Archaeological Services & Consultancy Ltd

ARCHAEOLOGICAL EVALUATION: LAND AT WAKERLEY, NORTHAMPTONSHIRE

Volume 2: Appendices

on behalf of
Burghley House Preservation Trust

By
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May 2007

ASC: 698/WKM/3 vol 2

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Plate 1: General view of the extension to Trench 63, showing furnaces prior to excavation. Plough scar in foreground

Site Data

ASC project code:	WKM	*ASC Project No:*	698
Event No:	N/a	*Accession No:*	
County:	Northampton		
Village/Town:	Wakerley		
NGR (to 8 figs):	SP 946 980		
Present use:	Agricultural		
Planning proposal:	Mineral extraction		
Planning application ref/date:	Pre-planning		
Local Planning Authority:	East Northamptonshire		
Date of fieldwork:	Summer 2005		
Client:	Burghley House Preservation Trust C/o Mineral Surveying Services 20 Saddlers Close Glenfield Leicester LE3 8QU		
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Internal Quality Check

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Edited/Checked By:		*Date:*	
Revisions:		*Date:*	
Edited/Checked By:		*Date:*	

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Plates

Appendix 1: Trench Summary Tables

Trench 3

Max Dimensions					
Length	52m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94287.25 97434.66	**S**	94286.37 97384.67

Orientation	North to south
Reason for Trench	Testing blank area from geophysics, close to area of known archaeological remains

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
301	Layer	Dark greyish brown silty sandy clay. Topsoil	-	*c.*200	0
300	Layer	Mid reddish brown sandy clay with small stones. Natural subsoil	-	Un-exc	*c.*200

Trench 4

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.28m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94295.64 97377.69	**S**	94319.10 97333.54

Orientation	NW - SE
Reason for Trench	Testing blank area from geophysics, close to area of known archaeological remains

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
401	Layer	Dark greyish brown silty sandy clay with occ small stones. Topsoil	-	*c.*250	0
400	Layer	Mid reddish brown sandy clay with occ pebbles. Subsoil	-	Un-exc	*c.*250

Trench 5

Max Dimensions					
Length	44m	**Width**	1.6m	**Depth**	0.22m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94361.86 97261.24	**S**	94385.43 97217.14

Orientation	NW – SE
Reason for Trench	Testing blank area from geophysics, close to area of known archaeological remains

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
501	Layer	Dark greyish brown silty sandy clay. Topsoil	-	*c.*200	0
500	Layer	Mid reddish brown sandy clay with occ pebbles. Natural subsoil	-	Un-exc	*c.*200

Trench 6

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94484.30 97262.33	**S**	94483.49 97212.33

Orientation	North to south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
601	Layer	Dark greyish brown silty clay. Topsoil	-	*c.*250	0
600	Layer	Mid reddish brown sandy clay. Natural Subsoil	-	Un-exc	*c.*250

Trench 7

Max Dimensions					
Length	51.3m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94383.50 97087.39	**W**	94333.50 97087.39
Orientation	E- W		
Reason for Trench	Testing blank area from geophysical survey, adjacent to known archaeological remains		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
701	Layer	Dark reddish brown sandy clay with occ pebbles. Topsoil		*c.*200	0
700		Reddish brown sandy clay with occ pebbles. Natural subsoil	-	Un-exc	*c.*200

Trench 8

Max Dimensions					
Length	38.5m	**Width**	1.6m	**Depth**	0.45m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94235.95 97046.31	**S**	94234.93 96996.32
Orientation	N - S		
Reason for Trench	Testing blank area from geophysical survey adjacent to known archaeological remains		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
801	Layer	Mid reddish brown sandy clay with occ pebbles. Topsoil	-	*c.*400	0
800	Layer	Light reddish brown sandy clay, with concentrations of limestone frags. Subsoil	-	Un-exc	*c.*400

Trench 9

Max Dimensions					
Length	49m	**Width**	2.2m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94114.89 96837.83	**W**	94064.89 96837.83
Orientation	E - W		
Reason for Trench	Testing blank area from geophysical survey adjacent to area of known archaeological remains		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
901	Layer	Mid greyish brown silty clay. Topsoil	-	300	0
900	Layer	Reddish brown clayey silt with gravel and concentration of limestone frags. at west end. Natural subsoil	-	Un-exc	300

Trench 10

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94003.12 96764.51	**S**	94002.42 96714.52
Orientation	N - S		
Reason for Trench	Testing blank area from geophysical survey adjacent to area of known archaeological remains		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1001	Layer	Mid greyish brown silty clay. Topsoil	-	350	0
1000	Layer	Reddish brown clay interspaced with patches of limestone frags. Subsoil/natural strata	0	Un-exc	350

Trench 11

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94211.78 97724.41	**W**	94162.01 96724.41
Orientation	E – W		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1100	Layer	Light grey brown silty clay. Topsoil	-	400	-
1104	Fill	Light brown silty clay. Natural infilling of Cut [1103]	1m	200	400
1103	Fill	Orangy brown silty clay. Primary silting of Ditch [1102]	800	200	600
1102	**Cut**	'U' shaped cut. Construction cut of ditch	2.2m	400	400
1101	Layer	Natural strata	-	400	-

Trench 12

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94211.78 96724.41	**W**	94162.01 96724.41
Orientation	East to West		
Reason for Trench	Targeting anomalies on geophysical survey and slag concentration from fieldwalking		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1200	Layer	Mid greyish brown sandy silty clay. Topsoil	-	230	-
1202	Fill	Mid greyish brown sandy clay. Disuse filling of ditch/land drain [1203]	360	220	230
1203	**Cut**	NE-SW linear cut with regular 'U' shaped profile. Construction cut of ditch or modern field drain (?)	360	220	230
1204	Fill	Grey-reddish brown mixed charcoal and clay. Debris from firing of furnace [1205]?	970	200	230
1205	**Cut**	Circular with exposed at side of trench. Surrounding natural stones scorched red. Construction cut of furnace (?)	970	200	230
1217	Fill	Dark brown/black clayey silt with charcoal. Burnt debris from last firing of ore roasting pit [1206]?	730	*c.*120	230
1207	Fill	Reddish orange silty clay at base of cut [1205]. Clay lining of ore roasting pit [1206]?	730	*c.*30	360
1206	**Cut**	Linear cut aligned NE-SW, extending beyond trench to W. Surrounding natural stones (1201) scorched red Shallow 'U' shaped profile. Construction cut of ore roasting pit.	730	150	230
1214	Fill	Light orange brown clayey silt. Disuse filling/silting of Ditch [1213].	600	250	230
1213	**Cut**	NE-SW orientated linear cut with irregular 'V' shaped profile. Construction cut of ditch	600	250	230
1216	Fill	Dark brown clayey silt. Disuse filling/silting of Ditch [1215].	1.25m (max)	260	230
1215	**Cut**	N-S orientated linear cut with irregular profile. Construction cut of ditch	1.25m (max)	260	230
1201	Layer	Mid reddish brown clay with frequent ironstone frags. Natural subsoil	-	-	230

