AN ARCHAEOLOGICAL AUGER SURVEY OF THE ROYAL DOCKS DRAINAGE SCHEME AT NORTH WOOLWICH (PHASE 5 WORKS)

LONDON BOROUGH OF NEWHAM
LEVEL III REPORT

TQ 4345/7985

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AND
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ABSTRACT
An auger survey on the site of the proposed Royal Docks Drainage Scheme at North Woolwich revealed a complex sequence of stratified alluvial deposits and preserved organic remains.
Newham Museum Service was commissioned jointly by the London Docklands Development Corporation and Thames Water, to undertake an archaeological auger survey on land affected by the forthcoming 5th phase of the Royal Docks Drainage Scheme at North Woolwich. The area involved lies to the east of Store Road, to the west of Barge House Road, to the south of Albert Road and north of the River Thames (see fig.1). Within this area it was decided to carry out an auger survey on two separate parcels of land, the Royal Victoria Gardens to the east and the Disused Goods Yard to the west.

An auger survey was undertaken because the proposed development lies within an Archaeological Priority Zone, as designated within the London Borough of Newham Unitary Development Plan (UDP), and threatened to destroy important archaeological remains that may be preserved within the alluvial deposits of the River Thames.

The proposed scheme consisted of a pipe trench, to be excavated through the Royal Victoria Gardens, across Manor Way and the railway lines ending at a new Pumping Station, to be built on land between the Disused Goods Yard and Store Road. The construction of the pipe trench and the pumping station would entail large scale and thus destructive excavations within the Thames alluvium to a proposed maximum depth of circa 5-6 metres (Moore, 93, p.3).

Recent discoveries made within the alluvial deposits that lie along the northern foreshore of the River Thames have highlighted the potential for significant archaeological remains preserved by the anaerobic conditions prevalent within the alluvium. These deposits are made up of stratified peat and clay horizons which overlie Thames floodplain gravels. Such deposits date from the prehistoric to the post medieval periods and represent fluctuations in the level of the river. Periods of extensive flooding led to the build up of silty clay horizons because of the deposition of large quantities of river silts. When drier conditions prevailed, lush, low-lying areas would have provided a relatively stable, marsh environment which enabled substantial layers of peat deposits to form. Such deposits are waterlogged and anaerobic and thus provide ideal conditions for the preservation of organic floral and faunal remains, remains that detail the ecology of the area. These palaeoenvironmental remains can be said to hold the climatic, vegetation and animal histories of the Thames region. (Moore, 1992, p.4)

Due to the conditions described above, alluvial deposits are known to preserve a variety of both organic and inorganic archaeological remains, from individual objects to complete settlements, indeed, recent excavations by Newham Museum Service (formerly Passmore Edwards Museum) have uncovered an unexpectedly high density and frequency of prehistoric human activity along the north bank of the River Thames. Timber and brushwood trackways have been discovered at Bridge Road, Rainham (Meddens and Beasley, 1990, p.242-248), Beckton Evelyn Dennington Road development (Beasley, 1993) and Highbridge Road, Barking (Chew, 1994). In addition, a causeway constructed from gravel and burnt flint was excavated at Poole’s Lane, Dagenham (Divers, 1993) and excavations at Fort Street, Silvertown revealed a waterlogged timber trackway (Wessex Archaeology, 1994, p.ii).
All of the structures listed above have been dated by pottery and Carbon 14 dating to the middle Bronze Age (approximately 1500-1100 BC).

A search of the Greater London Sites and Monuments Record (GLSMR) provides evidence of other prehistoric artefacts recovered from the vicinity of the site. Palaeolithic handaxes were recovered from the Royal Victoria and Royal Albert Docks (GLSMR ref: 060582 and 060581), a hand axe from the Victoria Ponto or Graving Dock (GLSMR 061758), and a Bronze Age palstave axe and a bronze ‘rapier’ also at the Royal Albert Dock site (GLSMR 061759 and 061751).

As well as prehistoric remains, the area encompassed by the development may also yield evidence of medieval settlement. The North Woolwich that we see today is a relatively modern development, as before the mid nineteenth century and the impact of the Docks, the area was used ‘only for grazing and not for habitation’ (Powell, 1973, p.2). However, there was an original settlement of North Woolwich extant in the medieval period which survived until flooding forced its abandonment in the early fifteenth century (Powell, 1973, p.2). This settlement may be associated with the Manor of Hammash, owned until the nineteenth century by Westminster Abbey, which appears to have been situated on land now occupied by the Royal Victoria Gardens (Powell, 1973, p.12) and therefore well within the scope of the proposed development.

Thus we can see that there is considerable scope for both significant archaeological and environmental remains preserved within the alluvium. The threat to these deposits however, comes not just from the physical destruction by the various excavations required by the project. A more long term threat is posed by the need for drainage to reduce the ground water pressure during the development and the improved drainage that will result from the finished scheme. Such a reduction in water levels within the area will have severe consequences for the preservation of archaeological and palaeoenvironmental organic material, which may be destroyed if drying out is permitted to occur.
Due to the depth of the expected alluvial deposits it was decided that the most appropriate way to conduct the evaluation was to carry out an auger survey of the area.

