Assessment of the Environmental Material from Beckton Sewage Farm (HE-SW94)

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Aims
The aims of this assessment are twofold: firstly to study the preservation and abundance of the biological remains and appraise their potential for contributing to post-excavation analysis. Secondly, to make recommendations for further analysis where necessary.

Introduction
The evaluation trenches were located within the extent of the Sewage farm (see archaeological archive report for more specific information). The site was visited by a member of the MoLAS Environmental Archaeology Section to consider the possibility and appropriate methods of sampling. Samples were taken from the cleaned south-facing section in trench 2, in less than ideal conditions. Three types of sample were taken:

No.	Type	Potential Use
1	Monolith samples	Pollen, sediment description, sediments, diatoms
2	Bulk samples	Plant macro-fossils, insects, radiocarbon
3.	Spot timber samples	Dendrochronology, radiocarbon

The quantity of samples is as follows:

Type	Quantity
Monoliths	3
Bulk samples	21
Spot samples	4

The Dating
Three samples were submitted from samples, in order to establish a dating framework. Two peat samples and one timber sample (from the outside of the tree trunk) were prepared and submitted to the RCD lab, Oxfordshire, for radiocarbon date determination. The results are as follows:

MoLAS ref	RCD ref	Height AOD	Uncal date BP	Cal date BC (2 sigma)
HE-SW94 C-14 1	RCD-2182	-0.455 to -0.405m	3220 +/- 60	1621-1328
HE-SW94 C-14 2	RCD 2183	-1.785 to 1.835m	4240 +/- 60	2922-2621
HE-SW94 C-14 3	RCD2184	?	4230 +/-60	2920-2617

These dates give a span of roughly 1500 years, during which c.1.5 metres of sediment accumulated on the site. The beginning of the sequence falls into the Neolithic with the upper part of the sequence falling into the Bronze Age. These dates correspond well with other peat sequences in the Beckton area, such as Beckton Nursery (HE-BN94). The dates also match well with other sites slightly further away, but representing the same type of sequence, i.e. the Tescos Tin Box site, Barking (BA-TB93). These sites both contain trackways, but another good comparison in terms of date and sequence (without a trackway) is the site of Wennington Marsh (WE-WM94).

No structural archaeology has been recovered from the Sewage Farm site, and so it is perhaps more meaningful to refer to the dates in climatically and ecologically derived terms, rather than using Neolithic and Bronze Age. The date range falls entirely within the Sub-Boreal phase, when conditions became warmer and drier than previously.

The Sequence
Jane Sidell

Three overlapping monolith tins were hammered into the section, in order to collect undisturbed samples of the sedimentary sequence, maintaining their stratigraphic integrity. These samples were removed to MoLAS, cleaned and described under controlled conditions. All Munsell values were taken whilst the units were moist, and all units are matrix supported unless otherwise specified.

The descriptions are from the bottom up (basal AOD height = minus 1.885)

UNIT	HEIGHT AOD	DESCRIPTION
A	-1.885 to -1.815	Medium sand, 2.5Y 5/1 grey. Rare organic root fragments penetrating from above. Otherwise clean. Reasonably sharp contact to:
B	-1.815 to -1.405	Peat, 10YR 2/2 very dark brown, with low mineral clay silt content. Includes abundant fibres and wood. Appears to be horizontally bedded. Diffuse regular contact to:
C	-1.405 to -1.345	Peat, 10YR 2/2 very dark brown, higher mineral clay silt content. Includes abundant fibres and wood. Appears to be horizontally bedded. Diffuse regular contact to:
D	-1.345 to -1.015	Peat, 10YR 2/2 very dark brown, low mineral clay silt content. Includes abundant fibres and wood. Appears to be horizontally bedded. Diffuse regular contact to:
E	-1.015 to -0.745	Silt clay/degraded organics, 10YR 2/2 very dark brown. Sharp regular contact to:
F	-0.745 to -0.685	Peat, 10YR 2/1.5 black/very dark brown. Includes twigs and fibres and degraded organics, appears to be horizontally bedded. Diffuse regular contact to:
G	-0.685 to -0.585	Silt clay/degraded organics, 10 YR 2/2 very dark brown. Diffuse regular contact to:
H	-0.585 to 0.485	Fine silt clay, 10YR 5/1 grey. Some degraded organic staining, some ?iron staining. Otherwise clean.

