Assessment of the environmental samples from Crossrail Central, Broadgate (XSM10) (Roman)

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ENV/BOT/ASS/

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1 Quantification and assessment

1.1 Site archive and assessment: finds and environmental

Category	Description	Weight
Bulk Soil Samples	Flots from 77 samples; sub-samples from unknown number of samples retained unprocessed.	8 boxes

Table 1 Finds and environmental archive general summary

1.2 The plant remains etc

Introduction/Methodology

169 environmental samples, ranging from five to 40 litres in volume, were taken during excavation at Broadgate. They represent a variety of context types and periods, from prehistoric waterlain deposits to post-medieval garden features.

The samples were processed by flotation, using meshes of 0.25mm and 1.00mm to catch the flot and residue respectively. The residues from flotation were dried, and sorted by eye for any finds or environmental material, and any flots which contained waterlogged organic material were stored in water. All other flots were dried. All flots were then scanned briefly, using a low-powered binocular microscope. Many of the flots were very large and subsamples of c 100 ml were assessed in these cases. The abundance, diversity and general character of the plant, animal and artefactual remains present within the samples were recorded on the MOLA Oracle database, and the botanical information is summarised below in Table 1.

Plant remains were preserved primarily by waterlogging, with some preservation by charring and mineralisation.

The results have been separated by period, to either Roman or post-Roman, but in some cases these are preliminary phasings and may change in the later stages of analysis. Results from previous phases of assessment work have been included in this report and are tabulated below in Table 2.

Charred remains

Occasional fragments of wood charcoal were present in around two thirds of the samples, but generally in very low amounts. Charcoal was recorded as abundant in only one sample, <338> from [6710], where the charcoal was recorded in large fragments, and of a non-oak type. Charred grains were occasionally noted in three samples, but in none of these were more than five grains counted.

Waterlogged and mineralised remains

Waterlogged seeds and other waterlogged plant remains were recorded as abundant in over half of the 77 samples dating to this phase. Preservation of organic remains was good or excellent in many of the samples with, in many cases, leaves, buds, and other plant parts surviving in addition to large assemblages of seeds and fruits.

Wetland and stream assemblages were particularly well represented with taxa such as gypsy wort (*Lycopus europaeus*), celery-leaved crowfoot (*Ranunculus sceleratus*) and water-plantain (*Alisma* spp.) very common, particularly in the ditch and other channel fill samples. Dry ground plants were also recorded and in most cases are likely to represent wild plants growing on waste land near the sites. In some cases these are likely to represent deliberate planting however, as in the case of box (*Buxus sempervirens*) leaves in {47} [1036].

Food remains were also recorded, with plums (Prunus domestica/), cherries (*Prunus avium/cerasus*), fig (*Ficus carica*) and mulberry (*Morus nigra*) all recorded. Olive was also recorded in one sample, {47} [1036], a relatively rare occurrence from Roman London.

Mineralised seeds were recorded in just one sample – {425} [6741]. These were a mix of food plants such as fig (*Ficus carica*) and mulberry (*Morus nigra*) and wild wetland taxa such as celery-leaved crowfoot (*Ranunculus sceleratus*). This material is most likely to represent cess material.

Faunal remains

Freshwater molluscs were very common in the samples taken from the site, occurring in almost all of the samples. In most cases these were in low to moderate numbers, but occasional samples with abundant molluscs were noted.

Animal bones were also common from the samples at the site, again mostly in low numbers. Mammal, bird and fish bones were all recorded. All animal bones from sampling are assessed in the animal bone assessment report (Appendix XX)

Fragments of beetle exoskeleton occurred frequently in the samples. In most cases these were in low to moderate numbers. Larval cases of caddis fly (Trichoptera) and leech eggs were also recorded in a number of samples, both of which are good indicators of wet habitats.

Artefactual remains

Artefacts were recorded in many of the samples from the Roman phases of activity at the site. In many cases these were in very low quantities, but pottery in particular was common. All finds have been assessed by the relevant specialists.

2 Potential of the data

2.1 General discussion of potential

Roman

Preservation of organic plant remains was good in many samples, and identification and analysis of these remains has the potential to provide information about several aspects of the site and its development.

Several of the samples include rich and diverse food remains assemblages, including imported taxa, and these have the potential to inform us about diet and trade in the Roman period at and near the site.

A high proportion of the waterlogged plant remains seen at assessment came from wild plants, and may have arrived on the site either by natural dispersal from the local environment or in dumped material associated with human activities. Analysis of plant groups from these assemblages should make it possible to reconstruct aspects of the natural environment of the site, in particular the character of the streams and ditches that cut across the site. Study of these wild plant remains should be integrated with that of molluscs and insects from the same samples, where present, in order to maximise the information about vegetation and landscape on and around the site throughout the period of deposition.