The method employed by Newham Museum Service involved the use of a Cobra 149 percussion auger in conjunction with 5x1 metre long steel probes of varying widths, the widest being 100 mm in diameter, the narrowest 38mm. The maximum possible depth of the bore holes was thus 5 metres, progressing from the widest diameter probe at the top to the narrowest at the bottom.

During the auguring process a certain amount of compaction takes place. By applying a compaction correlation factor the ‘true’ depths of the deposits can be calculated. Only these corrected depths will be used in this report.

The operation of the auger required two people, with a third person recording the completed probes. The deposits in each 1 metre probe were allocated an auger deposit number and recorded on an auger recording sheet which is archived with the level II records.

The auger deposit number is a three digit number ( eg. 4:07 ), the first digit represents the number of the borehole and the last two represent the deposit number within that hole.

A dumpy level was used to take spot heights at the top of each borehole and a mechanical excavator ( JCB ) was used to break out concrete where required.

Various external factors led to modification of the original proposed design of the auger survey. In the ‘Disused Goods Yard’ only 4 of the 6 proposed bore holes could be completed. Bore holes 1 and 2 were both abandoned after considerable efforts due to the encountering of buried obstructions; this being after preparatory excavation with a mechanical excavator. Consequently the north - south alignment of 3 bore holes proposed in the project design ( Moore 1993,p.8 ) could not be completed.

Both bore holes 3 and 13 could only be completed to a depth of 3 metres. In each case the watertable was very close to the surface and therefore further auguring was considered impractical due to the increased likelihood of difficulties arising in probe extraction.

The locations of the 4 completed bore holes vary slightly from the proposal, as access was limited by the large quantities of illegally dumped material on site (see fig.2).

In the "Royal Victoria Gardens Area" no serious problems were encountered and all 8 auger holes were completed to the intended depth of 5 metres. The locations of the bore holes do however vary slightly from those shown in the project design. Bore holes 8 to 12 all being approximately 30 metres further to the east than intended, due to the presence of an area of tarmac not shown on the site plans (see fig.3).
Care was taken to ensure that all the bore holes were located well clear of the archaeological exclusion zone. This zone was created to minimise the dangers of possible tunnelling and trenching collapse caused by the release of ground water held within the underlying gravels under artesian pressure.

The bore holes in the "Disused Goods Yard" were reinstated using Bentonite pellets in order to prevent any possible surface contamination of the ground water table.

The work was carried out by members of Newham Museum Service between the 19th and the 25th of October, 1993. The survey was directed by Mr Peter Moore and supervised by Shaun Tamblyn. This report was written by Nick Truckle with an initial draft by Shaun Tamblyn.

PHASE DISCUSSION
Due to the distances between the boreholes it is difficult and indeed unwise to attempt a comprehensive site phase chronology for all the recorded deposits. However it is possible to identify 5 phases of activity with some certainty (see fig.4).

Phase 1, which consisted of groups 3.1, 5.1, 13.1, 14.1, 4.1, 6.1, 7.1, 8.1, 9.1, 10.1, 11.1 and 12.1, represented the top soil deposits that overlie the investigated area. These layers appeared to consist of dumped material laid down from the nineteenth century as part of a general programme of land consolidation in the area probably dating from the laying out of the Royal Victoria Gardens in 1852-3 (Powell, 1973, p.14).

Phase 2 consisted of groups 6.2, 8.2 and 9.2. These groups represented demolition deposits associated with possible brick structures. It was not possible to identify the nature of these remains although they probably date from the late 19th century when the area was transformed by the coming of the railway (1847) and the construction of the Victoria Dock (1855) (Powell, 1973, p.4).

Phase 3 consisted of groups 3.2, 5.2, 13.2, 14.2, 4.2, 6.3, 7.2, 8.3, 9.3, 10.2, 11.2 and 12.2. This phase represents a substantial deposit of alluvial clay that covered the entire surveyed area. These deposits are formed by silt deposition during marine or brackish water conditions (Devoy, 1980, p.134) and so represent a period of severe flooding over a considerable period of time. It is not possible to date the deposition of this material at present, although it is interesting to note that the original settlement of North Woolwich had been abandoned due to persistent flooding by the early fifteenth century and may in fact have been deserted as early as 1236 (Powell, 1973, p.2).

Phase 4 consisted of groups 4.3 and 6.4 and would appear to represent the natural silting of a river channel or inlet. A similar channel was observed during the construction of the Royal Albert Dock extension scheme and such features appear to be a frequent occurrence reflecting the ever changing nature of the Thames tidal reach (Sherlock, 1960, p.52). Such a feature would have had a considerable influence on the local topography as will be discussed later.

Phase 5, consisting of groups 7.3, 8.4, 9.4, 10.3, 11.3 and 12.3 is the last phase of cross-site activity that can be identified with any certainty and represents a layer of silty organic clay. Such a deposit would have been laid down under waterlogged marshy conditions coupled with periods of more extensive flooding during which river sediments were deposited. These conditions would have been caused by a rise in the level of the Thames, a process that eventually led to the totally flooded conditions of Phase 4.

