to NatWest and also to High Street's junction with Mill Street at about 2pm on Friday.

There has also been a report in a national newspaper recording similar concerns:

Second driest spring in 90 years leaves house foundations crumbling

By Richard Alleyne and Rosie Murray-West

BRITAIN'S current spell of bad weather is too late to save thousands of households from subsidence caused by the second driest spring in 90 years.

While up to an inch of rain will fall in some places this weekend it will still not be enough to drag the country out of drought and stop the foundations of houses from crumbling.

Insurers said they have seen a five-fold increase in the number of calls about subsidence in the past few weeks.

A spokesman for the British Insurance Brokers' Association said. "We are getting the same number of calls in a day as we used to receive in a week. We are already contacting our customers to warn them that a dry spring could have disastrous consequences for their homes."

Forecasters said bands of rain will sweep across the country over the next few days and it will remain unsettled until the end of the week.

An average of half an inch of rain will fall as the weather front makes its way from the South West to Scotland over the weekend and on Monday.

John Hammond, a forecaster at the Met office, said: "Unlike the last few years, it is not looking great for the start of Wimbledon.

"A band of rain on Monday will make it overcast and wet. After that passes it is likely to remain unsettled for the rest of the week."

A spokesman for Wimbledon said that the weather would mean that its showpiece £100million retractable roof over centre court would come into its own.

"We could be using our new toy more," he said. "But when it comes to the rain, we will do what we do every year – we will do the best we can."

June has already been wet, with thunderstorms and showers meaning that much of the country has already experienced a month's rain in two weeks.

Wettest of all was the South East, where Kent experienced 2ins of rain in a fortnight. Across England and Wales it was the second driest spring since 1910 and the driest spring since 1990.

Overall, England and Wales had only 45 per cent of the long-term average rainfall for March, April and May.

But East Anglia had only 21 per cent, giving the area the driest spring for 101 years.

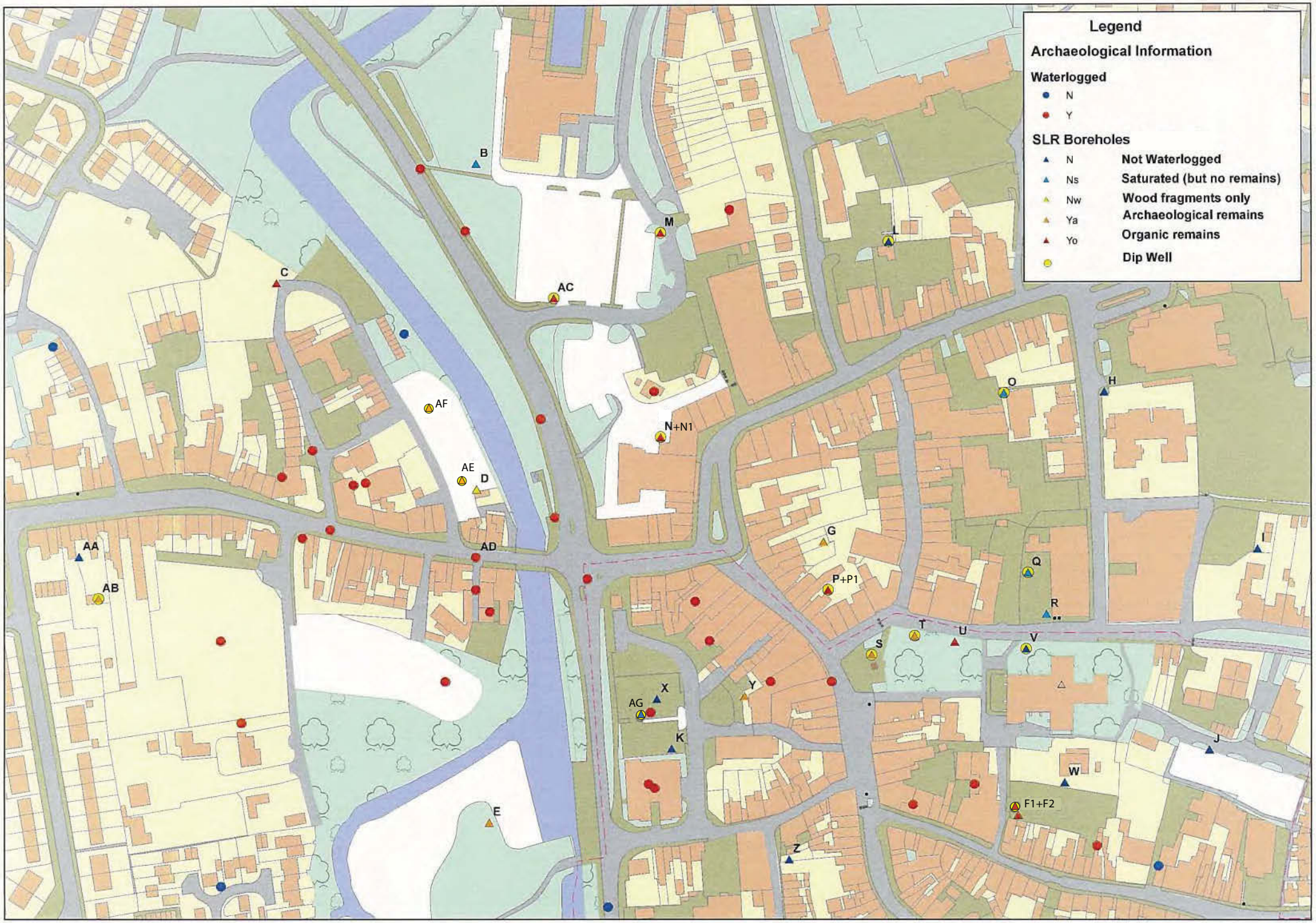
Vicki Woods: Page 24
Weather: Back Page
Your Money: Page 1

DT 18/6/11

These reports emphasize the conclusions of the Phase 1 study, that drying out of the waterlogged deposits at Nantwich not only pose a threat to buried archaeology, but also to the above ground heritage of the historic centre.

5.3 Recommendations

It is recommended that in future the quarterly in situ monitoring and transducer download visits are separated by six weekly intervals to allow more frequent servicing of the rain gauge and minimise the gaps in rainfall data collection caused by blockages.


Legend
Archaeological Information
Waterlogged
N
Y
SLR Boreholes
N Not Waterlogged
Ns Saturated (but no remains)
Nw Wood fragments only
Ya Archaeological remains
Yo Organic remains
Dip Well
B
C
AC
M
L
O
H
AF
N+N1
AE
D
AA
AB
AD
G
P+P1
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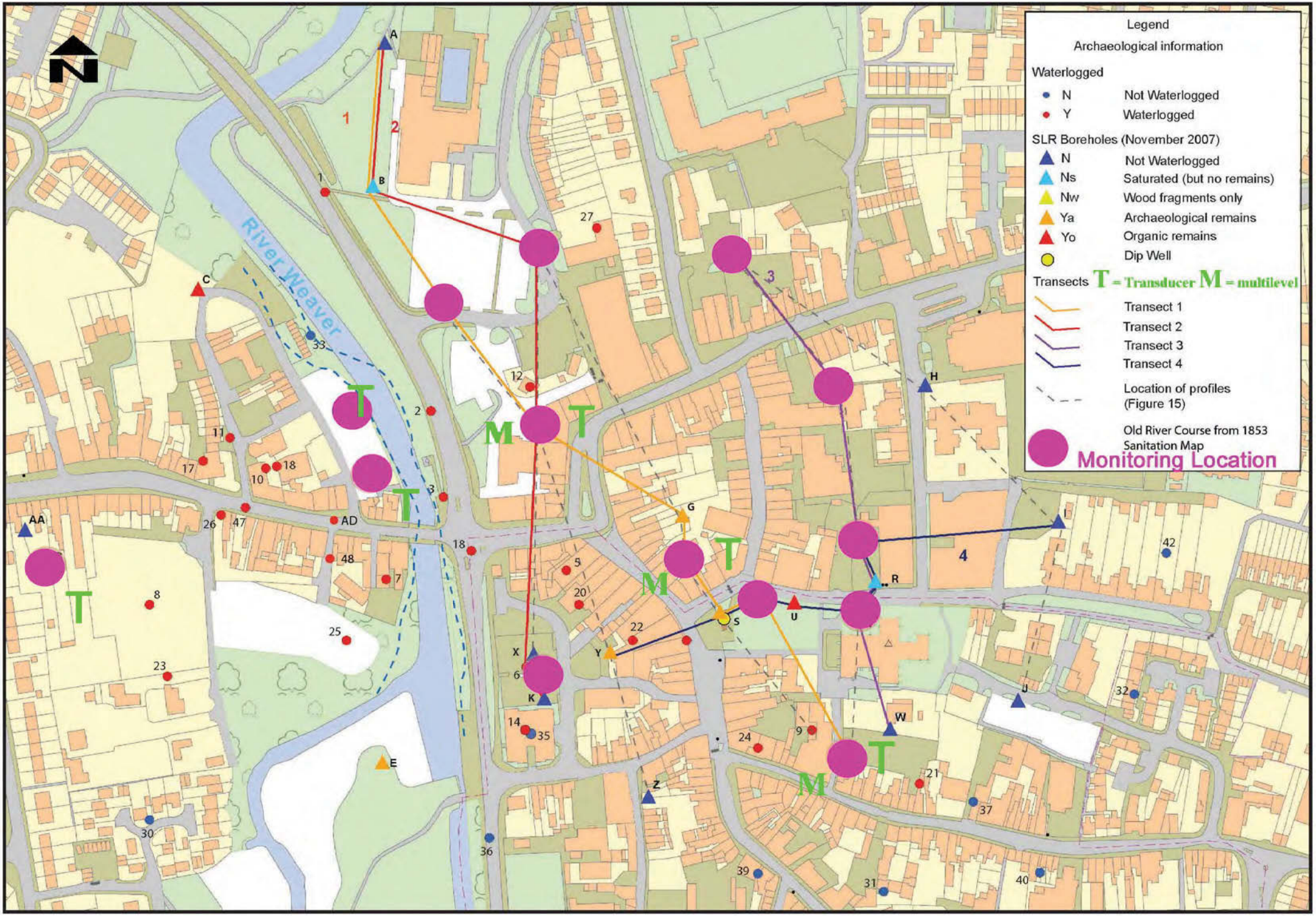
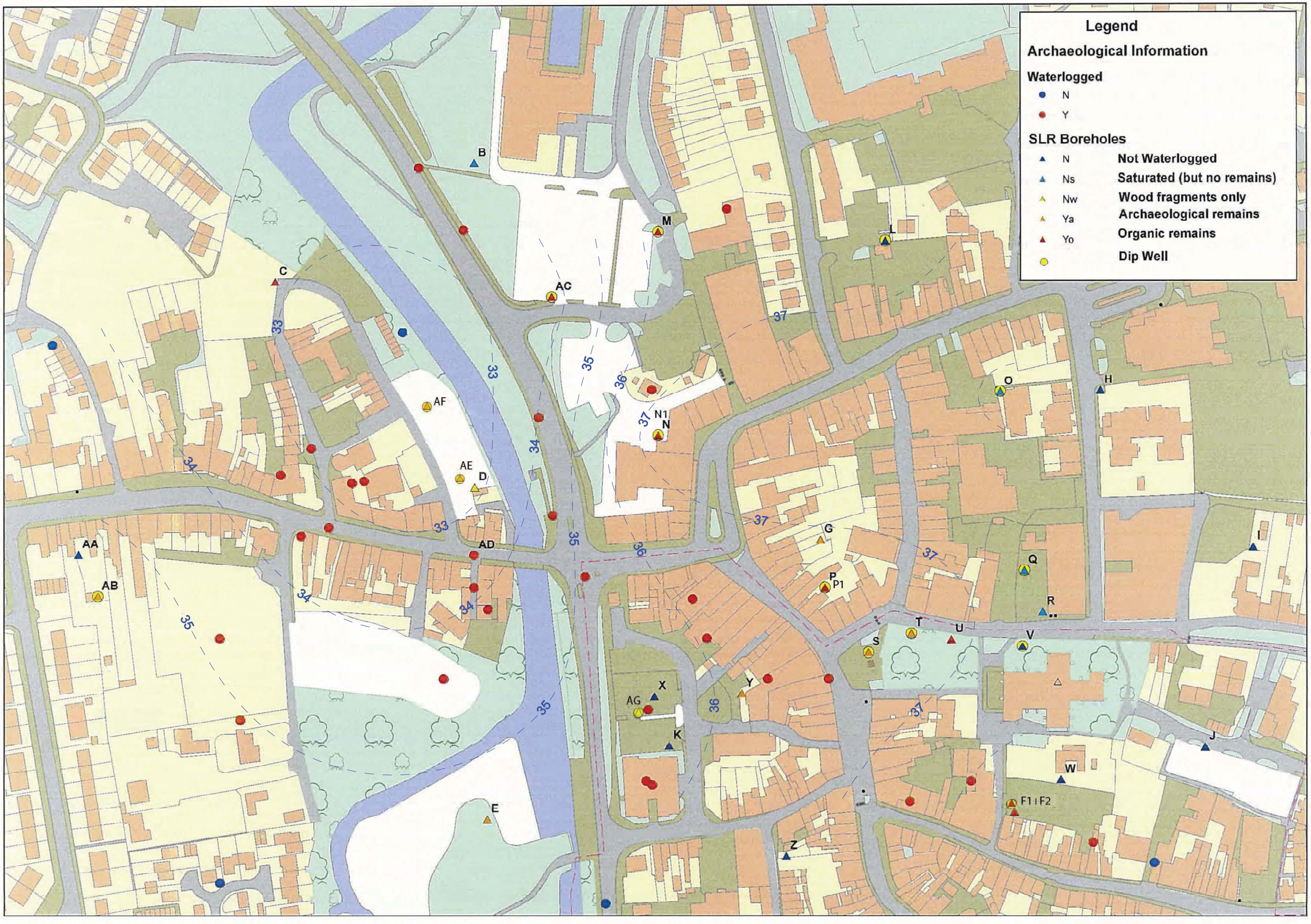
W
F1+F2
E
Z


Legend
Archaeological information
Waterlogged
N Not Waterlogged
Y Waterlogged
SLR Boreholes (November 2007)
N Not Waterlogged
Ns Saturated (but no remains)
Nw Wood fragments only
Ya Archaeological remains
Yo Organic remains
Dip Well
Transects T = Transducer M = multilevel
Transect 1
Transect 2
Transect 3
Transect 4
Location of profiles (Figure 15)
Old River Course from 1853 Sanitation Map
Monitoring Location
River Weaver
N

Inferred Groundwater Elevation Contours (mAOD) in November 2011



BOREHOLE LOG

BOREHOLE No. **AE**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	35.19maOD	

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							35.04		0.15	MADE GROUND: Tarmac over sub base	
							34.64	?	(0.40) 0.55	No recovery	
							34.49		0.70	Very loose dark greyish brown silty sandy medium GRAVEL	
							34.40		0.79	Medium dense dark grey gravelly coarse SAND	
							34.29		0.90	Medium dense greyish white GRAVEL of mortar with rare brick/tile fragments	
							34.19		1.00	Very dense dark greyish brown silty fine SAND, with rare flecks of mortar 0.97 - 1.00 ...Large brick/tile fragment (60 mm).	
1							33.19		(1.00) 2.00	Very soft greyish brown sandy SILT, with rare brick/tile and slight sulphide odour and rotted wood fragments.	
2							33.02		2.17	Very soft dark grey slightly sandy coarse SILT with frequent brick/tile and mortar	
							32.88		2.31	Very soft coarse SILT, with abundant charcoal and rare mortar fragments 2.27 - 2.31 ...Very rotted wood fragments.	
							32.19		(0.69) 3.00	Very soft greyish brown sandy coarse SILT with reddish brown mottling and rare fragments of brick/tile, mortar and charcoal 2.70 - 3.00 ...Becoming slightly clayey.	
3							31.79	?	(0.40) 3.40	No recovery	
							31.19		(0.60) 4.00	Very dense dark grey silty fine SAND with rare patches of black staining	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd, Mytton Mill, Forton Heath, Montford Bridge, Shrewsbury SY4 1HA Tel: 01743 850170, Fax: 01743 850868

BOREHOLE LOG

BOREHOLE No. **AF**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	11/01/11	34.89maOD	

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							34.74		0.15	MADE GROUND: Tarmac over sub base	
							34.59		0.30	No recovery	
							34.46		0.43	Very loose greyish brown slightly silty slightly sandy coarse GRAVEL	
							34.06		(0.40) 0.83	Stiff brown CLAY	
							33.89		1.00	Firm brown to dark grey slightly sandy silty CLAY 0.98 - 1.00 ...Single coarse gravel fragment.	
1							33.50		(0.39) 1.39	Stiff brown CLAY 1.17 - 1.20 ...Cinder fragments up to 18 mm. 1.30 ...Single coarse gravel fragment.	
							32.89		(0.61) 2.00	Firm dark grey silty CLAY, becoming increasingly silty with depth 1.52 - 1.56 ...Wood fragments up to 15 mm . 1.72 - 1.78 ...Pocket of brown clay.	
2							32.41		(0.48) 2.48	Very soft dark greyish brown sandy organic SILT with occasional patches of black - sulphide staining.	
							31.23		(1.18) 3.66	Very soft greyish brown slightly clayey sandy SILT	
3							30.89		(0.34) 4.00	Very dense greyish brown to dark grey slightly clayey fine SAND	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

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BOREHOLE LOG

BOREHOLE No. **AG**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	11/01/11	37.03maOD	

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							36.88		0.15	MADE GROUND: Tarmac over sub base	
							36.13	?	(0.75) 0.90	No recovery	
1							36.03		1.00	Very loose light grey slightly sandy silty coarse GRAVEL	
							35.13	?	(0.90) 1.90	No recovery	
2							35.03		2.00	Firm brown slightly sandy silty gravelly CLAY with abundant dark grey/black ash.	
							34.73	?	(0.30) 2.30	No recovery	
							34.53		2.50	Firm brown slightly sandy silty gravelly CLAY with abundant dark grey/black ash.	
3							33.03		(1.50) 4.00	Stiff brown CLAY	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

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TRIAL PIT LOG

TRIAL PIT No
BH AA

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

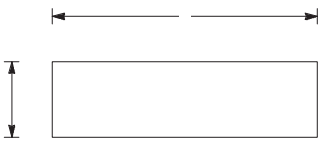
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	12/09/07	37.97mAOD	E 364730 N 352391	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.33		(0.64) 0.64	MADE GROUND/OVERBURDEN 0.35 - 0.54 Crushed brick and tile fragments present (<20mm).	
1								SAND 0.64 - 0.74 Becomes dark greyish brown.	
2					35.37		(1.96) 2.60		
					34.97		(0.40) 3.00	CLAY	
3								Trial Pit complete at 3.00m	
4									
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BH AB

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	12/09/07	37.93mAOD	E 364740 N 352370	1 of 1

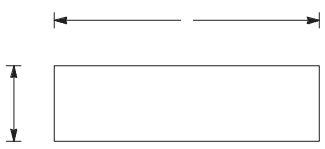
SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.32		(0.61) 0.61	MADE GROUND/OVERBURDEN 0.34 - 0.43 Brick becoming abundant.	
					36.20		(1.12) 1.73	ARCHAEOLOGICAL DEPOSIT 0.61 - 1.00 Brick, tile, coal and charcoal fragments (<20mm). 1.10 - 1.73 Ocasional black gravels of ash/cinder (<10mm).	
					35.93		2.00	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 1.73 - 2.00 Slight sulphide odour.	
				1	35.87		2.06	No Recovery.	
					35.56		(0.31) 2.37	MINERAL RICH DEPOSIT	
					35.14		(0.42) 2.79	SAND 2.70 - 2.79 Rounded pebbles (<20 mm) common.	
					34.93		3.00	CLAY	
								Trial Pit complete at 3.00m	

1 2 3 4 5

GENERAL REMARKS:
Groundwater present at 2.13m bgl. Well headspace concentration 40ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BH AC

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	12/09/07	36.42mAOD	E 364963 N 352517	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					34.42		(2.00) 2.00	MADE GROUND/OVERBURDEN 0.77 - 0.80 Brick and tile fragments (<40 mm) present. 0.99 - 1.00 Modern glass fragments (<40 mm) present.	
					33.90		(0.52) 2.52	ARCHAEOLOGICAL DEPOSIT 2.38 - 2.44 Rotted mortar (<12 mm) present.	
				1	32.98		(0.92) 3.44	MINERAL RICH DEPOSIT	
					32.42		(0.56) 4.00	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 3.55 - 3.59 Large stone inclusions (<60mm). 3.63 - 3.68 Large stone inclusions (<60mm).	
								Trial Pit complete at 4.00m	

GENERAL REMARKS:
Groundwater present at 2.83m bgl. Well headspace concentration 20 000ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHA

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	30/07/07	33.29mAOD	E 364931 N 352661	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
								MINERAL RICH DEPOSIT	
							(3.48)	1.61 - 1.63 Discontinuity of moist to wet, soft to unconsolidated, light grey, sand.	
								2.35 - 2.65 Very granular appearance caused by presence of indurated clay lumps (<3 mm) within the matrix.	
								3.20 - 3.48 Becoming slightly wetter and more sticky.	
					29.81		3.48		
							(0.42)	SAND	
					29.39		3.90		
								Trial Pit complete at 3.90m	

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GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHAE

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	10/01/11	35.19mAOD	E 364917.887 N 352428.049	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					34.40		(0.79) 0.79	MADE GROUND/OVERBURDEN	
					34.19		1.00	ARCHAEOLOGICAL DEPOSIT	
					32.88		(1.31) 2.31	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
					32.19		(0.69) 3.00	ARCHAEOLOGICAL DEPOSIT	
					31.79	?	(0.40) 3.40	No Recovery.	
					31.19		(0.60) 4.00	SAND	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHAF

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/01/11	34.89mAOD	E 364899.123 N 352463.451	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					34.46		(0.43) 0.43	MADE GROUND/OVERBURDEN	
					33.50		(0.96) 1.39	MINERAL RICH DEPOSIT	
					32.89		(0.61) 2.00	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
					30.89		(2.00) 4.00	SAND	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHAG

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/01/11	37.03mAOD	E 365007.316 N 352313.389	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					36.03		(1.00) 1.00	MADE GROUND/OVERBURDEN	
					35.13	?	(0.90) 1.90	No Recovery.	
					34.53		(0.60) 2.50	ARCHAEOLOGICAL DEPOSIT	
					33.03		(1.50) 4.00	CLAY	
								Trial Pit complete at 4.00m	

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GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHB

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

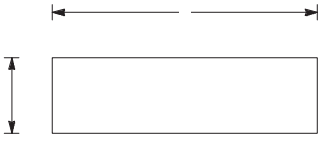
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	30/07/07	36.62mAOD	E 364925 N 352582	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
								MADE GROUND/OVERBURDEN 0.06 - 0.08 Becoming mid to dark grey-brown.	
							(2.44)		
					34.18		2.44		
								ARCHAEOLOGICAL DEPOSIT. Contains cinder and burnt material.	
								3.00 - 4.00 Slight sulphide odour.	
							(1.56)		
					32.62		4.00	3.92 Rounded edge pot fragment (<11mm)	
								CLAY	
							(2.00)		
					30.62		6.00		

GENERAL REMARKS:

Trial Pit complete at 6.00m

Trial Pit Dimensions:



Shoring/Support:
Stability:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHC

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	34.87mAOD	E 364827 N 352525	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
								ARCHAEOLOGICAL DEPOSIT	
								0.35 - 1.00 Fine ash/cinder.	
1							(1.90)		
								1.47 - 1.52 Pocket of orange sand. 1.60 - 1.62 Pocket of light grey-brown sand. 1.72 - 1.78 Waterlogged wood fragments.	
					32.97		1.90		
2								NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
								1.90 - 1.95 Slight sulphide odour. 1.95 Waterlogged wood fragments. 2.19 - 3.00 Moderate sulphide odour.	
3							(2.10)		
					30.87		4.00		
4								Trial Pit complete at 4.00m	
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No **BHD**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