Trench 13

Max Dimensions					
Length	48.5m	**Width**	1.8m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94144.82 96562.90	**W**	94094.82 96562.90
Orientation	East to West		
Reason for Trench	Targeting anomalies on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1300	Layer	Mid greyish brown sandy silty clay. Topsoil	-	300	-
1302	Fill	Mixed Dark brown/black charcoal and silt. Debris from final firing in ore roasting pit [1303]	590	70	300
1303	**Cut**	Semi circular cut aligned N/S with regular shallow 'U' shaped profile. Surrounding natural clay burnt red. Construction cut of ore roasting pit	590	70	300
1304	Fill	Greyish brown silty sand with freq. Lumps of tap slag. Disuse filling/silting of Ditch [1305]	2m	300	300
1305	**Cut**	N-S orientated linear cut with irregular profile. Construction cut of ditch	2m	300	300
1307	Fill	Light brown clayey silt. Disuse filling of Ditch (?) [1306]	400	200	300
1306	**Cut**	NE-SW orientated linear cut with regular 'U' shaped profile. Construction cut of ditch or modern drainage feature	400	200	300
1301	Layer	Mid reddish brown silty clay. Natural subsoil	-	-	300

Trench 14

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	0.5m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94313.24 96446.62	**W**	94263.24 96446.62
Orientation		E - W	
Reason for Trench		Testing blank area from geophysical survey	

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1401	Layer	Dark greyish brown silty clay. Topsoil	-	350	0
1400	Layer	Reddish brown clayey silt. Natural subsoil	0	Un-exc	350

Trench 15

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94280.25 96621.09	**S**	94279.52 96571.10
Orientation		N - S	
Reason for Trench		Testing blank area from geophysical survey	

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1501	Layer	Dark greyish brown silty clay. Topsoil	-	200	0
1500	Layer	Reddish brown clayey silt. Natural subsoil	0	Un-exc	200

Trench 16

Max Dimensions					
Length	54m	**Width**	1.8m	**Depth**	*c.*0.6m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94364.72 96723.71	**S**	94364.34 96673.71

Orientation	North to south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1601	Layer	Dark greyish brown silty clay. Topsoil	-	250	0
1602	Layer	Reddish brown clayey silt. Redeposited subsoil. Perhaps associated with the laying of field drains or World War II disturbance	-	150	250
1603	Layer	Dark greyish brown silty clay. Buried topsoil.	-	100	400
1604	Layer	Light brown silty clay. Natural subsoil, cut by four modern ceramic land drains	0	Un exc	500

Trench 17

Max Dimensions					
Length	52m	**Width**	1.8m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94470.81 97550.95	**W**	94420.81 96550.95

Orientation	East – West
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1701	Layer	Mid greyish brown silty clay. Topsoil	-	250	0
1702	Layer	Reddish brown silty clay. Natural subsoil, cut by modern land drain	-	*c.*500	250
1703	Layer	Reddish brown ironstone/limestone frags. Natural strata	-	Un-exc	750

Trench 18

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94664.54 96592.19	**W**	94614.54 96592.19
Orientation	East – west		
Reason for Trench	Testing blank area		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1801	Layer	Mid greyish brown silty clay. Topsoil	-	200	0
1802	Layer	Mottled reddish brown/grey clay. Natural subsoil	-	630	200
1800	Layer	Greyish brown clay with limestone/chalk fragments.	-	Un-exc	830

Trench 19

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94664.13 96727.50	**S**	94663.75 96677.50
Orientation	North to South		
Reason for Trench	Testing linear anomalies detected during geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
1901	Layer	Dark greyish brown silty clay. Topsoil	0	300	0
1900	Layer	Light reddish brown silty clay cut by two modern lands drains. Natural strata	-	630	300

Trench 20

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94652.15 96837.83	**W**	94602.15 96837.83

Orientation	East to West
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2001	Layer	Mid/dark greyish brown silty clay. Topsoil	0	200	0
2000	Layer	Light orangy brown clay with lighter coloured patches. Natural subsoil	0	300+	200

Trench 21

Max Dimensions					
Length	50m	**Width**	1.8m	**Depth**	1.6m max

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94294.99 96895.15	**S**	94294.99 96845.07

Orientation	North – South
Reason for Trench	Testing blank area on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2101	Layer	Dark greyish brown silty clay. Topsoil	-	*c.*200	0
2100	Layer	Mixed silty clay. Modern redeposited soil. Probably disturbed during constriction of the World War II airfield	-	1.6m+	200

Trench 22

Max Dimensions					
Length	46m	**Width**	2.2m	**Depth**	0.5m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94469.81 96863.60	**W**	94419.81 96963.41

Orientation	East to West
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2200	Layer	Light brown silty clay. Topsoil	-	400	-
2202	Fill	Red burnt clayey silt, seen in section only. Uncertain function within Cut [2202]	1.7m+	120	400
2203	**Cut**	Construction cut of uncertain function	1.7m+	120	400
2201	Layer	Light orangy brown silty clay. Natural subsoil	-	-	400

Trench 23

Max Dimensions					
Length	m	**Width**	m	**Depth**	

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94503.97 97054.36	**SE**	94511.97 97054.36

Orientation	Square trench
Reason for Trench	Testing linear anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
2301	Layer	Mid greyish brown silty clay. Topsoil	-	200	0
2300	Layer	Mottled light grey/mid brown boulder clay. Natural subsoil	-	Un-exc	200

Trench 24

Max Dimensions					
Length	7.5m	**Width**	6.5m	**Depth**	

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94559.45 97046.34	**SE**	94567.45 98054.34

Orientation	Square trench
Reason for Trench	Testing anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
2402	Layer	Light greyish brown silty clay. Topsoil.	-	350	0
2401	Layer	Mid/light reddish brown silty clay. Natural subsoil	-	200	350
2400	Layer	Light greyish brown clay- mixed with limestone flecks	-	Un-exc	550

Trench 25

Photograph not a available

Max Dimensions					
Length	7m	**Width**	7m	**Depth**	0.4m

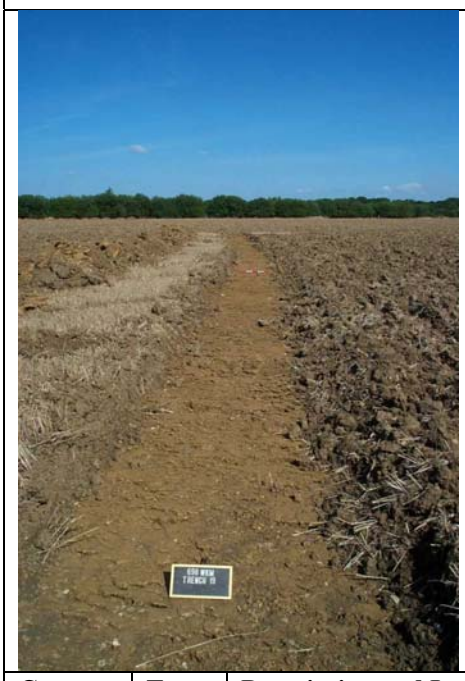
Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94613.04 97053.54	**SE**	94621.04 97053.54

Orientation	Square trench
Reason for Trench	Testing anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2501	Layer	Mid greyish brown silty clay. Topsoil	-	400	0
2500	Layer	Reddish brown silty clay. Natural subsoil	-	Un-exc	400

Trench 26



Max Dimensions					
Length	53m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94801.06 96823.41	**S**	94800.39 96773.41

Orientation	North – South
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2601	Layer	Mid grey brown silty clay. Topsoil	-	250	0
2600	Layer	Mottled reddish brown silty clay. Natural subsoil	0	Un-exc	250

Trench 27

Max Dimensions					
Length	47m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94901.91 96914.04	**S**	94901.18 96864.04

Orientation	North – South
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2701	Layer	Mid greyish brown silty clay. Topsoil	-	250	-
2700	Layer	Mottled light reddish brown clay. Natural subsoil	-	Un-exc	250

Trench 28

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94774.21 97109.72	**E**	94824.21 97109.72
Orientation	East - West		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2801	Layer	Mid greyish brown silty clay. Topsoil	-	350	0
2800	Layer	Bands of grey and orange clay. Natural strata	-	500+	350