The absence of any site phases after the one described above should not be taken to signify the absence of further archaeologically significant deposits.

The distance between the boreholes dictates that only very obvious layers can be grouped together with any certainty. As can be seen from figure 4 the majority of the deposits recorded during the survey lay outside the five readily identifiable site phases. These layers are the remains of an ever changing fluvial regime in which the
fluctuating river level directly influenced the environmental conditions along the foreshore of the Thames.

Due to the low-lying nature of the area it is probable that even when the river level was low, the ground would still have been heavily waterlogged with a widespread network of streams and channels. These forces would have eroded and sculpted the landscape leading to a constantly evolving topography, influenced by local flow variations as well as tidal and marine factors.

Periods of relative dryness and stability would have been characterised by the formation of peat deposits. A decrease in water level would have enabled marshy conditions with varied vegetation to develop, thus resulting in the deposition of material with a high organic content, though still with a predominately clay matrix. These layers can be seen on figure 4 characterised as peaty clay. As this material collected in the hollows and undulations water flow was further reduced, enabling more vegetation to thrive and so produce more organic material which in turn again reduced flow. As this process continued organic material replaced river silts and resulted in the formation of peat horizons.

Organic remains within these deposits remain preserved by the anaerobic conditions provided by the waterlogged environment. When a rise in the river level caused prolonged flooding, the predominately organic remains were superseded by layers of water-borne clays and silts, thus a series of stratified bands were created across the area. Where such a sequence is under the influence of marine conditions, such as further down the Thames Estuary at Tilbury, the peat and clay sequences can be up to several metres thick and can be dated with some accuracy (Devoy, 1980, p.136).

However, due to the dissipation of the marine influence coupled with local factors such as streams and vegetation patterns, it becomes impossible to correlate the known Tilbury sequences with the North Woolwich deposits. Indeed it is unwise to group together organic deposits from different boreholes, as without dating evidence such as Carbon 14 such generalisations become misleading.

SUMMARY AND CONCLUSION
Although it was not possible to produce an accurate phase chronology of the site, it can be seen from the recorded borehole columns that a significant series of stratified peat deposits were recorded during the evaluation (see appendix1).

Recent excavations within the alluvial deposits along the Thames flood plain at Beckton, Barking, Dagenham and Rainham (see fig.5) have revealed the potential for archaeological and palaeoenvironmental remains preserved in the anaerobic conditions provided by the peat deposits.

The archaeological evidence has ranged in date from the Neolithic to the post-medieval periods, with the recent discoveries of wooden trackways and structures at Beckton attributed to the Bronze Age by Carbon 14 dating (pers. comm, David Divers).

As one would expect due to the proximity of the site to the Thames, the influence of the river has been critical to the land use and development of the area. The Royal Victoria Gardens, part of the ancient Manor of Hammarsh, lies within the historical area of the East Ham ‘Levels’, which, as defined in and after the 16th century for the purposes of marshland drainage and flood control, comprised an area of over 1,500 acres (Powell,1973, p.17). The many references to be found regarding the levels suggest that they had a long history of serious and prolonged flooding, with the inundation’s of the 14th and 15th centuries being particularly severe. Indeed it seems probable that the medieval settlement of North Woolwich had been abandoned by the beginning of the 15th century due to this persistent flooding (Powell,1973, p.18). From about 1500 AD the marsh lands at North Woolwich were being reclaimed for grazing and meadow use, with no further settlement activity until the industrial boom of the 19th century.

No evidence of the original settlement was recovered during the evaluation, although the possible presence of medieval remains within the area of the Royal Victoria Gardens can not be ruled out.

Thus we can see how the river has had a profound influence on the area in historical times. That similar conditions prevailed in the prehistoric period is not in doubt, indeed without river walls or other flood defences the land would have been even more at the mercy of the changing fluvial environment. Flooding caused by storm surges and annual variations in the river level have little impact on the sedimentary record, thus the peat and clay banding that can be observed in the boreholes (see fig.4) are the remains of more severe and prolonged environmental conditions. Work carried out on the Thames Estuary deposits at Tilbury shows the occurrence of relative sea-level and coastal movements in alternate layers of silts and organic material. The organic peats are formed during periods when the marine influenced is removed enabling the formation of fresh and brackish water plant communities.

At least 5 regression phases have been identified (Tilbury I-V) (Devoy,1980, p.134-136) and dated by Carbon 14. Thus the changing nature of the prehistoric marine environment, and the influence this would have had on the environment of the Thames tidal reach can be seen. Unfortunately it is difficult to draw direct parallels between the Tilbury peat sequences and those recorded at North Woolwich as the
latter would have been affected by localised factors, although with further work it may be possible to correlate the more substantial deposits at North Woolwich with those recorded elsewhere in the Thames foreshore.