Sampling ended at minus 0.485 AOD.

Summary
The sequence as recovered in these samples appears to consist of a mixture of aquatic and terrestrial, albeit wetland units. The sequence commences with a clean sand, probably lain down under reasonably high energy conditions. Unit B represents a period when conditions were stable enough for vegetation to gain a hold and in fact begin forming a substantial peat. There is a mineral content, and presumably water was still transported onto the site, but not with sufficient energy, or for a sufficiently long period to halt growth of the vegetation. Unit C indicates a period with slightly more alluvial clay silt deposited on site, which may indicate slightly increased aquatic conditions. Unit D indicates the same sort of conditions prevailing in unit B. Above the peat bands, the units become more heavily minerogenic. From Unit E, it would seem that a larger scale event or events has caused flooding and inundation of the site to an extent where the upper levels of the peat have been churned around, and vegetation is no longer able to dominate. Some of the degraded organics in this unit may have been transported from elsewhere in the system if this site can be taken as representative for the local surrounding environment, with blanket peat being inundated, churned up and potentially redeposited. Unit F appears to represent a return to more stable wetland conditions, with a peat unit having formed. However, this is sealed by unit G, which is extremely similar to E. Unit A contains very few organics,

and is a probably a result of all the peat units having been sealed, and generally small amounts of organics present within the fluvial system. The presence of potential iron staining may be an indication of possible drying out periods within the deposition of this unit.

This is general and preliminary of summary of conditions under which this sequence may have formed. Detailed analytical processes may add information, for instance particle size analysis. It would also be useful to carry out loss-on-ignition tests to consider the ratios of organic to mineral matter incrementally within the sequence. X-radiography if possible may also assist in the consideration of site formation processes. All information gained will be useful in considering the potential use people could have made of this site and area throughout the periods in question.

The Plant Remains
Anne Davis

Introduction
Twenty one bulk samples were collected through a peat deposit found below alluvium at Beckton sewage farm. The deposit contained the remains of four yew trees (*Taxus baccata*), suggesting similarities with peats at Wennington Marsh, where a large number of well preserved yew trunks were found.

It was hoped that analysis of the plant and animal assemblages from these samples would enable a reconstruction of the landscape at the time of deposition to be made. This site would also provide useful comparisons with Wennington Marsh, and also with nearby sites at Beckton Nursery and Beckton Tollgate Road.

This assessment does not include full species identifications or detailed analysis of the samples, but establishes the abundance and diversity of the various types of plant and animal remains through the sequence, and assesses their suitability for further study.

Methods
Twenty one bulk samples of approximately 5-10 litres were taken, alongside the three monoliths, through the entire peat sequence, at 5cm intervals. The top sample (sample 1) was taken from overlying clays, and the bottom (sample 21) from grey sand below the peats.

Alternate samples (the odd numbers) were chosen for the assessment, to provide an indication of any change in preservation or content of samples through the sequence. A total of 11 samples were therefore assessed.

Sub-samples (500ml) from each of these 11 samples were carefully disaggregated in water, and then washed over a 0.25mm mesh sieve to get rid of silt and clay particles. The residue was then passed through a bank of sieves with mesh sizes 2.0mm, 1.0mm, 0.5mm, and 0.25mm for ease of scanning.

The general appearance of each residue was recorded before scanning each fraction in water, using a low-powered binocular microscope. It was found that almost all identifiable remains occurred in the larger two fractions, so time was saved in later samples by scanning only a small proportion of the finer material.

