SOUTHAMPTON WATERMARK WEST QUAY (PHASE 1)
Southampton

County of Hampshire

An archaeological watching brief report
on geotechnical boreholes and trial pits (Phase 1)

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MUSEUM OF LONDON ARCHAEOLOGY

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SOUTHAMPTON WATERMARK WEST QUAY (PHASE 1) Southampton Hampshire

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Summary

This report presents the results of an archaeological watching brief carried out by Museum of London Archaeology (MOLA) at Southampton Watermark West Quay (Phase 1). The report was commissioned from MOLA by Hammerson UK Properties Plc.

The watching brief was carried out from 9th December 2013 to 21st of January 2014 in accordance with the Written Scheme of Investigation (MOLA, 2013).

The work included monitoring and recording of five geotechnical boreholes and eight geotechnical trial pits. A separate geoarchaeological evaluation of two rotary boreholes was carried out simultaneously. The results of the evaluation will be presented in a separate report, but a brief summary is provided here in Appendix 1.

The boreholes successfully identified the stratigraphic sequence from ground surface to depths of 35m or 50m below ground level. The watching brief recorded the sequence to lesser depths, once the presence of *in situ* natural had clearly been established. Pleistocene (Ice Age) river gravels, alluvial deposits and marshland peats were recorded at various locations:

The river gravels would have been exposed at about 10,000BP following the end of the Pleistocene period and therefore have potential to contain artefacts particularly from the Mesolithic and the Palaeolithic periods.

The marshland peats provide high potential for palaeoenvironmental survival and reconstruction particularly in terms of vegetational changes over time. Artefactual material can also be preserved. Analysis of peats recorded at nearby Harbour Parade indicate they are likely to have developed from the early Mesolithic until the early Neolithic period.

Alluvial clay deposits overlying the bedrock geology or the Pleistocene river gravels would have accumulated over the last 10,000 years following the end of the Pleistocene. Alluvial clays *overlying* the peats, are likely to have accumulated from the late prehistoric through to the medieval period, a time of sea level rise and consequent inundation of the marsh. They have good palaeoenvironmental potential and it is also possible that waterfront structures such as jetties, fish traps or boats may survive.

The trial pits were excavated to a maximum depth of 4.2m below the modern ground level. Deposits included redeposited alluvium and gravels, soil/rubble and industrial waste; all associated with infilling of the site in the 1930's by the Southern Railway company.

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1 Introduction

1.1 Site background

The watching brief took place at Southampton Watermark, West Quay. The site, formerly occupied by a Pirelli factory, is currently a vacant, level area of hardstanding surrounded by fencing. Modern ground level lies at approximately 3m OD. The area is bounded by the Western Esplanade to the east and Harbour Parade on the west, the West Quay shopping centre to the north and a car park associated with the Quays Swimming complex to the south. The site is being developed to create a retail and leisure complex and has been commissioned from Museum of London Archaeology (MOLA) by Hammerson UK Properties Plc. The NGR is 441787 111537. The site code is SOU1646. The work was carried out from 9th December 2013 to 21st of January 2014.

The works were subject to a brief prepared by Southampton City Council Historic Environment Team (SCC 2013). The brief informed the present Written Scheme of Investigation (MOLA, 2013). The brief and WSI together formed the Project Design for the archaeological works.

Other relevant documents include:

An Archaeological desk-based assessment (Russel *et al* 2003). This presented the initial assessment of archaeological potential on the site.

A further *desk-based assessment* prepared in 2006 which formed the basis of the archaeological chapter in the environmental statement (Ottaway 2013)

A built heritage assessment (Parker 2013).

1.2 Planning background

The legislative and planning framework in which the watching brief took place was fully set out in the *Written Scheme of Investigation* for the watching brief (see Sections 1.2 and 1.3, MOLA, 2013). The present site lies within the City Centre and Itchen Ferry Local Area of Archaeological Potential as defined in the saved Policy HE6 of the City of Southampton Local Plan and the Core Strategy (paragraph 4.22).

The proposed scheme is now based upon an application (13/00464/OUT) to which five archaeological conditions were attached (Conditions 09 - 14).

1.3 Scope of the watching brief

An archaeological watching brief is normally a limited fieldwork exercise. It is not the same as full excavation, though individual features may be fully excavated.

The watching brief was carried out within the terms of the relevant Standard for watching briefs, specified by the Institute for Archaeologists (IFA, 2008).

All work has been undertaken within the research priorities established in the Standards and Code of Practice laid down by the Institute for Archaeologists, local and regional planning authority archaeology guidance, English Heritage Centre for

Archaeology Guidelines, where appropriate, and research priorities established in the Museum of London's A research framework for London Archaeology, 2002.

All work was undertaken within research aims and objectives established in the *Written Scheme of Investigation* for the watching brief (Section 2).

2 Topographical and historical background

A detailed description of the geology, archaeology and history of the site (and a detailed map regression) was provided in the earlier Archaeological desk-based assessment (Russel *et al* 2003). A brief resume is provided here:

2.1 Topography and geology

The site is situated upon reclaimed land once occupied by the Pirelli factory at West Quay. Beneath the made ground lies river alluvium of the River Test, one of two rivers (the other being the River Itchen) that flow south eastward into Southampton Water. The bedrock geology beneath the alluvium is the Earnley Sands of the Bracklesham group which date to the Middle Eocene (49 to 38 million years ago) and, consequently, are of no archaeological interest. Variously, however, river gravels can be found beneath the alluvium which relate to Pleistocene (Ice Age) deposits of the Test locally. A borehole core obtained from Harbour Parade, West Quay, in the locality of the site, found gravels lying approximately 12m below the surface (Allen *et al* 2012).The gravels would have been exposed over the last 10,000 years following the end of the Pleistocene and have potential therefore of containing artefacts particularly from the Mesolithic and the Palaeolithic periods.

2.2 Prehistoric

Borehole evidence indicates a series of peat deposits (representing marshland) lie within the alluvium (Russel *et al* 2003). The organic, acidic and anaerobic nature of the peats provides high potential for palaeoenvironmental survival and reconstruction particularly in terms of vegetational changes over time. Artefactual material can also be preserved in the peat and locally these have included Mesolithic flints and animal bone (Russel *et al* 2003). The peats from the borehole core obtained from Harbour Parade were radiocarbon dated and found to develop from the early Mesolithic until the early Neolithic period (Allen *et al* 2012). Overlying the peats are substantial mollusc-rich beds of grey silty clay accumulating from the late prehistoric through to the medieval period, a time of sea level rise and consequent inundation of the marsh. The silty clays similarly have good palaeoenvironmental potential. It is also possible that waterfront structures such as jetties, fish traps or boats may survive in the silty clays. Later prehistoric evidence includes Bronze Age material from the West Quay Shopping Centre site to the north-east and remnants of Iron Age buildings, together with artefacts, have been found during excavations at Maddison Street (400m to the southwest of the site).