Trench 29

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94542.18 97209.37	**E**	94592.18 97209.56
Orientation	East to West		
Reason for Trench	Testing blank area on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
2901	Layer	Mid grey silty clay with occasional pebbles. Topsoil	-	300	0
2900	Layer	Mid reddish brown sandy clay, occasional small stones	-	Un-exc	300

Trench 30

Max Dimensions					
Length	31m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94633.26 97291.08	**SE**	94656.54 97246.83

Orientation	NW - SE
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3001	Layer	Dark reddish brown silty clay, with occasional small stones. Topsoil	-	*c.*300	0
3000	Layer	Mid reddish brown sandy clay. Concentrations of limestone frags. Throughout. Concentration of tapslag at S. end. Natural subsoil	-	Un-exc	*c.*300

Trench 31

Max Dimensions					
Length	53m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94512.54 97353.89	**SE**	94535.76 97309.61

Orientation	NW – SE
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3101	Layer	Mid reddish brown sandy clay. Topsoil	-	250	0
3100	Layer	Mid/dark reddish brown sandy clay. Natural subsoil	-	Un-exc	250

Trench 32

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94453.22 97445.54	**E**	94503.22 97445.54
Orientation	East - West		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3201	Layer	Dark reddish brown sandy clay with occasional pebbles. Topsoil	-	260	0
3200	Layer	Mid reddish brown sandy clay. Natural subsoil	-	Un-exc	260

Trench 33

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.23m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94374.76 97549.20	**S**	94373.77 97499.21
Orientation	North - South		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3301	Layer	Mid/dark greyish brown sandy clay with occasional pebbles. Topsoil	-	230	0
3300	Layer	Mid reddish brown sandy clay. Subsoil	-	Un-exc	230

Trench 34

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
E	94407.11 97655.45	**W**	94457.11 97655.45

Orientation	East - West
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3401	Layer	Mid/dark reddish brown with occasional pebbles. Topsoil	-	260	0
3400	Layer	Mid reddish brown sandy clay. Natural subsoil	-	Un-exc	260

Trench 35

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.32m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94579.77 97762.01	**E**	94629.77 97762.01

Orientation	East- west
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3501	Layer	Dark reddish brown sandy clay with occasional pebbles. Topsoil	-	240	0
3500	Layer	Mid reddish brown sandy clay. Natural subsoil	-	80+	240

Trench 36

Max Dimensions					
Length	49m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94818.73 97800.58	**E**	94868.73 97800.99

Orientation	East- west
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3601	Layer	Dark reddish brown sandy clay. Topsoil	-	260	0
3600	Layer	Mid reddish brown sandy clay. Natural subsoil	-	Un-exc	260

Trench 37

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.24m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94739.10 97750.53	**S**	94738.31 97700.54

Orientation	North- south
Reason for Trench	Testing blank area from geophysical survey.

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3701	Layer	Dark reddish brown sandy clay. Topsoil	-	240	-
3700	Layer	Orangy brown sandy clay with freq. Limestone frags	-	Un-exc	240

Trench 38

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94647.81 97702.17	**S**	94647.02 97652.18

Orientation	North- south
Reason for Trench	Testing linear anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3801	Layer	Dark reddish brown sandy clay. Topsoil	-	250	-
3800	Layer	Mid reddish brown sandy clay	-	Un-exc	250

Trench 39

Max Dimensions					
Length	32m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94584.00 97675.04	**S**	94583.40 97645.05

Orientation	North – south
Reason for Trench	Testing linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
3901	Layer	Dark reddish brown sandy clay, with occasional pebbles. Topsoil	-	250	0
3900	Layer	Mid reddish brown sandy clay. Subsoil	-	Un-exc	250

Trench 40

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.23m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94537.35 97594.59	**E**	94587.35 97594.79

Orientation	East – west
Reason for Trench	Testing anomalies from geophysical survey.

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4001	Layer	Dark reddish brown sandy clay. Topsoil	-	230	0
4000	Layer	Mid reddish brown sandy clay. Subsoil	-	Un-exc	230

Trench 41

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94656.16 97603.95	**S**	94655.20 97553.96

Orientation	North – south
Reason for Trench	Testing linear anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4101	Layer	Dark reddish brown sandy clay. Topsoil	-	250	-
4100	Layer	Mid reddish brown sandy clay. Natural subsoil	0	Un-exc	250

Trench 42

Max Dimensions					
Length	49m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94644.21 97428.32	**E**	94694.21 97428.53

Orientation	East West
Reason for Trench	Testing for continuation of linear anomalies in geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4201	Layer	Dark reddish brown sandy clay. Topsoil	-	250	0
4200	Layer	mid/light reddish brown sandy clay with occasional limestone frags. Natural subsoil	-	Un-exc	250

Trench 43

Max Dimensions					
Length	48.5m	**Width**	2.2m	**Depth**	0.23m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94765.84 97540.53	**S**	94765.19 97490.54

Orientation	North – south
Reason for Trench	Testing continuation of linear anomalies in geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4301	Layer	Greyish brown silty clay. Topsoil	-	*c.*200	-
4300	Layer	Light reddish brown silty clay. Freq. Limestone frags	-	Un-exc	*c.*200

Trench 44

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94781.11 97570.54	**E**	94831.11 97570.73

Orientation	East – west
Reason for Trench	Testing continuation of linear feature (enclosure ditch?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4401	Layer	Greyish brown silty clay. Topsoil/subsoil	-	*c.*300	0
4000	Layer	Light grey/cream and and limestone frags. Natural strata	-	Un-exc	300

Trench 45

Max Dimensions					
Length	9.5m	**Width**	10m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	94840.22 97597.19	**SE**	94850.15 97587.19

Orientation	Square trench
Reason for Trench	Testing anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
4501	Layer	Greyish brown silty clay. Topsoil/subsoil	-	300	0
4502	Layer	Reddish brown silty clay. Natural soil variation. Colluvium?	*c.*500	120	300
4500	Layer	Cream sand and limestone frags. Natural strata	-	Un-exc	300

Trench 46

Max Dimensions					
Length	51m	**Width**	2.2m	**Depth**	0.22m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94878.65 87624.27	**S**	94877.64 97574.28
Orientation	North – South		
Reason for Trench	Testing continuation of linear anomaly (enclosure ditch?) from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4601	Layer	Greyish brown silty clay. Natural topsoil and subsoil	-	200	0
4600	Layer	Cream/light grey limestone frags and sand. Natural strata	-	Un-exc	200

Trench 47

Max Dimensions					
Length	50.5m	**Width**	2.2m	**Depth**	0.33m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94913.52 97583.97	**E**	94963.52 97583.97
Orientation	East – West		
Reason for Trench	Testing linear anomalies (enclosure?) from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4701	Layer	Brown yellow silty clay. Topsoil	-	300	-
4703	Fill	Mid brown sandy silty clay. Natural silting within Ditch [4702]	850	600	300
4702	**Cut**	N-S orientated cut with 'U' shaped profile. Ditch construction cut	850	600	300
4700	Layer	Yellow brown sandy silty clay. Natural subsoil	-	-	300

Trench 48

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.29m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94864.81 98536.21	**E**	94914.81 97536.42
Orientation	East – west		
Reason for Trench	Testing linear anomaly on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4801	Layer	Mid/dark greyish brown silty clay. Topsoil	-	*c.*150	0
4802	Layer	Greyish brown silty clay. Subsoil. Colluvium	-	*c.*150	*c.*150
4800	Layer	Reddish brown limestone and sand. Natural strata	-	Un-exc	290