During scanning, all classes of plant and animal material were recorded, including identifications of seeds/fruits where easily recognisable, and their approximate abundance scored as follows: + (1 - 10), ++ (11 - 50), +++ (51 - 250), ++++ (over 250, many hundreds).

Results

The top sample of the sequence (sample 1) consisted of approximately 95% clay mixed with a little peat. The peat:clay ratio increased in each of the following two samples, and samples 7 and below contained little or no clay. At the bottom of the sequence sample 21 consisted of grey sand and a little gravel, with few peaty, organic inclusions.

Apart from the top (clay) and bottom (sand) samples, all those taken from the peat sequence itself contained well preserved plant remains. The abundance of each category of material is shown in the table below.

sample no.:	1	3	5	7	9	11	13	15	17	19	21
wood/twigs/bark	+	+++	+++	+++	++	+++	++	++	++	++	+
roots	++	+++	++	+++	+++	++	+++	+++	++	++	+
stems/leaves	++	+++	++	++	++	++	++	++	++	+++	+
bud scales	-	+	+	-	-	-	+	+	-	-	-
seeds/fruits	-	+	+	++	++	++	++	+	++	++	+
moss	-	+	+	-	-	++	++	++	-	+	+
insect frags.	+	+	+	+	+	+	+	+	+	+	+

Table 1.Abundance ratings for different categories of biological remains from soil samples

Wood was abundant in all samples, including quite substantial pieces (up to 10cm long) in some sub-samples which may be identifiable to species. Many smaller fragments, twigs and bark were also present. Plant roots were very frequent, as were unidentified fragments of plant tissue, probably from stems and leaves. Samples 19 and 21 contained identifiable leaves of holly (*Ilex aquifolium*), and 19 also contained a yew (*Taxus baccata*) leaf.

Moss was present in most samples, and was most abundant in samples 11-15. Buds and bud scales were also quite common.

Seeds and fruits were not particularly abundant or diverse, despite the generally good organic preservation. The most common taxa identified were alder (*Alnus glutinosa*) and blackberry/raspberry (*Rubus* sp.), both of which were found in most samples. Fragments of hazel nut shells (*Corylus avellana*) were found in samples 5, 9, and 11, and holly (*Ilex aquifolium*) seeds in 11 and 19.

A single seed of yew (*Taxus baccata*) was found in sample 17, and it is thought that some of the unidentified remains in other samples may have been fragments of yew cones and buds.

A small number of seeds from sedges (*Carex* spp.) and spike-rush (*Eleocharis palustris*) were found, along with single occurrences of water-plantain (Alismataceae), water-dropwort (*Oenanthe* sp.), violet (*Viola* sp.) and buttercup (*Ranunculus* sp.).

All samples contained a very low frequency of arthropod remains, including beetles and mites. Fungal sclerotia were present in samples 1 and 3, and single examples were seen of water-flea egg (*Cladoceran ephippia*) in sample 17 and a small fish bone in sample 9.

Discussion

Despite generally good preservation, the number of seeds recovered from these sub-samples is disappointing. Some of the species recovered are quite interesting however.

A number of wetland species were represented, such as alder, water-dropwort, water-plantain and sedges, and seeds from trees (alder, hazel, holly and yew) made up an unusually high proportion of

species present. It is possible that drying of the deposits has resulted in differential preservation, with only the more robust seeds surviving, but this seems unlikely considering the good preservation of leaves in some sub-samples.

The finds of yew seed and leaves are interesting, as they may indicate the zone of peat formation associated with the growth of the yew trunks found in the peat. Yew has recently been found on several other sites to the east of London, and its presence here extends our knowledge of the area over which these trees were growing.

There is no clear evidence for variation through the sequence, due to the low number of taxa, but there may be clues to differences. For example hazel was found only in samples 5 - 11, and holly in samples 11, 19 and 21. Study of much larger quantities of peat would be necesary to check whether these differences are real, however.