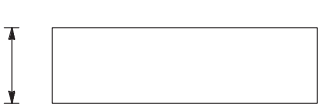
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	35.03mAOD	E 364925 N 352423	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					34.33		(0.70) 0.70	MADE GROUND/OVERBURDEN	
1								ARCHAEOLOGICAL DEPOSIT. Contains fine ash/cinder and mortar.	
							(1.39)		
2					32.94		2.09	2.00 - 2.09 Slight sulphide odour.	
					32.66		2.37	SAND	
							(0.63)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 2.47 - 2.50 Rotted wood.	
3					32.03		3.00		
							(1.00)	CLAY	
4					31.03		4.00		
								Trial Pit complete at 3.00m	
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHE

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	35.34mAOD	E 364931 N 352261	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					34.34		(1.00) 1.00	MADE GROUND/OVERBURDEN	
					33.84		(0.50) 1.50	ARCHAEOLOGICAL DEPOSIT. Contains brick, stones and slate.	
					32.93		(0.91) 2.41	MINERAL RICH DEPOSIT	
					31.34		(1.59) 4.00	ARCHAEOLOGICAL DEPOSIT. Contains fragments of brick and ash.	
								Trial Pit complete at 4.00m	

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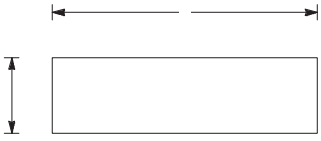
GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHF

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

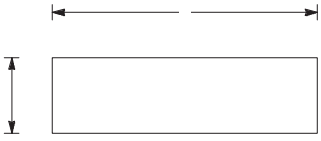
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	01/08/07	39.74mAOD	E 365191 N 352264	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					39.07		(0.67) 0.67	MADE GROUND/OVERBURDEN	
1					37.88		(1.19) 1.86	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 0.76 - 0.81 Waterlogged wood fragments 0.76 - 0.96 Moderate sulphide odour. 1.00 - 1.86 Slight sulphide odour. 1.48 - 1.52 Light grey sand intrusions (at ~45 degrees to horizontal). 1.50 - 1.86 Becomes wet. 1.56 - 1.60 Light grey sand intrusions (at ~45 degrees to horizontal). 1.64 - 1.72 Light grey sand intrusions (at ~45 degrees to horizontal). 1.76 - 1.80 Fibrous organic content.	
2					37.74		2.00	SAND 1.96 - 2.00 Slight sulphide odour.	
					36.74		(1.00) 3.00	CLAY	
3								Trial Pit complete at 3.00m	
4									
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHG

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	01/08/07	39.60mAOD	E 365096 N 352398	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					39.33		0.27	MADE GROUND/OVERBURDEN	
							(1.72)	ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, tile fragments and rotted charcoal. 0.87 Very rotted shell.	
					37.61		1.99		
							(1.01)	SAND	
					36.60		3.00		
								Trial Pit complete at 3.00m	

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GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHH**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	01/08/07	39.35mAOD	E 365233 N 352471	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.99		(0.36) 0.36	MADE GROUND/OVERBURDEN	
					38.35		(0.64) 1.00	ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, mortar and glass.	
					37.93	?	(0.42) 1.42	No Recovery.	
					37.83		1.52	SAND	
							(2.48)	CLAY	
					35.35		4.00		
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHI

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	38.96mAOD	E 365308 N 352394	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(0.86)	ARCHAELOGICAL DEPOSIT 0.00 - 0.86 Very slight sulphide odour.	
					38.10		0.86		
					38.00		0.96	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains ash/cinder and woody root fragments.	
1							(0.41)	MINERAL RICH DEPOSIT	
					37.59		1.37		
					37.38		1.58	SAND	
								CLAY	
2									
							(2.12)		
3									
					35.26		3.70		
								Trial Pit complete at 3.70m	
4									
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres Scale 1:37.5	Contractor : Sherwood Drilling Plant: Geotool	Method: Windowless Sampler	Logged By:	Approved By:

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TRIAL PIT LOG

TRIAL PIT No **BHJ**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	40.04mAOD	E 365284 N 352296	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(1.00)	MADE GROUND/OVERBURDEN	
					39.04		1.00		
							(0.75)	SAND	
					38.29		1.75		
							(2.25)	CLAY	
					36.04		4.00		
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHK

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	31/07/07	37.14mAOD	E 365021 N 352297	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					36.14		(1.00) 1.00	MADE GROUND/OVERBURDEN	
					34.14		(2.00) 3.00	CLAY	
								Trial Pit complete at 3.00m	

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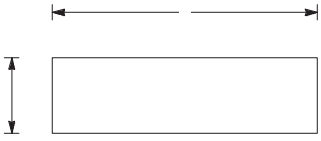
GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHL

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/09/07	38.71mAOD	E 365128 N 352544	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.96		(0.75) 0.75	MADE GROUND/OVERBURDEN	
1					37.41		(0.55) 1.30	ARCHAELOGICAL DEPOSIT 0.97 Post medieval/modern pottery fragment (<35mm).	
2				1	36.26		(1.15) 2.45	SAND	
3					34.71		(1.55) 4.00	CLAY	
4								Trial Pit complete at 4.00m	
5									

GENERAL REMARKS:
Groundwater present at 2.28m bgl. Well headspace concentration 35ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHM**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/09/07	37.81mAOD	E 365015 N 352549	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					36.58		(1.23) 1.23	MADE GROUND/OVERBURDEN	
				1	35.58		(1.00) 2.23	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains waterlogged organic material. 1.23 - 1.44 Slight sulphide odour. 1.44 - 1.60 Slight sulphide odour. 1.60 - 2.00 Slight sulphide odour. 2.00 - 2.23 Very slight sulphide odour.	
					34.81		(0.77) 3.00	SAND	
								Trial Pit complete at 3.00m	

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GENERAL REMARKS:
Groundwater present at 1.58m bgl. Well headspace concentration 905ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHN**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	12/09/07	39.17mAOD	E 365016 N 352449	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.97		0.20	MADE GROUND/OVERBURDEN	
					38.10		(0.87) 1.07	ARCHAELOGICAL DEPOSIT. Contains ash/cinder, brick, tile fragments, mortar and rotted charcoal.	
				1				NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains waterlogged wood and herbaceous detritus.	
					36.45		(1.65) 2.72	1.74 Bone fragment (<11mm) 1.88 - 1.91 Slight sulphide odour. 1.91 Blue vivianite? (<12mm) 1.91 - 2.00 Overpowering sulphide odour. 1.93 Hazelnut fragment. 2.00 - 2.46 Overpowering sulphide odour. 2.61 - 2.72 Very slight sulphide odour. 2.62 - 2.70 Large round wood (wattle?) inclusions.	
					36.17		3.00	SAND	
					35.17		(1.00) 4.00	CLAY	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:
Groundwater present at 1.37m bgl. Well headspace concentration 80ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No **BHO**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/09/07	39.64mAOD	E 365184 N 352470	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.44		(1.20) 1.20	MADE GROUND/OVERBURDEN 0.50 - 0.54 Brick/tile which becomes the dominant component.	
				1	37.87		(0.57) 1.77	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains brick, tile, coal fragments and waterlogged plant remains. 1.20 - 1.77 Slight sulphide odour.	
					37.64		2.00	ARCHAELOGICAL DEPOSIT	
					37.25	?	(0.39) 2.39	No Recovery.	
					36.75		(0.50) 2.89	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 2.39 - 2.89 Slight sulphide odour.	
					35.64		(1.00) 4.00	CLAY	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:
Groundwater present at 1.44m bgl. Well headspace concentration 10ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK TP File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 28-11-11

TRIAL PIT LOG

TRIAL PIT No
BHP

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	10/09/07	39.93mAOD	E 365098 N 352374	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.62		(1.31) 1.31	ARCHAELOGICAL DEPOSIT. Contains brick, tile, coal fragments and charcoal.	
								1.30 Animal bone fragment (<20mm).	
					37.93		(0.69) 2.00	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Very humified amorphous organic peat.	
				1			(2.00)	SAND 2.67 - 3.00 Slight sulphide odour.	
					35.93		4.00		
								Trial Pit complete at 4.00m	

GENERAL REMARKS:
Groundwater present at 3.33m bgl. Well headspace concentration 170ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHQ

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	10/09/07	39.22mAOD	E 365196 N 352383	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.74		(0.48) 0.48	MADE GROUND/OVERBURDEN	
					37.72		(1.02) 1.50	ARCHAELOGICAL DEPOSIT. Contains brick, tile, cinder/coal and glass fragments.	
				1	37.39		(0.33) 1.83	MINERAL RICH DEPOSIT	
					36.34		(1.05) 2.88	SAND	
					35.42		(0.92) 3.80	CLAY	
								Trial Pit complete at 3.80m	

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GENERAL REMARKS:
Groundwater present at 1.71m bgl. Well headspace concentration 170ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHR

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	10/09/07	39.18mAOD	E 365205 N 352362	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.68		(0.50) 0.50	MADE GROUND/OVERBURDEN	
					37.82		(0.86) 1.36	ARCHAELOGICAL DEPOSIT. Contains brick, tile, cinder/coal and mortar fragments.	
					37.31		(0.51) 1.87	MINERAL RICH DEPOSIT	
					36.68		(0.63) 2.50	SAND	
					35.18		(1.50) 4.00	CLAY	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHS

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

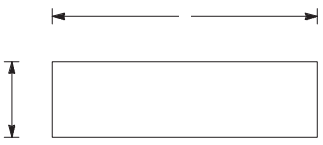
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	11/09/07	39.77mAOD	E 365119 N 352343	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					38.96		(0.81) 0.81	MADE GROUND/OVERBURDEN	
							(2.47)	ARCHAELOGICAL DEPOSIT. Contains fragments of brick and tile. 2.44 Brick surface (Large fragments <130mm)	
				1	36.49		3.28		
					35.77		(0.72) 4.00	SAND	
								Trial Pit complete at 4.00m	

GENERAL REMARKS:
Groundwater present at 3.34m bgl. Well headspace concentration 130ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHT

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

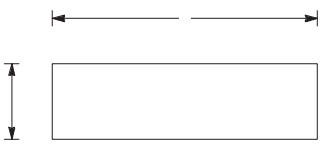
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	14/09/07	39.50mAOD	E 365140 N 352352	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
								ARCHAELOGICAL DEPOSIT	
							(1.80)	0.70 Human skull fragment.	
					37.70		1.80	1.59 Charred bone fragment (<20mm) 1.60 - 1.80 Very slight sulphide odour.	
								SAND	
				1			(1.90)		
					35.80		3.70		
							(0.30)	CLAY	
					35.50		4.00		
								Trial Pit complete at 4.00m	

GENERAL REMARKS:
Groundwater present at 3.16m bgl. Well headspace concentration 140ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No
BHU

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	14/09/07	39.43mAOD	E 365160 N 352349	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.93		(1.50) 1.50	ARCHAELOGICAL DEPOSIT. Contains brick, tile and coal fragments. 0.35 Animal bone fragment (<55mm) 0.60 - 0.65 Human skull fragments (<40mm) 1.00 - 1.08 Large human skull fragment (<80mm)	
					37.66		1.77	MINERAL RICH DEPOSIT	
					36.43		(1.23) 3.00	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 1.77 - 1.96 Slight sulphide odour. 2.00 - 2.17 Slight sulphide odour.	
								Trial Pit complete at 3.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No
BHV

Client:
CHESHIRE COUNTY COUNCIL

Project:
NANTWICH WATERLOGGED DEPOSITS

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	14/09/07	39.39mAOD	E 365195 N 352346	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(1.44)	MINERAL RICH DEPOSIT	
					37.95		1.44		
				1			(1.06)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains waterlogged wood fragments.	
					36.89		2.50		
							(2.00)	CLAY	
					34.89		4.50		
								Trial Pit complete at 4.50m	

1 2 3 4 5

GENERAL REMARKS:
Groundwater present at 1.95m bgl. Well headspace concentration 60ppm.

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHW**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	13/09/07	40.03mAOD	E 365214 N 352280	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					39.03		(1.00) 1.00	MADE GROUND/OVERBURDEN	
					38.67		(0.36) 1.36	ARCHAELOGICAL DEPOSIT. Contains brick and tile fragments. 1.20 SIngle pot sherd	
					37.55		(1.12) 2.48	SAND	
					37.03		(0.52) 3.00	CLAY	
								Trial Pit complete at 3.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHX**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

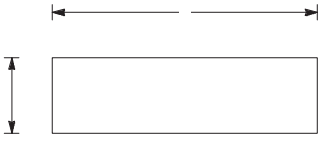
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	13/09/07	37.62mAOD	E 365014 N 352321	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.02		(0.60) 0.60	MADE GROUND/OVERBURDEN	
1					36.20		(0.82) 1.42	ARCHAELOGICAL DEPOSIT. Possible castle mound construction material.	
2					34.62		(1.58) 3.00	CLAY	
3								Trial Pit complete at 3.00m	
4									
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

TRIAL PIT LOG

TRIAL PIT No **BHY**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	13/09/07	39.90mAOD	E 365057 N 352322	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							(2.06)	MADE GROUND/OVERBURDEN	
					37.84		2.06		
							(1.68)	SAND	
					36.16		3.74		
					35.90		4.00	CLAY	
								Trial Pit complete at 4.00m	

1 2 3 4 5

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:

Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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TRIAL PIT LOG

TRIAL PIT No **BHZ**

Client: **CHESHIRE COUNTY COUNCIL**

Project: **NANTWICH WATERLOGGED DEPOSITS**

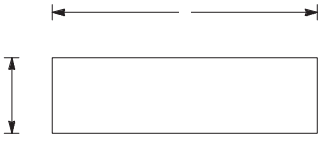
Project No:	Date:	Ground Level:	Co-ordinates:	Sheet:
406.0889.00003.005	13/09/07	38.46mAOD	E 365079 N 352243	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					37.76		(0.70) 0.70	MADE GROUND/OVERBURDEN	
1					36.42		(1.34) 2.04	SAND	
2					35.46		(0.96) 3.00	CLAY	
3								Trial Pit complete at 3.00m	
4									
5									

GENERAL REMARKS:

KEY:
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
D = Small Disturbed Sample
B = Large Bulk Sample
HS = Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:
Stability:

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:37.5	Plant: Geotool			

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Table 1. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Description of deposit sequences encountered by borehole following that used previously in the original survey. Key: 'PC' = Preservational condition (following the Bergen excavation office state of preservation scale); 'Spot sample' = material removed as an organic spot find; 'C14' = any material noted of possible value for radiocarbon dating; 'NS' = not sampled.

i) Borehole F1

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.600	39.690	39.090	D0	Void	-	-	level	-	-	-	-
0.600	0.790	39.090	38.900	A0	More or less dry, light to mid brown, stiff (working plastic), clay	Abundant angular stones (to 48 mm) throughout	none	level	22	-	-	-
0.790	1.000	38.900	38.690	A1	Moist, dark grey-brown/grey, crumbly and slightly sticky (working soft), ?slightly clay silt	Rootlet at interface (0.79), traces of ?decayed mortar at 0.80-0.82, patches coloured black and light to mid brown at 0.88-0.94 and a bone fragment at 0.96	none	level	23	-	SPOT2 = bone fragment at 0.96	-
1.000	1.130	38.690	38.560	D0	Void	-	-	level		-	-	-
1.130	1.230	38.560	38.460	A3	More or less dry, very dark grey-brown to black, crumbly, amorphous organic sediment, with a little silt and sand content	Fine herbaceous detritus throughout	none	level	24	Sample 24 = all of core from 1.13-1.23	-	-
1.230	1.380	38.460	38.310	B2	Just moist, mid to dark grey-brown, crumbly (working soft), slightly sandy slightly clay silt	Rounded pebbles (to 14 mm) present at 1.27-1.29 and occasional plant tissue fragments at 1.32-1.38	none	level	25	-	-	-
1.380	1.860	38.310	37.830	C0	Moist to wet, dark grey, sticky, clay sand	Rounded pebbles (to 12 mm) present at 1.58-1.61	none	level	26	-	-	-
1.860	2.000	37.830	37.690	C0	Moist to wet, light grey/grey-brown, unconsolidated, sand	None	none	-	27	-	-	-

ii) Borehole F2

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	1.000	39.690	38.690	E0	Moist, light to mid brown/grey-brown, unconsolidated gravel (to 50 mm), with a little silty sand matrix - no recovery in tube (small sample submitted in bag)	None	none	-	28	-	-	-
1.000	1.500	38.690	38.190	D0	Void	-	-	level	-	-	-	-
1.500	1.590	38.190	38.100	C0	Moist, light to mid brown/grey-brown, unconsolidated gravel (to 50 mm), with a little silty sand matrix	None	none	level	NS	-	-	-
1.590	1.650	38.100	38.040	C0	Moist, mid to dark grey, soft to unconsolidated, sand	Some areas mid grey-brown in colour and white patches of ?decayed mortar/lime (to 10 mm) present throughout	none	level	29	Sample 29 = all from 1.59-1.65	-	-
1.650	2.000	38.040	37.690	C0	Moist (somewhat wetter from 1.90-2.00), soft to unconsolidated, sand, mostly mid grey, with mid brown mottling and mid brown from 1.95-2.00	Rounded pebbles (to 9 mm) present at 1.72-1.75 and light to mid grey clay inclusions at 1.81-1.86	none	level	30	-	-	-
2.000	2.320	37.690	37.370	D0	Void	-	-	level	-	-	-	-
2.320	2.560	37.370	37.130	C0	Wet, light to mid brown/grey-brown, unconsolidated, sand	None	none	level	31	-	-	-
2.560	2.660	37.130	37.030	C0	As 2.32-2.56 (above) but with the addition of a slight clay content	Abundant large rounded pebbles to 60 mm	none	level	31	-	-	-
2.660	3.000	37.030	36.690	C0	Moist, mid brown, stiff (working plastic), clay	None	none	level	32	-	-	-
3.000	4.000	36.690	35.690	C0	As 2.66-3.00 (above)	None	none	-	NS	-	-	-

iii) Borehole N1

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.530	39.160	38.630	D0	Void	-	-	irregular	-	-	-	-
0.530	0.560	38.630	38.600	E0	Just moist, dark grey/grey-brown, crumbly to soft (working plastic), clay - only represented in part of core tube	Occasional brick/tile fragments (to 15 mm) present throughout	none	level	NS	-	-	-
0.560	0.950	38.600	38.210	A0	Moist, mid brown, stiff (working plastic), clay - ?redeposited	single large stone (to 55 mm) at 0.56-0.60 and black inclusions of ?charcoal/ash present thoughout and becoming common from 0.87-0.95	none	level	33 (0.56-0.87)and 34 (0.87-0.95)	-	-	-
0.950	1.000	38.210	38.160	A0	Moist, very dark grey/black (occasionally dark grey-brown), soft, clay silt	Abundant ?charcoal/black ash and occasional stones (to 12 mm) throughout	none	level	35	Sample 35 = all of 0.95-1.00	-	-
1.000	1.170	38.160	37.990	D0	Void	-	-	level	-	-	-	-
1.170	1.340	37.990	37.820	A0	Moist, mid brown, stiff (working plastic), clay - ?redeposited	occasional stones (to 12 mm) present throughout	none	level	36	-	-	-
1.340	2.000	37.820	37.160	B2	Moist (becoming wet at 1.85-2.00), very dark grey to black, sticky, humic, sandy clay silt	?Decayed wood fragments (to 15 mm) at 1.46-1.47, ?decayed mortar/lime (to 15 mm) at 1.63-1.65 and roundwood fragments (to 35 mm) common at 1.92-1.94	moderate - stronger with depth	level	37	37A - sediment from 1.34-1.45 AND 37B - sediment around roundwood at 1.90-2.00	SPOT3 - roundwood fragments from 1.92-1.94	SPOT3 possibly for dating
2.000	2.230	37.160	36.930	D0	Void	-	-	level	-	-	-	-

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
2.230	2.710	36.930	36.450	C3	As 1.34-2.00 (above)	large wood inclusion (to 65 mm) at 2.23-2.30, fine herbaceous detritus present at 2.23-2.51, smaller wood fragments (to 12 mm) common at 2.51-2.71	moderate	level	38	-	SPOT4 - large wood fragment at 2.23-2.30	-
2.710	2.770	36.450	36.390	C0	Large rounded pebbles - little or no matrix	Large rounded pebbles (to 60 mm) at 2.71-2.77	none	level	39	-		-
2.770	2.890	36.390	36.270	C2	Light brown, very decayed wood - no matrix	Very decayed wood at 2.77-2.89	none	level	SPOT5	-	SPOT5 - all of wood at 2.77-2.89	-
2.890	3.000	36.270	36.160	C3	Wood continues but less decayed and mid to dark brown/grey-brown in colour	Wood at 2.89-3.00	none	-	SPOT6	-	SPOT6 - all of wood at 2.89-3.00	-

iv) Borehole P1

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.500	39.930	39.430	D0	Void	-	-	level	-	-	-	-
0.500	0.530	39.430	39.400	E0	Just moist, light to mid brown/grey-brown, unconsolidated, sand	Stones (to 30 mm) present throughout	none	level	40 - over burden	-	-	-
0.530	0.620	39.400	39.310	E0	As 0.50-0.53 (above)	Single rounded pebble (to 15 mm) at 0.57-0.59	none	level	40	-	-	-
0.620	0.710	39.310	39.220	E0	Just moist, mid grey-brown/grey, unconsolidated (working soft), clay sand	None	none	level	40	-	-	-
0.710	0.740	39.220	39.190	E0	Moist, mid brown, stiff (working plastic), clay - redeposited	None	none	level	40	-	-	-
0.740	1.000	39.190	38.930	E0	More or less dry, dark grey-brown/black, unconsolidated to crumbly, sandy clay silt - former ground surface	Clay lump (to 70 mm) at 0.77-0.84, modern rootlet, coal (to 20 mm), cinder (to 50 mm) and stones (to 40 mm) present throughout	none	level	40	-	-	-
1.000	1.550	38.930	38.380	D0	Void	-	-	level	-	-	-	-
1.550	1.720	38.380	38.210	A0	Just moist, light to mid grey, unconsolidated, sandy clay silt	Abundant gravel (to 40 mm) throughout	none	level	41	-	-	-
1.720	1.820	38.210	38.110	A3	More or less dry (just moist from 1.77-1.82), dark brown/grey-brown, unconsolidated, silty amorphous organic sediment	Wood/bark fragments (to 15 mm), lumps of clay (to 15 mm) and stones (to 10 mm) present throughout	very slight	level	42	42 = all from 1.72-1.82	-	-
1.820	2.000	38.110	37.930	A1	Just moist, very dark grey-brown, crumbly (working soft), ?slightly humic, slightly sandy silt	Occasional ?herbaceous detritus present throughout	very slight	-	43	43 = all from 1.82-2.00	-	-

v) Borehole AE

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.550	35.190	34.640	D0	Void	-	-	level	-	-	-	-
0.550	0.700	34.640	34.490	E0	Moist, dark grey/grey-brown very granular, unconsolidated, silty sand - smells strongly of tar	abundant stones (to 15 mm) throughout	none	level	NS – over burden	-	-	-
0.700	0.790	34.490	34.400	E0	Moist, light brown, unconsolidated, sand (stained very dark grey from 0.70-0.75 - ?by tar)	Stones (to 15 mm) common throughout	none	level	NS – over burden	-	-	-
0.790	0.900	34.400	34.290	E0	Moist, just off-white, unconsolidated, ?mortar - no matrix	Occasional brick/tile fragments (to 12 mm) throughout	none	level	NS - over burden	-	-	-
0.900	1.000	34.290	34.190	E0	Moist, mid to dark grey/grey-brown, unconsolidated, silty sand to sandy silt	Flecks of ?mortar from 0.90-0.94 and large brick/tile fragment (to 60 mm) at 0.97-1.00	none	-	NS – over burden	-	-	-
1.000	2.000	34.190	33.190	A1	Moist, mid grey-brown, unconsolidated (occasionally crumbly), sandy silt - no recovery in tube (small sample submitted in bag)	Brick/tile (to 26 mm), some dark grey-brown (internally very dark grey) lumps of ?humic slightly sandy silt (to 55 mm) which gave a slight sulphide smell when broken, a little herbaceous detritus (?rootlet) and decayed wood (to 30 mm) present	slight - from ?humic lumps	-	1	-	-	-
2.000	2.170	33.190	33.020	A0	Moist, mostly dark grey with some light grey patches, unconsolidated to crumbly (working soft), slightly sandy silt	Brick/tile and mortar (both to 40 mm) common throughout	none	level	NS	-	-	-
2.170	2.310	33.020	32.880	A1	Just moist, mid to dark grey, unconsolidated to soft, silt	Charcoal (to 12 mm) common throughout and abundant in places, mortar flecks present throughout and very decayed ?wood fragments present at 2.27-2.31	none	level	2	Sample 2 = majority of sediment from 2.17-2.26	-	-