Trench 49

Max Dimensions					
Length	38m	**Width**	2.2m	**Depth**	0.28m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94834.75 97534.00	**S**	94833.82 97497.03
Orientation	North – south		
Reason for Trench	Testing linear anomalies (enclosure ditches?) from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
4901	Layer	Mid/dark greyish brown silty clay. Topsoil	-	280	0
4902	Layer	Orangy brown silty clay. Colluvium. Subsoil?	-	540	280
4900	Layer	Orangy brown limestone frags. Natural strata	-	Un-exc	210

Trench 50

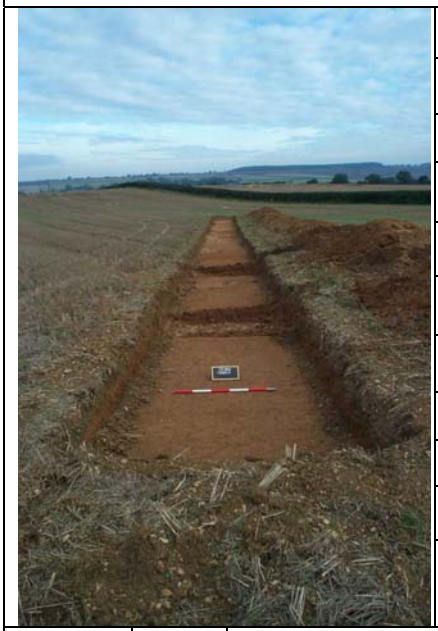
Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94837.12 97418.26	**S**	94836.04 97383.28
Orientation	North - south		
Reason for Trench	Testing linear anomalies from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5001	Layer	Mid/dark greyish brown silty clay. Topsoil & subsoil	-	300	0
5002	Layer	Greyish brown silty clay. Colluvium	0	Un-exc	300
5000	Layer	Reddish brown limestone frags. Natural strata			300

Trench 51



Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94992.31 97501.98	**S**	94991.56 97451.99
Orientation	North – south		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5101	Layer	Mid/dark greyish brown silty clay. Topsoil	-	300	-
5102	Layer	Orangy brown silts. Colluvium	-	780	300
5100	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	*c.*400

Trench 52

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.24m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94859.10 97327.63	**E**	94909.10 97327.63

Orientation	East – west
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5201	Layer	Mid/dark greyish brown silty clay. Topsoil	-	240	0
5202	Layer	Greyish brown silty clay. Colluvium	-	490	240
5200	Layer	Reddish brown limestone fragments. Natural strata	-	Un-exc	240

Trench 53

Max Dimensions					
Length	51m	**Width**	2.2m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95042.12 97390.25	**S**	95041.09 97340.27

Orientation	North - south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5301	Layer	Mid greyish brown silty clay. Topsoil	-	260	0
5302	Layer	Orangy brown sandy clay. Colluvium	-	Un-exc	260
5300	Layer	Orangy brown limestone frags. Natural strata	-	Un-exc	260

Trench 54

Max Dimensions					
Length	51m	**Width**	2.2m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95060.02 97421.00	**E**	95110.02 97421.00
Orientation	East – west		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5401	Layer	mid brown sandy silty clay. Topsoil	-	-	
5403	Fill	mid grey brown clayey sandy silt. Natural infilling over Furnace base (5407)	*c.*1m	80	300
5404	Fill	Black charcoal. Burnt material within Furnace (5407)	*c.*1m	*c.*50	350
5406	Fill	Mid-dark brown sandy clay. Clay sealing or packing within Furnace (5407)	*c.*1m	70	*c.*370
5407	Structure	Burnt limestone pieces. Probably natural 'in situ' stones burnt due to firing iron ore.	*c.*1m	*c.*50	*c.*320
5405	**Cut**	Shallow 'U' shaped cut. Construction cut for furnace?	*c.*1m	170	*c.*320
5402	Layer	Greyish brown sandy clay with limestone frags. Natural strata	-	-	300

Trench 55

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.46m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95058.33 97578.71	**S**	95057.35 97528.72

Orientation	North – south
Reason for Trench	Testing linear anomalies (enclosure ditches?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5501	Layer	Mid/dark Grey brown silty clay. Natural topsoil & subsoil	-	380	0
5502	Layer	Greyish brown clayey silt. Colluvium	-	40	*c.*340
5500	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	*c.*340

Trench 56

Max Dimensions					
Length	48m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95107.40 97573.57	**S**	95106.61 97523.58

Orientation	North – south
Reason for Trench	Testing linear anomaly (enclosure ditch?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5601	Layer	Greyish brown silty clay. Natural topsoil and subsoil	-	260	0
5602	Layer	Reddish brown clayey silt. Colluvium	-	Un-exc	260
5600	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	260

Trench 57

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.24m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95238.08 97559.36	**S**	95237.12 97509.37

Orientation	North – south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5701	Layer	Mid greyish brown silty clay. Natural topsoil and subsoil	-	240	0
5700	Layer	Orange brown limestone frags and sand. Natural strata	-	Un-exc	240

Trench 58

Max Dimensions					
Length	52m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95116.24 97574.19	**E**	95166.24 97573.99

Orientation	East – west
Reason for Trench	Testing anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
5801	Layer	Mid/dark greyish brown silty clay. Natural topsoil and subsoil	-	300	0
5802	Layer	Orangy red clayey silt. Colluvium	-	Un-exc	300
5800	Layer	Cream limestone fragments. Natural strata	-	Un-exc	300

Trench 59

Max Dimensions					
Length	11m	**Width**	11m	**Depth**	0.38m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95085.41 97596.10	**SE**	95095.41 97586.10

Orientation	Square
Reason for Trench	Targeting linear anomalies (enclosure ditches?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
5904	Layer	Light grey brown silty sandy clay. Topsoil	-	300	-
5903	Layer	Red brown silty clay. Colluvium	-	400	300
5902	Layer	Light brownish orange silty clay with chalk inclusions. Colluvium	-	400	700
5901	Layer	Orange brown clayey silt. Colluvium	-	300	1.1m
5900	Layer	Yellow brown slity clay. Natural Subsoil	-	-	1.4m

Trench 60

Max Dimensions					
Length	48.8m	**Width**	1.5m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95020.27 97621.21	**E**	95070.27 97621.41

Orientation	East - west
Reason for Trench	Testing linear anomalies (enclosure ditches?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6001	Layer	Dark brown sandy clay. Natural topsoil/subsoil	-	350	0
6000	Layer	Mixed red to orange limestone frags and sand. Natural strata	-	Un-exc	350

Trench 61

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.28m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94982.66 97604.44	**E**	95032.66 97604.26

Orientation	East - west
Reason for Trench	Targetting linear anomalies (enclosure ditches?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6101	Layer	Dark brown sandy clay. Natural topsoil and subsoil	-	280	0
6100	Layer	Reddish brown limestone frags. Natural strata	0	Un-exc	280

Trench 62

Max Dimensions					
Length	52.8m	**Width**	1.48m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95002.27 97638.50	**S**	95052.27 97638.70

Orientation	East – west
Reason for Trench	Targetting linear anomalies (enclosure ditches?) from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6201	Layer	Dark brown sandy clay. Natural topsoil and subsoil	-	260	0
6200	Layer	Orangy brown limestone frags. Natural strata	-	Un-exc	260

Trench 63

Max Dimensions					
Length	7.5m	**Width**	6.5m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95077.80 97671.57	**S**	95077.63 97621.57