In addition to the study of fruits and seeds from larger quantities of peat, useful information for reconstructing the landscape could be gained from the identification of other classes of remains, notably the mosses and insects, as well as any suitable wood.

Recommendations
All samples except 1 and 21 contained well preserved plant material and the entire peat sequence should be studied if changes in its composition are to be detected. To analyse 19 samples in detail would be very time-consuming however, and it might be advisable to use only alternate samples in the first instance. Extra samples could be included if and where a particular part of the sequence needs extra clarification.

While it is hoped that larger assemblages of seeds will be produced by processing larger samples, the information from these should be supplemented by study of wood, mosses, and any other plant parts which may be found, such as tree cones. Study of the insects would also be very useful if they are present in large enough numbers.

The Pollen Remains
Rob Scaife

Introduction
Sub-samples taken from basal 140 cm of peat have been examined for sub-fossil pollen and spore content. This assessment has been undertaken with the following aspects taken into consideration:

1a) To ascertain if pollen and spores are present in these sediments and if so, their state of preservation and the feasibility of obtaining 'full' pollen counts enabling construction of a more detailed pollen diagram.

1b) To provide preliminary information on the pollen taxonomic content and the possibility of correlating this sequence with other biostatigraphical assemblages in the region.

1c) To examine the sequence for any indications of human activity (e.g. deforestation and agriculture) in the pollen record?

1d) To provide an indication of overall potential of the peat and sediment stratigraphy for reconstructing the local and regional vegetation and environmental history?

Consequently a total of eight pollen samples were taken form the monolith section at representative intervals from between 16 cm (-0.655 metres OD) and 136 cm (-1.855 metres OD).

Methodology

Pollen extraction procedures followed those outlined by Moore et al. (1991). Samples were deflocculated with 8% KOH. Coarse debris was removed through sieving at 150u and fine inorganics by micro-mesh (10u). Remaining silica was digested with 40% hydrofluoric acid. Erdtman's acetolysis was carried out for removal of cellulose. The concentrated pollen and spores were stained with safranin and mounted in glycerol jelly. Pollen was identified and counted with an Olympus biological research microscope with phase contrast facility at magnifications of x400 and x1000. These extraction techniques were successful and a preliminary pollen diagram has been constructed using Tilia and Tilia Graph in the Quaternary Environmental Change Research Centre of the Department of Geography, University of Southampton. Calculations are based on a dry-land pollen sum of 300 grains for each level. Marsh taxa (including *Alnus*) and spores were counted outside of the pollen sum. Pollen percentages are calculated as a percentage of the dry-land pollen sum. *Alnus* being a very high pollen producer and an autochthonous component of the flora was not included in the pollen sum and has been calculated as a percentage of the pollen sum plus *Alnus* to remove the purely statistical effects of its very high pollen numbers (Janssen 1969). Marsh taxa and spores of ferns are similarly calculated as a percentage of the pollen sum plus marsh taxa and spores respectively. From these data, a preliminary pollen diagram has been constructed (see attached printout). Tentative pollen zonation has been undertaken to facilitate description of the changes in the pollen flora. Taxonomy follows that of Stace (1991).

Results

All of the samples examined were found to contain well preserved sub-fossil pollen and spores. Absolute pollen numbers were high which allowed 'full' pollen counts to be made. Pollen preservation was in general good, although a small proportion of the grains from the peat showed some degree of biological degradation. This is typical of preservation in alder carr habitats where the surface levels of the mire may be relatively dry during the summer months when pollen is being deposited on an upper fermentation layer. Three pollen zones (designated BK) have been delimited and are characterised as follows from the base of the section upwards.