The greatest potential for archaeological and palaeoenvironmental remains was located in the area of the Royal Victoria Gardens. The stratified alluvial sequences in this area contained well preserved organic remains including several layers indicating the presence of preserved timber. Given the nature of the survey, it is not possible to identify the wood as structural. However, the presence of preserved wood indicates that a great deal of information regarding the changing nature of the prehistoric environment would be destroyed by the proposed drainage works.

The deposits beneath the disused Railway Yard proved to be more difficult to evaluate. The disturbed nature of the ground surface deposits coupled with artesian water pressure made the completion of the survey to the required depth impossible. However boreholes 3 and 13 indicated the presence of peat and peaty clay deposits and borehole number 14 revealed a stratified sequence of peat and silt deposits similar to those recorded beneath the Royal Victoria Gardens. With boreholes 4 and 6 revealing a deep sequence of river silts, it is possible to extrapolate the existence of an undulating waterlogged environment divided by a river channel or inlet (as noted in phase 4). Such a feature would provide a further source of fluvial activity and may go some way to explaining the variations in the alluvial deposits over the site.

Taking together the deep sequence of preserved organic deposits with the recent archaeological discoveries within the Thames alluvium, it can be seen that there is the potential for the widespread destruction of significant archaeological and environmental remains. It is therefore essential that a programme of archaeological investigation be carried out in both of the threatened areas together with a thorough environmental sampling policy (see appendix 2). Such works would shed a great deal of light on the prehistoric environment of the Thames floodplain before the proposed excavations and improved drainage destroy the fragile and important remains that lay beneath modern North Woolwich.

ACKNOWLEDGEMENTS
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The authors would like to personally thank Mr David Divers for his comments on the Beckton Trackways and Caz Mamwell for her hard work during the auger survey.

BIBLIOGRAPHY


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London Borough of Newham 1993: *Unitary Development Plan*, Department of Environment and Planning, Planning Division


**Appendix 1**

**Auger Survey Results**
Area 1

<table>
<thead>
<tr>
<th>Height in metres above ordnance</th>
<th>max</th>
<th>min</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABANDONED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| BH 2                           |     |     |
| ABANDONED                      |     |     |

<table>
<thead>
<tr>
<th>BH 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:01- Light grey sandy silt with frequent large pebbles, and moderate brick fragments.</td>
<td>1.81</td>
<td>1.66</td>
</tr>
<tr>
<td>3:02- Off white decayed chalk.</td>
<td>1.66</td>
<td>1.60</td>
</tr>
<tr>
<td>3:03- Black sandy silty cinders with occasional large stone fragments.</td>
<td>1.60</td>
<td>1.17</td>
</tr>
<tr>
<td>The above group represents dumped make-up material.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:04- Light blue/grey sandy clay.</td>
<td>1.17</td>
<td>1.08</td>
</tr>
<tr>
<td>3:05- Dark grey sandy silty clay.</td>
<td>1.08</td>
<td>0.82</td>
</tr>
<tr>
<td>3:06- Light blue/grey sandy silty clay.</td>
<td>0.82</td>
<td>0.09</td>
</tr>
<tr>
<td>The above group represents alluvially deposited clay.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:07- Dark brown silty clay peat.</td>
<td>0.09</td>
<td>-0.14</td>
</tr>
<tr>
<td>The above group represents a mixed layer of river silts and organic material.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3:08- Dark brown peat. - 0.14 -0.34

The above group represents naturally deposited peat.

Probe 3 was abandoned due to an obstruction caused by the collapse of the sides due to water action

**BH 5**

**Group 5.1**

5:01- Dark grey sandy silt with moderate gravel, mortar and brick fragments. 3.75 3.58

5:02- Dark grey sandy silt with frequent gravel, mortar and brick fragments. 3.58 3.06

5:03- Mid yellow/brown sandy clay with occasional mortar fragments, moderate brick fragments and moderate small pebbles. 3.06 2.82

The above group represents a series of dumped make-up layers.

**Group 5.2**

5:04- Mid orange/yellow coarse sand with frequent small to medium pebbles. 2.82 2.64

5:05- Mid blue/grey silty clay with frequent organic flecks and occasional medium pebbles. 2.64 1.15

5:06- Light brown/grey silty clay. 1.15 1.03

5:07- Light blue/grey silty clay with occasional small pebbles and frequent organic flecks. 1.03 0.77

5:08- Light green/blue silty clay. 0.77 0.55

5:09- Light blue/grey clay with green/brown mottles. 0.55 0.29

5:10- Light blue/grey with frequent organic flecks. 0.29 -0.31

The above group represents a series of alluvially deposited clays and silts.
BH 13

Group 13.1

13:01- Dark brown sandy clay silt. 2.24 2.06
13:02- Black sandy clay silt with occasional medium pebbles, frequent cinders and moderate chalk flecks and small pebbles. 2.06 0.92

The above group represents dumped make-up material.

Group 13.2

13:03- Dark grey silty clay with frequent charcoal flecks. 0.92 0.68
13:04- Dark blue/grey sandy silty clay. 0.68 0.16

The above group represents alluvially deposited clays and silts.