Orientation	North to south
Reason for Trench	Testing anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
6320	Layer	Light brown silty clay. Topsoil	-	*c.*300	-
6301	Group	General number for furnaces/tapping pits [6316], [6330], [6335], (6336), (6337), (6338) and (6339)	*c.*2.4m		300
6302	Group	General number for unexcavated furnace	*c.*2.1m	Un-exc	300
6305	Fill	Mid grey brown silty loam. Final infilling in disused stokehole [6308]	850	170	300
6319	Fill	Dark greyish brown silty loam. Lower fill of flue [6306]. Fuel debris from last firing?	500	70	*c.*430
6306	**Cut**	Circular cut with regular 'U' shaped profile. Construction cut of stokehole for Furnace [6308]	850	200	300
6307	Fill	Mid yellowish brown silty loam, with disturbed flat limestone slabs at the interface with Cut [6308]. Final disuse filling of furnace/corndryer [6308]. Accumulated following collapse of stone lining	400	270	300
6331	Fill	Dark greyish brown silty loam.mixed with ash and charcoal. Primary filling/debris from last firing? Of furnace/corndryer [6308]	400	100	480
6308	**Cut**	Linear cut with irregular profile. Construction cut of flue for furnace/corndryer	400	370	300
6309	Fill	Mid reddish brown clay with limestone frags. Final filling of former corndryer/furnace [6304] following collapse of stone lining	580	200	300
6303	Fill	Mid greyish brown silty clay with displaced limestone frags. Stone frags remains of lining?	800	200	300
6304	**Cut**	Circular cut with asymmetrical profile. Construction cut of corndryer/furnace.	580	200	300
6311	Fill	Light brown sandy silt. Disuse silting of Ditch [6310].	700	150	300
6310	**Cut**	Linear cut aligned NE/SW with 'U' shaped profile. Construction cut of ditch	700	150	300
6312	Fill	Dark greyish brown silty loam with rectangular limestone frags. Mixed refuse deposit in Pit [6314]. Limestone from an adjacent structure?	1.1m	350	300
6313	Fill	Mid yellowish brown silty loam. Rubbish	600	340	300

		deposit in Pit [6314]?			
6314	**Cut**	Circular cut with a 'U' shaped profile. Construction cut of (rubbish) pit?	1.1m	350	300
6318	Fill	Light brown sandy silt. Disuse filling/silt in former ditch/corndryer [6317].	400	250	300
6317	**Cut**	Linear cut aligned NE/SW with butt and at SW. Irregular 'V' shaped profile. Slightly deeper at NE end. Construction cut of ditch or possible corndryer?	400	250	300
6323	Fill	Light brown sandy silt. Disuse fill/silting in former ditch [6322].	620	200	300
6322	**Cut**	Linear cut aligned E/W with 'U' shaped profile. Ditch construction cut	620	200	300
6327	Layer	Mixed material above Wall [6324], etc. Assigned for collection of artefacts from cleaning	*c.*1.2m	500	300
6325	Layer	Dark yellowish brown silty loam. Backfill in wall construction trench [6324].	*c.*600	500	300
6324	Structure	Curvilinear alignment of limestone blocks of regular size and shape. Lower courses of a wall	500	Un-exc	300
6326	**Cut**	Irregular cut, not fully excavated. Wall construction cut?	*c.*1.2m	Un-exc	300
6315	Fill	Dark yellowish brown silty clay. Disuse filling/silting in former pit [6316]	800	350	300
6316	**Cut**	Circular cut with an irregular 'V' shaped profile. Construction cut of a pit. Possibly a tapping pit?	800	350	300
6329	Fill	Variable fill comprising slag, clinker and burnt limestone frags. Material deposited with, of slag from last firing of Furnace [6333]?, within Tapping Pit (?) [6340].	1m	200	300
6330	**Cut**	Subcircular cut with irregular 'U' shaped profile. Construction cut of tapping pit for Furnace [6333].	1m	200	300
6332	Fill	Burnt limestone and slag/clinker. Slag remains in collapsed furnace (6333).	300	180	300
6334	Fill	Burnt clay and slag. Mixed deposit formed from slag frag (from last firing?) and collaped furnace wall from iron furnace (6333).	300	200	480
6333	Structure	Clay inserted around cut [6340]. Forms a 'bowl' with upper internal diameter = 300mm. Inner face of clay burnt red, outer part, adj. to cut less fired and grey in colour. Furnace	600	380	300
6340	**Cut**	Circular cut with 'U' shaped profile. Construction cut for Furnace [6339]	600	400+	300
6328	Structure	Circular deposit of clay. Part of wider mass of burnt clay. In-situ base of a furnace, but may contain some redeposited material at top	*c.*1m	*c.*100	300
6336	Structure	Truncated deposit of fired clay, probably originally forming a circle. Possible truncated furnace base.	550	Un-exc	300
6337	Structure	Curved deposit of fired clay. Probably part of truncated furnace. May be part of same furnace as (6338)	100	Un-exc	300
6338	Structure	Curved deposit of fired clay. Probably part of truncated furnace. May be part of same furnace as (6337)	100	Un-exc	300
6339	Structure	Circular deposit of clay fired pink/red, at base of cut [6335]. Furnace base	500	Un-exc	*c.*400

6335	**Cut**	Circular cut. Construction cut for Furnace [6335].	*c.*1m	Un-exc	300
6321	Layer	Yellowish brown silty clay. Natural subsoil			

Trench 64

Max Dimensions					
Length	13m	**Width**	11.5m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95150.82 97626.32	**SE**	95160.82 97616.32

Orientation	(square)
Reason for Trench	Testing anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
6400	Layer	Mid greyish brown clayey silt. Topsoil	-	300	-
6405	Fill	Dark greyish brown silt. Final filling of Quarry [6402]	6m+	600	300
6409	Fill	Mid/light grey ash. Debris tipped into partially filled former quarry [6402]	*c.*4m	300	*c.*400
6410	Fill	Mixed grey and black ash and charcoal. Debris tipped into partially filled former quarry pit [6402]	*c.*2m	100	*c.*700
6411	Fill	Orangy brown gravel/cornbrash. Natural strata weathered into partially filled former quarry pit [6402]	*c.*3.5m	150	300
6412	Fill	Light grey ash. Dump of ash deposited into partially filled former quarry pit [6402]	*c.*1.6m	200	*c.*700
6413	Fill	Purplish orange limestone frags and gravel.	*c.*2.6m	400	*c.*700
6414	Fill	Mid grey silty clay and ash. Many animal bones present.	*c.*3.5m	200	700
6415	Fill	Mixed greyish orange ironstone and gravel. Weathered material redeposited within partially filled former quarry pit [6402]	6m+	150	300
6403	Fill	Mixed dark grey-black silt and charcoal. Dump of waste material towards base of former quarry pit [6402]. Fuel from a nearby furnace or corn dryer?	3.5m	*c.*200	*c.*700
6416	Fill	Light orange/cream subrectangular ironstone/cornbrash blocks. Redeposited natural strata –probably slumped from edge of former quarry pit [6402].	*c.*2.5m	1.5+	300
6417	Fill	Orange ironstone/cornbrash frags in loose gravely matrix. Redeposited natural strata – probably slumped from edge of former quarry pit [6402].	2.8m+	3000+	400
6402	**Cut**	Irregular cut at SW corner of trench. Not fully excavated. Construction cut of quarry pit.	6m+	1.4m+	300
6408	Fill	Greyish brown silty clay. Disuse filling within corn drying oven (6406)	2.6m	220	300
6407	Fill	Dark brown/black fine charcoal and silt. Fuel debris at base of corn drying oven (6406)	2.6m	80	520
6406	**Structure**	'T' shaped structure in plan constructed of	2.6m	300	300

		roughly squared clunch blocks. Corn drying oven			
6401	Layer	Variable light grey-reddish brown gravel/ironstone	-	-	300