2.3 Roman

A substantial Roman settlement (Clausentum) was established at Bitterne Manor on the east shore of the River Itchen (some 6km north east of the site). This site appears to have been abandoned around the end of the Roman period. Very few *in situ* Roman remains have been found in the vicinity of the present site, though occasional residual finds are recovered from the medieval town.

2.4 Saxon

A new settlement (known as Hamwic) was established on the west shore of the River Itchen (approximately 1km east of the site) during the Middle Saxon period (c. AD 650-850). During this time Hamwic became a large trading town of international importance. The centre of occupation moved eastwards in the Late Saxon period (c.

AD 850-1066) to the east shore of the River Test immediately to the east of the present site.

2.5 Medieval

During the medieval period Southampton continued to develop and expand, exporting wool and importing French wine (Platt 1976). By the early 12th Century a Royal castle had been built and the town was provided with stone wall defences between the 12th and 14th centuries, including those some 20m to the east of the site.

2.6 Post-medieval

By the post-medieval period Southampton's position as part of the international trade network diminished although its importance as a transatlantic port would replace this to some degree later on. By the mid-18th Century the national fashion for taking the waters and bathing brought tourism to the town and particularly within the area of the site (Chalybeate spring north of the Arundel Tower and an assembly rooms [known as the Long Rooms], and a bathing establishment immediately to the south of the present site).From the late19th century land reclamation in the vicinity of the site began with the laying out of Western Esplanade on the eastern edge of the present site, and culminating with the infilling of the bay (and the area of the site) in the 1930's by the Southern Railway.

3 The watching brief

3.1 Field methodology

The ground surface was broken out and cleared by contractors under MOLA supervision. Geotechnical trial pits and boreholes were machine-excavated/drilled by contractors and monitored by a MOLA archaeologist.

Eight trial pits were excavated, all aligned west to east, varying in size from 2.8m x 1.1m (TP1) to 5m x 1.1m (TP5) and up to 4.2m max. depth. The boreholes were drilled to either 35m or 50m depth; they were archaeologically monitored to a depth where the presence of *in situ* natural beneath alluvium/gravels had clearly been established.

Deposits were recorded in accordance with the *Written Scheme of Investigation* (MOLA, 2013).

A geoarchaeological evaluation comprising two rotary boreholes – RBH1 and RBH2 was carried out simultaneously. The results of the evaluation will be presented in a separate document. Their location is noted on Fig 2 in this report and a summary of the is provided in Appendix 1.

3.2 Recording methodology

A written record of all archaeological deposits encountered was carried out in accordance with the *Written Scheme of Investigation* (MOLA, 2013) and the Museum of London Archaeological Site Manual (MoL 1994).

3.3 Watching brief site archive

Number of overall location plans	1
Site notes	16 x A4 sheets
Digital photos	23

4 Results of the watching brief

For borehole and test pit locations see Fig 2

Results of geoarchaeological rotary boreholes RBH1 and RBH2 are noted separately in Appendix 1.

Munsell soil colour charts were used to record *in situ* natural deposits.

4.1 Borehole 1

Borehole 1 was located towards the NW site-limit. Ground level: **3.42m OD**

Table 1: Borehole 1

Depth below ground level (bgl)	m OD	Description
0m–0.3m	3.42	Existing ground surface – 0.15m gravel over 0.15m thick concrete slab
0.3m–1.5m	3.12	Dark grey clayey sandy silt with frequent light brown clay mottling. Moderate fine to small flint; occasional large brick frags. and flint cobbles. Modern infill
1.5m–3m	1.92	Yellowish–light brown, mixed clay/sandy silt. Moderate fine to small flint. Modern infill
3m–3.5m	0.42	Light brown with pale blue mottling, fine sandy clay. Occasional flecks of ceramic building material (CBM); moderate fine to small flint. Mixed redeposited alluvium. Modern infill
3.5m–4m	-0.08	Dark grey, soft, sticky silty clay. Occasional chalk/shell - flecks and small frags. and plant fibres. Alluvial material. May be redeposited?
4m–5m	-0.58	Dark bluish grey (5B 4/1) clayey sand. Moderate shell flecks; occasional fine flint. Surface of *in situ* alluvium?
5m–7m	-1.58	Black (N2.5) organic clayey silt. Occasional shell flecks and fine flint. *In situ* alluvium, or marsh deposit?
7m–9m	-3.58	Dark grey (N4) soft, sticky silty clay. Occasional shell flecks and small frags. *In situ* alluvium
9m–10m	-5.58	Very dark grey (N3) firm clay, mixed with dark brown fibrous peaty material. Occasional shell flecks. *In situ* marshland deposit
10m–10.5m	-6.58	Dark grey (N4) firm clay. Very occasional shell flecks/flint. *In situ* alluvium
10.5m	-7.08	Dark greenish-grey (5G 4/1) clayey fine sand. Occasional shell flecks and fine flint. *In situ* natural – Bracklesham Beds

4.2 Borehole 2

Borehole 2 was located towards the east site-limit. Ground level: **3.59m OD**

Table 2: Borehole 2

Depth below ground level (bgl)	m OD	Description
0m–0.5m	3.59	Existing ground surface – concrete slab
0.5m–3m	3.09	Greyish-mid. brown clayey silt. Frequent brick and tile flecks and small frags; occasional mortar/charcoal/shell flecks and small frags. Moderate fine to coarse flint. Modern infill
3m–4.5m	0.59	Dark grey to black, clayey/silty gravelly sand. Moderate shell flecks, occasional CBM flecks and small frags. Very occasional late post-medieval pottery and glass frags. Modern infill
4.5m–6m	-0.91	Greyish-dark brown clayey/silty sandy gravel. Occasional shell flecks, very occasional CBM flecks. Modern infill
6m–7.5m	-2.41	Mixed – olive-yellow (2.5Y 6/6) clayey fine sand with light grey (2.5Y 7/1) thin clay bands throughout. Natural alluvial? deposit, but unclear if *in situ* or redeposited