Group 13.3

13:05- Dark brown clay peat. 0.16 0.04

The above group represents a mixed layer of river silts and organic material.

Abandoned due to the collapse of the sides of the borehole.

BH 14

Group 14.1

14:01- Dark grey sandy silt with frequent cinders and small to medium pebbles. 2.38 2.11
14:02- Dark grey sandy silty cinders with occasional tarmac fragments. 2.11 1.83
14:03- Dark grey/black cinders with frequent small pebbles and coal fragments. 1.83 1.68
14:04- Dark grey clay cinders. 1.68 1.40

The above group represents a series of dumped make-up layers.

Group 14.2

14:05- Mid grey silty sandy gravel. 1.40 1.18
14:06- Dark grey/black clay sandy gravel.  1.18  0.92
14:07- Dark grey silty clay with frequent small pebbles.  0.92  0.68
14:08- Mid grey clay.  0.68  0.46
14:09- Dark grey/black clay.  0.46  0.19
14:10- Light grey/blue clay.  0.19 -0.14
14:11- Dark green/grey clay.  -0.14 -0.38

The above group represents a series of alluvially deposited clays and silts.

Group 14.3

14:12- Mid grey/brown peaty clay.  -0.38 -0.52

The above group represents a mixed deposit of river silts and organic material.

Group 14.4

14:13- Dark brown peat with frequent wood fragments.  -0.52 -0.74
14:14- Light brown peat with frequent wood fragments.  -0.74 -1.22

The above group represents naturally deposited peat.

Group 14.5

14:15- Mid blue/grey clay.  -1.22 -1.24

The above group represents alluvially deposited clay.

Group 14.6

14:16- Dark brown peat.  -1.24 -1.37

The above group represents naturally deposited peat.

Group 14.7

14:17- Light grey clay.  -1.37 -1.47

The above group represents alluvially deposited clay.

Group 14.8
14:18- Light brown/grey clay with frequent wood fragments and organic material. - 1.47 -1.77

The above group represents a mixed deposit of river silts and organic material.

Group 14.9

14:19- Dark brown peat with frequent wood fragments. - 1.77 -1.96

The above group represents naturally deposited peat.

Group 14.10

14:20- Dark grey clay. -1.96 -1.99

The above group represents a layer of alluvially deposited clay.

AREA 2

BH 4

Group 4.1

4:01- Dark grey/brown sandy silty clay with frequent small to medium pebbles and occasional coal fragments. 1.38 0.91

The above group represents the top soil of the site.

Group 4.2

4:02- Light brown sandy clay with occasional shell fragments. 0.91 0.38

4:03- Light orange brown sandy silty clay. 0.38 -0.30

The above group represents a series of alluvially deposited clays and silts.

Group 4.3

4:04- Light brown/blue sandy clay. - 0.30 -0.62

4:05- Light orange/brown sandy clay. -0.62 -0.94

4:06- Dark grey sandy silty clay. - 0.94 -1.12

4:07- Dark grey silty clay. - 1.12 -1.62
4:08- Light grey silty clay. - 1.62 -1.83
4:09- Dark grey silty clay. - 1.83 -2.10
4:10- Light grey silty clay. - 2.10 -2.34
4:11- Dark grey silty clay. - 2.34 -2.74

The above group represents a series of alluvial silts and clays possibly forming the fill of a water channel.

**Group 4.4**

4:12- Dark brown/blue peaty clay with occasional wood fragments. - 2.74 -2.95
4:13- Light brown peaty clay with moderate wood fragments. - 2.95 -3.07

The above group represents mixed deposits of river silts and organic material.

**Group 4.5**

4:14- Dark brown peat with frequent wood fragments. - 3.07 -3.32

The above group represents naturally deposited peat.

**Group 4.6**

4:15- Light grey/brown silty peaty clay with moderate wood fragments. -3.32 -3.62

The above group represents a mixed deposit of river silts and organic material.

**BH 6**

**Group 6.1**

6:01- Dark grey/ black sandy silt. 2.04 1.86
6:02- Dark orange/ brown slightly silty clay with occasional small pebbles, cinders, bottle glass and modern pottery fragments. 1.86 1.52

The above group represents the top soil of the site.

**Group 6.2**

6:03- Light orange/ brown slightly silty clay. 1.52 1.46
6:04- Dark grey/black silty clay.  1.46  1.40
6:05- Mid orange/brown silty clay with occasional concrete fragments  1.40  1.36
6:06- Dark grey/black silty clay.  1.36  1.22
6:07- Dark orange/brown clay with occasional small pebbles, coal fragments and charcoal flecks.  1.22  1.02
6:08- Mid red/brown sandy silty clay with occasional gravel and organic traces.  1.02  0.72
6:09- Mid red/brown sandy silty clay with occasional chalk flecks and light blue/grey clay mottles.  0.72  0.22

The above group consists of a series of dumped make-up deposits, possibly representing the silting or in-filling of an excavated feature.

**Group 6.3**

6:10- Light red/brown silty clay with frequent gravel and occasional organic traces.  0.22  -0.12

The above group represents a series of alluvially deposited clays and silts.