Trench 65

No overall photograph available

Max Dimensions					
Length	10.5m	**Width**	8.5m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95091.57/97689.68	**SE**	95101.57 97679.68

Orientation	(square)
Reason for Trench	Testing anomalies on geophysical survey

Context	**Type**	**Description and Interpretation**	**Max Width (mm)**	**Max Thckn (mm)**	**Depth BGL (mm)**
6512	Layer	Mid/Dark greyish brown silty clay. Topsoil	-	*c.*300	-
6503	Fill	Mid greyish brown silty clay. Disuse filling/silt in Ditch [6504]	900	400	300
6504	**Cut**	Linear cut with' U' shaped profile. Ditch construct cut.	900	400	300
6502	Fill	Mid yellowish brown silty loam. Final disuse silting of Ditch [6501]	550	100	300
6507	Fill	Mid yellowish brown silty loam. Primary silting of Ditch [6501]	450	150	400
6501	**Cut**	Linear cut with 'U' shaped profile. Ditch construction cut	550	250	300
6505	Fill	Mid greyish brown silty clay with slag lump in top centre. Disuse filling Pit [6506]?	700	120	300
6506	**Cut**	Circular cut with regular 'U' shaped profile. Construction cut of pit	700	120	300
6509	Fill	Mid-dark grey clayey silt with burnt stones at the top. Final filling of Pit [6508]	2m	60	300
6510	Fill	Mixed deposit of silty clay with lenses of gravel, ash, etc. Dumping of soil, burnt debris in Pit [6508].	2.9m	500	360
6511	Fill	Dark grey/black charcoal. Dump of charcoal at base of Pit [6508].	400	50	600
6508	**Cut**	Butt end of cut with irregular profile. Construction cut of pit (quarry?) or large ditch butt end?	2.9m+	630	300
6526	Fill	Mid greyish brown silty clay. Disuse filling/silting within Pit [6513].	300	Unexc	300
6513	**Cut**	Circular cut. Unexcavated. Pit?	300	Unexc	300
6515	Fill	Grey brown silty clay. Disuse filling/silt within Pit [6514]	450	120	300
6514	**Cut**	Subcircular cut with 'U' shaped profile. Construction cut of pit?	450	120	300
6517	Fill	Mid greyish brown silty clay. Disuse filling/silting within Pit [6516].	150	Unexc	300
6516	**Cut**	Circular cut. Unexcavated. Pit?	150	Unexc	300

6519	Fill	Grey brown silty clay. Disuse filling/silt in Pit [6518].	300	Unexc	300
6518	**Cut**	Circular cut. Unexcavated. Pit?	300	Unexc	300
6521	Fill	Mid greyish brown clayey silt with large slag lump in top centre. Disuse filling of pit [6520]	350	350	300
6520	**Cut**	Sub circular cut with regular 'U' shaped profile. Construction cut of pit or furnace?	350	350	300
6525	Fill	Mid greyish brown silty clay. Disuse filling/silt in Pit [6524].	1m	Unexc	300
6524	**Cut**	Sub circular cut. Unexcavated. Pit?	1m	Unexc	300
6528	Fill	mid grey silty clay. Animal bone concentrates at sides and large central slag lump at top. Disuse filling within pit/furnace [6527]	850	450	300
6527	**Cut**	Sub circular cut with vertical sides and flat base. Construction cut of pit or furnace?	850	450	300
6500	Layer	Yellowish brown gravel/ironstone. Natural strata	-	-	300

Trench 66

Max Dimensions					
Length	53m	**Width**	1.5m	**Depth**	0.39m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94963.94 97712.32	**E**	95013.94 97712.43

Orientation	East – west
Reason for Trench	Targeting blank area from geophysical survey

Context	**Type**	**Description and Interpretation**	**Max Width (mm)**	**Max Thckn (mm)**	**Depth BGL (mm)**
6601	Layer	Dark brown sandy clay. Natural topsoil and subsoil	-	*c.*300	0
6600	Layer	Orangy brown limestone frags. Natural strata	0	90+	*c.*300

Trench 67

Max Dimensions					
Length	49.5m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95062.91 97749.31	**S**	95062.14 97699.32

Orientation	North – south
Reason for Trench	Targeting anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6701	Layer	Dark reddish brown sandy clay. Natural topsoil and subsoil	-	250	0
6700	Layer	Mid reddish brown limestone frags. Natural strata	-	Un-exc	250

Trench 68

No overall photograph available

Max Dimensions					
Length	53.7m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95115.59 97696.84	**E**	95165.59 97697.04

Orientation	East to West
Reason for Trench	Testing curvilinear anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6800		Mid/Dark greyish brown silty clay. Topsoil	-	*c.*300	-
6802	Fill	Mid greyish brown silty clay. Disuse filling within corn drying oven (6801)	600	*c.*380	300
6803	Fill	Dark grey mixed silt ash and silt. Debris from last firing in corn drying oven (6801)?	600	20	680
6801	Structure	Roughly hewn stone blocks at N & S sides of cut [6806]. Corn drying oven or similar?	600	400	300
6806	**Cut**	E-W orientated rectangular cut with 'U' shaped profile. Construction cut for corn dryer (6801)	600	400	300
6805	Fill	Mid to dark grey clayey silt. Disuse filling/silting of Ditch [6805]	800	300	300
6804	**Cut**	E-W aligned linear cut with regular 'U' shaped profile. Construction cut of ditch	800	300	300
6807	Structure	Furnace with *c.*0.4m diameter. Unexcavated	400	-	300
6808	Layer	Mid grey brown clayey silt.	-	250	300
6809	Layer	Mid/dark greyish brown clayey silt.	-	120	550
6810	Layer	Dark brown clayey silt	-	100	670
6811	Layer	Mid/dark greyish brown clayey silt	-	250	770
6814	Fill	Greyish green clayey silt. Disuse filling/silt within industrial feature [6813].	800	*c.*300	1.65m
6813	**Cut**	Subcircular cut exposed in side of sondage. Adjacent natural strata (6812) burnt red. Construction cut for industrial feature-uncertain function	800	*c.*300	1.65m
6815	Structure	Furnace of uncertain diameter. Unexcavated	-	-	300
6812	Layer	Light orangy brown clayey silt. Colluvium	-	-	1.65m

Trench 69

No overall photograph available

Max Dimensions					
Length	55m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95079.43 97808.20	**E**	95129.43 97808.39

Orientation	East – west
Reason for Trench	Targeting blank area on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
6901	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*130	0
6902	Layer		-	*c.*130	*c.*130
6900	Layer	Reddish brown limestone frags, sand and clay. Natural strata	-	Un-exc	260

Trench 70

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94945.18 97867.20	**S**	95944.60 97817.20

Orientation	North – south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7001	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*130	0
7002	Layer	Reddish brown sandy clay. Natural subsoil	-	*c.*130	*c.*130
7000	Layer	Red brown limestone frags. Natural strata	0	Un-exc	*c.*260

Trench 71

Max Dimensions					
Length	52m	**Width**	1.6m	**Depth**	0.23m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94990.89 97917.23	**E**	95040.89 97917.47

Orientation	East - west
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7101	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*120	0
7102	Layer	Mid reddish brown sandy clay. Natural subsoil	-	*c.*110	*c.*120
7100	Layer	Red brown sand and limestone frags. Natural strata	-	Un-exc	230