Depth		AOD										
From	To	From	To	PC	Sediment description	Inclusions	Sulphide odour	Interface	Sample	Chemical sample	Spot sample	C14
2.310	3.000	32.880	32.190	B3	Moist (become wet from 2.41-3.00), mid grey-brown/grey (with some mid reddish-brown mottling), unconsolidated to soft, sandy silt (slightly clay from 2.70-3.00). Note: sandy at very base but this material was out of the sampling tube within the bag covering the end	Occasional fragments of brick/tile, mortar (to 20 mm) and charcoal (to 12 mm) present from 2.31-2.41	strong - largely localised to 2.41-3.00	-	3 (2.31-2.41) AND 4 (2.41-2.78) and 5 (2.78-3.00)	Sample 4 = all from 2.55-2.78	-	-
3.000	3.400	32.190	31.790	D0	Void	-	-	level	-	-	-	-
3.400	4.000	31.790	31.190	C1	Moist, mid to dark grey, soft to unconsolidated, silty fine sand (occasional black patches of ?sulphide staining)	None	very slight	-	6	-	-	-

vi) Borehole AF

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.300	34.890	34.590	D0	Void	-	-	-	-	-	-	-
0.300	0.430	34.590	34.460	E0	Wet, mid to dark grey/grey-brown, unconsolidated, slightly silty sand matrix but primarily gravel (see inclusions) - strong smell of tar	Abundant stone gravel (to 50 mm)	none	level	11	-	-	-
0.430	0.830	34.460	34.060	A0	Moist, mid brown, stiff (working plastic), clay - ?redeposited	Orange ?iron pan at 0.50-0.54, large stone (to 40 mm) at 0.82-0.83 and one piece of glass (to 25 mm, ?modern) at 0.83	none	level	12	-	SPOT1 - glass fragment at 0.83	-
0.830	1.000	34.060	33.890	A0	Moist, mid to dark brown to dark grey (occasional mid brown patches), stiff (working soft and somewhat plastic), slightly sandy silty clay	Stone (to 45 mm) at 0.98-1.00	none	level	13	Sample 13 = all from 0.83-1.00	-	-
1.000	1.390	33.890	33.500	A0	Moist, mid brown, stiff (working plastic), clay - ?redeposited	?Cinder (to 18 mm) at 1.17-1.20, small stone (to 9 mm) at 1.30	none	level	14	-	-	-
1.390	2.000	33.500	32.890	A2	Moist, very dark grey, silty clay to clay silt (grades from one to the other with increasing depth - slightly stiff working plastic in upper part to soft in lower)	Wood fragments (to 15 mm) at 1.52-1.56 and brown clay inclusion at 1.72-1.78	slight	level	15 (1.39-1.70) AND 16 (1.70-2.00)	Sample 15 = some from 1.39-1.70	-	-
2.000	2.480	32.890	32.410	A4	Moist, dark grey-brown (with some black sulphide staining), crumbly (working slightly soft), humic sandy silt	Fine and coarse herbaceous detritus common throughout	over-powering	level	17 (2.00-2.27) AND 18 (2.27-2.48)	Sample 17 = some from 2.00-2.27	-	-
2.480	3.000	32.410	31.890	B0	Moist to wet (becoming wet at 2.90-3.00), mid grey-brown, soft and sticky (working just soft), ?very slightly clay, sandy silt	None	none	level	19	-	-	-
3.000	3.660	31.890	31.230	C0	As 2.48-3.00 (above)	None	none	level	20	Sample 20 = all from 3.00-3.20	-	-
3.660	4.000	31.230	30.890	C0	Moist to wet, mid to dark grey-brown to dark grey, firm (working soft), slightly	None	none	-	21	-	-	-

Depth		AOD										
From	To	From	To	PC	Sediment description	Inclusions	Sulphide odour	Interface	Sample	Chemical sample	Spot sample	C14
					clay sand							

vii) Borehole AG

Depth		AOD										
From	**To**	**From**	**To**	**PC**	**Sediment description**	**Inclusions**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.900	37.030	36.130	D0	Void	-	-	-	-	-	-	-
0.900	1.000	36.130	36.030	E0	Moist, light grey, unconsolidated, sandy silt matrix but mostly gravel (?hardcore/levelling - see inclusions)	Abundant stones (to 40 mm)	none	level	7	-	-	-
1.000	1.900	36.030	35.130	D0	Void	-	-	-	-	-	-	-
1.900	2.000	35.130	35.030	A0	Moist, mix of gravel (see inclusions), with a little light to mid grey-brown sand and silt matrix and a small 'core' of moist, mid brown, firm (working soft and slightly sticky), clay silt	Stones (to 45 mm) and very dark grey/black ?ash common	none	level	8 - combined with 2.30-2.50	-	-	-
2.000	2.300	35.030	34.730	D0	Void	-	-	-	-	-	-	-
2.300	2.500	34.730	34.530	C0	As 1.90-2.00 (above)	Stones (to 50 mm) and very dark grey/black ?ash common	none	level	8 - combined with 1.90-2.00	-	-	-
2.500	3.000	34.530	34.030	C0	Just moist, stiff (working plastic), clay - mid brown to mid grey-brown at 2.50-2.70 and with small 'granules' perhaps of dried clay formed from repeated drying and re-wetting, mid brown and without 'granules' at 2.70-3.00	None	none	level	9 (2.50-2.70) AND 10 (2.70-3.00)	Sample 10 = some from 2.70-3.00	-	-
3.000	4.000	34.030	33.030	C0	As 2.70-3.00 (above)	None	none	-	NS	-	-	-

Table 2. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Description of deposit sequences encountered by borehole following GeoTest format. Key: 'PC' = Preservational condition (following the Bergen excavation office state of preservation scale); 'Spot sample' = material removed as an organic spot find;'C14' = any material noted of possible value for radiocarbon dating; 'NS' = not sampled.

i) Borehole F1

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.600	39.690	39.090	D0	VOID	-	level	-	-	-	-
0.600	0.790	39.090	38.900	A0	Stiff brown CLAY, with abundant angular coarse gravel	none	level	22	-	-	-
0.790	1.000	38.900	38.690	A1	Soft dark greyish brown/grey clayey fine SILT with rare rootlet, ?decayed mortar and bone. Some colour variation, patches of brown and black at 0.88-0.94	none	level	23	-	SPOT2 = bone fragment at 0.96	-
1.000	1.130	38.690	38.560	D0	VOID	-	level	-	-	-	-
1.130	1.230	38.560	38.460	A3	Spongy very dark greyish brown to black slightly silty slightly sandy pseudo-fibrous PEAT	none	level	24	Sample 24 = all of core from 1.13-1.23	-	-
1.230	1.380	38.460	38.310	B2	Soft greyish brown slightly sandy slightly clay fine SILT, slightly organic at 1.32-1.38, with rare rounded medium gravel at 1.27-1.29	none	level	25	-	-	-
1.380	1.860	38.310	37.830	C0	Dense dark grey slightly clay medium SAND, with rare rounded medium gravel at 1.68-1.61	none	level	26	-	-	-
1.860	2.000	37.830	37.690	C0	Medium dense light grey/greyish brown medium SAND	none	-	27	-	-	-

ii) Borehole F2

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	1.000	39.690	38.690	E0	Very loose brown/greyish brown slightly silty slightly sandy coarse GRAVEL	none	-	28	-	-	-
1.000	1.500	38.690	38.190	D0	VOID	-	level	-	-	-	-
1.500	1.590	38.190	38.100	C0	Very loose brown/greyish brown slightly silty slightly sandy coarse GRAVEL	none	level	NS	-	-	-
1.590	1.650	38.100	38.040	C0	Dense grey (greyish brown in places) medium SAND, with rare patches of ?decayed mortar/lime (to 10 mm)	none	level	29	Sample 29 = all from 1.59-1.65	-	-
1.650	2.000	38.040	37.690	C0	Dense grey (mottled brown and grading to mid brown from 1.95-2.00) medium SAND, with rare fine and medium rounded gravel at 1.72-1.75 and grey clay inclusions at 1.81-1.86	none	level	30	-	-	-
2.000	2.320	37.690	37.370	D0	VOID	-	level	-	-	-	-
2.320	2.560	37.370	37.130	C0	Medium dense, brown/greyish brown SAND	none	level	31	-	-	-
2.560	2.660	37.130	37.030	C0	Medium dense, brown/greyish brown slightly clay SAND, with abundant rounded coarse gravel	none	level	31	-	-	-
2.660	3.000	37.030	36.690	C0	Stiff brown CLAY	none	level	32	-	-	-
3.000	4.000	36.690	35.690	C0	Stiff brown CLAY	none	-	NS	-	-	-

iii) Borehole N1

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.530	39.160	38.630	D0	VOID	-	irregular	-	-	-	-
0.530	0.560	38.630	38.600	E0	Firm dark grey/greyish brown CLAY, with rare fragments of brick/tile (to 15 mm)	none	level	NS	-	-	-
0.560	0.950	38.600	38.210	A0	Stiff brown CLAY	none	level	33 (0.56-0.87)and 34 (0.87-0.95)	-	-	-
0.950	1.000	38.210	38.160	A0	Soft dark grey/black (occasionally dark grey-brown), clayey SILT, with abundant ?charcoal/black ash and rare fine and medium gravel	none	level	35	Sample 35 = all of 0.95-1.00	-	-
1.000	1.170	38.160	37.990	D0	VOID	-	level	-	-	-	-
1.170	1.340	37.990	37.820	A0	Stiff brown CLAY	none	level	36	-	-	-
1.340	2.000	37.820	37.160	B2	Very soft dark grey/black slightly organic sandy clay SILT, with rare ?decayed wood fragments (to 15 mm) at 1.46-1.47 and ?decayed mortar/lime (to 15 mm) at 1.63-1.65, and occasional roundwood fragments (to 35 mm) at 1.92-1.94	moderate - stronger with depth	level	37	37A - sediment from 1.34-1.45 AND 37B - sediment around roundwood at 1.90-2.00	SPOT3 - roundwood fragments from 1.92-1.94	SPOT3
2.000	2.230	37.160	36.930	D0	VOID	-	level	-	-	-	-
2.230	2.710	36.930	36.450	C3	Very soft dark grey/black slightly organic sandy clay SILT, large wood inclusion (to 65 mm) at 2.23-2.30, slightly organic at 2.23-2.51 and occasional smaller wood fragments (to 12 mm) at 2.51-2.71	moderate	level	38	-	SPOT4 - large wood fragment at 2.23-2.30	-
2.710	2.770	36.450	36.390	C0	Very loose rounded coarse GRAVEL	none	level	39	-		-
2.770	2.890	36.390	36.270	C2	Light brown very decayed WOOD	none	level	SPOT5	-	SPOT5 - all of wood at 2.77-2.89	-
2.890	3.000	36.270	36.160	C3	Dark brown/grey-brown decayed WOOD	none	-	SPOT6	-	SPOT6 - all of wood at 2.89-3.00	-

iv) Borehole P1

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.500	39.930	39.430	D0	VOID	-	level	-	-	-	-
0.500	0.530	39.430	39.400	E0	Dense brown/greyish brown medium SAND, with rare medium gravel	none	level	40 - all sediment from 0.50-1.00 taken as one sample of overburden	-	-	-
0.530	0.620	39.400	39.310	E0	Dense brown/greyish brown medium SAND, with rare medium gravel	none	level	40 - all sediment from 0.50-1.00 taken as one sample of overburden	-	-	-
0.620	0.710	39.310	39.220	E0	Soft greyish brown/grey clayey medium SAND	none	level	40 - all sediment from 0.50-1.00 taken as one sample of overburden	-	-	-
0.710	0.740	39.220	39.190	E0	Stiff brown CLAY	none	level	40 - all sediment from 0.50-1.00 taken as one sample of overburden	-	-	-
0.740	1.000	39.190	38.930	E0	Very dense dark greyish brown/black slightly sandy clayey medium SILT, with clay lump (to 70 mm) at 0.77-0.84 and modern rootlet, coal (to 20 mm), cinder (to 50 mm) and medium gravel rare throughout	none	level	40 - all sediment from 0.50-1.00 taken as one sample of overburden	-	-	-
1.000	1.550	38.930	38.380	D0	VOID	-	level	-	-	-	-
1.550	1.720	38.380	38.210	A0	Soft grey sandy clay medium SILT, with abundant coarse gravel	none	level	41	-	-	-

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
1.720	1.820	38.210	38.110	A3	Spongy dark brown/greyish brown slightly silty amorphous PEAT, with wood/bark fragments (to 15 mm), lumps of clay (to 15 mm) and stones (to 10 mm) rare throughout	very slight	level	42	42 = all from 1.72-1.82	-	-
1.820	2.000	38.110	37.930	A1	Soft dark greyish brown, slightly organic slightly sandy medium SILT	very slight	-	43	43 = all from 1.82-2.00	-	-

v) Borehole AE

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.550	35.190	34.640	D0	VOID	-	level	-	-	-	-
0.550	0.700	34.640	34.490	E0	Very loose dark grey/greyish brown silty sandy medium GRAVEL	none	level	NS - 0.55-1.00 bagged as overburden	-	-	-
0.700	0.790	34.490	34.400	E0	Medium dense grey/dark grey coarse SAND, with frequent medium gravel	none	level	NS - 0.55-1.00 bagged as overburden	-	-	-
0.790	0.900	34.400	34.290	E0	Medium dense greyish white ?MORTAR, with rare brick/tile fragments (to 12 mm)	none	level	NS - 0.55-1.00 bagged as overburden	-	-	-
0.900	1.000	34.290	34.190	E0	Very dense dark grey/greyish brown silty fine SAND, with rare flecks of ?mortar from 0.90-0.94 and large brick/tile fragment (to 60 mm) at 0.97-1.00	none	-	NS - 0.55-1.00 bagged as overburden	-	-	-
1.000	2.000	34.190	33.190	A1	Very soft greyish brown slightly organic (?rootlet) sandy coarse SILT, with rare brick/tile (to 26 mm), dark greyish brown (internally very dark grey) lumps of ?humic slightly sandy silt (to 55 mm) which gave a slight sulphide smell when broken and rotted wood (to 30 mm)	slight - from ?humic lumps	-	1	-	-	-
2.000	2.170	33.190	33.020	A0	Very soft dark grey (some light grey patches) slightly sandy coarse SILT, with frequent brick/tile and mortar (both to 40 mm)	none	level	NS	-	-	-
2.170	2.310	33.020	32.880	A1	Very soft coarse SILT, with charcoal (to 12 mm) frequent throughout and abundant in places, rare mortar flecks throughout and very rotted ?wood fragments present at 2.27-2.31	none	level	2	Sample 2 = majority of sediment from 2.17-2.26	-	-
2.310	3.000	32.880	32.190	B3	Very soft greyish brown/grey (some reddish brown mottling), sandy coarse SILT, with slight clay content from 2.70-3.00 and rare fragments of brick/tile, mortar (to 20 mm) and charcoal (to 12 mm) from 2.31-2.41	strong - largely localised to 2.41-3.00	-	3 (2.31-2.41) AND 4 (2.41-2.78) and 5 (2.78-3.00)	Sample 4 = all from 2.55-2.78	-	-
3.000	3.400	32.190	31.790	D0	VOID	-	level	-	-	-	-

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
3.400	4.000	31.790	31.190	C1	Very dense grey/dark grey silty fine SAND, with rare black patches (from ?sulphide staining)	very slight	-	6	-	-	-

vi) Borehole AF

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.300	34.890	34.590	D0	VOID	-	-	-	-	-	-
0.300	0.430	34.590	34.460	E0	Very loose grey/greyish brown slightly silty slightly sandy coarse GRAVEL	none	level	11	-	-	-
0.430	0.830	34.460	34.060	A0	Stiff brown CLAY	none	level	12	-	SPOT1 - glass fragment at 0.83	-
0.830	1.000	34.060	33.890	A0	Firm brown to dark grey slightly sandy silty CLAY, with single coarse gravel inclusion at 0.98-1.00	none	level	13	Sample 13 = all from 0.83-1.00	-	-
1.000	1.390	33.890	33.500	A0	Stiff brown CLAY, with ?cinder (to 18 mm) at 1.17-1.20 and single medium gravel inclusion at 1.30	none	level	14	-	-	-
1.390	2.000	33.500	32.890	A2	Firm dark grey silty CLAY to clayey SILT (grades from one to the other with increasing depth), with rare wood fragments (to 15 mm) at 1.52-1.56 and brown clay inclusion at 1.72-1.78	slight	level	15 (1.39-1.70) AND 16 (1.70-2.00)	Sample 15 = some from 1.39-1.70	-	-
2.000	2.480	32.890	32.410	A4	Very soft dark greyish brown (occasionally black - sulphide staining), organic sandy coarse SILT	over-powering	level	17 (2.00-2.27) AND 18 (2.27-2.48)	Sample 17 = some from 2.00-2.27	-	-
2.480	3.000	32.410	31.890	B0	Very soft greyish brown ?very slightly clay sandy coarse SILT	none	level	19	-	-	-
3.000	3.660	31.890	31.230	C0	Very soft greyish brown ?very slightly clay sandy coarse SILT	none	level	20	Sample 20 = all from 3.00-3.20	-	-
3.660	4.000	31.230	30.890	C0	Very dense greyish brown to dark grey slightly clay fine SAND	none	-	21	-	-	-

vii) Borehole AG

Depth		AOD									
From	**To**	**From**	**To**	**PC**	**GeoTest format description**	**Sulphide odour**	**Interface**	**Sediment sample**	**Chemical sample**	**Spot sample**	**C14**
0.000	0.900	37.030	36.130	D0	VOID	-	-	-	-	-	-
0.900	1.000	36.130	36.030	E0	Very loose light grey slightly sandy silty coarse GRAVEL	none	level	7	-	-	-
1.000	1.900	36.030	35.130	D0	Void	-	-	-	-	-	-
1.900	2.000	35.130	35.030	A0	Mix of very loose slightly sandy silty coarse GRAVEL and a 'core' of firm brown CLAY, with frequent very dark grey/black ?ash	none	level	8 - combined with 2.30-2.50	-	-	-
2.000	2.300	35.030	34.730	D0	VOID	-	-	-	-	-	-
2.300	2.500	34.730	34.530	C0	Mix of very loose slightly sandy silty coarse GRAVEL and a 'core' of firm brown CLAY, with frequent very dark grey/black ?ash	none	level	8 - combined with 1.90-2.00	-	-	-
2.500	3.000	34.530	34.030	C0	Stiff brown CLAY	none	level	9 (2.50-2.70) AND 10 (2.70-3.00)	Sample 10 = some from 2.70-3.00	-	-
3.000	4.000	34.030	33.030	C0	Stiff brown CLAY	none	-	NS	-	-	-

Table 3. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Scales employed for the recording of the general composition of the washover fractions from the processed subsamples and the plant and invertebrate (other than unidentified mollusc shell) macrofossil remains recovered.

1) Description of composition of the washover fractions: proportion of organic component

1 – 0%
2 – <25%
3 – <50%
4 – <75%
5 – >75%

2) Abundance: number of recorded items (identifiable waterlogged plant or invertebrate remains – seeds or fruits/minimum number of individuals represented)

1 – sample contained no identifiable items
2 – sample contained 1-20 items
3 – sample contained 21-100 items
4 – sample contained 101-500 items
5 – sample contained more than 500 items

3) Diversity: range of recorded items (minimum numbers of identifiable waterlogged plant or invertebrate taxa present)

1 – sample contained no non-carbonised, determinable botanical macro-remains, or only largely sub-recent intrusive/contaminant remains, carbonised macro-remains may be present
2 – sample contained non-carbonised remains of 1-5 taxa, typically largely corrosion-resistant species (e.g. goosefoot, chickweed, stinking nettle, knotweed)
3 – sample contained non-carbonised macro-remains of 6-10 taxa
4 – sample contained non-carbonised macro-remains of 11-40 taxa
5 – sample contained non-carbonised macro-remains of more than 40 taxa

4) Preservation: condition of recorded items (waterlogged plant or invertebrate remains)

1 – no taxon/species determination was possible to the level that should theoretically be possible for the taxon concerned, the material was too severely fragmented and/or corroded
2 – some species determination was possible, though the remains were highly fragmented and/or the seed coat was highly corroded
3 – most remains could be determined to the maximum taxonomic level feasible, though there was some damage or corrosion to the seed coat (other than splitting, which can be caused by germination prior to deposition)
4 – remains complete and undamaged, though no fine elements such as hairs or fragile husk remains were present
5 – remains complete and undamaged, and fine, fragile elements such as hairs and some husk remains were present. NB: A large number of species do not include these elements, and the husk of most types of grain is in fact more resistant than the seed coat, so this cannot be used for classification in category 5

The categories for Diversity and Preservation follow Smit *et al*. (2006) with minor modifications.

Table 4. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Scales employed for the recording of the general composition of the 'squash' subsamples and the microfossils present.