BK: 1 135-130 cm

Although only a single level, this zone has been delimited because of the substantial *Tilia* (lime/linden) values to 35%. *Quercus* (21%), *Alnus* (35%) and *Corylus avellana* type (15%) are also important constituents. Small numbers of *Betula* (birch), *Pinus* (pine) and *Ulmus* (elm) are also noted. Non-arboreal pollen (herbs) are few with only small numbers of Poaceae (grasses) and Cyperaceae (sedges). Spores of ferns include *Pteridium aquilinum* (3%), monolete *Dryopteris* type (20%) and *Polypodium vulgar* (6%; polypody fern).

BK: 2 130-60 cm

Tilia values decline consistently upwards from zone BK:1 to <5% in BK:2. *Quercus* and *Alnus* values are relatively higher (to 35% and 65% respectively). *Fraxinus* (ash) increases in importance in the upper part of the zone. *Taxus* (yew) occurs sporadically. Shrubs comprise *Corylus avellana* type (hazel but possibly also sweet gale) with some *Salix* (willow). Herbs although occurring only sporadically, notably include *Plantago lanceolata* (ribwort plantain). *P. media/major* type (greater plantain and hoary plantain), Chenopodiaceae (goosefoots) and cereal type coming in at the top of this zone. Spores taxa remain similar to BK:1 with an marked increase in *Dryopteris* type to 40%. Sphagnum spores are noted.

BK: 3 60-15 cm

This upper zone is characterised by a substantial increase in percentages and diversity of herb taxa. Poaceae (to 28%) and Cyperaceae (17%) are dominant. There are also small increases in percentages of herb taxa also noted in BK:2. Marsh taxa increase in importance with *Caltha palustris* (marsh marigold), *Typha latifolia* (common reedmace) and *Typha angustifolia/Sparganium* type (lesser reedmace and bur-reed, Cyperaceae noted above and the fern *Osmunda regalis* (royal fern).

In this zone, there is also a notable increase in spores of *Pteridium aquilinum* (bracken) and monolete *Dryopteris* type.

Inferred vegetation history
A total of 41 pollen and 5 spore taxa was recorded from the 8 levels examined. The interpretation of the past vegetation can be considered in terms of a) the dry-land communities and b) the mire ecology responsible for the sediment accumulation analysed.

The dry-land flora
Radiocarbon dating places the base of the peat sequence at 4240+/-60 BP that is, during the Neolithic. During this period (p.a.z. BK:1) *Tilia* was the dominant woodland element on drier, better drained soils. Percentages recorded here are typical of those encountered for sites of middle Holocene (Flandrian chronozone II) and the later prehistoric period (Flandrian chronozone III) in southern and eastern England (Moore 1977; Greig 1982). *Tilia*, being entomophilous, produces relatively small quantities of pollen which are poorly dispersed and thus poorly represented in pollen profiles. Thus, the percentage values in BKI:1 suggest that lime dominant woodland was extensive in areas close to the sampled site. *Quercus* and *Corylus* may also have been lesser constituents of the community but may also have formed separate communities on 'heavier' and less well drained soils adjacent to, or on the floodplain.

Ulmus percentages are relatively low compared with *Tilia* and *Quercus*. This is commensurate with the radiocarbon date of 4240+/-60 placing the initiation of peat accumulation shortly after the primary *Ulmus* decline. The decline of *Ulmus* is a widespread and common occurrence in pollen records of western Europe and appears to be a more or less synchronous event which took place at circa 5300-5000 BP (Smith and Pilcher 1973). Although a variety of reasons have been given for the reduction in elm at this time (see Smith 1970; Scaife 1987 for discussion) it is now generally agreed that opening of natural woodland by the first Neolithic colonisers for habitation and the first agriculture allowed the spread of fungal disease carrying *Scolytus* beetles (Girling and Greig 1985; Girling 1987). The *Ulmus* decline is strongly associated with the first evidence of forest clearance and arable cultivation (Scaife 1987). At Beckton Sewage Farm, the pollen sequence starts in the period shortly after this event. Neolithic activity during this period was localised and frequently of 'shifting cultivation' type, that is, the often described landnam clearances (Iversen 1949). Here, there is little evidence of such clearances although sporadic herbs are noted which include typically *Plantago major* type, *P. lanceolata*. Since Neolithic activity was likely to have been of ephemeral character, a closer pollen sampling interval than used in this assessment would be required to confirm or otherwise the presence of Neolithic occupation and nearby agricultural activity.