**Group 6.4**

6:11- Light grey/brown silty clay with dark organic mottles and frequent organic traces.  - 0.12  -0.58
6:12- Mid grey slightly silty clay with occasional organic traces.  - 0.58  -2.58

The above group represents a series of clays and silts possibly deposited within a water channel.

**BH 7**

**Group 7.1**

7:01- Dark grey/brown sandy clay silt with moderate gravel.  1.34  1.15
7:02- Mid grey/brown sandy clay silt with moderate gravel and occasional cinders and modern bottle glass.  1.15  1.05
The above group represents the top soil of the site.

**Group 7.2**

7:03- Light red/brown sandy silty clay with blue/grey clay mottles. 1.05 -0.14

The above group represents alluvially deposited clays and silts.

**Group 7.3**

7:04- Mid red/brown peaty clay with frequent organic material. - 0.14 -0.26

The above group represents a mixed deposit of river silts and organic material.

**Group 7.4**

7:05- Dark brown peat. - 0.26 -0.33

The above group represents naturally peat.

**Group 7.5**

7:06- Light yellow/brown clay with frequent organic material. - 0.33 -0.55

The above group represents alluvially deposited clay.

**Group 7.6**

7:07- Dark red/brown peat with frequent wood fragments. - 0.55 -1.08

The above group represents naturally deposited peat.

**Group 7.7**

7:08- Light blue/grey silty clay with frequent organic material. - 1.08 -1.13

The above group represents alluvially deposited clay.

**Group 7.8**

7:09- Dark brown peat with frequent wood fragments. - 1.13 -1.33
7:10- Dark brown/red peat with moderate wood fragments. - 1.33 -1.88

The above group represents naturally deposited peat.

**Group 7.9**

7:11- Mid grey silty clay with moderate wood fragments and frequent -1.88 -2.38
organic material.
The above group represents alluvially deposited clay.

**Group 7.10**

7:12- Dark brown/black peat. - 2.38 -2.65
7:13- Dark brown wood. - 2.65 -2.89

The above group represents naturally deposited peat.

**Group 7.11**

7:14- Mid blue/grey silty clay with moderate wood fragments and frequent organic material. - 2.89 -3.29

The above group represents alluvially deposited clays.

**BH 8**

**Group 8.1**

8:01- Mid brown sandy clay silt with occasional charcoal flecks, moderate brick fragments and frequent small pebbles. 1.42 1.22

The above group represents the top soil of the site.

**Group 8.2**

8:02- Red brick. 1.22 1.10
8:03- Light orange/brown silty sand with occasional brick fragments and frequent mortar flecks. 1.10 0.96
8:04- Black sandy silt with occasional mortar flecks and frequent cinders. 0.96 0.84
8:05- Creamy white mortar. 0.84 0.82
8:06- Dark orange sandy gravel with moderate medium pebbles. 0.82 0.62

The above group represents a dump of demolition rubble.

**Group 8.3**

8:07- Mid orange/brown sandy clay with occasional small pebbles. 0.62 -0.03
8:08- Dark blue/grey sandy silty clay with occasional charcoal flecks. -0.03 -0.75

The above group represents alluvially deposited clays and silts.

**Group 8.4**

8:09- Dark brown clay peat with moderate wood fragments. -0.75 -1.11

The above group represents a mixed deposit of river silts and organic material.

**Group 8.5**

8:10- Light orange/brown wood. -1.11 -1.29
8:11- Dark brown peat with moderate wood fragments. -1.29 -1.69

The above group represents naturally deposited peat.

**Group 8.6**

8:12- Light blue/brown clay silt with frequent organic material. -1.69 -1.85

The above group represents alluvially deposited silts and clays.

**Group 8.7**

8:13- Dark brown peat with frequent wood fragments. -1.85 -1.95

The above group represents naturally deposited peat.

**Group 8.8**

8:14- Mid blue/grey sandy silty clay with occasional wood fragments. -1.95 -2.08

The above group represents alluvially deposited clays and silts.

**Group 8.9**

8:15- Dark brown peat with occasional wood fragments. -2.08 -2.25

The above group represents naturally deposited peat.

**Group 8.10**

8:16- Mid blue/grey sandy silty clay. -2.25 -2.29
The above group represents alluvially deposited silts and clays.

**Group 8.11**

8:17- Dark brown peat with moderate wood fragments. - 2.29 -2.38
The above group represents naturally deposited peat.

**Group 8.12**

8:18- Dark blue/grey sandy silty clay. - 2.38 -2.48
The above group represents alluvially deposited silts and clays.

**Group 8.13**

8:19- Light grey/brown silty sandy peaty clay with occasional wood fragments. - 2.48 -2.75
The above group represents a mixed deposit of river silts and organic material

**Group 8.14**

8:20- Dark brown peat with occasional wood fragments. - 2.75 -2.98
The above group represents naturally deposited peat.

**Group 8.15**

8:21- Light blue/grey silty clay with occasional peat and wood fragments. - 2.98 -3.14
The above group represents alluvially deposited silts and clays.