1) Description of composition of the 'squash': proportion of organic component

1 – 0%
2 – <25%
3 – <50%
4 – <75%
5 – >75%

2) Abundance: number of recorded items (identifiable microfossil remains)

1 – sample contained no identifiable items
2 – sample contained 1-20 items
3 – sample contained 21-100 items
4 – sample contained 101-500 items
5 – sample contained more than 500 items

3) Diversity: range of recorded items (minimum numbers of microfossil taxa present)

1 – sample contained no non-carbonised, determinable microfossil remains, or only largely sub-recent intrusive/contaminant remains, carbonised remains may be present
2 – sample contained non-carbonised remains of 1-5 taxa
3 – sample contained non-carbonised remains of 6-10 taxa
4 – sample contained non-carbonised remains of 11-40 taxa
5 – sample contained non-carbonised remains of more than 40 taxa

4) Preservation: condition of recorded items (microfossils)

1 – no taxon/species determination was possible to the level that should theoretically be possible for the taxon concerned, the material was too severely fragmented and/or corroded
2 – some species determination was possible, though the remains were highly fragmented and/or corroded
3 – most remains could be determined to the maximum taxonomic level feasible, though there was some damage or corrosion
4 – remains more or less complete and undamaged, there may be some very slight chemical erosion (e.g. parasite eggs may be intact but rather pale)
5 – remains complete and undamaged

Table 5. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Records for plant and animal remains from the washovers from subsamples from Boreholes AE, AF and AG. Key: 'S' = subsample; 'Dep (cm)' = depth in borehole in centimetres; 'wt (kg)' = weight of processed subsample in kilos; 'w/o' = volume or weight of washover in ml or g; 'res' = weight of residue in kilos; 'C14' = possible material for radiocarbon dating; 'Desc' = description; 'Ab' = abundance; 'Div' = diversity; 'Pres' = preservation; 'char' = charcoal; 'mod. root' = modern rootlet; 'eec' = earthworm egg capsules; 'mite' = mites; 'eph' = Daphnia *ephippia; 'fly' = fly puparia; 'beetle' = adult beetle sclerites/sclerite fragments; 'ant' = ant heads; 'ii' = indeterminate non-molluscan invertebrate cuticle fragments; 'bo' = bone; 'co' = coal; ' 's/s' = sand and stones; 's/c' = slag/cinder; 'x' = present. Note: all of subsample AF13 was taken for chemical analysis.*

							Macrofossil remains			Botanical remains								Animal remains								Artefactual and inorganic		
S	**Dep (cm)**	**wt (kg)**	**w/o (ml)**	**res (kg)**	**C14**	**Desc**	**Ab**	**Div**	**Pres**	**char**	**mod. root**	**moss**	**wood**	**worked wood debris?**	**bark**	**twig**	**buds/ bud scales**	**eec**	**mite**	**eph**	**fly**	**beetle**	**ant**	**ii**	**bo**	**co**	**s/s**	**s/c**
AE 1	100 to 200	0.1	~50	0.007	Yes	4	1	2	1	x	-	x	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-
AE 2	217 to 231	0.15	~110	0.015	No	5	1	1	1	x	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-
AE 3	231 to 241	0.2	~100	0.016	No	5	2	2	3	x	-	x	x	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-
AE 4	241 to 278	1	9	0.046	Yes	4	3	3	2	x	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-	-	-	-
AE 5	278 to 300	1.3	4	0.069	No	2	2	2	3	x	-	-	x	-	x	-	-	-	-	-	-	x	-	x	-	-	-	-
AE 6	340 to 400	2.3	18	0.405	Yes	2	2	2	2	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF 11	30 to 43	0.4	1	0.303	No	2	1	1	1	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF 12	43 to 83	1	7	0.193	No	2	2	2	3	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF 14	100 to 139	2	~10	0.181	No	5	2	3	2	x	-	x	x	-	-	x	x	-	-	-	-	x	-	x	-	-	-	-
AF 15	139 to	0.8	~230	0.082	No	4	2	3	3	x	-	x	x	x	-	-	-	-	-	-	-	-	-	x	-	-	-	-

							Macrofossil remains			Botanical remains								Animal remains								Artefactual and inorganic		
S	**Dep (cm)**	**wt (kg)**	**w/o (ml)**	**res (kg)**	**C14**	**Desc**	**Ab**	**Div**	**Pres**	**char**	**mod. root**	**moss**	**wood**	**worked wood debris?**	**bark**	**twig**	**buds/ bud scales**	**eec**	**mite**	**eph**	**fly**	**beetle**	**ant**	**ii**	**bo**	**co**	**s/s**	**s/c**
	170																											
AF 16	170 to 200	1.5	~570	0.171	Yes	4	3	4	3	x	-	x	x	x	x	x	x	-	x	-	x	x	-	x	-	-	-	-
AF 17	200 to 227	0.6	400	0.057	Yes	4	3	4	3	x	-	x	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-	-
AF 18	227 to 248	0.6	500	0.027	Yes	4	3	2	3	x	-	x	x	x	x	x	x	-	-	-	-	x	-	x	-	-	-	-
AF 19	248 to 300	3.25	~60	0.021	Yes	4	3	4	3	x	-	x	x	-	x	x	x	x	x	-	x	x	x?	x	-	-	-	-
AF 20	300 to 366	3.4	5	0.118	No	2	2	2	3	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF 21	366 to 400	1.1	5	0.112	No	1	1	1	1	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AG 7	0 to 100	0.85	<1	0.687	No	1	1	1	1	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	-
AG 8	190 to 200	0.75	2.5	0.294	No	2	1	1	1	-	-	-	x?	-	-	-	-	x	-	-	-	x	-	-	-	x	-	x
AG 9	250 to 270	1	2.5	0.158	No	2	2	2	2	x	-	-	-	-	-	-	-	-	-	x	-	x	-	x	-	x	-	-
AG 10	270 to 300	1.25	1	0.081	No	2	1	1	2	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-

Table 6. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: List of identified plant and animal remains from subsamples from Borehole AF, with notes on the presence of other components. Key: 'c' = charred; 'w' = waterlogged. Note: all of subsample AF13 was taken for chemical analysis.

Sample				**AF 11**	**AF 12**	**AF 14**	**AF 15**	**AF 16**	**AF 17**	**AF 18**	**AF 19**	**AF 20**	**AF 21**
Gathered plants													
Corylus avellana L.	hazel	nut shell	w	-	-	-	-	x	x	x	x	-	-
Corylus avellana L.	hazel	nut shell	c	-	-	-	-	-	-	-	x	x	-
Prunus	plum/cherry/sloe	fruit stone	w	-	-	-	-	-	-	-	x	-	-
Rubus	bramble	fruit stone	w	-	-	-	-	x	x	x	x	x	-
Sambucus nigra L.	elder	seed	w	-	-	-	-	x	-	-	x	x	-
Disturbed/cultivated ground													
Anthemis cotula L.	stinking chamomile	achene	w	-	-	-	x	-	x	x	x	-	-
Atriplex/*Chenopodium*	orache/goosefoot	seed	w	-	-	-	-	x	x	x	-	-	-
Chrysanthemum segetum L.	corn marigold	achene	w	-	-	-	-	x	-	-	x	-	-
Polygonum aviculare L. agg.	knotgrass	achene	w	-	-	-	-	-	x	-	x	-	-
Polygonum	knotgrass	achene	w	-	-	x	x	-	x	-	-	-	-
Raphanus raphanistrum L.	wild radish	pod	w	-	-	-	-	-	-	x	-	-	-
Sonchus	sow-thistle	achene	w	-	-	-	-	x	-	-	-	-	-
Solanaceae	nightshade family	seed	w	-	-	-	-	x	-	-	-	-	-
Stachys/Galeopsis	woundwort/hemp-nettle	nutlet	w	-	-	-	-	x	-	-	-	-	-
Urtica dioica L.	common nettle	achene	w	-	-	x	-	x	x	x	-	-	-
Grassland													
Ranunculus Subgenus *Ranunculus*	meadow/creeping/bulbous buttercup	achene	w	-	-	-	x	x	x	x	x	-	-
Ranunculus	buttercup	achene	w	-	-	x	-	-	-	-	x	-	-
Wetlands (e.g. bog, fen, marsh)													
Carex	sedge	caryopsis	w	-	x	x	-	x	x	x	x	-	-
Cyperaceae	sedge family	fruit	w	-	-	-	-	x	-	x	x	-	-
Eleocharis	spike-rush	nutlet	w	-	-	x	-	x	-	x	x	-	-
Ranunculus sceleratus L.	celery-leaved buttercup	achene	w	-	-	-	x	-	x	-	-	-	-
cf. *Sparganium erectum* L.	branched bur-reed	fruit	w	-	-	-	-	-	-	x	-	-	-
Other wild plant taxa													

Sample				**AF 11**	**AF 12**	**AF 14**	**AF 15**	**AF 16**	**AF 17**	**AF 18**	**AF 19**	**AF 20**	**AF 21**
Apiaceae	carrot family	mericarp	w	-	-	-	-	-	-	-	x	-	-
Asteraceae	daisy family	achene	w	-	-	-	-	-	-	-	x	-	-
cf. *Crataegus*	?hawthorn	fruitstone	w	-	-	-	x	-	-	-	-	-	-
Persicaria lapathifolia L.	knotweed	achene	w	-	-	x	x	-	-	-	-	-	-
cf. *Prunella vulgaris* L.	?selfheal	nutlet	w	-	-	-	x	-	-	-	-	-	-
Poaceae	grass family	caryopsis	w	-	-	-	x	-	-	x	x	-	-
Rumex	dock	achene	w	-	-	-	-	x	x	-	x	-	-
Other botanical remains													
bark fragments			w	-	-	-	-	x	x	x	x	-	-
buds/bud scales			w	-	-	x	-	x	-	x	x	-	-
culm fragments			w	-	-	-	-	-	-	-	-	-	-
modern rootlets			w	-	-	-	-	-	-	-	-	-	-
mosses (Bryophyta)			w	-	-	x	x	x	x	x	x	-	-
twig fragments			w	-	-	-	-	x	x	x	-	-	-
wood fragments			w	-	-	x	x	x	x	x	x	-	-
unidentifiable plant fibres			w	x	x	-	-	-	-	-	-	x	-
Animal remains													
earthworm egg capsules			w	-	-	-	-	-	-	-	x	-	-
mites (Acarina) – one form			w	-	-	-	-	x	-	-	x	-	-
fly puparia – at least one form			w	-	-	-	-	x	-	-	x	-	-
beetle sclerites/sclerite fragments			w	-	-	x	-	x	x	x	x	-	-
Helophorus ?*flavipes* (Fabricius) – pronotum			w	-	-	-	-	-	-	-	x	-	-
?*Monotoma* sp. elytron fragment			w	-	-	-	-	-	x	-	-	-	-
?ant (Formicidae) – head fragments			w	-	-	-	-	-	-	-	x	-	-
non-molluscan invertebrate cuticle – indeterminate			w	-	-	x	x	x	x	x	x	-	-
Artefactual and inorganic material													
charcoal			c	x	x	x	x	x	x	x	x	x	x
worked wood debris?			w	-	-	-	x	x	x	x	-	-	-

Table 7. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire – 2011 works: Microfossil remains from the investigated deposits from Boreholes AE, AF and AG. Key: 'Desc' = description; 'Ab' = abundance; 'Div' = diversity; 'Pres' = preservation; 'N' = semi-quantitative numbers; 'f. hy.' = fungal hyphae; 'f' = few (1-5); 's' = some (6-20); 'm' = many (20-100). Note: all of subsample AF13 was taken for chemical analysis.

						Diatoms		**Fungal spores**		**Pollen**		**'Phytoliths'**					
Sample	**Depth (cm)**	**Desc**	**Ab**	**Div**	**Pres**	**N**	**types**	**N**	**types**	**N**	**types**	**N**	**types**	***Trichuris***	***Ascaris***	**f. hy.**	**plant tissue frags**
AE1	100 - 200	3	2	2	2	-	-	s	1	f	1	-	-	-	-	f	m
AE2	217 - 231	4	2	2	2	-	-	f	1	-	-	-	-	-	-	-	m
AE3	231 - 241	3	2	2	2	-	-	f	1	f	1	-	-	-	-	-	s
AE4	241 - 278	2	2	2	3	-	-	-	-	-	-	-	-	1	-	s	f
AE5	278 - 300	2	2	2	1	-	-	f	1	-	-	-	-	-	-	-	f
AE6	340 - 400	2	1	1	1	-	-	-	-	-	-	-	-	-	-	f	f
AF11	30 to 43	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
AF12	43 - 83	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
AF14	100 - 139	2	1	1	1	-	-	-	-	-	-	-	-	-	-	f	-
AF15	139 - 170	5	2	2	1	-	-	-	-	-	-	f	1	-	-	-	f
AF16	170 - 200	4	2	2	1	-	-	f	1	-	-	-	-	-	-	f	f
AF17	200 - 227	3	3	3	2	-	-	f	2	s	4	-	-	1	-	-	m
AF18	227 - 248	5	2	2	2	-	-	s	3	s	2	-	-	-	-	-	m
AF19	248 - 300	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF20	300 - 366	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AF21	366 - 400	2	1	1	-	-	-	f	1	-	-	-	-	-	-	f	-
AG7	0 to 100	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
AG8	190 - 200	2	2	2	3	-	-	f	1	f	1	-	-	-	-	f	-
AG9	250 - 270	2	2	2	2	-	-	f	1	-	-	-	-	-	-	-	f
AG10	270 - 300	2	1	1	1	-	-	-	-	-	-	-	-	-	-	f	-

Table 8. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Summary abundance and diversity data for the plant assemblages from Boreholes AE, AF and AG. For 'density (items/kg)' fractional values are shown to one decimal place and values greater than one to the nearest whole number (rounded down). Note: all of subsample AF13 was taken for chemical analysis.

					Identifiable charred plant remains		Identifiable waterlogged plant remains		
Subsample	**Depth (cm)**	**weight (kg)**	**washover (ml)**	**residue**	**number of plant taxa**	**abundance (items/sample)**	**number of plant taxa**	**abundance (items/sample)**	**density (items/kg)**
AE 1	100 to 200	0.1	~50	0.007	-	-	1	1	10
AE 2	217 to 231	0.15	~110	0.015	-	-	0	-	-
AE 3	231 to 241	0.2	~100	0.016	-	-	3	5	25
AE 4	241 to 278	1	9	0.046	-	-	8	63	63
AE 5	278 to 300	1.3	4	0.069	-	-	3	10	7
AE 6	340 to 400	2.3	18	0.405	-	-	1	1	0.4
AF 11	30 to 43	0.4	1	0.303	-	-	0	-	-
AF 12	43 to 83	1	7	0.193	-	-	1	1	1
AF 14	100 to 139	2	~10	0.181	-	-	6	10	5
AF 15	139 to 170	0.8	~230	0.082	-	-	8	10	12
AF 16	170 to 200	1.5	~570	0.171	-	-	16	29	19
AF 17	200 to 227	0.6	400	0.057	-	-	12	25	41
AF 18	227 to 248	0.6	500	0.027	-	-	13	30	50
AF 19	248 to 300	3.25	~60	0.021	1	1	16	95	29
AF 20	300 to 366	3.4	5	0.118	1	1	2	2	0.6
AF 21	366 to 400	1.1	5	0.112	-	-	0	-	-
AG 7	0 to 100	0.85	<1	0.687	-	-	0	-	-
AG 8	190 to 200	0.75	2.5	0.294	-	-	0	-	-
AG 9	250 to 270	1	2.5	0.158	-	-	5	est. 6	est. 6
AG 10	270 to 300	1.25	1	0.081	-	-	3	3	2

Table 9. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Possible material for radiocarbon dating recovered from sediment subsamples from Boreholes AE, AF and AG. Key: 'S' = subsample. Note: where moss or ?moss was noted there is a possibility that remains selected for possible C14 dating may derive from peat and may therefore return dates much earlier than their archaeological 'use'.

Sample	Depth range (cm)	Potential material for C14	Notes
AE1	100-200	1x small (to 6 mm; <0.1 g) uncharred hazel (*Corylus*) nutshell fragment from residue	adhering material will need cleaning from inner surface
AE4	241-278	1x charred grain, poorly preserved, ?oat or large grass (*Avena*/Poaceae) (to 3 mm; <0.1 g)	-
AE6	340-400	4x charred hazelnut shell fragments (to 8 mm; 0.3 g)	1x small hazelnut fragment retained
AF16	170-200	1x hazelnut shell fragment (to 11 mm; 0.1 g) – uncharred or ?part charred	moss noted in washover
AF17	200-227	1x hazelnut shell fragment (to 19 mm; 0.1 g) – not charred	?moss noted in washover
		5x small twig fragments (unidentified but of only 1or 2 years growth max and retaining bark) to 22 mm; <0.1 g	?moss noted in washover
AF18	227-248	1x whole hazelnut (to 14 mm; 1.0 g) – not charred	moss noted in washover
		1x uncharred roundwood fragment (unidentified but of only approx. 8 years growth and retaining a little bark) to 50 mm; 6.3 g	moss noted in washover; roundwood fragment broken in two for ID attempt
AF19	248-300	11x hazelnut shell fragments (to 12 mm; 0.5 g) – not charred	?moss noted in washover; 8 other hazelnut shell fragments retained (mni hazelnuts represented = 5 in total)

Figure 1. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Plant biodiversity in subsamples from Boreholes AE, AF and AG. Note: all of subsample AF13 was taken for chemical analysis.

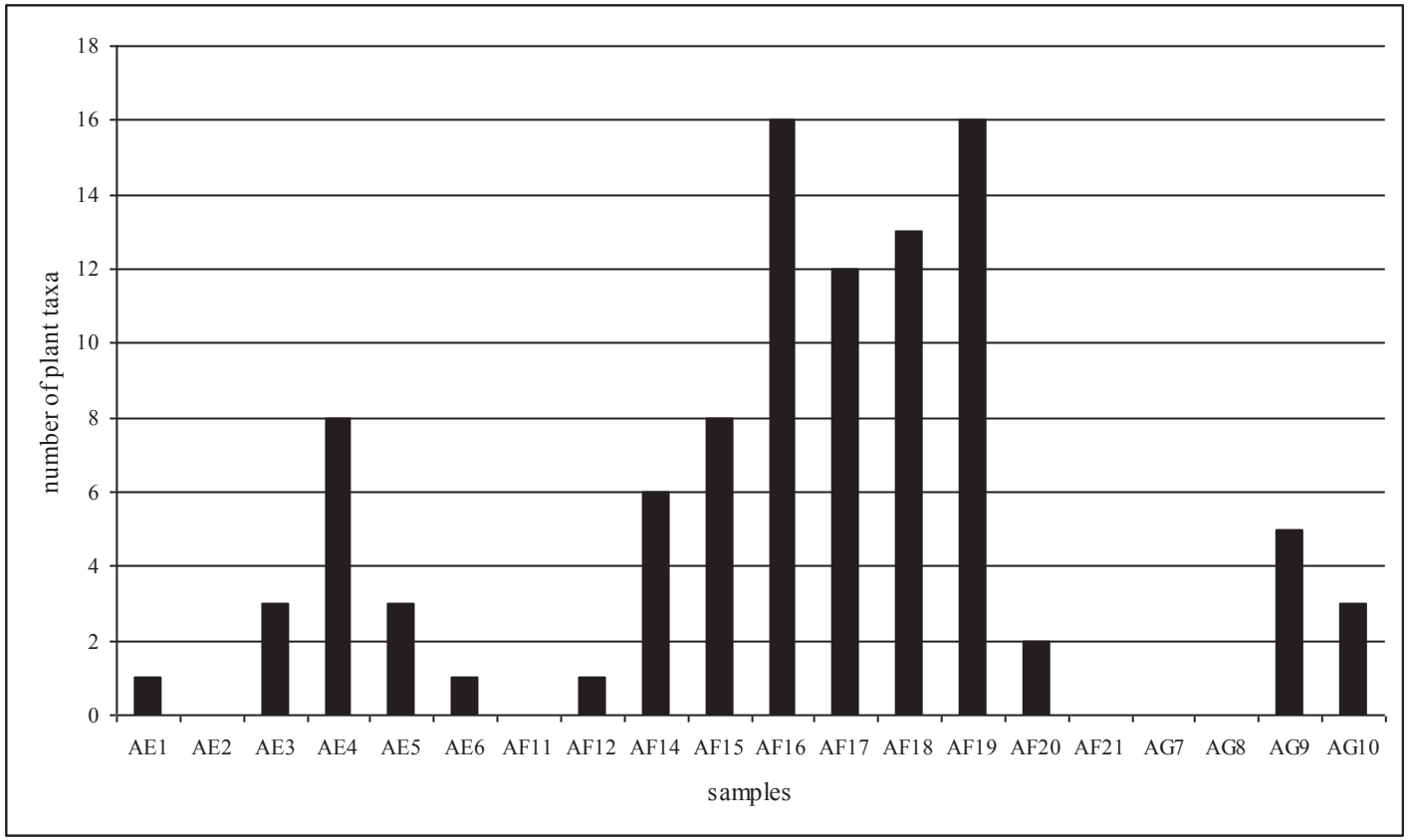


Figure 2. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: Plant biodiversity and abundance in subsamples from Boreholes AE, AF and AG. Note: all of subsample AF13 was taken for chemical analysis.

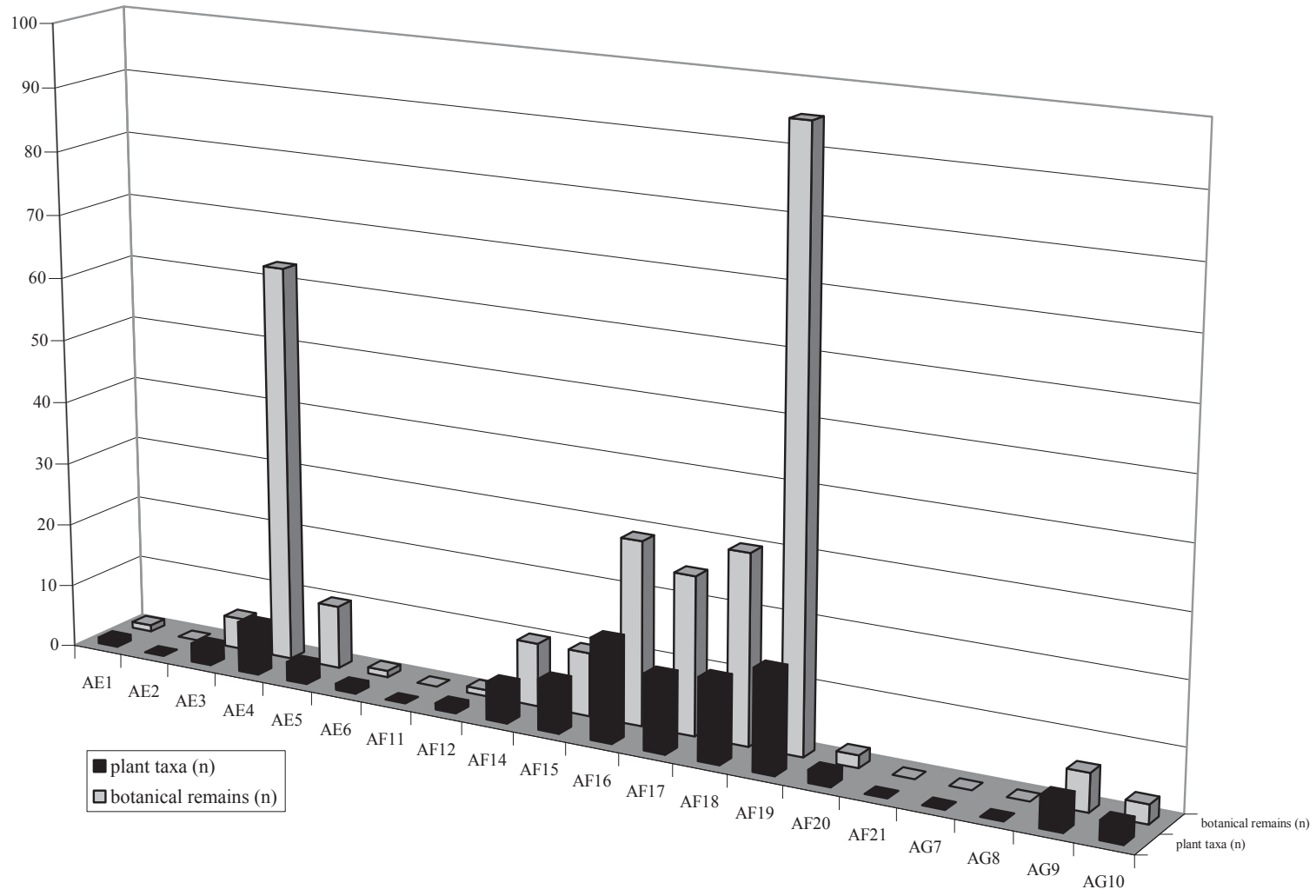
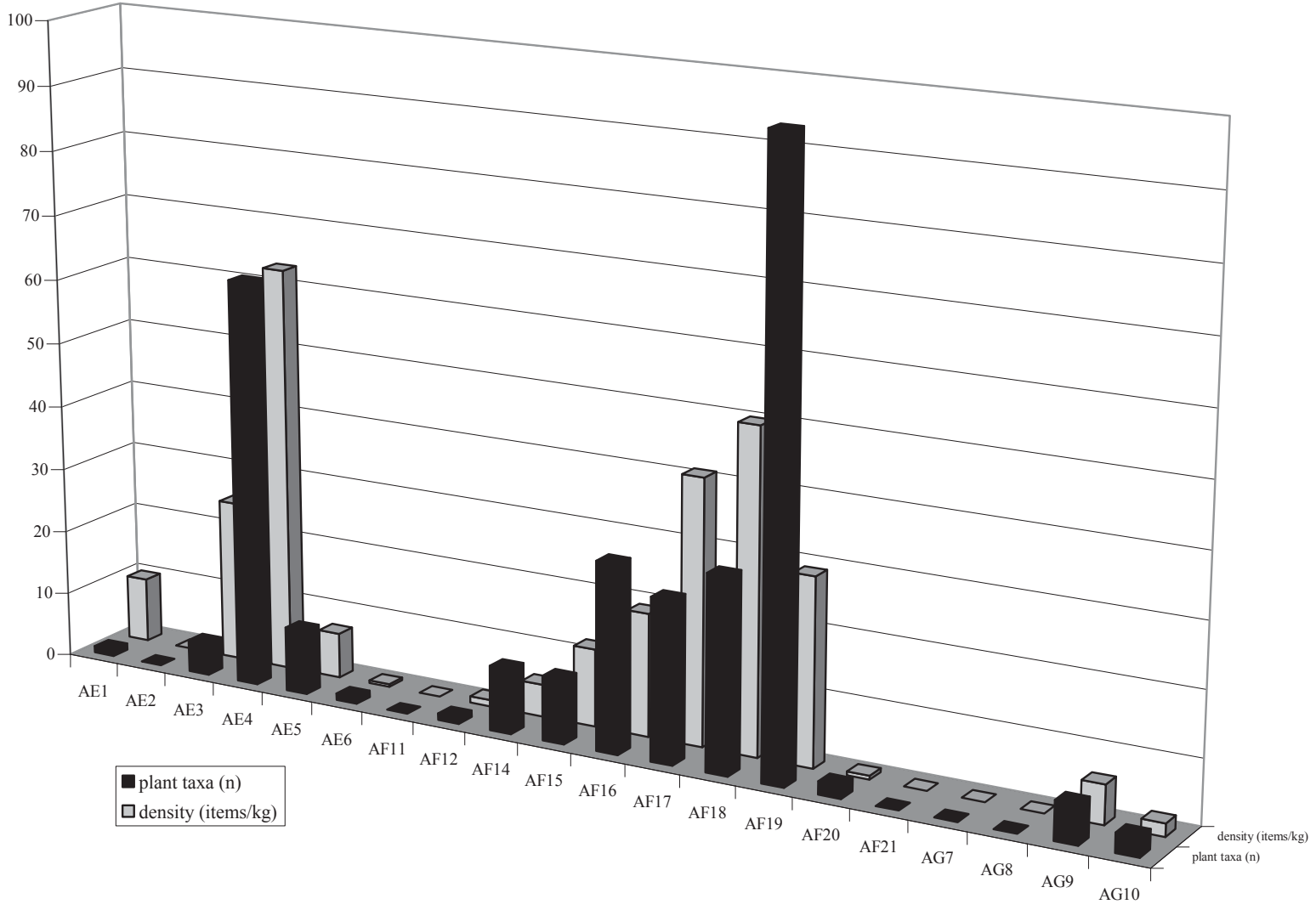


Figure 3. Further borehole investigations of the nature and extent of sub-surface deposits, Nantwich, Cheshire: biodiversity and density (items per kilo) in subsamples from Boreholes AE, AF and AG. Note: all of subsample AF13 was taken for chemical analysis.



Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7				LOD	Units	Method No.
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20						
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2						
COC No / misc													
Containers	T	T	T	T	T	T	T						
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011						
Sulphur	1.02	0.45	0.02	0.14	0.32	1.12	0.49				<0.01	%	TM63/PM15
Ammoniacal Nitrogen as N	11.2	5.7	1.3	4.8	4.9	5.0	12.8				<0.6	mg/kg	TM38/PM20
Chloride #M	428	78	108	134	197	743	81				<2	mg/kg	TM38/PM20
Nitrate as NO3 #M	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5				<2.5	mg/kg	TM38/PM20
Nitrite as NO2 #M	<0.05	0.07	0.13	<0.05	0.15	<0.05	0.11				<0.05	mg/kg	TM38/PM20
Ortho Phosphate as PO4	6.5	8.9	1.7	1.1	2.2	<0.3	19.5				<0.3	mg/kg	TM38/PM20
Sulphate as SO4 #M	468.8	52.8	42.0	30.7	88.5	139.7	<1.5				<1.5	mg/kg	TM38/PM20
Loss on Ignition #	27.6	2.5	2.0	5.4	12.8	23.5	2.2				<1.0	%	TM22/PM0
pH #M	7.37	7.99	8.21	7.60	6.93	7.30	8.12				<0.01	pH units	TM73/PM11
Sulphide*	<10	<10	<10	23	<10	55	<10				<10	mg/kg	TM0/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7					
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20					
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2					
COC No / misc												
Containers	T	T	T	T	T	T	T					
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1					
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011					

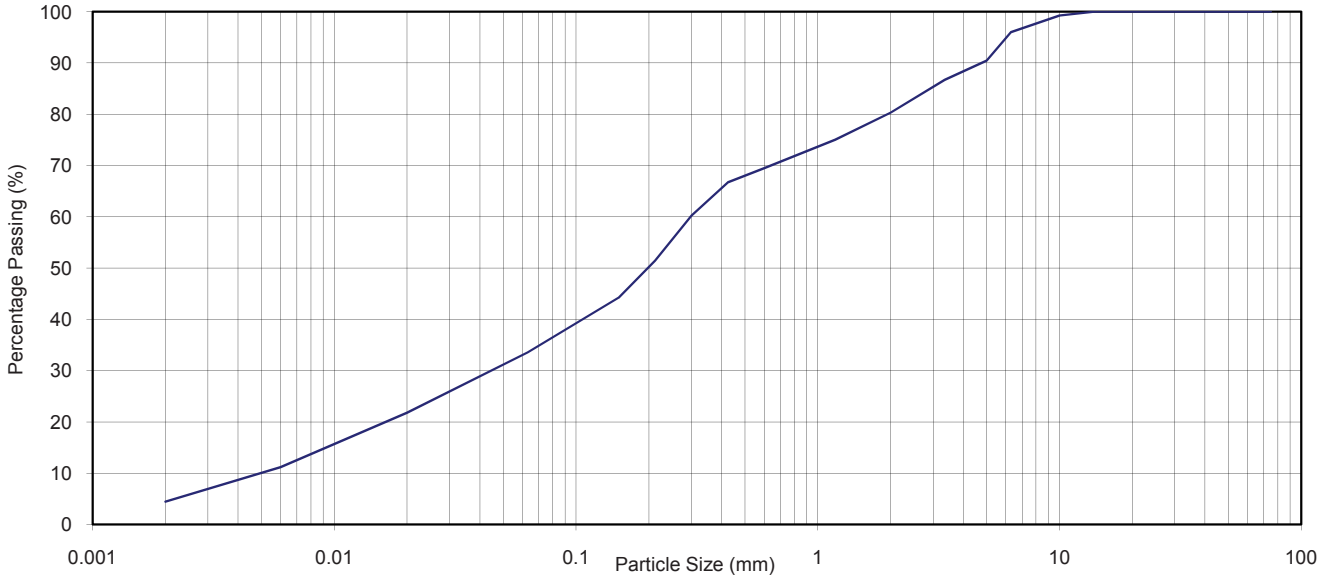
Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Iron	14050	10260	28260	35470	17360	9550	15660				<20	mg/kg	TM30/PM15
Sodium	2411	165	394	288	1465	2356	255				<5	mg/kg	TM30/PM15
Electrical Conductivity @25C #	1300	100	775	<100	750	1800	525				<100	uS/cm	TM76/PM0

harrisontesting
SERVICES

PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**1**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	99
6.30	96
5.00	90
3.35	87
2.00	80
1.18	75
0.600	70
0.425	67
0.300	60
0.212	51
0.150	44
0.063	34
0.020	22
0.006	11
0.002	4

Sample Description
MADE GROUND (Dark grey slightly clayey silty gravelly SAND. Gravel is of brick, clinker and wood fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	19.7
Sand	46.7
Silt	29.1
Clay	4.4

Remarks

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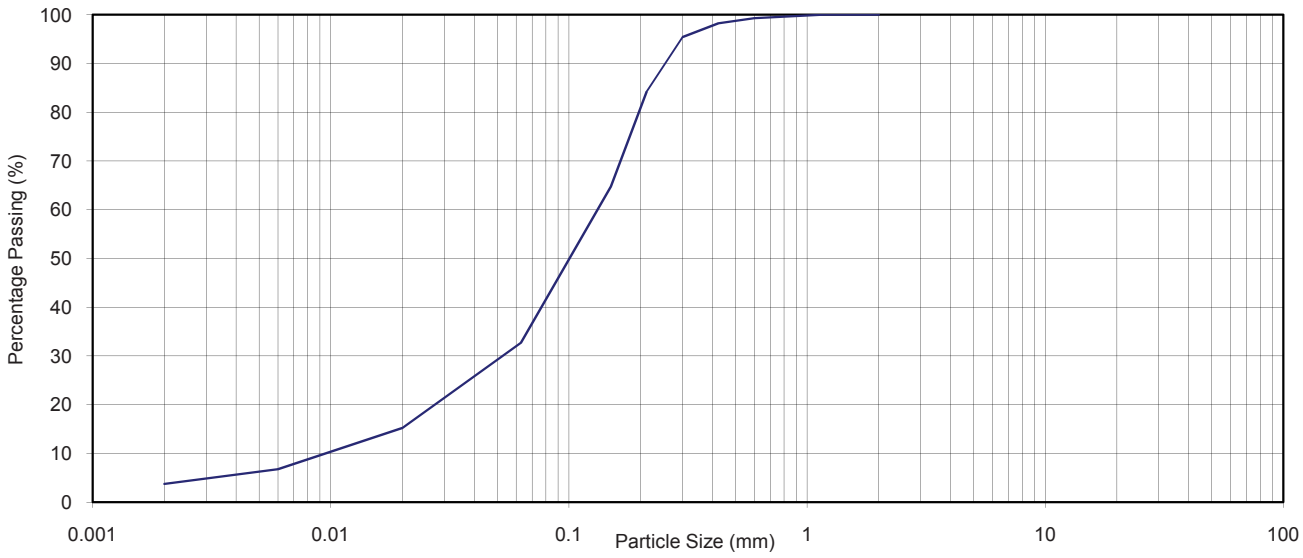
Fax: +44 (0)1603 416443
email: laboratory@harrisongroupuk.com

harrisontesting
SERVICES

PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**2**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.30	100
5.00	100
3.35	100
2.00	100
1.18	100
0.600	99
0.425	98
0.300	95
0.212	84
0.150	65
0.063	33
0.020	15
0.006	7
0.002	4

Sample Description
Dark grey slightly clayey silty SAND

Sample Proportions %	
Cobbles	0.0
Gravel	0.0
Sand	67.3
Silt	29.0
Clay	3.7

Remarks

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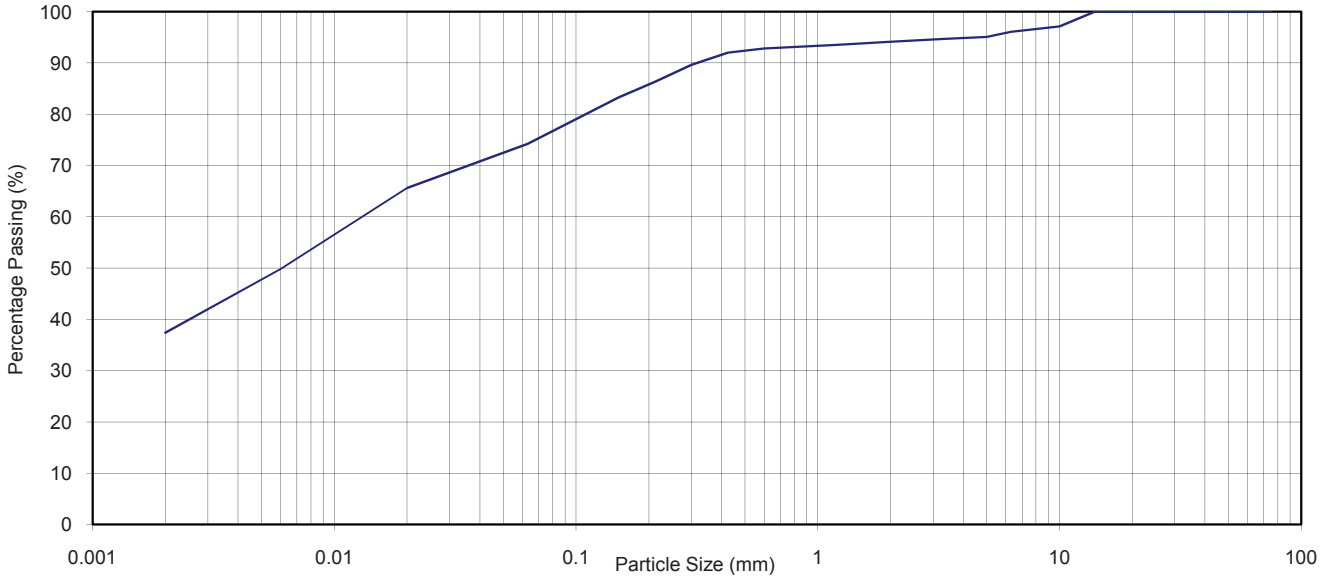
SERVICES

PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**3**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	97
6.30	96
5.00	95
3.35	95
2.00	94
1.18	94
0.600	93
0.425	92
0.300	90
0.212	86
0.150	83
0.063	74
0.020	66
0.006	50
0.002	37

Sample Description
MADE GROUND (Reddish brown slightly gravelly slightly sandy silty CLAY. Gravel is of sandstone and occasional clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	5.9
Sand	19.9
Silt	36.9
Clay	37.4

Remarks

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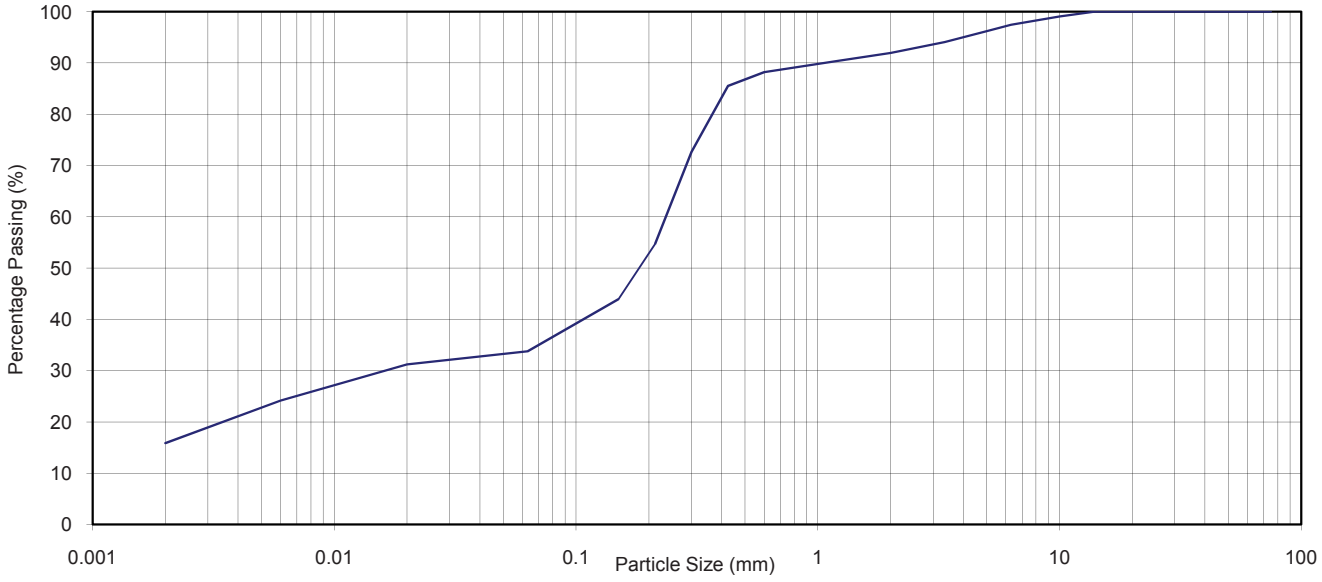
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**4**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	99
6.30	97
5.00	96
3.35	94
2.00	92
1.18	90
0.600	88
0.425	86
0.300	73
0.212	55
0.150	44
0.063	34
0.020	31
0.006	24
0.002	16

Sample Description
MADE GROUND (Dark grey clayey silty gravelly SAND. Gravel is of sandstone, brick and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	8.0
Sand	58.2
Silt	17.9
Clay	15.9

Remarks

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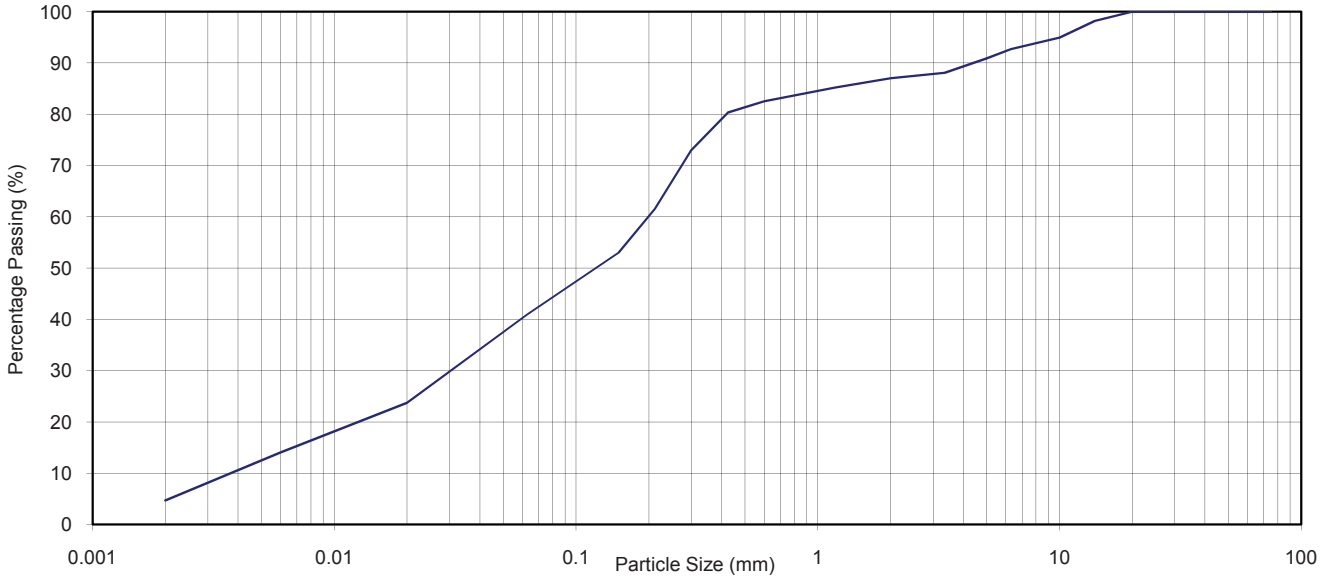
SERVICES

PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**5**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	98
10.0	95
6.30	93
5.00	91
3.35	88
2.00	87
1.18	85
0.600	83
0.425	80
0.300	73
0.212	62
0.150	53
0.063	41
0.020	24
0.006	14
0.002	5

Sample Description
MADE GROUND (Dark grey slightly gravelly sandy clayey SILT. Gravel is of flint, brick and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	13.0
Sand	46.0
Silt	36.3
Clay	4.7

Remarks

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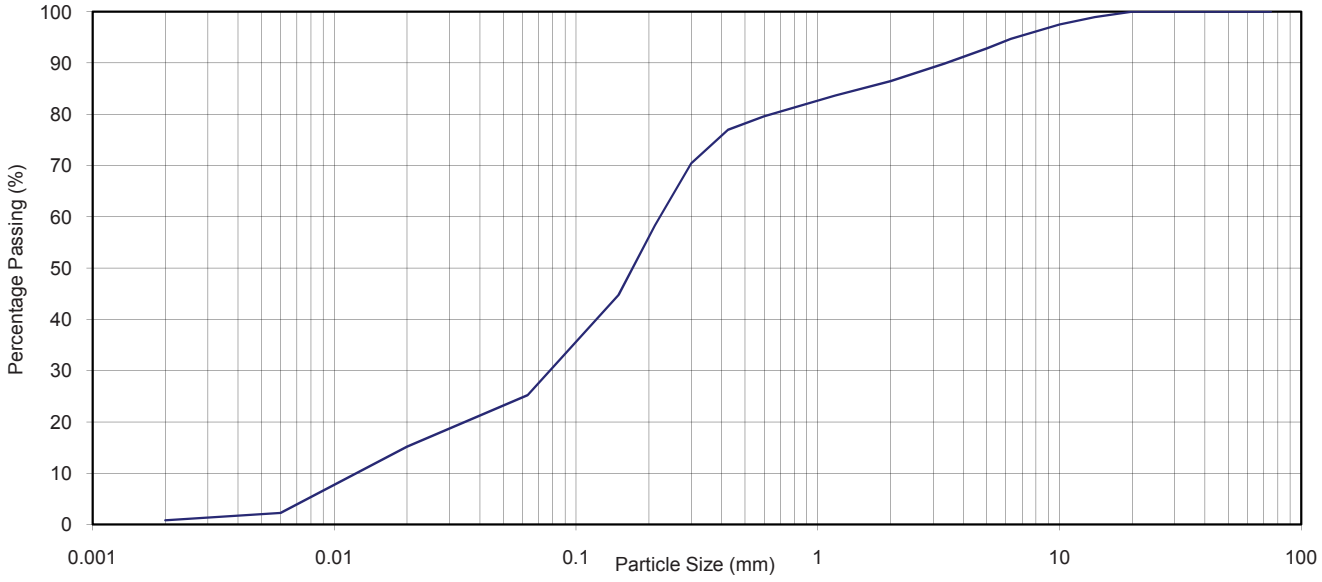
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**6**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	99
10.0	98
6.30	95
5.00	93
3.35	90
2.00	86
1.18	84
0.600	80
0.425	77
0.300	71
0.212	58
0.150	45
0.063	25
0.020	15
0.006	2
0.002	1

Sample Description
MADE GROUND (Dark brown slightly clayey silty gravelly SAND. Gravel is of wood and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	13.5
Sand	61.3
Silt	24.4
Clay	0.8

Remarks

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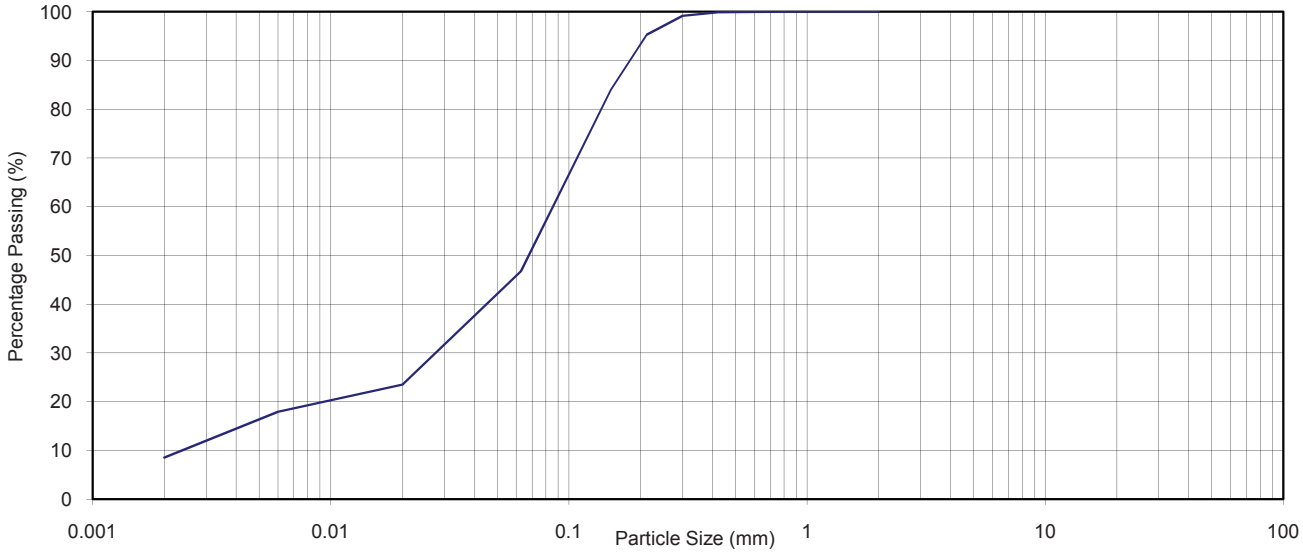
SERVICES

PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**7**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.30	100
5.00	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	95
0.150	84
0.063	47
0.020	23
0.006	18
0.002	9

Sample Description
Dark grey sandy clayey SILT

Sample Proportions %	
Cobbles	0.0
Gravel	0.0
Sand	53.3
Silt	38.2
Clay	8.5

Remarks

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Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Mark Swain

JE Job No.: 11/2257

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	LOD	Units	Method No.
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N	O			
Depth	1.77	2.65	2.58	2.84	2.61	1.44	2.26	1.55	1.73	1.49			
COC No / misc													
Containers	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G			
Sample Date	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011	02/02/2011	02/02/2011	02/02/2011	02/02/2011			
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011			
Dissolved Iron #	<0.02	13.55	0.25	0.10	0.24	<0.02	<0.02	<0.02	0.07	<0.02	<0.02	mg/l	TM30/PM14
Dissolved Manganese #	0.007	3.516	1.663	0.920	0.543	1.353	0.643	0.148	0.476	1.365	<0.002	mg/l	TM30/PM14
Dissolved Sodium #	64.7	505.9	145.1	467.2	604.4	176.0	151.5	196.5	114.3	141.2	<0.1	mg/l	TM30/PM14
Sulphate #	44.94	171.73	62.12	12.39	311.67	222.30	153.71	104.96	86.18	41.96	<0.05	mg/l	TM38/PM0
Chloride #	90.6	1051.9	228.6	787.0	1488.6	325.3	298.5	368.1	176.5	201.6	<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	25.3	5.4	<0.2	<0.2	<0.2	<0.2	9.7	3.1	1.2	3.4	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	9.91	<0.06	11.78	10.95	<0.06	0.82	0.89	7.79	0.41	1.24	<0.06	mg/l	TM38/PM0
Sulphide Aquakem	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.03	1.52	21.36	46.22	5.27	4.71	21.52	0.23	4.48	10.19	<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	<0.001	1.981	3.396	0.009	<0.001	0.032	<0.001	8.107	<0.001	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	434	480	708	868	552	476	476	352	466	592	<1	mg/l	TM75/PM0
pH #	8.10	7.43	7.82	7.73	7.49	7.70	7.93	7.54	7.93	7.78	<0.01	pH units	TM73/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Mark Swain

JE Job No.: 11/2257

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	51-55	56-60	61-65	66-70	71-75						LOD	Units	Method No.
Sample ID	P	Q	S	T	V								
Depth	3.29	1.86	3.35	3.14	1.75								
COC No / misc													
Containers	V H P G	V H P G	V H P G	V H P G	V H P G								
Sample Date	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011								
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011								
Dissolved Iron #	<0.02	<0.02	<0.02	<0.02	<0.02						<0.02	mg/l	TM30/PM14
Dissolved Manganese #	1.313	0.154	0.213	0.786	4.041						<0.002	mg/l	TM30/PM14
Dissolved Sodium #	14.9	661.9	104.8	31.0	18.3						<0.1	mg/l	TM30/PM14
Sulphate #	468.44	59.37	56.09	20.25	396.31						<0.05	mg/l	TM38/PM0
Chloride #	16.9	1075.0	202.1	68.6	15.5						<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	16.5	6.0	2.0	1.8	<0.2						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	16.26	6.00	7.73	12.44	<0.06						<0.06	mg/l	TM38/PM0
Sulphide Aquakem	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.12	0.15	0.29	3.99	1.24						<0.03	mg/l	TM38/PM0
Dissolved Methane	0.007	<0.001	0.017	2.970	0.094						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	246	282	342	304	78						<1	mg/l	TM75/PM0
pH #	6.98	7.45	7.31	7.36	6.36						<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

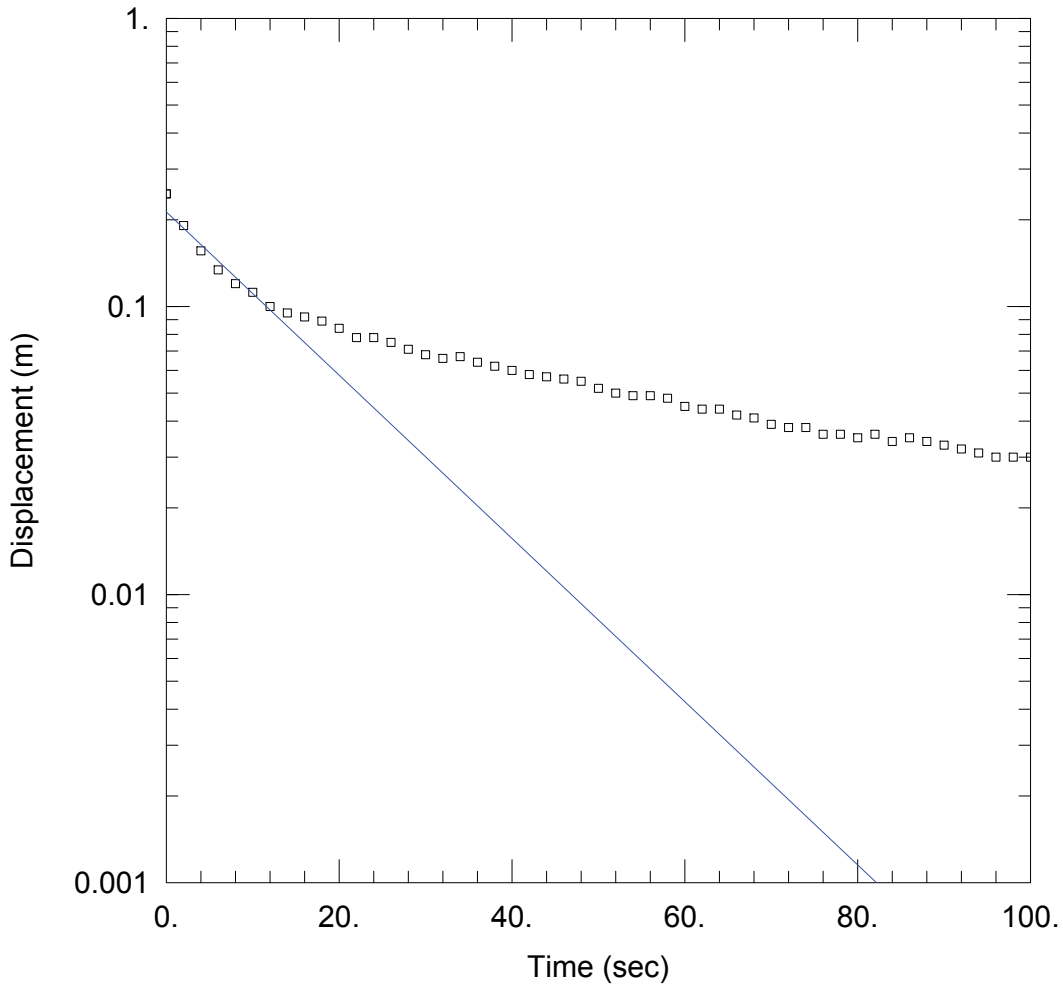
Date	F1	P	N1	AB	AE	AF	Rainfall (mm)
26/01/2011	1.311	3.26147	1.658	1.65483	2.517	2.754	0
27/01/2011	1.393	3.27025	1.689	1.67294	2.617	2.820	0.402
28/01/2011	1.419	3.26382	1.699	1.66981	2.624	2.819	0
29/01/2011	1.418	3.26454	1.704	1.67665	2.611	2.809	0
30/01/2011	1.418	3.2694	1.712	1.68407	2.623	2.815	0
31/01/2011	1.425	3.27611	1.721	1.69105	2.631	2.821	0
01/02/2011	1.429	3.27742	1.726	1.69787	2.616	2.811	0
02/02/2011	1.413	3.28416	1.732	1.70773	2.646	2.829	1.407
03/02/2011	1.425	3.29351	1.741	1.72298	2.646	2.834	0
04/02/2011	1.406	3.29413	1.737	1.72627	2.588	2.798	0
05/02/2011	1.419	3.29734	1.742	1.73566	2.616	2.812	0.402
06/02/2011	1.400	3.30336	1.751	1.75063	2.666	2.843	0.402
07/02/2011	1.422	3.30351	1.755	1.75098	2.643	2.828	1.809
08/02/2011	1.471	3.31245	1.759	1.76653	2.707	2.867	0
09/02/2011	1.450	3.30596	1.761	1.76451	2.647	2.833	0
10/02/2011	1.456	3.31055	1.763	1.77312	2.634	2.824	0.804
11/02/2011	1.337	3.3001	1.704	1.77588	2.622	2.818	4.02
12/02/2011	1.280	3.28985	1.669	1.78192	2.624	2.824	0.402
13/02/2011	1.351	3.28717	1.659	1.77077	2.561	2.784	4.02
14/02/2011	1.132	3.27127	1.467	1.76427	2.549	2.784	5.427
15/02/2011	1.150	3.26598	1.610	1.74371	2.510	2.744	2.613
16/02/2011	1.164	3.27391	1.628	1.73933	2.518	2.753	0
17/02/2011	1.194	3.28095	1.651	1.73478	2.606	2.799	0.603
18/02/2011	1.209	3.28757	1.676	1.73428	2.659	2.831	0
19/02/2011	1.176	3.28321	1.683	1.72602	2.617	2.804	0
20/02/2011	1.085	3.28242	1.629	1.72967	2.648	2.823	4.422
21/02/2011	1.097	3.28383	1.660	1.72396	2.621	2.802	0
22/02/2011	1.101	3.28463	1.670	1.72266	2.625	2.802	0.201
23/02/2011	1.113	3.28604	1.678	1.72527	2.625	2.801	1.005
24/02/2011	1.061	3.2836	1.626	1.72805	2.641	2.814	3.216
25/02/2011	1.082	3.28825	1.658	1.72619	2.637	2.808	0
26/02/2011	0.942	3.24676	1.595	1.71505	2.547	2.754	0
27/02/2011	1.131	3.23903	1.536	1.68043	2.453	2.646	15.075
28/02/2011	1.249	3.24495	1.604	1.65724	2.434	2.654	1.809
01/03/2011	1.305	3.24954	1.633	1.64106	2.489	2.716	0.201
02/03/2011	1.338	3.24852	1.651	1.62769	2.505	2.753	0
03/03/2011	1.365	3.25071	1.658	1.61986	2.517	2.784	0
04/03/2011	1.388	3.25444	1.670	1.62332	2.532	2.798	0
05/03/2011	1.411	3.2546	1.677	1.6239	2.535	2.804	0
06/03/2011	1.409	3.26296	1.688	1.63196	2.568	2.823	0.201
07/03/2011	1.430	3.26254	1.696	1.63844	2.575	2.826	0
08/03/2011	1.402	3.26041	1.695	1.642	2.541	2.802	0
09/03/2011	1.4334	3.2829	1.7062	1.672	2.5724	2.7973	0.603
10/03/2011	1.4497	3.2888	1.7128	1.6846	2.5687	2.8574	0.201
11/03/2011	1.4518	3.2868	1.7235	1.6927	2.6004	2.8452	0.402
12/03/2011	1.4497	3.2902	1.7152	1.7009	2.5547	2.9396	0.603
13/03/2011	1.361	3.286	1.6878	1.7175	2.6259	2.9496	0
14/03/2011	1.4051	3.3011	1.7277	1.7313	2.707	2.8392	4.824
15/03/2011	1.402	3.2999	1.7365	1.7341	2.6707	2.8393	0
16/03/2011	1.4069	3.3021	1.7461	1.7414	2.6668	2.8402	0
17/03/2011	1.4149	3.3117	1.7493	1.7541	2.6759	2.8295	0
18/03/2011	1.4185	3.3192	1.7582	1.7641	2.7073	2.762	0
19/03/2011	1.423	3.3201	1.7701	1.7724	2.7325	2.6805	0
20/03/2011	1.3958	3.3206	1.7695	1.7767	2.6956	2.6939	0
21/03/2011	1.4116	3.3304	1.7832	1.789	2.7236	2.667	1.206
22/03/2011	1.4527	3.3354	1.795	1.797	2.7444	2.622	0
23/03/2011	1.4679	3.3368	1.802	1.8046	2.7281	2.5985	0
24/03/2011	1.452	3.3368	1.8032	1.8057	2.6802	2.6367	0

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)
25/03/2011	1.4329	3.3346	1.7929	1.8109	2.6392	2.7501	0
26/03/2011	1.4241	3.3337	1.7884	1.8122	2.6622	2.8047	0
27/03/2011	1.4228	3.3376	1.7976	1.8207	2.6855	2.8266	0
28/03/2011	1.4215	3.3418	1.8061	1.8284	2.7083	2.8257	0
29/03/2011	1.413	3.3446	1.8071	1.8362	2.6902	2.8675	0
30/03/2011	1.3512	3.3322	1.8038	1.836	2.6828	2.8655	0
31/03/2011	1.3878	3.3369	1.759	1.8517	2.734	2.8634	2.814
01/04/2011	1.4857	3.3328	1.7841	1.8541	2.7443	2.8799	3.015
02/04/2011	1.5393	3.3401	1.7909	1.862	2.7389	2.866	0.201
03/04/2011	1.5708	3.3448	1.8005	1.8694	2.7642	2.8809	0
04/04/2011	1.5432	3.3359	1.7923	1.8649	2.7667	2.8985	1.407
05/04/2011	1.5886	3.3478	1.8042	1.8786	2.7833	2.8862	1.608
06/04/2011	1.6124	3.3501	1.8202	1.8861	2.8118	2.9171	0
07/04/2011	1.6277	3.3509	1.8255	1.8901	2.8375	2.9291	0
08/04/2011	1.6275	3.3533	1.8299	1.8976	2.8038	2.9397	0
09/04/2011	1.6253	3.3533	1.8306	1.9019	2.7785	2.9181	0
10/04/2011	1.6345	3.3563	1.8325	1.9068	2.7822	2.9058	0
11/04/2011	1.6177	3.3552	1.8307	1.9092	2.7746	2.9052	0
12/04/2011	1.6202	3.361	1.8364	1.9173	2.819	2.9131	1.005
13/04/2011	1.6158	3.354	1.8265	1.9164	2.7399	2.9184	1.005
14/04/2011	1.6299	3.3581	1.8328	1.9223	2.7584	2.8776	0
15/04/2011	1.6364	3.3613	1.8417	1.9303	2.7788	2.8917	0
16/04/2011	1.6478	3.366	1.8495	1.9378	2.8037	2.904	0
17/04/2011	1.6513	3.3689	1.8543	1.9431	2.8091	2.9185	0
18/04/2011	1.6355	3.3668	1.8533	1.9465	2.7584	2.9171	0
19/04/2011	1.6277	3.3734	1.8567	1.9534	2.7689	2.8825	0
20/04/2011	1.6469	3.3751	1.8602	1.9608	2.7819	2.8957	0
21/04/2011	1.6497	3.3749	1.8632	1.9665	2.7772	2.9028	0
22/04/2011	1.6495	3.3796	1.8645	1.9736	2.7616	2.8934	0
23/04/2011	1.4551	3.3741	1.7946	1.9768	2.8113	2.8914	0
24/04/2011	1.457	3.3742	1.8173	1.9831	2.8394	2.9197	5.025
25/04/2011	1.4538	3.3806	1.834	1.9888	2.8443	2.9342	0
26/04/2011	1.4447	3.376	1.84	1.9897	2.8329	2.9374	0
27/04/2011	1.4419	3.3806	1.8497	1.996	2.8165	2.9283	0
28/04/2011	1.4284	3.382	1.8521	2.0003	2.7831	2.9199	0
29/04/2011	1.4217	3.3833	1.8549	2.007	2.7646	2.8895	0
30/04/2011	1.4262	3.3848	1.8541	2.0169	2.7764	2.8835	0
01/05/2011	1.4316	3.3838	1.8565	2.0195	2.7902	2.8889	0
02/05/2011	1.4389	3.3765	1.8631	2.0264	2.8077	2.8969	0
03/05/2011	1.4475	3.3869	1.8679	2.0323	2.8279	2.9095	0
04/05/2011	1.4531	3.39	1.8721	2.0351	2.8311	2.9207	0
05/05/2011	1.4488	3.3915	1.8754	2.038	2.8072	2.9142	0
06/05/2011	1.4319	3.394	1.8791	2.0448	2.8069	2.89	0
07/05/2011	1.2877	3.3836	1.8106	2.0475	2.7868	2.895	1.407
08/05/2011	1.1907	3.3748	1.7248	2.0527	2.8114	2.8831	6.834
09/05/2011	1.23	3.3728	1.7552	2.059	2.8382	2.9115	5.226
10/05/2011	1.2331	3.3722	1.7655	2.0625	2.85	2.9226	2.613
11/05/2011	1.2594	3.3746	1.7681	2.059	2.8139	2.9237	1.005
12/05/2011	1.2683	3.3716	1.7563	2.0557	2.8045	2.9027	0
13/05/2011	1.3032	3.3757	1.7751	2.0603	2.8497	2.9051	0
14/05/2011	1.3135	3.3746	1.7614	2.0604	2.8366	2.908	1.206
15/05/2011	1.2804	3.381	1.7727	2.0678	2.8761	2.9268	2.412
16/05/2011	1.2974	3.3869	1.7839	2.0759	2.8586	2.9161	0.603
17/05/2011	1.3055	3.388	1.7836	2.079	2.8402	2.9064	0.201
18/05/2011	1.3137	3.3891	1.7853	2.0838	2.8181	2.895	1.608
19/05/2011	1.3148	3.3909	1.7858	2.0849	2.8545	2.9168	0
20/05/2011	1.3312	3.3916	1.7915	2.092	2.8492	2.9157	0
21/05/2011	1.3527	3.3925	1.7999	2.0938	2.8705	2.9152	0

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)
22/05/2011	1.3203	3.3901	1.791	2.0984	2.8113	2.9055	2.211
23/05/2011	1.3299	3.3967	1.8012	2.1055	2.8797	2.9253	1.206
24/05/2011	1.3313	3.4003	1.7953	2.1081	2.8885	2.9498	0
25/05/2011	1.3632	3.3981	1.8054	2.1128	2.9096	2.9317	0
26/05/2011	1.3267	3.3956	1.7924	2.1156	2.7868	2.8771	5.226
27/05/2011	1.2397	3.3951	1.7538	2.1209	2.8721	2.9307	2.01
28/05/2011	1.2273	3.3923	1.7439	2.124	2.8358	2.9021	0.201
29/05/2011	1.2565	3.4004	1.7561	2.1299	2.819	2.899	0
30/05/2011	1.2997	3.4035	1.7601	2.1355	2.8528	2.9169	6.231
31/05/2011	1.1138	3.3867	1.6545	2.1326	2.8602	2.9348	3.417
01/06/2011	1.2768	3.3943	1.7159	2.1369	2.9111	2.9556	0.201
02/06/2011	1.3915	3.4039	1.7379	2.1456	2.9247	2.9635	0
03/06/2011	1.4756	3.4033	1.7433	2.1472	2.9119	2.9469	0
04/06/2011	1.5146	3.4045	1.737	2.1507	2.8657	2.9134	0
05/06/2011	1.4762	3.3998	1.7251	2.1516	2.8263	2.8787	2.412
06/06/2011	1.41	3.3942	1.7014	2.1544	2.7806	2.8637	0.804
07/06/2011	1.4858	3.3963	1.7039	2.1549	2.7803	2.86	0
08/06/2011	1.5191	3.4008	1.7068	2.1572	2.7936	2.8767	1.005
09/06/2011	1.5845	3.4075	1.7237	2.1628	2.8601	2.9242	0
10/06/2011	1.6116	3.4045	1.7313	2.1631	2.8746	2.9276	0.201
11/06/2011	1.6134	3.4065	1.7321	2.1657	2.8696	2.9289	0
12/06/2011	1.5621	3.4024	1.7354	2.1668	2.8692	2.9056	7.236
13/06/2011	1.2025	3.3862	1.6261	2.1718	2.7972	2.9042	2.211
14/06/2011	1.2875	3.3944	1.6892	2.1718	2.8815	2.9288	0.201
15/06/2011	1.2952	3.3989	1.7086	2.1773	2.8398	2.898	0.603
16/06/2011	1.2846	3.398	1.7125	2.1774	2.823	2.8921	2.211
17/06/2011	1.2512	3.3964	1.716	2.1785	2.8281	2.8784	No Data
18/06/2011	1.2154	3.3924	1.7091	2.1791	2.7783	2.8688	No Data
19/06/2011	1.2041	3.3996	1.7045	2.1819	2.8507	2.9231	No Data
20/06/2011	1.2074	3.3989	1.7003	2.1828	2.8642	2.9154	No Data
21/06/2011	1.1022	3.3991	1.6765	2.1876	2.817	2.8956	No Data
22/06/2011	1.1153	3.3952	1.6789	2.1858	2.8104	2.8961	No Data
23/06/2011	1.0901	3.3951	1.6571	2.1841	2.8431	2.923	No Data
24/06/2011	1.1326	3.3966	1.6746	2.1794	2.8804	2.9357	No Data
25/06/2011	0.9698	3.3675	1.5675	2.1782	2.8163	2.9061	No Data
26/06/2011	1.0372	3.3775	1.623	2.1729	2.8429	2.9051	No Data
27/06/2011	1.0796	3.3783	1.6496	2.1721	2.803	2.8806	No Data
28/06/2011	1.1056	3.3792	1.6633	2.1689	2.8319	2.8983	No Data
29/06/2011	1.1599	3.3785	1.675	2.1664	2.8496	2.915	No Data
30/06/2011	1.2099	3.3819	1.6891	2.1661	2.8649	2.9256	No Data
01/07/2011	1.2538	3.385	1.7008	2.1711	2.8719	2.9263	No Data
02/07/2011	1.2696	3.3854	1.7027	2.1701	2.8431	2.9013	No Data
03/07/2011	1.2832	3.3917	1.7085	2.1779	2.83	2.9019	No Data
04/07/2011	1.3039	3.3951	1.716	2.1816	2.8424	2.9064	No Data
05/07/2011	1.3116	3.3967	1.7195	2.1862	2.8285	2.8933	No Data
06/07/2011	1.2754	3.3876	1.7123	2.1875	2.7929	2.8764	No Data
07/07/2011	1.2063	3.3854	1.6873	2.1884	2.7758	2.8749	No Data
08/07/2011	1.2302	3.3925	1.6938	2.1929	2.8187	2.8903	No Data
09/07/2011	1.2129	3.3891	1.7079	2.1955	2.8516	2.9249	No Data
10/07/2011	1.2017	3.3948	1.7189	2.1955	2.9029	2.9502	No Data
11/07/2011	1.2009	3.3962	1.7274	2.1962	2.9096	2.9538	No Data
12/07/2011	1.2318	3.3997	1.7315	2.201	2.9004	2.9461	No Data
13/07/2011	1.2635	3.4022	1.7346	2.2042	2.8961	2.9431	No Data
14/07/2011	1.2972	3.404	1.7356	2.2068	2.8893	2.9382	No Data
15/07/2011	1.3182	3.4062	1.7348	2.21	2.8793	2.9269	No Data
16/07/2011	1.3128	3.402	1.7238	2.2153	2.8101	2.8738	No Data
17/07/2011	1.2429	3.4001	1.7086	2.2168	2.7803	2.8719	No Data
18/07/2011	0.8901	3.3659	1.3704	2.2132	2.7997	2.894	No Data