In pollen zones BK:2 and BK:3, *Tilia* declines to absence and this possibly reflects increasing prehistoric deforestation. This is associated with some increases in other woodland taxa. *Ulmus*, *Fraxinus* and *Fagus* are typical secondary woodland elements. As with *Ulmus*, the decline in *Tilia* is a phenomenon seen in pollen sequences for southern and eastern England. However, the event was not apparently synchronous with radiocarbon dates spanning the late Neolithic (Scaife 1980) to as late as the Saxon period in Epping Forest (Baker et al. 1978). The majority of dates, however, place the decline in the middle and later Bronze Age and often associated with expansion of arable agriculture (Turner 1962). At Beckton, the radiocarbon assay of 3230 +/-60 BP for the top of the sequences suggests that the *Tilia* decline occurred somewhat earlier than the late Bronze Age since throughout p.a.z. BK:3, *Tilia* is almost absent. It is suggested that the arrival of Bronze Age peoples started to clear larger tracts of the nearby woodland. It must also be considered that changes in sedimentation from peat to organic sediments may also have influenced the character of the pollen spectra with input of taxa from farther distances. More detailed analysis will allow greater understanding of the taphonomy of the pollen.

The mire ecology

Alnus was the dominant constituent of the wetland pollen flora throughout the period of sediment deposition. *Alder* fen carr woodland was undoubtedly growing on and adjacent to the site from *circa* 4250 BP to 3220 BP as evidenced by the high absolute pollen frequencies recorded here. Plant macro-fossils and small numbers of pollen grains also show that *Taxus* (yew) and *Salix* (willow) were also, and typically, constituents of this carr. However, p.a.z BK:3 shows an increase in numbers and diversity of marginal aquatic taxa such as *Typha latifolia, T. angustifolia/Sparganium* type and Cyperaceae. This indicates a period of increased waterlogging during the later Bronze Age. The causes of this are speculative without further data but two possibilities may be postulated. First, increased human activity and deforestation may have reduced evapotranspiration and increased surface water run-off. This may have caused an increase in the ground-water table. Second, waterlogging may have been caused by rising sea levels in the later prehistoric period. This would equate with Thames stage IV (Devoy 1979). Whichever the cause, it appears that a retrograde hydroseral succession was established.

Summary and conclusions

This assessment has demonstrated that well preserved pollen and spores are present in the 140cm of peat and sediment analysed. The radiocarbon dating and pollen analysis show that the sediment sequence spans the important archaeological phases of the Neolithic and Bronze Age and thus, the first introduction of agriculture and the first substantial effects of prehistoric activity on the environment. Preliminary data, although the sampling interval is very broad, illustrates that lime woodland was dominant on drier soils. This appears to have been cleared progressively throughout the Bronze Age. Associated with this, is an increase in herbs and evidence of secondary woodland growth.

Suggestions for further analysis

The data presented here can only be regarded as preliminary. Although individual pollen sums are statistically adequate, the sampling interval is greater than acceptable for full analysis of vegetation and environmental change.

It is clear from the data given that the site of Beckton Sewage Farm has excellent potential for studying the character of Neolithic and Bronze Age vegetation between c.4250 and 3200 BP. This would thus span the critical period when the first deforestation and agriculture was taking place in this region. A more detailed analysis of this sequence would thus form an important part of our knowledge of prehistoric environments in London.