7.5m–9m	-3.91	Light olive-brown (2.5Y 5/3) mixed clay/fine sand. Very occasional shell flecks and fine flint. Alluvial deposit; probably *in situ*
9m–10.5m	-5.41	Firm clayey fine sand. Predominantly dark greenish-grey (5GY 4/1) with frequent strong brown (7.5YR 4/6) mottling. *In situ* natural – Bracklesham Beds
10.5m–12m	-6.91	Very dark grey (N3) firm clayey fine sand. *In situ* natural – Bracklesham Beds
12m–15m	-8.41	Dark bluish-grey (5B 4/1) firm clayey fine sand. *In situ* natural – Bracklesham Beds
15m	-11.41	Dark grey (N4) fine sand. *In situ* natural – Bracklesham Beds

4.3 Borehole 3

Borehole 3 was located towards centre of site. Ground level: **3.73m OD**

Table 3: Borehole 3

Depth below ground level (bgl)	m OD	Description
0m–0.1m	3.73	Existing tarmac ground surface
0.1m–1m	3.63	Pale brown sandy gravel. Modern infill
1m–1.5m	2.73	Brownish-light grey clay. Moderate fine to small flint. Modern infill
1.5m–2m	2.23	Black charcoal-stained clayey sandy gravel, mixed with a pale yellow clayey sandy gravel. Occasional late post-medieval pottery frags. Modern infill
2m–5m	1.73	Black silty sandy gravel. Occasional frags. of late post-medieval/modern pottery. Modern infill
5m–5.5m	-1.27	Dark grey (N4) silty clay. Alluvium – probably redeposited? Modern infill
5.5m–8m	-1.77	Dark greenish-grey (5GY 4/1) mixed clayey silt and sandy gravel. Frequent shell flecks and small frags. Mixed interface between truncated alluvium and underlying river gravels? *In situ* natural?
8m–10.5m	-4.27	The same mixed clay silt and gravel described above, but with a higher clay content. *In situ* river gravels?
10.5m–12m	-6.77	Brownish-yellow (10YR 6/8) coarse sandy gravel – predominantly fine to small flint. *In situ* river gravels
12m	-8.27	Olive (5Y 5/3) very slightly clayey fine sand. *In situ* natural – Bracklesham Beds

4.4 Borehole 4

Borehole 4 was located towards the NE site-limit. Ground level: **3.43m OD**

Table 4: Borehole 4

Depth below ground level (bgl)	m OD	Description
0m–0.5m	3.43	Existing cemented gravel ground surface
0.5m–1.5m	2.93	Dark brown clayey sandy silt. Frequent fine to small; occasional coarse flint. Moderate CBM and shell - flecks/small frags. Modern infill
1.5m–3m	1.93	Reddish-dark brown clayey sandy silt. Moderate CBM, including occasional large brick frags. Moderate shell flecks. Modern infill
3m–4.5m	0.43	Black, mixed, sandy gravel / clay lumps. One large cobble in sample; occasional CBM flecks and small frags. Modern infill
4.5m–6m	-1.07	Mottled – light olive brown (2.5Y 5/4–5/6) and greyish-brown (2.5Y 5/2) slightly clayey fine sand. Occasional small to coarse flint; occasional shell flecks. Probably in situ alluvium?
6m–7.5m	-2.57	Very dark grey (N3) to black (N2.5) slightly clayey fine sand. Probably in situ alluvium?
7.5m–9m	-4.07	Dark bluish grey (5B 4/1) very clayey fine sand. *In situ* alluvium; possibly at interface with Bracklesham Beds?
9m–10.5m	-5.57	Dark greenish grey (5G 4/1) clayey fine sand with frequent very small shell flecks. *In situ* natural - top of the Bracklesham Beds?
10.5m–12m	-7.07	Very dark grey (N3) fine sandy clay. *In situ* natural - Bracklesham

		Beds
12m–16m	-8.57	Very dark grey (N3) fine sandy clay; similar to deposit above, but with a higher clay content and stiff compaction. *In situ* natural - Bracklesham Beds
16m–23m	-12.57	Interleaving bands of light grey (5Y 6/1) fine sand and dark grey (5Y 4/1) stiff, fine sandy clay. Typically: sand – 1mm thick; clay – 4mm thick. *In situ* natural - Bracklesham Beds

4.5 Borehole 5

Borehole 5 was located towards the west site-limit. Ground level: **3.42m OD**

Table 5: Borehole 5

Depth below ground level (bgl)	**m OD**	**Description**
0m–0.5m	3.42	Existing ground surface – concrete slab
0.5m–1.5m	2.92	Dark brown, soft, sticky, gravelly silty clay. Occasional orange-light brown gravel lensing. Occasional shell/ charcoal/CBM flecks. Redeposited alluvium/gravels. Modern infill
1.5m–2m	1.92	Similar to gravelly clay deposit described above, but increased clay content. Redeposited alluvium/gravels. Modern infill
2m–3.5m	1.42	Dark brown gravelly clay with moderate pale blue/green sand lensing. Redeposited alluvium/gravels/sand. Modern infill
3.5m–4.5	-0.08	Dark bluish-grey gravelly clay with gravel lensing. Moderate chalk flecks. Redeposited alluvium/gravels. Modern infill
4.5m–6m	-1.08	Dark bluish-grey, mixed – slightly gravelly silty clay with frequent light olive brown sandy lensing. Occasional small modern wood frags. Redeposited alluvium. Modern infill
6m–7m	-2.58	Predominantly olive (5Y 4/3) clayey fine sand with dark greenish-grey (5GY 4/1) clay mottling/lensing. Very occasional fine to small flint. Probably the surface of *in situ* alluvium.
7m–9m	-3.58	Predominantly dark greenish-grey (5GY 4/1) silty clay with moderate chalk flecks and small frags. Mixed with firmer: dark grey (7.5YR 4/1) silty clay and very dark grey (N/3) silty clay with occasional olive sandy mottling. Probably *in situ* alluvium.
9m–11.5m	-5.58	Very dark grey (N3) firm sticky clay with moderate black (N2.5) peat lensing. Occasional fine shell?/chalk? flecks. One large wood frag. *In situ* – alluvium, merging with underlying marshland peat
11.5m–12m	-8.08	Black (7.5YR 2.5/1) marshland peat
12m–13m	-8.58	Dark greenish-grey (5GY 4/1) clayey fine sand. *In situ* alluvium
13m–13.5m	-9.58	Dark grey (N4) very clayey fine sand. *In situ* alluvium
13.5m–14m	-10.08	Reddish-black (2.5YR 2.5/1) stiff, clayey marshland peat
14m	-10.58	Greyish-brown (2.5Y 5/2) to light olive-brown (2.5Y 5/3) clayey fine sand. *In situ* natural - Bracklesham Beds