These findings will be compared and contrasted with those from previously-studied sites in the area, and conclusions drawn about the natural flora and the nature of the organic materials dumped here.

3 Significance of the data

The excellent preservation of organic remains in many of the samples suggests that their study will produce information of high significance in relation to the understanding of the vegetation of the site, domestic and industrial activities that occurred there, and the diet of its inhabitants, during the Roman and the post-medieval periods.

4 Publication project: aims and objectives

4.1 Revised research aims

Roman

RRA1: What can the waterlogged plant assemblages tell us about the diet of the site's inhabitants? Do they show change through time?

RRA2: What information can the plant assemblages provide about past activities and land-use on the site, in all periods?

*RRA*3: What can the wild plant, insect and mollusc assemblages tell us about the vegetation and appearance of the area, and is there any evidence of change through time?

RRA4: Can the environmental evidence be useful in characterising the depositional environment of the channels?

4.2 Botanical method statement

31 of the samples were found to contain abundant plant remains assemblages. A number of these samples however are likely to be duplications of the same context and need not be analysed. At the current time this is likely to be c. 10 samples. It is suggested that all remaining samples containing abundant plant remains be analysed, though selection of other samples may be required based on revised research aims.

Methodology will follow standard procedures in use by MOLA. Any charred plant remains will be sorted, identified and quantified numerically, while waterlogged remains will be scanned, and estimates made of their abundance. Relevant results from the assessment stage will be incorporated into the final report.

Accessing stratigraphic data & selection of samples for study (in consultation with strat. team):	0.5 days
Scanning & id of 21 rich waterlogged samples:	15.25 days
ID of plant remains from sample residues:	0.5 days
Data entry, production & editing of tables:	1 days
Analysis and research, production of archive report :	5 days
Total time required:	**22.25 days**

Insect samples

As almost all of the samples contained insect remains, selection of those samples that are best likely to contribute to the revised research aims will be undertaken.
Costings for the analysis should be obtained from the insect specialist and can vary, depending on the level of analysis required.
In addition, the following work will need to be carried out by MOLA staff:

Retrieval of the samples from store, and wet-sieving samples:	0.25 days per sample
Packing and dispatch:	0.5 days
Liaison between botanist and insect specialist:	0.25 days

				Charred grain		Charred chaff		Charred seeds		Charred misc		Charred wood		W'logged seeds		W'logged misc		Mineralised seeds		
Sample	Context	Flot. Vol.	Process	A	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D	Comments
11	299	200	F									1	1	3	3	1	1			WET,&DRY WASTELAND PLANTS. V MANY SNAILS
12	306	300	F									1	1	3	3	3	3			WET.WET, & DRY DISTBD GND SEEDS
13	309	800	F									1	1	3	3	3	3			WET.MOSTLY DRY GRND PL - STABLE WASTE?
14	314	100	F									1	1	3	3	3	3			WET. WET & DRY GROUND PLANTS
31	979	100	F									1	1	3	3	3	1			WET. MUCH STEM/RT.WETLND & DISTBD SEEDS
31	979	100	W									1	1			1	1			2 BAGS
33	1019	150	F									1	1	3	3	3	1			WET. MARGINAL WETLAND SPP, ROOTS
35	1029	20	F											1	1	3	1			WET. ROOTS/ROOTLETS. DISCARDED
42	1041	80	F									1	1	3	3	3	2			WET. WETLAND PLANTS, MANY MOLLUSCS
43	1042	80	F	1	1							1	1	3	3	3	1			WET. MOSTLY MARG WETLAND SPP.
45	1035	800	F									1	1	3	2	3	1			WET. USUAL WETLAND ETC SEEDS
45	1035	800	W											1	1					FEW CERATOPHYLLUM SEEDS
46	1037	120	F											3	2	3	1			WET.MOST AQUAT/WETLAND SPP.
47	1036	1600	F					1	1			2	1	3	3	3	3			WET.V RICH.FEW FOODS,BOX LVS
47	1036	1600	W											1	1					FEW FOODS, INCL ?OLE
52	1054	50	F									2	1	2	2	3	2			WET. ROOTLETS, FEW SEEDS
53	1047	800	F									1	1	3	3	3	3			WET. MOSTLY WETLAND SPP.
56	1063	100	F													3	1			WET.LUMPS OF DECAYED WOOD. NO SEEDS. DIS