**Group 8.16**

8:22- Dark brown peat. - 3.14 -3.18
The above group represents naturally deposited peat.

**Group 8.17**

8:23- Dark blue/grey sandy silty clay with occasional wood fragments. -3.18 -3.48
The above group represents alluvially deposited silts and clays.
### BH 9

#### Group 9.1

<table>
<thead>
<tr>
<th>9:01</th>
<th>Dark grey/brown silty clay with frequent small pebbles.</th>
<th>1.48</th>
<th>1.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:02</td>
<td>Dark orange/brown silty clay with frequent small pebbles.</td>
<td>1.25</td>
<td>1.14</td>
</tr>
</tbody>
</table>

The above group represents the top soil of the site.

#### Group 9.2

<table>
<thead>
<tr>
<th>9:03</th>
<th>Dark grey/black cindery silty clay with frequent concrete fragments.</th>
<th>1.14</th>
<th>1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:04</td>
<td>Red brick (three courses, dark brown mortar).</td>
<td>1.00</td>
<td>0.64</td>
</tr>
</tbody>
</table>

The above group represents the remains of a brick wall.

#### Group 9.3

<table>
<thead>
<tr>
<th>9:05</th>
<th>Dark grey/orange/brown clay.</th>
<th>0.64</th>
<th>0.48</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:06</td>
<td>Dark orange/brown clay with occasional shell fragments and frequent organic flecks.</td>
<td>0.48</td>
<td>0.25</td>
</tr>
<tr>
<td>9:07</td>
<td>Dark grey clay with frequent organic material.</td>
<td>0.25</td>
<td>-0.05</td>
</tr>
<tr>
<td>9:08</td>
<td>Mid blue/grey clay with occasional organic flecks.</td>
<td>-0.05</td>
<td>-0.35</td>
</tr>
</tbody>
</table>

The above group represents alluvially deposited silts and clays.

#### Group 9.4

| 9:09  | Dark blue grey clay with frequent organic material.              | -0.35 | -0.52 |

The above group represents a mixed deposit of river silts and organic material.

#### Group 9.5

| 9:10  | Dark brown peat with frequent wood fragments.                    | -0.52 | -0.99 |

The above group represents naturally deposited peat.

#### Group 9.6

| 9:11  | Mid brown silty clay peat with frequent wood fragments.          | -0.99 | -1.34 |
The above group represents a mixed deposit of river silts and organic material.

Group 9.7

9:12- Dark brown peat with frequent wood fragments. - 1.34 -1.46

The above group represents naturally deposited peat.

Group 9.8

9:13- Dark brown silty clay peat with frequent wood fragments. - 1.46 -1.66

The above group represents a mixed deposit of river silts and organic material.

Group 9.9

9:14- Dark brown peat with frequent wood fragments. - 1.66 -1.84

The above group represents naturally deposited peat.

Group 9.10

9:15- Dark brown silty clay peat with frequent wood fragments - 1.84 -2.11

9:16- Mid grey/brown silty clay peat with frequent wood fragments. -2.11 -

9:17- Dark grey silty clay with frequent wood fragments and organic material. -2.20 -

9:18- Dark brown silty clay peat with moderate wood fragments. - 2.36 -2.76

The above group represents a series of mixed deposits of river silts and organic material.

Group 9.11

9:19- Dark brown peat with frequent wood fragments. - 2.76 -3.03

The above group represents naturally deposited peat.

Group 9.12

9:20- Mid blue/grey silty clay with frequent organic material. - 3.03 -3.24

9:21- Dark grey/brown silty clay peat with frequent wood fragments. -3.24 -3.46
The above group represents mixed deposits of river silts and organic material.

**BH 10**

**Group 10.1**

10:01- Mid brown clay sandy silt with moderate small and medium pebbles.  
1.34  1.19

10:02- Dark grey/brown clay silt with occasional brick fragments, moderate small pebbles and moderate gravel.  
1.19  0.98

The above group represents the top soil of the site.

**Group 10.2**

10:03- Mid red/yellow silty sand with frequent gravel and small pebbles.  
0.98  0.86

10:04- Mid red/grey/brown silty sandy clay with occasional gravel.  
0.86  0.34

10:05- Mid grey/brown silty clay.  
0.34  0.19

10:06- Mid blue/grey silty clay with frequent organic material.  
0.19  0.02

10:07- Mid blue/grey silty clay with red/brown clay mottles and moderate organic material.  
0.02 -0.47

The above group represents alluvially deposited silts and clays.

**Group 10.3**

10:08- Mid blue/grey peaty clay.  
- 0.47 -0.54

The above group represents a mixed deposit of river silt and organic material.

**Group 10.4**

10:09- Dark red/brown peat with moderate wood fragments.  
0.54  -1.55

The above group represents naturally deposited peat.

**Group 10.5**

10:10- Mid grey/brown clay peat with moderate wood fragments.  
- 1.55 -1.77
The above group represents a mixed deposit of river silt and organic material.

**Group 10.6**

10:11- Dark red/brown peat with occasional wood fragments. - 1.77 -1.98

The above group represents naturally deposited peat.