4.6 Trial pit 1

Table 6: Trial pit 1

Location	Phase 1, South-central
Dimensions	2.8m E-W by 1.10m by 3.75m depth
Modern ground level	3.8m OD
Base of modern tarmac surface	3.65m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.05m OD

The tarmac sealed a pale brown sandy gravel to 0.33m below ground level (bgl) which in turn sealed a black gravel deposit to 0.7m bgl. The gravel sealed a sequence of clay deposits: orange-light brown clay to 1m bgl, over a dark grey clay to *c* 1.5m bgl; a brown clay to 1.9m bgl, over a bluish – light grey silty clay to base at 3.75m bgl. The earliest blue-grey clay was redeposited alluvial material; it is likely the two overlying clay layers were also sourced from *in situ* natural. A black sandy gravel at the base of the trench contained occasional fragments of pottery, glass, plastic. Some of the pottery and glass may have been residual late post-medieval material (18th to early 20th century) but all deposits in the trial pit were modern, presumably related to 1930's infilling of the site by the Southern Railway company.

4.7 Trial pit 2

Table 7: Trial pit 2

Location	Phase 1, South-central
Dimensions	2.9m E-W by 1.20m by 3.6m depth
Modern ground level	3.79m OD
Base of modern slab	3.59m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.19m OD

The concrete slab sealed 0.45m of mixed clay/rubble to 0.65m bgl. The clay/rubble sealed a light brown clay to 1.5m bgl, overlying the same bluish–light grey alluvial silty clay observed in TP1, extending to base at 3.6m bgl. Both clay layers were redeposited. A black gravel layer recorded at the base of the trial pit was the same deposit observed at the base of TP1. All deposits in the trial pit were modern; related to 1930's infilling of the site.

4.8 Trial pit 3

Table 8: Trial pit 3

Location	Phase 1, West-central
Dimensions	2.9m E-W by 1.15m by 4.2m depth
Modern ground level	3.77m OD
Base of modern slab	3.67m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	-0.43m OD

The concrete slab was bedded onto a 0.6m thick concrete/rubble fill to 0.7m bgl. It sealed a light grey sandy silt/rubble fill to 0.9m bgl, over a thin black gravel layer to 1m bgl. The gravel sealed a second light grey sandy silt/rubble fill to 1.2m bgl. The rubble overlay a brownish-yellow sandy gravel (10yr 6/8) to 1.6m bgl, over a dark bluish grey alluvial clay (5B 4/1) which extended to base at 4.2m bgl. Comparing the sequence in TP3 with the other trial pits suggests the alluvial clay and overlying gravel were redeposited 1930's infill, rather than *in situ*.

4.9 Trial pit 4

Table 9: Trial pit 4

Location	Phase 1, North-central
Dimensions	4.7m E-W by 1.2m by 3.2m depth
Modern ground level	3.73m OD
Base of modern slab	3.48m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.53m OD

At the surface of TP4, the 0.25m thick concrete slab was associated with a concrete foundation(?) pad, exposed on the east side of the south-facing section; 0.7m wide, extending to 0.6m bgl. The slab/foundation pad sealed a clay/rubble fill to 0.85m bgl. The rubble sealed a light brown mixed clay/gravel deposit to 1.25m bgl, over a sequence of gravels layers: a black gravel to 1.55m bgl, over brown gravel to 1.85m bgl, over a second black gravel layer, extending to base at 3.2m bgl; the same deposit seen at the base of TPs 1 and 2. All 1930's infill.

4.10 Trial pit 5

Table 10: Trial pit 5

Location	Phase 1, North-central
Dimensions	5m E-W by 1.1m by 4.1m depth
Modern ground level	3.72m OD
Base of modern ground surface	3.22m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	-0.38m OD

The ground surface at TP5 was comprised of a 0.5m thick compacted gravel/rubble layer. It was set against a brick structure exposed in the centre of the north-facing section, 1.7m wide, extending from ground level to 0.6m bgl. Towards the east end, a concrete structure, 0.75m wide, set at 0.55m bgl, straddled the full width of the trial pit. Its full depth was not established. In the north-facing section towards the west end, a circular concrete structure, 0.75m wide, was part-visible, extending from just below ground level to *c* 0.8bgl. On its east side, at its base and immediately adjacent, a 50mm diameter metal service pipe extended north-south across the pit. The structures and brickwork were all modern; presumably associated with the Pirelli factory that previously occupied the site.

A mixed, orange-brown clayey sand/gravel layer extended for 0.3m beneath the brickwork. It sealed a dark grey silty soil/rubble infill to 1.9m bgl, which in turn sealed a black gravel layer, extending 4.1m to base; the same deposit seen at the base of TPs 1, 2 and 4. All 1930's infill.

4.11 Trial pit 6

Table 11: Trial pit 6

Location	Phase 1, North-east
Dimensions	4.8m E-W by 1.2m by 3.2m depth
Modern ground level	3.79m OD
Base of modern slab	3.3m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.59m OD

A concrete structure exposed at the east end of TP6 consisted of a straight-sided 'gully', 0.7m wide (N-S). The base of the gully extended to 0.5m bgl; the base of the structure as a whole extended to 1.1m bgl. In the remainder of the pit, the concrete slab was 0.49m thick.

The slab sealed a dark brown sand/silt 'garden-type' soil to 1m bgl, over a dark orange gravel to 1.15m bgl. The gravel sealed a dark grey layer of friable sandy silt with frequent ash/mortar/chalk inclusions and occasional brick rubble, extending to *c* 1.5m bgl, which in turn sealed a black soil/rubble fill to *c* 1.7m bgl. The rubble layer sealed a 0.2m thick band of dark orange sandy gravel, over a greyish–dark brown (coarse) gravelly, sandy silt/brick rubble fill, extending to base at 3.2m bgl. It contained fragments of 19th/20th century pottery, glass and ceramic bottles. All 1930's infill.

4.12 Trial pit 7

Table 12: Trial pit 7

Location	Phase 1, Centre-east
Dimensions	2.8m E-W by 1.2m by 3.5m depth
Modern ground level	3.92m OD
Base of modern ground surface	3.02m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.42m OD

The ground surface at TP7 was comprised of a 0.3m thick layer of compacted sandy gravel, over a 0.6m thick layer of concrete. The concrete sealed a further layer of orange–light brown sandy gravel to 1.4m bgl. The gravel sealed a bluish-grey redeposited alluvial clay to 1.7m bgl, over a black gravel layer, extending to base at 3.5m bgl. The black gravel was the same material recorded at the base of the sequence in TPs 1, 2, 4 and 5. All 1930's infill.