57	1063	200	F											1	1	3	1			DECAYED WOOD/ROOTS. DISCARDED.ALSO {56}
59	1068	150	F											3	3	3	3			WET. MOST AQU/WETLAND SPP.
59	1068	150	W					1	1											1 VITVI
60	1070	200	F											3	3	3	2			WET. FEW FOODS, WETLAND SPP.
61	1071	150	F											3	3	3	3			WET. WETLAND & DRY SPP.
62	1072	200	F									1	1	3	3	3	1			WET. DRY & WET GRND SPP.
63	1073	400	F											3	3	3	3			WET. MANY MOLLUSCS. MOD DIV SEEDS
64	1074	400	F									1	1	3	2	3	1			WET. MOSTLY AQU/WETLAND SPP, LOW DIVERSI
65	1085	800	F											3	3	3	2			WET. SML WOOD FRAGS, SEEDS V SPARSE
66	1096	350	F									1	1	2	2	3	1			WET. MOSTLY MOSS
76	1335	300	F									1	1	2	2	3	1			WET. MOSTLY WOOD FGS, INCL ROUNDWOOD
77	1337	500	F											2	1	3	3			2 BAGS. WET. LEAF LITTER?
83	1397	200	F			1	1	1	1			2	1	2	2	3	1			WET.
84	1401	70	F									1	1	3	2	3	2			WET. V FINE SEDIMENT
89	1403	20	F									1	1	2	2	3	1			WET. V FINE (MOST <1MM).WETLAND
90	1430	250	F											3	2	3	1			WET.
90	1430	250	W											1	1					FEW FOODS
93	1429	60	F									1	1	2	2	3	2			WET. MANY CAREX SEEDS
95	1437	600	F			1	1					1	1	3	2	3	1			WET.
99	1446	10	F											1	1	3	2			WET.FEW SEEDS
101	1442	20	F											1	1	3	1			WET. ALL ROOTS.
113	2071		F									1	1	1	1	3	1			
330	6496	25	F									1	1	1	2	1	1			
331	6582	150	F											2	2	2	1			
334	6586	150	F									1	1	2	3	2	2			
338	6710	300	F									3	1	1	1					V.F CHARCOAL (NON-OAK)

338	6710	300	W									3	1						
340	6741	400	F									1	1	3	3	2	1		
341	6730	350	F	1	1			1	1			1	1	2	2	2	1		
342	6716	500	F											3	3	2	1		
343	6743	400	F									1	1	3	2	3	1		
350	6747	700	F											3	3	3	2			WOOD CHIPS
354	6766	400	F					1	1			1	1	2	3	2	2		
355	6738	800	F									1	1	3	2	2	2		
355	6738	800	W											1	1				
389	6778	500	F									1	1	1	2	3	1		
391	6795	250	F									1	1	2	2	2	1		
421	8433	600	F									1	1	3	2	3	2			2 BAGS BIG BLACK INDET
422	8439	150	F									1	1	2	2	2	1		
423	6781	500	F									1	1	3	3	2	1		
424	6781	500	F									1	1	3	3	2	1		
425	6741	200	F	1	1							1	1	3	2	1	1	2	2	
426	8363	430	F									1	1	3	3	2	1			2 BAGS
426	8363	430	W											1	1				
427	6770	500	F											3	3	3	1			2 BAGS
433	6556	400	F									1	1	3	3	2	1		
435	6868	100	F											2	2	1	1		
436	6870	40	F									1	1	1	1	2	1		
437	6872	150	F									1	1	2	2	2	2		
438	6875	400	F									1	1	3	3	2	1		
439	6879	150	F	1	1									2	1	2	1		
441	6757	600	F									1	1	3	3	2	2		
600	8784	150	F									1	1	1	1	3	1		
601	8475	20	F									1	1	2	2	1	1		
602	8476	20	F									1	1	1	2				

603	8477	25	F										1	2	2	1			
604	8478	20	F										1	1	3	1			
605	8479	20	F										1	1	2	1			
606	8480	10	F										1	1	1	1			
607	8481	50	F									1	1	1	1	2	1		
608	8482	40	F									1	1	1	1				
609	8483	200	F											1	2	1	1		
610	8484	20	F					1	1			1	1	1	1	2	1		
611	8485	40	F									1	1	1	1	1	1		
612	8486	20	F											1	1	1	1		
613	8487	30	F											1	1	2	1		
615	8489	15	F									1	1	1	1				
616	8490	20	F									1	1	1	1	1	1		

Table 2: Summary of botanical assessment data (Roman)
A: abundance, D: diversity (1 = occasional, 2 = moderate, 3 = abundant)
F: Flot, W: Residue