**Group 10.7**

10:12- Mid grey/brown clay peat with occasional wood fragments. - 1.98 -2.41

The above group represents a mixed deposit of river silt and organic material.

**Group 10.8**

10:13- Dark red/brown peat with occasional wood fragments. - 2.41 -2.82

The above group represents naturally deposited peat.

**Group 10.9**

10:14- Light blue grey peaty clay with occasional wood fragments. - 2.82 -3.07

10:15- Dark brown/black wood. - 3.07 -3.23

10:16- Mid grey/brown peaty clay with occasional wood fragments. - 3.23 -3.32

The above group represents a mixed deposit of river silts and organic material.

**BH 11**

**Group 11.1**

11:01- Light brown clay sandy silt with frequent small, medium and large pebbles. 1.60 1.28

11:02- Dark grey/black silty cindery sand with occasional medium pebbles, moderate brick fragments and frequent charcoal and mortar flecks. 1.28 1.08

11:03- Light grey silty sandy clay with occasional brick fragments, moderate small and medium pebbles and frequent charcoal flecks. 1.08 0.68
The above group represents top soil and dumped levelling deposits.

**Group 11.2**

11:04- Light grey/brown silty clay with occasional shell fragments.  0.68  0.47  
11:05- Dark brown sandy peaty clay.  0.47  0.17  
11:06- Light blue/grey silty clay.  0.17  -0.13  
11:07- Dark grey/blue silty clay with frequent charcoal flecks.  -0.13  -0.50  

The above group represents alluvially deposited clays and silts.

**Group 11.3**

11:08- Dark grey silty peaty clay with occasional wood fragments.  - 0.50  -0.95  
11:09- Dark brown silty peaty clay with occasional wood fragments.  - 0.95  -1.07  

The above group represents mixed deposits of river silts and organic material.

**Group 11.4**

11:10- Dark brown peat with occasional wood fragments.  - 1.07  -1.31  

The above group represents naturally deposited peat.

**Group 11.5**

11:11- Light grey/blue clay.  - 1.31  -1.41  

The above group represents alluvially deposited clay.

**Group 11.6**

11:12- Dark brown peat.  - 1.41  -1.46  
11:13- Dark brown/black wood.  - 1.46  -1.50  
11:14- Dark brown peat with moderate wood fragments.  - 1.50  -1.90  

The above group represents naturally deposited peat.

**Group 11.7**

11:15- Light blue/grey clay.  - 1.90  -1.95  

29
The above group represents alluvially deposited clay.

**Group 11.8**

11:16- Dark brown silty clay peat. - 1.95 -2.25

The above group represents a mixed deposit of river silts and organic material.

**Group 11.9**

11:17- Dark brown peat with occasional wood fragments. - 2.25 -2.58

The above group represents naturally deposited peat.

**Group 11.10**

11:18- Light blue/grey silty clay with frequent wood fragments. - 2.58 -2.89

The above group represents alluvially deposited clay.

**BH 12**

**Group 12.1**

12:01- Mid brown sandy clay silt. 1.63 1.51
12:02- Mid red/brown clay sandy silt with frequent small pebbles. 1.51 1.33
12:03- Dark brown/black cinders with frequent small pebbles. 1.33 1.13
12:04- Mid yellow coarse sand with occasional small pebbles and brick fragments. 1.13 1.05
12:05- Mid grey/brown silty clay with occasional small pebbles and moderate mortar fragments.

The above group represents top soil and dumped levelling material.

**Group 12.2**

12:06- Mid red/brown silty clay with moderate organic material. 0.92 0.36
12:07- Mid blue/brown silty clay with occasional organic material. 0.36 0.24
12:08- Mid blue/grey clay with occasional red/brown mottles and 0.24 -0.47
organic material.

The above group represents alluvially deposited clays and silts.

**Group 12.3**

12:09- Mid blue/grey peaty clay. - 0.47 -0.71
12:10- Dark red/brown clay peat with moderate wood fragments. - 0.71 -1.08
12:11- Dark red/brown peaty clay with occasional wood fragments. - 1.08 -1.63

The above group represents mixed deposits of river silts and organic material.

**Group 12.4**

12:12- Dark red/brown peat with occasional wood fragments. - 1.63 -2.08
12:13- Dark red/brown peat with moderate grey/brown clay patches 2.08 -2:80 and frequent wood fragments.

The above group represents naturally deposited peat.

**Group 12.5**

12:14- Light blue/grey sandy clay with frequentt wood fragments and organic material. - 2.80 -2.98
12:15- Light blue/grey sand. - 2.98 -3.08

The above group represents alluvially deposited sands and clays.
Appendix 2

ENVIRONMENTAL APPRAISAL OF BOREHOLE DATA
FROM THE ROYAL DOCKS, NORTH WOOLWICH,
LONDON BOROUGH OF NEWHAM

BY JOHN A GIORGI

OF THE
MUSEUM OF LONDON ENVIRONMENTAL ARCHAEOLOGY SERVICE

17.12.93