4.13 Trial pit 8

Table 13: Trial pit 8

Location	Phase 1, Centre-east
Dimensions	3m E-W by 1m by 3.4m depth
Modern ground level	3.87m OD
Base of modern slab	3.57m OD
Depth of archaeological stratigraphy above natural	N/A
Top of surviving natural	N/A
Level of base of trench	0.47m OD

The ground surface at TP8 was comprised of a 0.15m thick layer of compacted soil/sandy gravel, over a 0.15m thick concrete slab. The slab sealed a 0.1m thick layer of mixed black gravel/clinker, over a 0.2m thick layer of dark orange sandy gravel. The gravel sealed a 0.4m thick layer of bluish – dark grey redeposited alluvial clay. The clay sealed two further gravel layers: a mixed greyish – dark brown soil/gravel to 1.2m bgl, over a dark grey soil/gravel to 1.5m bgl. The gravels sealed a 0.2m thick layer of greenish – grey clay, over a mixed soil/gravel layer with brick rubble, extending to base at 3.4m bgl. The rubble layer sealed a mixed, dark bluish-grey soil/coarse gravel deposit with 19th/20th century pottery and glass fragments and one clay tobacco pipe bowl. All 1930's infill.

4.14 The finds

No finds were retrieved from site.

4.15 Discussion

The top of the natural Bracklesham Beds deposits sloped upwards from -7.08m OD in BH 1 to -5.57m OD in BH4 to the east, presumably reflecting a natural slope down into the river channel to the west. The top of these deposits were lower to the south at -8.27m OD (BH3) and -10.58m OD (BH5). This may represent the bed of a palaeochannel crossing the river shore levels. River Terrace Gravels were only recovered in BH3 at –4.27m OD and RBH2 at -4.22m OD, and may represent outwash into this postulated channel.

Peat deposits were only found in BH 1 and 5 and RBH1 at the west side of the site at a height of -5.58m OD. They probably formed in freshwater marshes on the shore of the main river channel. The absence of peat in the four investigations to the east suggests that these deposits did not extend into this area. Alluvial clays were present in all boreholes apart from BH3. They were probably deposited under estuarine mudflat conditions as sea levels rose. The level of the top of the alluvium was very variable, but showed a general rise from south to north from -2.58m OD in BH 5 to -0.08m OD in BH1. The results from the western boreholes corroborates the results from a borehole on the Carnival site some 150m to the west (Allen *et al* 2012) where peat was also encountered at -5.58m OD, and the alluvium at -3.30m OD. Here the peat deposits were dated to between 5210 – 4840 cal BC to 9150 – 8550 cal BC.

5 Archaeological potential

5.1 Answering original research aims

The limited nature of the proposed works and the watching brief upon them made it unreasonable to establish many specific archaeological research objectives. Nevertheless a few research questions have been outlined:

- *What is the nature and level of natural topography?*

  In situ natural clays and sands (the Bracklesham Beds) were recorded in all boreholes, at surface heights ranging from -5.41m OD in BH2 to -10.58m OD in BH5. The levels at each borehole location demonstrate the slope from east to west as the river bed extends away from the pre-existing shoreline.

- *What are the earliest deposits identified?*

  The earliest deposits with archaeological potential include layers of Pleistocene (Ice Age) river gravels recorded in BH3. The gravels relate to the river Test and would have been exposed over the last 10,000 years following the end of the Pleistocene (see Section 2.1).

  Alluvial clay deposits overlying the bedrock geology (Bracklesham Beds) or the Pleistocene river gravels, in BHs 1–4, would have accumulated over the last 10,000 years following the end of the Pleistocene.

  Marshland peat deposits within the alluvium, recorded in BHs 1 and 5 and RBH1, are likely to have developed from the early Mesolithic until the early Neolithic period (Allen *et al* 2012, see Section 2.1).

  Alluvial deposits overlying the peats in BHs 1 and 5, likely accumulated from the late prehistoric through to the medieval period (Allen *et al* 2012).

- *What are the latest deposits identified?*

  The latest deposits identified were redeposited alluvium and gravels, soil/rubble and industrial waste; all associated with infilling of the site in the 1930's by the Southern Railway, and foundations associated with the Pirelli factory that was built on the reclaimed land.

- *What is the extent of modern disturbance?*

  1930's infill deposits were picked up in all borehole and trial pit locations, in a spread that represents most areas of site (Phase 1). The base level of modern truncation ranged from -3.91m OD (7.5m bgl in TP2) to -0.58m OD (4m bgl in TP1).

- *Is there any evidence indicating the depth of peat deposits identified on the site*

A 1m thick layer of peat extending from -6.58m OD to -5.58m OD (9–10m bgl) was recorded within the alluvial sequence in BH1. A 0.5m thick layer of peat extending from -8.58m OD to -8.08m OD (11.5–12m bgl) was recorded within the alluvial sequence in BH5. Also in BH5, a 0.5m thick layer of peat extending from -10.58m OD to -10.08m OD (13.5–14m bgl) was recorded immediately above *in situ* natural sand.

- *Is there any evidence for structures or wrecks within the former river deposits?*

  None

- *Are there any remains of waterfront structures adjacent to the town wall?*

  None

The Bracklesham Beds deposits are likely to have been exposed at about 10,000BP following the end of the Pleistocene period and therefore have potential to contain artefacts particularly from the Mesolithic and the Palaeolithic periods.

The marshland peats provide high potential for palaeoenvironmental survival and reconstruction particularly in terms of vegetational changes over time. Artefactual material can also be preserved. Analysis of peats recorded at nearby Harbour Parade indicate they are likely to have developed from the early Mesolithic until the early Neolithic period.

Alluvial clay deposits overlying the bedrock geology or the Pleistocene river gravels would have accumulated over the last 10,000 years following the end of the Pleistocene. Alluvial clays *overlying* the peats, likely accumulated from the late prehistoric through to the medieval period, a time of sea level rise and consequent inundation of the marsh. They have good palaeoenvironmental potential and it is also possible that waterfront structures such as jetties, fish traps or boats may survive.

5.2 Significance of the data

The watching brief has demonstrated the likely extent of dumped material associated with the 1930s infilling of the site by the Southern Railway. This information is of local significance. It has also identified the nature, level and depth of surviving archaeological/geological deposits beneath modern infill and above the underlying bedrock geology. This information is of local and regional significance.

6 Publication and archiving

The results of the watching brief will be made publicly available by means of a database in digital form, to permit inclusion of the site data in any future academic researches into the development of Southampton Watermark West Quay.