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)
19/07/2011	0.909	3.362	1.4202	2.2044	2.8194	2.9121	No Data
20/07/2011	1.0044	3.3621	1.5698	2.1936	2.8506	2.9237	No Data
21/07/2011	1.0999	3.3652	1.6092	2.1906	2.862	2.9342	No Data
22/07/2011	1.1628	3.37	1.634	2.19	2.8843	2.9387	No Data
23/07/2011	1.0547	3.3516	1.4335	2.1815	2.841	2.9109	No Data
24/07/2011	1.083	3.354	1.5805	2.1813	2.8119	2.8967	No Data
25/07/2011	1.1177	3.3554	1.6087	2.1824	2.8085	2.8969	No Data
26/07/2011	1.1676	3.3642	1.6385	2.1878	2.8439	2.9238	No Data
27/07/2011	1.212	3.3705	1.6611	2.1934	2.8858	2.9465	No Data
28/07/2011	1.2391	3.3719	1.675	2.1941	2.8817	2.9488	No Data
29/07/2011	1.2676	3.3763	1.6874	2.2001	2.8854	2.9467	No Data
30/07/2011	1.278	3.3766	1.6911	2.2012	2.8727	2.9343	No Data
31/07/2011	1.2814	3.3794	1.6902	2.206	2.8365	2.9111	No Data
01/08/2011	1.2978	3.3868	1.6953	2.2131	2.8401	2.9157	No Data
02/08/2011	1.3108	3.3898	1.6967	2.2141	2.8542	2.9289	No Data
03/08/2011	1.3217	3.3914	1.703	2.2193	2.8758	2.936	No Data
04/08/2011	1.3268	3.3924	1.7041	2.2229	2.8526	2.9226	No Data
05/08/2011	1.2192	3.3894	1.6302	2.2256	2.8667	2.9471	No Data
06/08/2011	1.2484	3.3845	1.6593	2.2264	2.846	2.9222	No Data
07/08/2011	1.2649	3.3905	1.6659	2.2278	2.8207	2.9179	No Data
08/08/2011	1.2397	3.3901	1.6088	2.2295	2.8526	2.9482	No Data
09/08/2011	1.2739	3.399	1.656	2.2354	2.9413	3.0055	No Data
10/08/2011	1.3028	3.3955	1.687	2.2321	2.9356	2.9741	No Data
11/08/2011	1.0716	3.3786	1.4588	2.2379	2.8342	2.9199	No Data
12/08/2011	1.1101	3.3824	1.5866	2.2367	2.8507	2.9287	No Data
13/08/2011	1.1251	3.3803	1.6145	2.2369	2.814	2.9071	No Data
14/08/2011	1.1697	3.3859	1.6312	2.2376	2.832	2.923	No Data
15/08/2011	1.2272	3.3901	1.652	2.238	2.8818	2.9527	No Data
16/08/2011	1.2432	3.3889	1.6721	2.242	2.8749	2.9494	No Data
17/08/2011	1.2484	3.394	1.683	2.2427	2.8919	2.9607	No Data
18/08/2011	1.2732	3.3952	1.6926	2.2425	2.8821	2.9476	No Data
19/08/2011	1.2891	3.3972	1.7051	2.2499	2.8601	2.9463	No Data
20/08/2011	1.3008	3.4022	1.7105	2.2545	2.8584	2.9416	No Data
21/08/2011	1.2942	3.4014	1.7123	2.2557	2.8379	2.9357	No Data
22/08/2011	1.32	3.4081	1.7243	2.2586	2.8898	2.9662	No Data
23/08/2011	1.3244	3.4095	1.7311	2.2642	2.873	2.9452	No Data
24/08/2011	1.3368	3.4091	1.7283	2.2646	2.8481	2.9373	No Data
25/08/2011	1.3469	3.4024	1.7286	2.2664	2.8481	2.9404	No Data
26/08/2011	1.3009	3.4019	1.7207	2.2668	2.8391	2.9301	No Data
27/08/2011	1.1914	3.3905	1.4091	2.2706	2.8563	2.9522	No Data
28/08/2011	0.975	3.3698	1.3368	2.2604	2.8174	2.9394	No Data
29/08/2011	1.0296	3.3677	1.5386	2.2553	2.8221	2.9351	No Data
30/08/2011	1.0632	3.3677	1.5704	2.2539	2.8203	2.9281	No Data
31/08/2011	1.1142	3.3681	1.592	2.2532	2.8143	2.9186	No Data
01/09/2011	1.1569	3.3723	1.607	2.2557	2.8169	2.9131	No Data
02/09/2011	1.178	3.3736	1.6151	2.2568	2.797	2.9064	No Data
03/09/2011	1.2061	3.3762	1.6278	2.2617	2.795	2.901	No Data
04/09/2011	1.2296	3.384	1.6326	2.2629	2.802	2.9028	No Data
05/09/2011	1.244	3.3819	1.644	2.2618	2.8007	2.9191	No Data
06/09/2011	1.2357	3.3798	1.6584	2.2639	2.8059	2.9173	No Data
07/09/2011	1.2433	3.3918	1.6691	2.2673	2.8441	2.9391	No Data
08/09/2011	1.2383	3.3885	1.6809	2.2699	2.8399	2.9355	No Data
09/09/2011	1.2577	3.394	1.6916	2.2757	2.8512	2.9451	No Data
10/09/2011	1.2333	3.3945	1.6972	2.2793	2.8333	2.9191	No Data
11/09/2011	1.2411	3.3983	1.6973	2.2784	2.8274	2.928	No Data
12/09/2011	1.2314	3.3933	1.7031	2.2809	2.8159	2.9324	No Data
13/09/2011	1.2523	3.4058	1.7171	2.2824	2.9083	2.9765	No Data
14/09/2011	1.2786	3.4101	1.7255	2.2826	2.9297	2.9968	No Data

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)
15/09/2011	1.3051	3.4101	1.7344	2.2861	2.9454	3.0023	No Data
16/09/2011	1.3128	3.4109	1.7328	2.2885	2.912	2.9609	No Data
17/09/2011	1.218	3.4028	1.6902	2.2916	2.8492	2.9282	No Data
18/09/2011	1.1469	3.3959	1.5431	2.2877	2.8409	2.9353	No Data
19/09/2011	1.1873	3.4071	1.65	2.2931	2.8952	2.9627	No Data



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_T.aqt
Date: 11/25/11 Time: 20:31:41

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

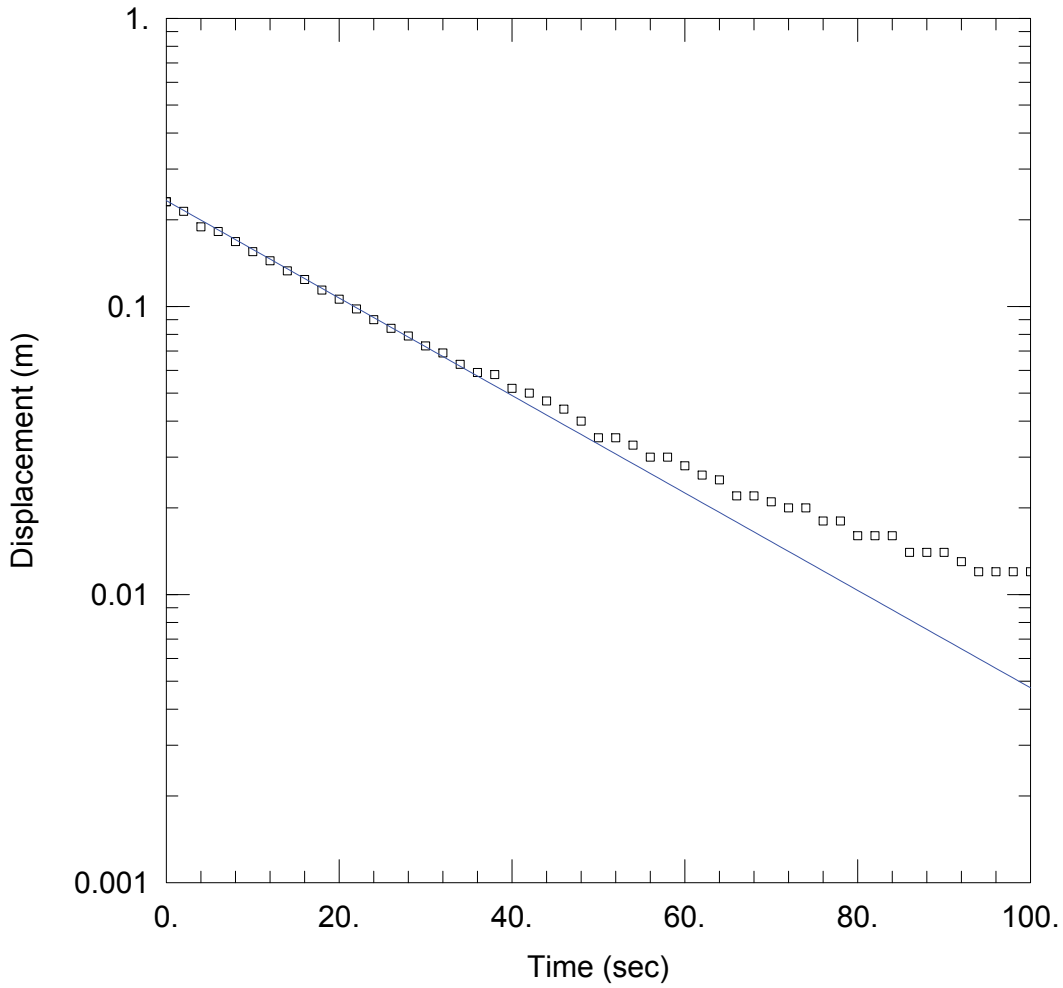
Saturated Thickness: 0.5 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (T)

Initial Displacement: 0.246 m Static Water Column Height: 0.78 m
Total Well Penetration Depth: 0.78 m Screen Length: 0.78 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 5.623 m/day y0 = 0.2129 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_S.aqt
Date: 11/25/11 Time: 20:31:58

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

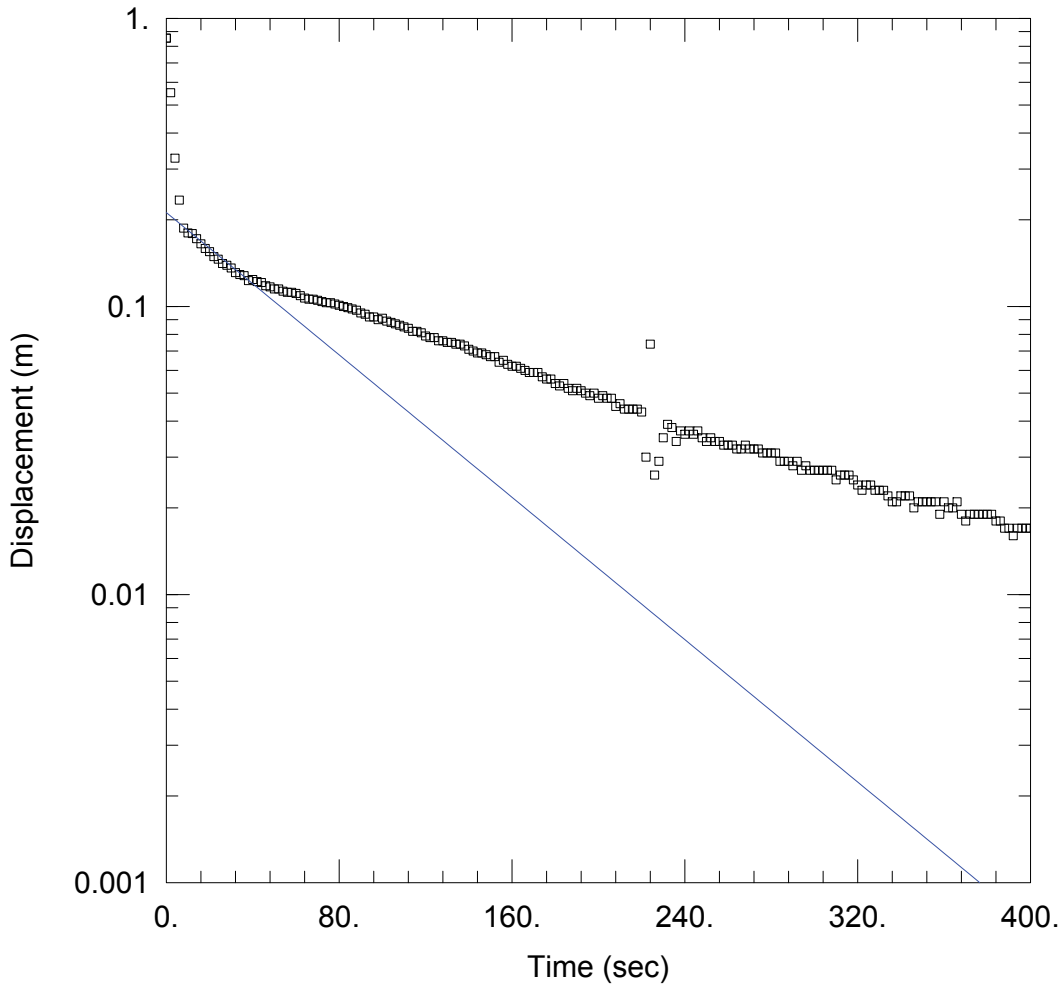
Saturated Thickness: 0.52 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (S)

Initial Displacement: 0.231 m
Total Well Penetration Depth: 0.52 m
Casing Radius: 0.025 m
Static Water Column Height: 0.52 m
Screen Length: 0.52 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.799 m/day
y0 = 0.233 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_Q.aqt
Date: 11/25/11 Time: 20:32:12

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

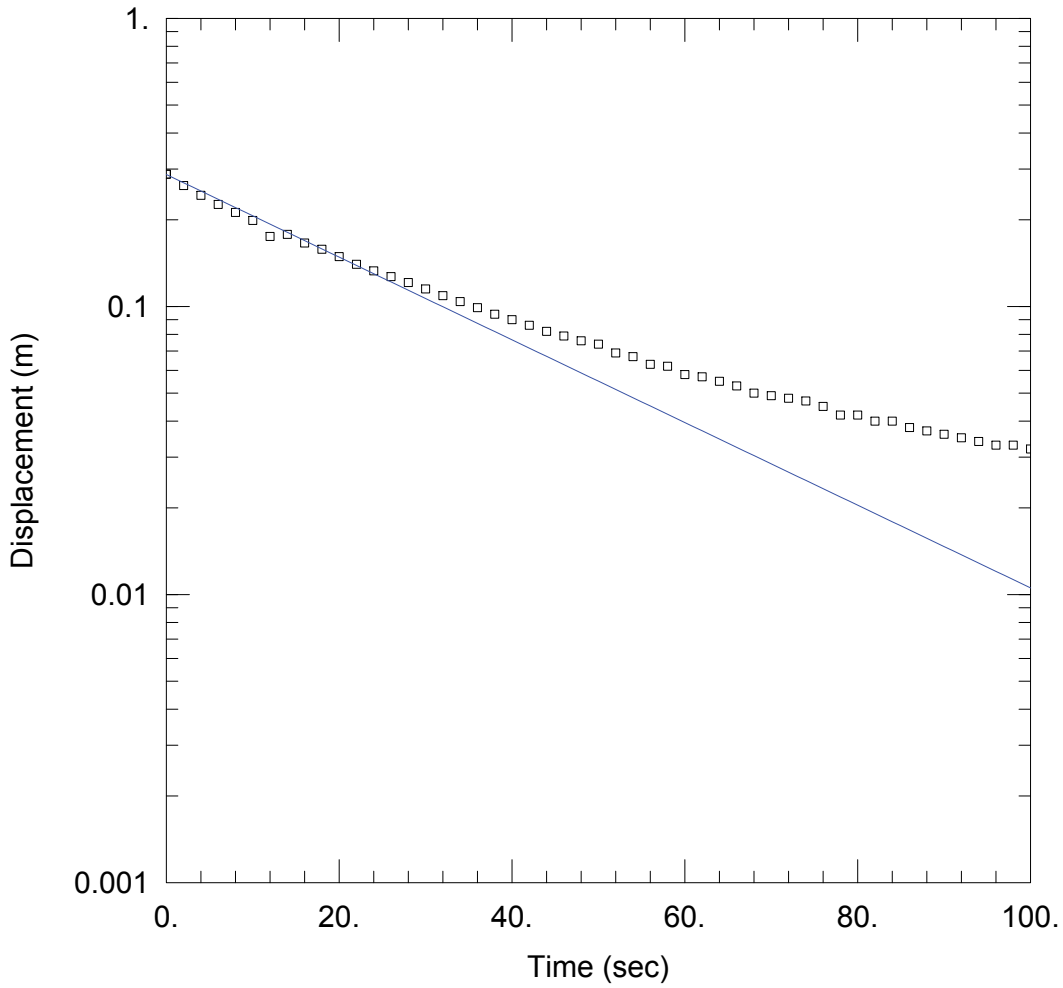
Saturated Thickness: 1.19 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (Q)

Initial Displacement: 0.854 m
Total Well Penetration Depth: 1.93 m
Casing Radius: 0.025 m
Static Water Column Height: 1.93 m
Screen Length: 1.93 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7419 m/day
y0 = 0.2118 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_P.aqt
Date: 11/25/11 Time: 20:28:36

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

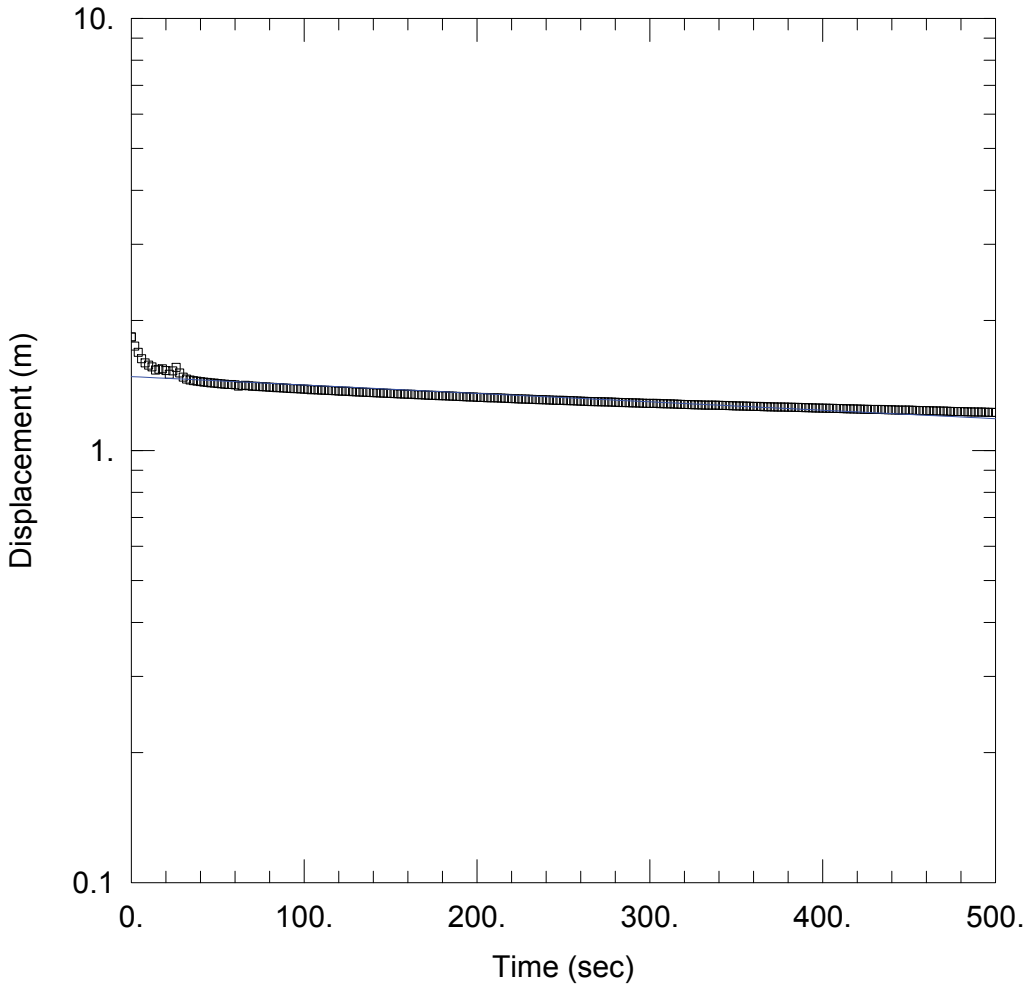
Saturated Thickness: 0.6 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (P)

Initial Displacement: 0.288 m
Total Well Penetration Depth: 0.6 m
Casing Radius: 0.025 m
Static Water Column Height: 0.6 m
Screen Length: 0.6 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.208 m/day
y0 = 0.2872 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_N.aqt
Date: 11/25/11 Time: 20:29:31

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Date: March 2011

AQUIFER DATA

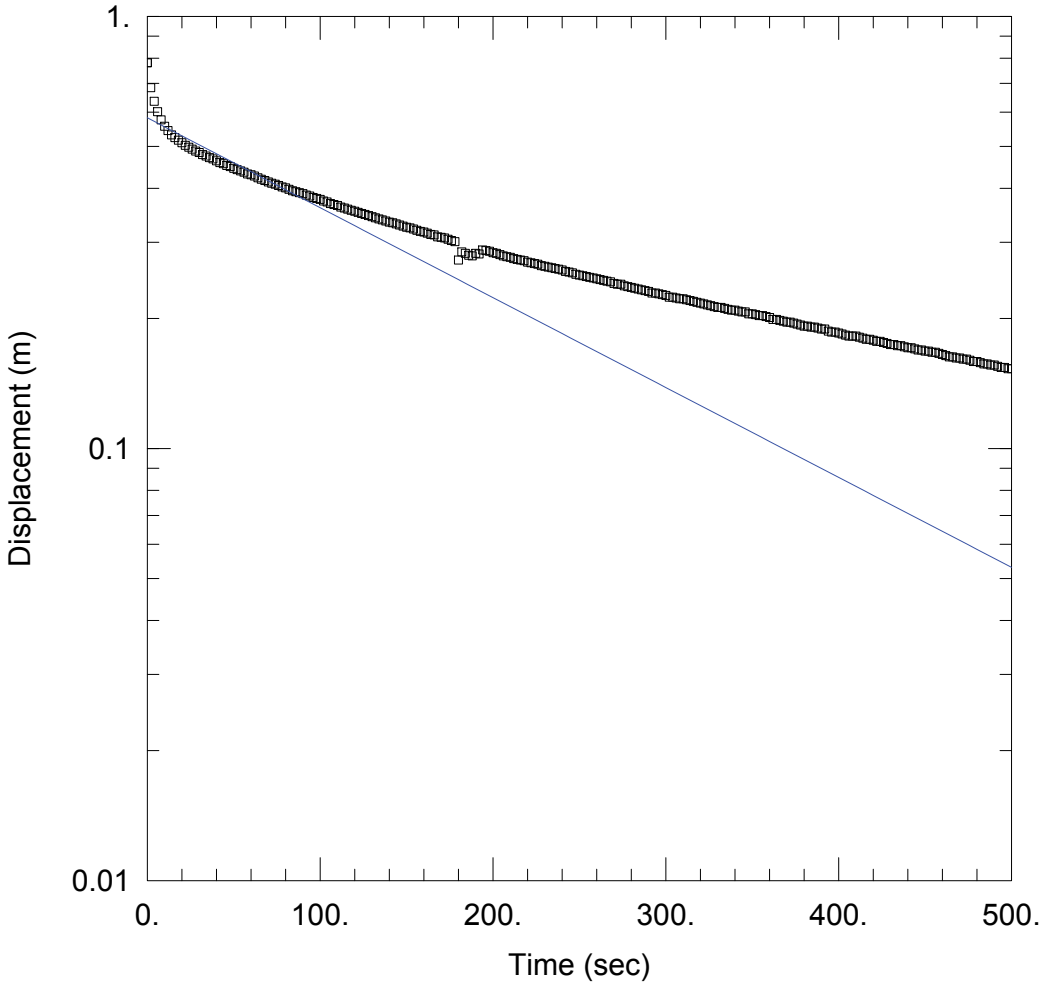
Saturated Thickness: 2.22 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (N)

Initial Displacement: 1.832 m Static Water Column Height: 2.22 m
Total Well Penetration Depth: 1.22 m Screen Length: 1.22 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.01741 m/day y0 = 1.483 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_F2.aqt
Date: 11/25/11 Time: 20:29:49

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Date: March 2011

AQUIFER DATA

Saturated Thickness: 2.61 m Anisotropy Ratio (Kz/Kr): 1.