Trench 72

Max Dimensions					
Length	100m	**Width**	1.6m	**Depth**	0.31m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95125.38 97934.51	**E**	95225.38 97934.69

Orientation	East – west
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7201	Layer	Mid/dark greyish brown silty clay. Natural topsoil and subsoil	-	300	0
7202	Layer	Mid reddish brown clayey silt. Colluvium	-	*c.*2m	300
7204	Layer	Mid-dark brown clay with occ iron ore frags and charcoal. Water deposited material	0	*c.*300	*c.*2m
7203	Layer	Orange brown sand and limestone frags. Natural strata	-	Un-exc	*c.*2.3m

Trench 73

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.24m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95307.00 97960.93	**S**	95306.04 97910.94
Orientation	North - south		
Reason for Trench	Testing blank area on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7401	Layer	Dark reddish brown sandy clay. Topsoil	-	190	0
7402	Layer	Greyish brown clayey silt. Colluvium. Subsoil	-	Un-exc	190
7403	Layer	Reddish brown limestone frags and sand. Natural strata	0	Un-exc	190

Trench 74

Max Dimensions					
Length	53m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95386.81 97972.00	**E**	95436.81 97972.19
Orientation	East – west		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7401	Layer	Dark reddish brown sandy clay. Topsoil	-	210	0
7402	Layer	Greyish brown silty clay. Colluvial subsoil	-	Un-exc	210
7400	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	210

Trench 75

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95421.29 97916.09	**S**	95420.25 97866.10

Orientation	North – south
Reason for Trench	Testing blank area from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7501	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*200	0
7500	Layer	Brownish orange clayey silt. Colluvial subsoil	-	Un-exc	*c.*200

Trench 76

Max Dimensions					
Length	31m	**Width**	1.6m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95358.96 97844.36	**S**	95358.37 97814.37

Orientation	North – south
Reason for Trench	Targeting linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7601	Layer	Dark reddish brown sandy clay. Topsoil.	-	*c.*260	0
7602	Layer	Greyish brown clayey silt. Colluvial subsoil	-	Un-exc	*c.*260
7600	Layer	Light reddish brown limestone frags. Modern ploughmarks present. Natural strata	-	Un-exc	*c.*260

Trench 77

No overall photograph available

Max Dimensions					
Length	50m	**Width**	2.2m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94587.37 97020.79	**E**	94637.37 97020.79

Orientation	East – west
Reason for Trench	Targeting linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7701	Layer	Light brown silty clay. Topsoil	-	200	-
7704	Fill	Dark grey silty clay.	*c.*900	100	200
7703	Fill	Black charcoal	*c.*900	50	300
7702	**Cut**	Circular cut with 'U' shaped profile. Construction cut of pit.	*c.*900	150	300
7700	Layer	Light yellowish brown silty clay. Natural subsoil	-	-	200

Trench 78

Max Dimensions					
Length	40m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95213.29 97776.31	**S**	95212.14 97726.32

Orientation	North – south
Reason for Trench	Testing blank area on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7801	Layer	Dark reddish brown sandy clay. Topsoil	-	300	0
7802	Layer	Pale grey clay with freq. Limestone frags. Natural subsoil	-	Un-exc	300
7800	Layer	Greyish brown sand. Natural strata	-	Un-exc	400

Trench 79

Max Dimensions					
Length	33.2m	**Width**		**Depth**	

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95244.71 97719.46	**E**	95274.71 97719.46
Orientation	East - west		
Reason for Trench	Targeting anomaly on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
7901	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*300	0
7902	Layer	Greyish brown clayey silt. Colluvial subsoil	0	Un-exc	*c.*300
7900	Layer	Light greyish brown limestone frags. Natural strata	-	Un-exc	*c.*300

Trench 80

Max Dimensions					
Length	31m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95342.43 97732.32	**S**	95342.43 97702.32
Orientation	North - south		
Reason for Trench	Targeting linear anomaly on geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8001	Layer	Mid/dark greyish brown. Topsoil	-	300	0
8002	Layer	Orange brown clayey silt. Colluvial subsoil	0	Un-exc	300
8000	Layer	Light reddish brown limestone frags. Natural strata	-	Un-exc	300

Trench 81

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95408.23 97779.37	**E**	95458.23 97779.45
Orientation	East – west		
Reason for Trench	Targeting anomalies from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8101	Layer	Mid/dark greyish brown. Occ slag frags. Topsoil	-	300	0
8102	Layer	Mid greyish brown clayey silt. Colluvial subsoil	-	Un-exc	300
8100	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	300

Trench 82

No overall photograph available

Max Dimensions					
Length	48.5m	**Width**	1.6m	**Depth**	0.32m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95517.77 97832.45	**S**	95516.95 97782.45
Orientation	North – south		
Reason for Trench	Testing blank area from geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8201	Layer	Mid/dark greyish brown silty clay. Slag in north part of trench. Topsoil	-	*c.*300	0
8200	Layer	Mixed orangy brown sandy clay. Natural subsoil	0	Un-exc	300

Trench 83

No overall photograph available

Max Dimensions					
Length	31m	**Width**	1.6m	**Depth**	0.28m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95532.81 97724.31	**S**	95532.81 97694.31

Orientation	North - south
Reason for Trench	Targeting anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8301	Layer	Mid/dark greyish brown silty clay. Topsoil	-	280	0
8302	Layer	Mid greyish brown clayey silt. Colluvial subsoil	-	Un-exc	280
8303	Layer	Semi-circular area of purple/pink burnt clay. Possible truncated hearth?	2m	Un-exc	280
8300	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	280

Trench 84

Max Dimensions					
Length	32.8m	**Width**	1.6m	**Depth**	0.33m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95409.24 97683.18	**E**	95439.24 97683.25

Orientation	East - west
Reason for Trench	Targeting linear anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8401	Layer	Dark reddish brown silty clay. Topsoil	-	*c.*330	0
8400	Layer	Mid reddish brown sandy clay. Natural subsoil	-	Un-exc	*c.*330

Trench 85

Max Dimensions					
Length	52.5m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95365.98 97644.84	**S**	95364.46 97594.87
Orientation	North to South		
Reason for Trench	Targeting ditch identified in geophysical survey		

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8501	Layer	Light brown silty sandy clay. Topsoil	-	290	-
8502	Fill	Orangy brown silty clay.	1.62	80	290
8503	**Cut**	Shallow cut orientated E-W. Possibly a shallow ditch, but may just be area of deeper topsoil	1.62	80	290
8506	Fill	Orangy brown silty clay. Secondary disuse silting in Ditch [8504]	1.45m	280	290
8505	Fill	Orangy brown silty clay. Primary silting of Ditch [8504]	1.45m	170	570
8504	**Cut**	Linear cut aligned NW-SE with 'U' shaped profile. Ditch construction cut	1.45m	280	290
8500	Layer	Mid-light greyish brown sandy clay. Natural subsoil	-	Un-exc	290

Trench 86

Max Dimensions					
Length	33.5m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95293.25 97565.99	**E**	95323.25 97565.99

Orientation	East - west
Reason for Trench	Targeting linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8601	Layer	Mid brown sandy clay. Topsoil	-	400	0
8602	Layer	Orange sandy clay with occ. Iron ore and slag. Natural subsoil	-	Un-exc	400
8600	Layer	Reddish brown limestone frags. Natural strata	-	Un-exc	400

Trench 87

Max Dimensions					
Length	7.5m	**Width**	6.5m	**Depth**	

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95379.48 97556.44	**SW**	95389.48 97546.44