The site archive containing original records will be stored in accordance with the terms of the *Written Scheme of Investigation* (MOLA, 2013) with Southampton City Council, within 12 months of the end of the watching brief.

In view of the limited potential of the material (Section 5) and the relatively limited significance of the data (Section 5.2) it is suggested that a short note on the results of the watching brief should appear in *The annual review of archaeology in Hampshire*.

7 NMR OASIS archaeological report form

7.1 OASIS ID: molas1-171406

Project details

Project name	Southampton Watermark West Quay (Phase 1)
Short description of the project	The work included monitoring and recording of five geotechnical boreholes and eight geotechnical trial pits. The boreholes successfully identified the stratigraphic sequence from ground surface to depths of 35m or 50m below ground level. The watching brief recorded the sequence to lesser depths, once the presence of in situ natural had clearly been established. Pleistocene (Ice Age) river gravels, alluvial deposits and marshland peats were recorded at various locations: The trial pits were excavated to a maximum depth of 4.2m below ground level. Deposits included redeposited alluvium and gravels, soil/rubble and industrial waste; all associated with infilling of the site in the 1930's by the Southern Railway company.
Project dates	Start: 09-12-2013 End: 21-01-2014
Previous/future work	No / Yes
Any associated project reference codes	SOU1646 - Sitecode
Type of project	Recording project
Site status (other)	Local Area of Archaeological Potential
Current Land use	Other 13 - Waste ground
Monument type	RIVER GRAVELS Upper Palaeolithic
Monument type	RIVER GRAVELS Mesolithic
Monument type	ALLUVIUM Upper Palaeolithic
Monument type	ALLUVIUM Mesolithic
Monument type	ALLUVIUM Neolithic
Monument type	ALLUVIUM Bronze Age
Monument type	ALLUVIUM Iron Age
Monument type	ALLUVIUM Roman
Monument type	ALLUVIUM Early Medieval
Monument type	ALLUVIUM Medieval
Monument type	PEAT Mesolithic
Monument type	PEAT Neolithic

Significant Finds	NONE None
Significant Finds	NONE None
Investigation type	"Watching Brief"
Prompt	Planning condition

Project location

Country	England
Site location	HAMPSHIRE SOUTHAMPTON SOUTHAMPTON Southampton Watermark West Quay (Phase 1)
Study area	17600.00 Square metres
Site coordinates	SU 41787 11537 50.9012417193 -1.40568716164 50 54 04 N 001 24 20 W Point
Height OD / Depth	Min: -10.58m Max: -5.41m

Project creators

Name of Organisation	MOLA
Project brief originator	MOLA
Project design originator	MOLA
Project director/manager	Michael Smith
Project supervisor	Jez Taylor
Type of sponsor/funding body	Developer
Name of sponsor/funding body	Hammerson UK Properties Plc.

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Southampton City Council
Paper Archive recipient	Southampton City Council

Project bibliography 1

Grey literature (unpublished document/manuscript)

Publication type	
Title	Southampton Watermark West Quay (Phase 1), An archaeological watching brief report on geotechnical boreholes and trial pits (Phase 1)
Author(s)/Editor(s)	'Taylor, J.'
Date	2014
Issuer or publisher	MOLA
Place of issue or publication	London
Description	Standard A4 Client report
Entered by	Jeremy Taylor (jtaylor@mola.org.uk)
Entered on	12 February 2014