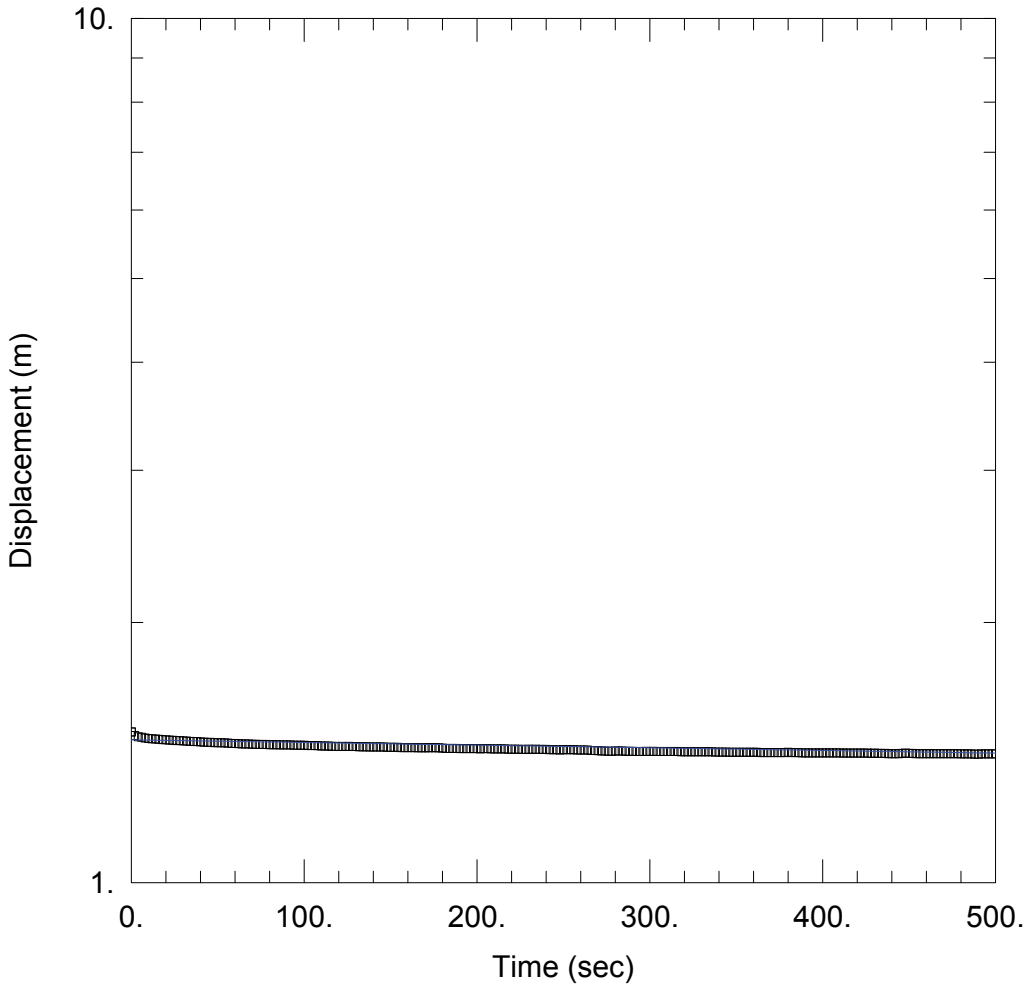
WELL DATA (F2)

Initial Displacement: 0.781 m Static Water Column Height: 2.61 m
Total Well Penetration Depth: 2.61 m Screen Length: 2.61 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.1336 m/day y0 = 0.5824 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_AG.aqt
Date: 11/25/11 Time: 20:30:21

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Date: March 2011

AQUIFER DATA

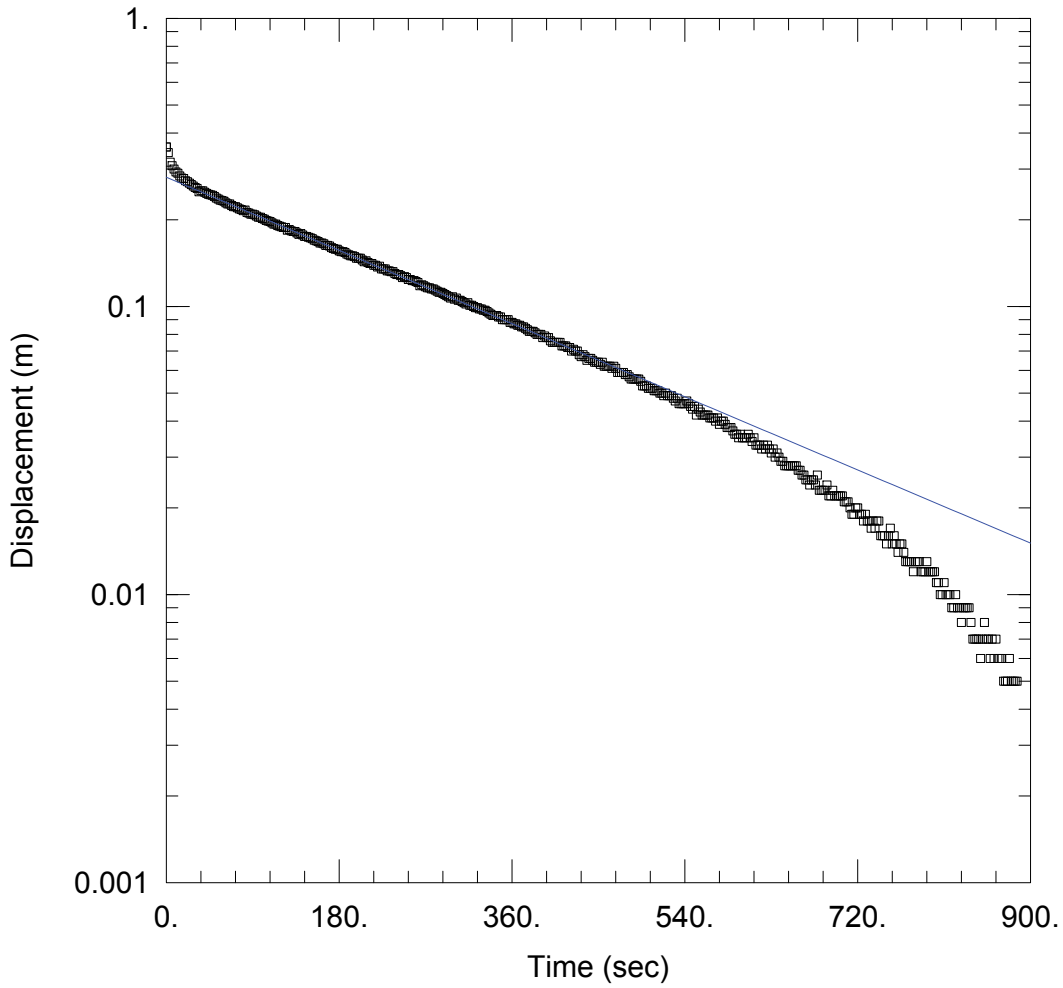
Saturated Thickness: 0.41 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AG)

Initial Displacement: 1.494 m Static Water Column Height: 1.94 m
Total Well Penetration Depth: 1.94 m Screen Length: 1.94 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.009173 m/day y0 = 1.463 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_AF.aqt
Date: 11/25/11 Time: 20:30:39

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

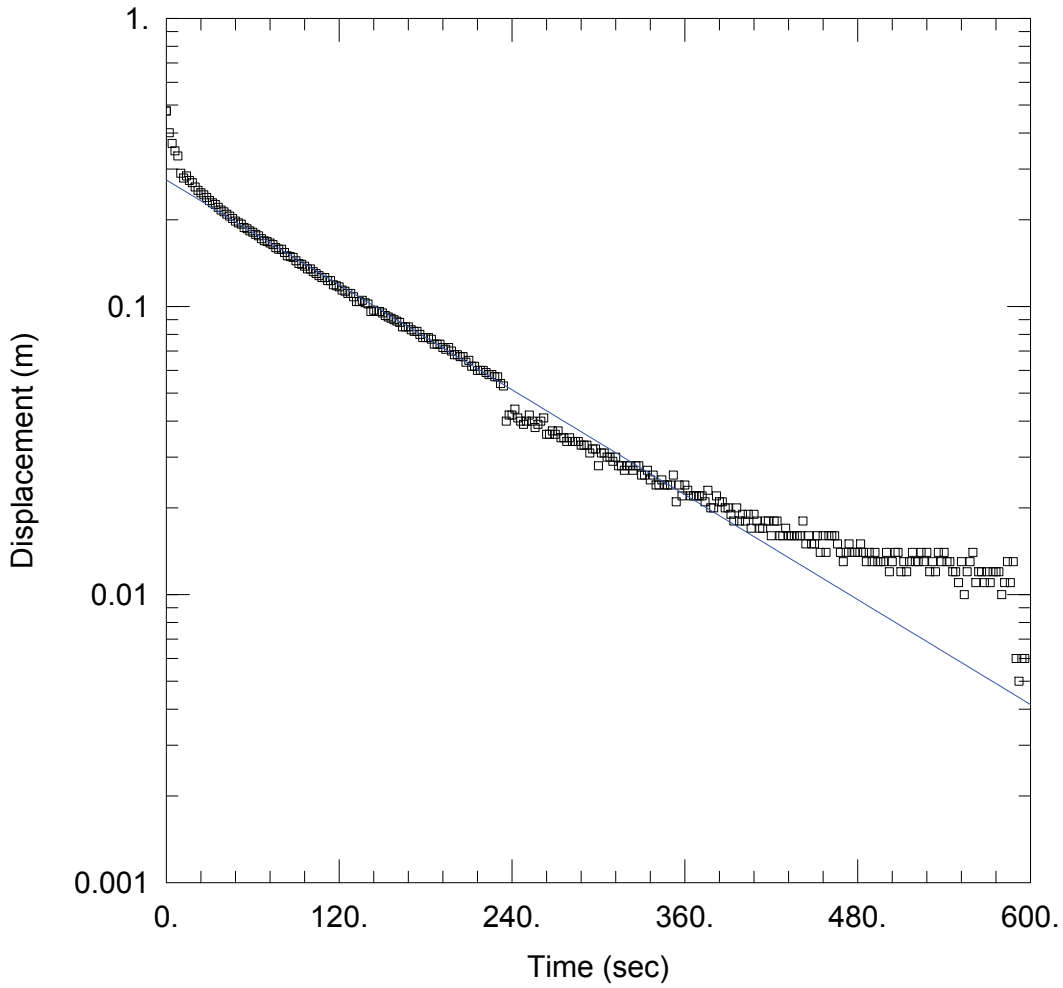
Saturated Thickness: 1.08 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AF)

Initial Displacement: 0.358 m
Total Well Penetration Depth: 1.08 m
Casing Radius: 0.025 m
Static Water Column Height: 1.08 m
Screen Length: 1.08 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1578 m/day
y0 = 0.2809 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_AE.aqt
Date: 11/25/11 Time: 20:30:54

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

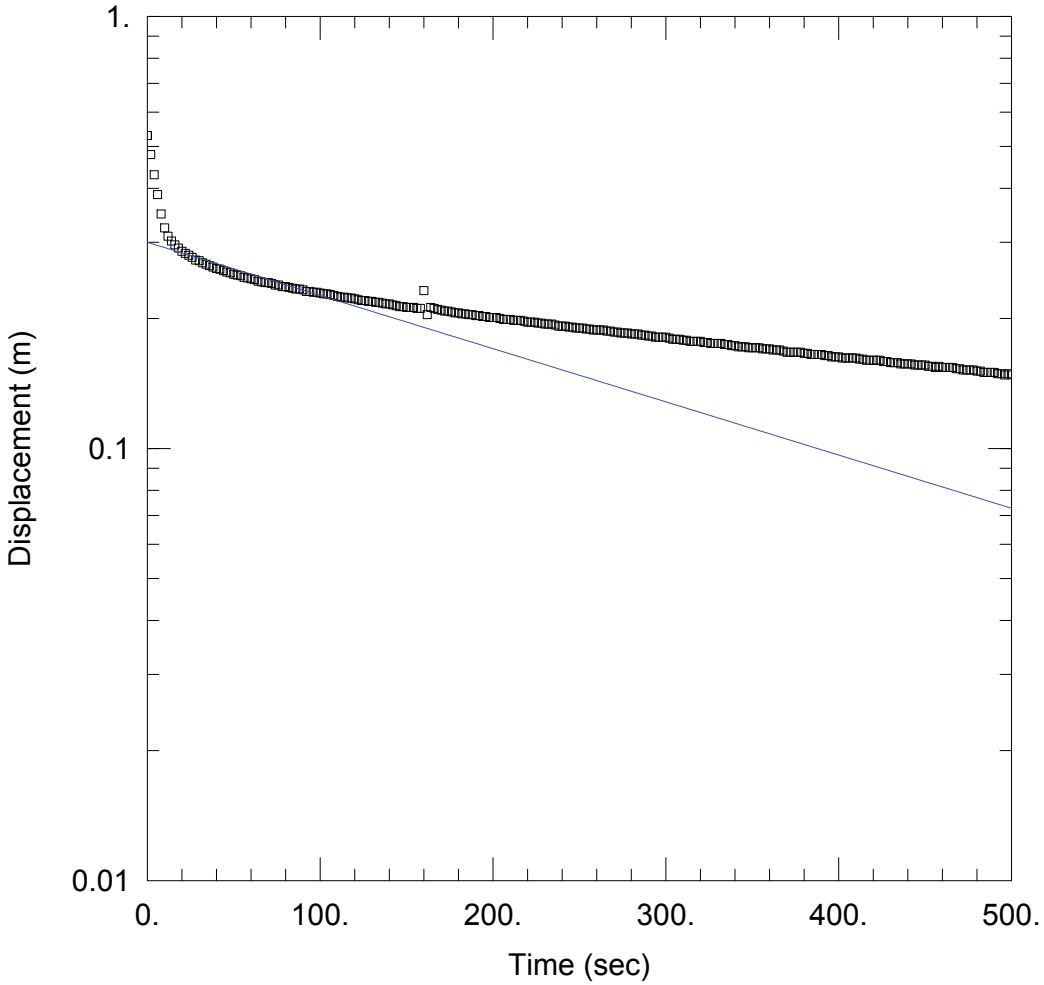
Saturated Thickness: 1.24 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AE)

Initial Displacement: 0.477 m
Total Well Penetration Depth: 1.24 m
Casing Radius: 0.025 m
Static Water Column Height: 1.24 m
Screen Length: 1.24 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3132 m/day
y0 = 0.275 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_AC.aqt
Date: 11/25/11 Time: 20:31:11

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Date: March 2011

AQUIFER DATA

Saturated Thickness: 1.4 m Anisotropy Ratio (Kz/Kr): 1.

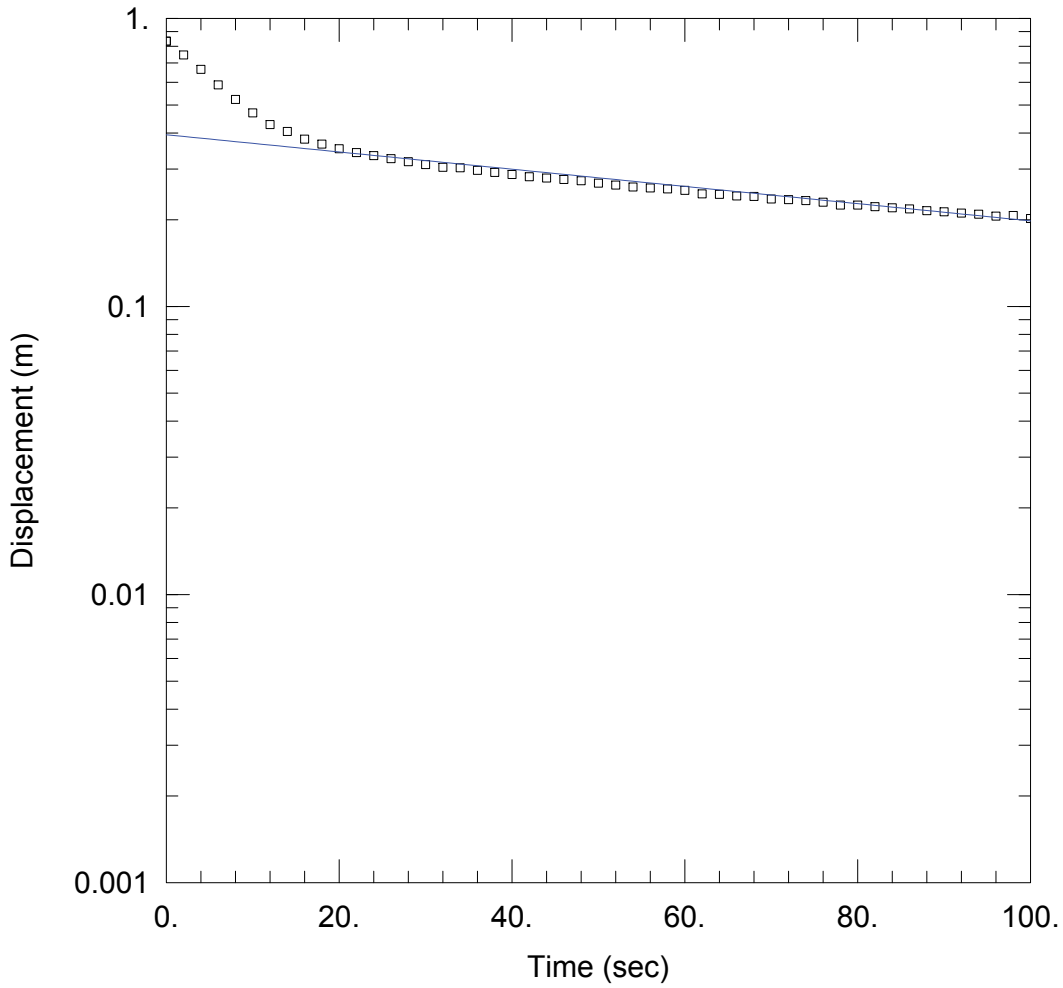
WELL DATA (AC)

Initial Displacement: 0.53 m Static Water Column Height: 1.4 m
Total Well Penetration Depth: 1.4 m Screen Length: 1.4 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.1182 m/day y0 = 0.3001 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_AB.aqt
Date: 11/25/11 Time: 20:32:28

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

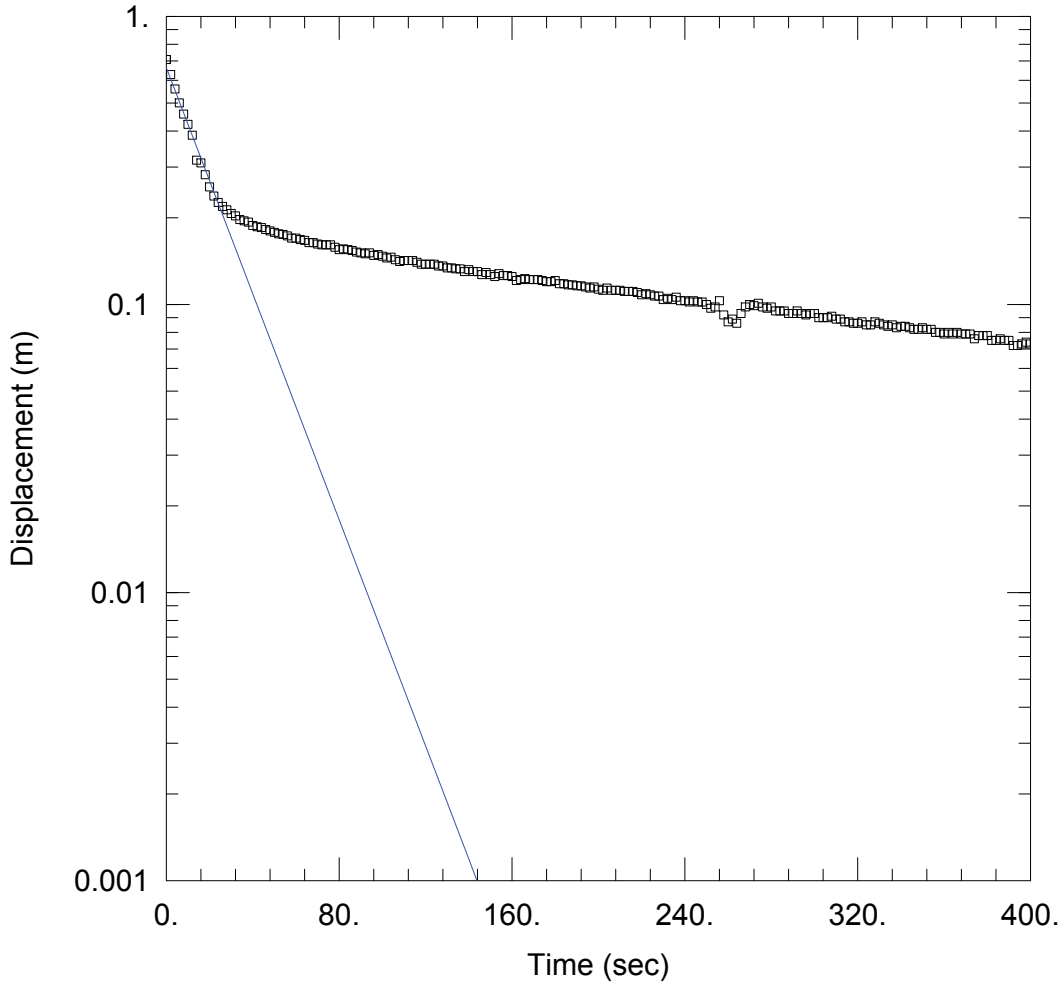
Saturated Thickness: 0.91 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (AB)

Initial Displacement: 0.833 m Static Water Column Height: 1.96 m
Total Well Penetration Depth: 1.96 m Screen Length: 1.96 m
Casing Radius: 0.025 m Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.4525 m/day y0 = 0.3945 m



WELL TEST ANALYSIS

Data Set: T:\...\110509_406.00889.00005_Nantwich_RHT_V.aqt
Date: 11/25/11 Time: 20:31:28

PROJECT INFORMATION

Company: SLR
Client: English Heritage
Project: 406.00889.00005
Location: Nantwich
Test Well: AE
Test Date: March 2011

AQUIFER DATA

Saturated Thickness: 0.67 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (V)

Initial Displacement: 0.708 m
Total Well Penetration Depth: 2.15 m
Casing Radius: 0.025 m
Static Water Column Height: 2.15 m
Screen Length: 2.15 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.921 m/day
y0 = 0.6636 m

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