For a complete analysis, the following work is required:

sampling/analysis a 4cm intervals throughout the whole sediment profile.

samples analysed at closer interval periods of important ecological change.

additional radiocarbon dating of vegetation changes. Anticipated 2 additional dates.

correlation with other peat sequences in East London

References

Baker, C.A. Moxey, P.A. and Oxford, P.M. (1978) 'Woodland Continuity and Change in Epping Forest'. *Field Studies* **4** 645-669.

Devoy, R.J.N. 1979 'Flandrian sea level changes and vegetational history of the lower Thames estuary'. *Philosophical Transactions of the Royal Society of London B.* **285**. 355-407.

Girling, M.A. and Greig, J., (1985) 'A first fossil record for *Scolytus scolytus* (F.) (Elm Bark Beetle): its occurrence in Elm Decline deposits from London and the implication for the Neolithic Elm Decline. *Journal of Archaeological Science* **12**, 347-351.

Greig, J.R.A. (1982) 'Past and present lime woods of Europe'. in Bell, M. and Limbrey, S. (eds.) Archaeological aspects of Woodland ecology. pp. 23-55 *Assoc. Environ. Arch Symposia* Vol 2 BAR (Int. Ser.) **146**.

Iversen, J. (1949) 'The influence of prehistoric man on vegetation *Danm. geol. Unders*. Ser. I V 3 (6) 1-25.

Janssen, C.R. (1969) '*Alnus* as a disturbing factor in pollen diagrams'. *Acta Bot. Neere*. **8**, 55-58.

Moore, P.D. (1977) 'Ancient distribution of lime trees in Britain'. *Nature*, London **268**, 13-14.

Moore, P.D., Webb, J.A. and Collinson, M.E. (1991) *'Pollen analysis'* Second edition. Oxford: Blackwell Scientific.

Scaife, R.G. (1980) *Late-Devensian and Flandrian palaeoecological studies in the Isle of Wight*. Unpublished Ph.D thesis of University of London, King's College, Department of Geography.

Scaife, R.G. (1987b) 'The elm decline in the pollen record of south east England and its relationship to early agriculture'. in Jones, M. (ed.) *Archaeology and the flora of the British Isles*. Oxford: Oxford University Committee for Archaeology, 21-33.

Smith, A.G. (1970) 'The influence of Mesolithic and Neolithic man on British vegetation: a discussion'. in Walker, D and West, R.G. (eds.) *Studies in the Vegetational history of the British Isles* Cambridge University Press.

Smith, A.G. and Pilcher, J.R. (1973) 'Radiocarbon dates and the vegetational history of the British Isles'. *New Phytologist* **72**, 903-914.

Stace, C. (1991) *'New flora of the British Isles'*. Cambridge: Cambridge University Press.

Turner, J. (1962) 'The *Tilia* decline: an anthropogenic interpretation'. *New Phytologist* **61**, 328-341.

The Timber
Jane Sidell

Four timbers were sampled from this site. A preliminary identification of yew, (*Taxus*) has been assigned to all samples. The samples are from trees all apparently over fifty years old when they died. It will be extremely useful to measure the tree ring sequence from the samples and compare all the patterns created in this way. This will address the question of whether the trees grew at the same period or not. Study should also be made of the intrinsic pattern of each sample, with reference to ecological information, for instance whether any periods of stress are obvious, i.e. towards the end of the trees life, or climatic indicators such as periods of exceptionally wide ring patterns.

It will also be important to compare the patterns with the yew trees from the other sites in the area (and of this approximate date) where yew was recovered, notably Wennington Marsh, Beckton Nursery and Dagenham Hays Storage. It may be possible to study whether the yew trees in this general area are broadly contemporaneous, also whether the ring sequences are reflecting similar environmental conditions.

Summary
This assessment demonstrates that the biological material from the site at Beckton Sewage Farm is generally well preserved and that the potential for addressing a number of research objectives is

extremely high. These objectives are primarily associated with local and regional vegetational reconstruction, although it will be extremely interesting and important to pursue evidence for anthropogenic exploitation and modification of the local landscape.