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Fig 1 Site location

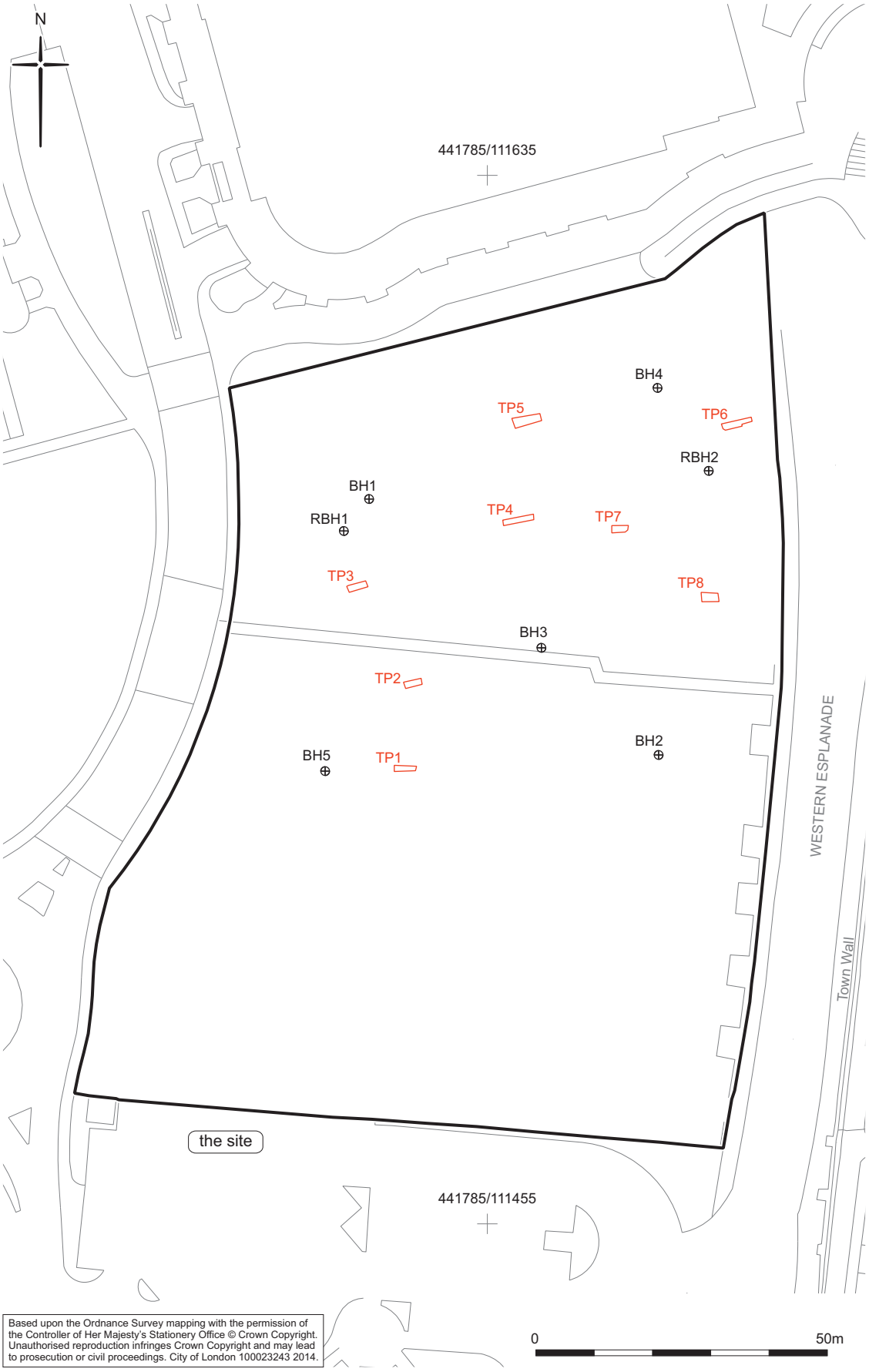

Fig 2 Borehole and trial pit locations, Phase 1

Fig 3 South-facing section in Trial pit 2

8 Appendix 1: Geoarchaeological interim summary

8.1 On-site methodology for the geoarchaeological borehole evaluation

For borehole locations, see Fig 2

Two successful boreholes were drilled at the proposed locations. The boreholes were drilled with a rotary rig supplied by the contractor under the supervision of a MOLA geoarchaeologist. Continuous samples were collected through the alluvial deposits down to the surface of the Pleistocene floodplain gravels (estimated c 15m depth maximum). The cores recovered were undisturbed 1m plastic tubes, roughly 100mm diameter.

Preliminary interpretation of the soil and sediment characteristics of the cores was made and an overview of the stratigraphy produced that characterises the sequence. All the sediments examined within the core samples were described according to standard sedimentary criteria loosely following Jones et al (1999) and Tucker (1988) (relating to colour, compaction, texture, structure, bedding, inclusions, and clast-size). The borehole locations were surveyed in by members of the MOLA Geomatics team, with each borehole position located to a six figure national grid reference, and levelled to metres above ordnance datum. The borehole samples were sealed and labelled and taken to MOLA geoarchaeology laboratories to be kept in controlled storage during the assessment and analysis stages of the work.

8.2 Off-site methodology for the geoarchaeological evaluation

The samples from the evaluation will be extruded and recorded according to standard sedimentary criteria. The sedimentary logs retrieved from the geoarchaeological evaluation will be input into a Rockworks 15 digital database. This will reconstruct the deposit sequence across the site. If suitable organic sediment is recovered, consideration will be given to carrying out radiocarbon (^{14}C) dating, in order to provide a dating framework for the stratigraphic sequence. Samples for dating will be cut from the cores retained.

The preservation and potential of environmental remains within the core samples will be assessed by sub-sampling the ‘best’ borehole sequence (i.e. that retained unopened from site) and examining for a range of environmental indicators. Where possible blocks of sediment from selected key deposit locations will be wet sieved over a 0.25mm mesh for macrofossils (e.g. seeds, snails, ostracods and insects); and sub-samples submitted to external specialists for the assessment of microfossils (e.g. pollen and diatoms).

The combined information on the buried topography, distribution and sequence of deposits surviving across the site and the preservation of environmental remains in the core samples will be used to reconstruct the past environments represented and to assess the potential for past landscape reconstruction of the core samples recovered from the site. A report will be produced summarising the results; illustrating the location of the core samples within a schematic section; identifying their potential for past landscape reconstruction; and recommending a proposal for any further analysis that might be appropriate.

8.3 Geoarchaeology borehole logs

Watermark, Southampton RBH01 09/12/2013							
Location						441760.4	111573.9
Dimensions						0.1m	
Modern ground level/top of slab (m OD)						3.78	
Base of modern fill/slab (m OD)						5.00	
Depth of archaeological deposits seen (top)						n/a	
Level of base of deposits observed and/or base of intervention (m OD)						-8.22	
Holocene natural observed (m OD)						-1.22	
Pleistocene or older natural observed (m OD)						-7.02	
Unit Number	**Depth below ground level (m)**		**Elevation (m OD)**		**Description**	**Interpretation**	**Facies No.**
1.42	0.00	0.25	3.78	3.53	Red gravel and sand make up	Topsoil	3
1.41	0.25	0.50	3.53	3.28	Concrete	Made ground	
1.40	0.50	1.30	3.28	2.48	Brown loam and brick rubble (yellow/red) and concrete		
1.39	1.30	1.60	2.48	2.18	Soft brown clay		
1.38	1.60	1.75	2.18	2.03	Gravel and brick fragments		
1.37	1.75	2.00	2.03	1.78	Mid to dark blue green sandy silt, soft		
1.36	2.00	2.65	1.78	1.13	Void/backfill		
1.35	2.65	3.00	1.13	0.78	Blue green silty clay soft		
1.34	3.00	3.20	0.78	0.58	Backfill		
1.33	3.20	3.50	0.58	0.28	Very soft silt, green grey, wet		
1.32	3.50	4.00	0.28	-0.22	Soft green grey sandy/silty clay		
1.31	4.00	4.60	-0.22	-0.82	Void		
1.30	4.60	4.90	-0.82	-1.12	Mix blue grey clay, glass, gravel, brick		
1.29	4.90	5.00	-1.12	-1.22	Black ash clinker		
1.28	5.00	5.45	-1.22	-1.67	Very soft dark greenish grey (GLEY 5GY 4/1), generally fine sandy silt clay, grading boundary	Alluvium and peat	2
1.27	5.45	5.80	-1.67	-2.02	Loose wet dark greenish grey (GLEY 5GY 4/1), slightly silty fine sand, getting siltier with depth, sharp boundary		
1.26	5.80	6.00	-2.02	-2.22	Soft dark greenish grey (GLEY 5GY 4/1) silty clay with fine abraided wood fragments, occasional chalk and mortar flecks, irregular distribution, some occasional sub rounded gravel, historic foreshore activity		
1.25	6.00	6.60	-2.22	-2.82	Soft wet dark grey (10YR 4/1) silt, sharp boundary		
1.24	6.60	6.80	-2.82	-3.02	Loose wet very dark grey (10YR 4/1) fine sand, occasional fine to coarse angular to rounded gravel		
1.23	6.80	6.90	-3.02	-3.12	Compact very dark brown (10YR 2/2) to black (10YR 2/1), fine to medium sand		

1.22	6.90	7.00		-3.22	Soft dark greenish grey (5GY 4/1), very slightly fine sandy silt with rare abraided mollusc fragments		
1.21	7.00	8.00	-3.22	-4.22	No retrieval. Cased from here don		
1.20	8.00	8.38	-4.22	-4.60	Soft dark grey (GLEY N4/1) silty clay with moderate abraided shell fragments, rare laminations of fine sand, rare laminations of peaty material (Inwash), sharp contact		
1.19	8.38	8.73	-4.60	-4.95	Firm reddish black (2.5YR 2.5/1) woody peat, sharp boundary		
1.18	8.73	9.00	-4.95	-5.22	Wood, dark reddish grey (10R 3/1)		
1.17	9.00	9.16	-5.22	-5.38	Soft dark blue grey (GLEY 5b 4/1), silty clay, occasional shell fragments		
1.16	9.16	9.48	-5.38	-5.70	Soft wet, reddish black (2.5YR 2.5/1) woody peat with frequent fine plant fragments, sharp boundary		
1.15	9.48	9.90	-5.70	-6.12	Soft dark bluish grey (GLEY 5b 4/1) silty clay with 0.5cm thick lamination of soft dark yellowish brown (10YR 4/4) silty peat (inwash as opposed to sedimentation) sharp boundary		
1.14	9.90	10.00	-6.12	-6.22	Compact dark grey (2.5YR 4/1) fine to coarse rounded gravel in a silty clay matrix		
1.13	10.00	10.45	-6.22	-6.67	Soft light greenish grey (GLEY 5GY 7/1) silty clay with occasional fine peaty flecks <0.5cm throughout, sharp boundary		
1.12	10.45	10.65	-6.67	-6.87	Large wood fragment c. 5cm in length with coarse rounded pebbles (5cm) infilled with soft dark greenish grey (GLEY 5GY 5/1) occasional fine angular gravel, sharp contact		
1.11	10.65	10.75	-6.87	-6.97	Compact well formed slightly peaty clay black (10YR 2/1) diffuse boundary		

1.10	10.75	10.80	-6.97	-7.02	Soft greenish grey (GLEY 5G 5/1) mottled with black (10YR 5/2) silty clay with laminations of highly organic silty clay throughout		
1.9	10.80	10.88	-7.02	-7.10	Soft dark green grey (GLEY 5G 4/4) fine sandy clayey silt	Pleistocene sands	1
1.8	10.88	10.96	-7.10	-7.18	Soft very dark grey (GLEY N3) fine sandy slightly clay with occasional fine sub angular to angular gravel, sharp contact		
1.7	10.96	11.00	-7.18	-7.22	Compact light yellowish brown (2.5Y 6/3) coarse sand		
1.6	11.00	11.15	-7.22	-7.37	Compact light yellowish brown (2.5Y 6/3) medium sand		
1.5	11.15	11.20	-7.37	-7.42	Soft dark greenish grey (GLEY 5GY 4/1) sticky clay silt		
1.4	11.20	11.30	-7.42	-7.52	Compact light yellowish brown (2.5Y 6/3) medium sand, occasional wood flecks and angular fine to medium gravel		
1.3	11.30	11.32	-7.52	-7.54	Soft greyish green (GLEY 5G 4/2) fine sandy silt		
1.2	11.32	11.62	-7.54	-7.84	Dark grey (7.5YR 4/1) silt with frequent laminations/couplets of fine light yellowish brown (2.5Y 6/4) sand		

1.1	11.62	12.00	-7.84	-8.22	Dense light yellow brown (2.5Y 6/3) sand with bands of dark grey silt (7.5YR 4/1)		

Table 14 RBH01

Watermark, Southampton RBH02 10/12/2013							
Location						441823.0	111584.3
Dimensions						0.1m	
Modern ground level/top of slab (m OD)						3.33	
Base of modern fill/slab (m OD)						-1.62	
Depth of archaeological deposits seen (top)						n/a	
Level of base of deposits observed and/or base of intervention (m OD)						-4.22	
Holocene natural observed (m OD)						-1.62	
Pleistocene or older natural observed (m OD)						-2.52	
Unit Number	**Depth below ground level (m)**		**Elevation (m OD)**		**Description**	**Interpretation**	**Facies No.**
3.0	0.00	1.00	3.78	2.78	Light brown loam, abundant brick rubble and black gravel fill	Topsoil	3
2.9	1.00	3.00	2.78	0.78	Madeground, clay loam brown, frequent brick rubble, occasional ash clinker, occasional glass bottle fragments, occasional ceramic pipe	Made ground	
2.8	3.00	3.80	0.78	-0.02	Brown grey gravel, angular, with brick fragments, sandier to base		
2.7	3.80	4.00	-0.02	-0.22	Black hydrocarbon gravel		
2.6	4.00	5.40	-0.22	-1.62	Brown grey gravel, angular, with brick fragments, sandier to base		
2.5	5.40	6.00	-1.62	-2.22	Soft, greenish grey (GLEY 5GY 4/1) silt, striated structure	Alluvium	2
2.4	6.00	6.30	-2.22	-2.52	Void		
2.3	6.30	6.95	-2.52	-3.17	Angular to subangular greyish green (GLEY 5G 4/2) to white flint gravel	Pleistocene gravel	1
2.2	6.95	7.00	-3.17	-3.22	Gravel and greyish green (GLEY 5G 4/2) sand (fine)		
2.1	7.00	8.00	-3.22	-4.22	Gravel loose sample, unretrieved, blown through stuck casing		

Table 15 RBH02

8.4 Summary interpretation

The two geoarchaeological boreholes recorded c. 5m of madeground overlying the natural Holocene deposits. Predominantly the made ground appears to be silty sand to gravel dumps with brick glass and ash clinker inclusions used to raise the ground behind the sea wall. Underlying the made ground and overlying the basal Pleistocene gravels are Holocene natural deposits of variable thickness and composition. Towards the west (RBH01) the Holocene natural deposits are 5.8m thick. They predominantly consist of gleyed (waterlogged) silty clays but two peat bands from -4.6m OD (c. 1m thick) and -6.67m OD (c. 0.3m thick) were identified. The early Holocene sandy silts grade into the coarse sands and sandy gravels of the underlying Pleistocene sediments at -7.02m OD at this location. To the north east of site (RBH02) under 1m of natural Holocene deposits were recorded from -1.62m OD. No peats were identified and these are almost entirely foreshore/mudflat silts. The Pleistocene gravels were recorded at -2.52m OD. As to be expected the gravel surface slopes upwards from west to east as we move towards the old city wall and historic dry ground. Due to the minimal Holocene deposits recorded in RBH02 the palaeoenvironmental assessment will focus upon the deeper thicker deposits contained in RBH01. A separate report detailing these findings will follow.

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