Orientation	Square trench
Reason for Trench	Testing anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
8700	Layer	Light brown silty clay. Topsoil	-	-	
8703	Layer	Solid light brown slag. Waste material from smelting	*c.*8m	100	
8704	Layer/fill	Yellowish grey clay mixed with slag and charcoal. Disuse filling/furnace waste	*c.*8m	500 max	
8706	Fill	Light brown clayey silt with occ pebbles. Silt/disuse filling of Ditch [8705[	750	300	
8705	**Cut**	'U' shaped linear cut aligned NE-SW. Ditch construction cut	750	300	
8718	Layer	Charcoal with slag inclusions. Waste material from iron smelting	1m+	Un-exc	
8711	Fill	Dark grey/black charcoal. Fuel debris within pit [8711].	1m	40	
8712	**Cut**	Linear cut aligned NE/SW with 'U' shaped profile. Surrounding nat. strata burnt red. Construction cut of ore roasting pit (?)	1m	280	
8713	Fill	Yellowish brown clay. Upper fill of cut [8714]. Deliberate sealing/backfilling	800	170	
8715	Fill	Dark grey charcoal. Fuel debris within pit [8714]	600	30	
8714	**Cut**	Linear cut aligned NE/SW with 'U' shaped profile. Surrounding nat. strata burnt red. Construction cut of ore roasting pit (?)	800	200	
8716	Fill	Dark grey/black charcoal. Fuel debris within pit [8717]	700	30	
8717	**Cut**	Linear cut aligned NE/SW with 'U' shaped profile. Surrounding nat. strata burnt red. Construction cut of ore roasting pit (?)	700	200	
8707	Fill	Mixed dark grey deposit of charcoal and clay. Dump/tip of burnt debris (?). Same as (8719)	2m	Un-exc	
8722	**Cut**	Sub-circular cut with 'U' shaped profile. Construction cut of tapping pit. Filled with part of (8704).	1.4m	500	
8710	Fill		1.8m+	300	
8709	**Cut**	Sub-circular cut with 'V' shaped profile. Construction cut of furnace?	1.8m+	300	
8719	Layer/fill	Black charcoal and silt. Fuel debris at top of, and surrounding, disused furnace [8721]	900	Un-exc	
8720	Fill	Mixed burnt pink clay with slag and charcoal	1.2m+	Un-exc	

		inclusions. Debris at base of disused furnace [8720].			
8721	**Cut**	Sub-circular cut. Construction cut of furnace (?)	1.2m+	Un-exc	
8723	Fill	Mixed burnt pink clay with slag and charcoal inclusions. Debris at base of disused furnace [8724].	600+	Un-exc	
8724	**Cut**	Sub-circular cut. Construction cut of furnace (?)	600+	Un-exc	
8725	Fill	Mixed burnt pink clay with slag and charcoal inclusions. Debris at base of disused furnace [8724].	1.2m+	Un-exc	
8726	**Cut**	Sub-circular cut. Construction cut of furnace (?)	1.2m+	Un-exc	
8727	Fill	Yellow sandy clay. Material within disused furnace [8728]	*c.*1m	Un-exc	
8728	**Cut**	Sub circular cut. Surrounding nat. strata burnt red. Construction cut of furnace	*c.*1m	Un-exc	
8702	**Cut**	General number for furnace cuts. See individual cuts for details.	-	-	
8729	Layer	Pink cornbrash. Scorched natural strata	*c.*8m	Un-exc	
8701	Layer	Variable yellowish brown sandy clay with patches of pebbles, ironstone concentrations. Natural strata	-	-un-exc	

Trench 88

Max Dimensions					
Length	59m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95404.33 97538.01	**E**	95454.33 97538.21

Orientation	East - west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8801	Layer	Mid greyish brown silty clay. Topsoil/subsoil	-	250	0
8800	Layer	Light brownish grtey clay with occ. Limestone frags. Kimmeridge Clay? Natural strata	-	Un-exc	250

Trench 89

Max Dimensions					
Length	51m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95394.17 97623.58	**E**	95444.17 97623.58

Orientation	East – west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
8901	Layer	Mid/dark greyish brown silty clay. Topsoil	-	*c.*150	0
8902	Layer	Mid orangy brown silty sand. Ploughmarks visible Colluvial subsoil	-	*c.*150	*c.*150
8900	Layer	Cream/light grey limestone frags. Natural strata	-	Un-exc	*c.*300

Trench 90

Max Dimensions					
Length	46m	**Width**	1.6m	**Depth**	0.22m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95474.83 97608.43	**S**	95473.67 97558.44

Orientation	North – south
Reason for Trench	Targeting anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9001	Layer	Mid greyish brown silty clay. Topsoil/subsoil	-	220	0
9000	Layer	Mixed strata comprising bluish grey clay changing to brownish orange sand. Natural strata	-	Un-exc	220

Trench 91

Max Dimensions					
Length	10m	**Width**	10m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95492.84	**SE**	95502.84 97567.95

Orientation	Square trench with N-S orientated extension to north
Reason for Trench	Targeting anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
9101	Layer	Mid/dark greyish brown silty clay. Topsoil/subsoil	-	300	0
9100	Layer	Bluish grey clay with occ sand patches. Natural strata	-	Un-exc	300

Trench 92

Max Dimensions					
Length	55m	**Width**	1.6m	**Depth**	0.26m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95504.31 97622.64	**E**	95554.31 97622.45

Orientation	East – west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9201	Layer	Mid greyish brown silty clay. Topsoil/subsoil	-	260	0
9200	Layer	Variable bluish grey-brown clay. Kimmeridge Clay? Natural strata	-	Un-exc	260

Trench 93

Max Dimensions					
Length		**Width**		**Depth**	

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95575.27 97723.02	**SE**	95585.27 97713.02

Orientation	Square trench with linear extension to north
Reason for Trench	Targeting anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
9301	Layer	Yellowish brown silty clay. Topsoil	-	260	-
9304	Fill	Dark brown/black silty clay and charcoal. Remains of final roasting episode in pit [9302]?	*c.*600	80	260
9303	Fill	Natural clay burnt red. Base of ore roasting pit [9302]?	*c.*600	*c.*20	260
9302	**Cut**	Linear cut aligned E-W. Construction cut of ore roasting pit?	*c.*600	80	260
9308	Fill	Burnt clay varying between red and black in colour, mixed with charcoal. Redeposited charcoal, etc. in disused ore roasting pit [9305]	260	60	260
9307	Fill	Dark-mid orangy brown. Sandy clay. Silting within disused ore roasting pit [9305]	920	100	260
9306	Fill	Black charcoal. Remains of final roasting episode in ore roasting pit [9305]?		30	360
9305	**Cut**	Linear cut with butt ends orientated E-W. 'U' shaped profile Edge of natural clay (9300) is burnt red. Construction cut of ore roasting pit?	920	130	260
9309	Feature	Linear charcoal filled feature orientated N-S. Ore roasting pit?	490	Un-exc	260
9310	Feature	Linear charcoal filled feature orientated N-S. Ore roasting pit?	210	Un-exc	260
9311	Feature	Linear charcoal filled feature orientated N-S. Ore roasting pit?	420	Un-exc	260
9300	Layer	Mid yellowish brown sandy clay. Natural subsoil	-	-	

Trench 94

Max Dimensions					
Length	44m	**Width**	22m	**Depth**	1.6m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95607.85 97716.94	**S**	95606.87 97666.95

Orientation	North – south
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9401	Layer	Light brown silty clay. Topsoil.	-	300	-
9407	Fill	Greyish brown sandy clay mixed with charcoal. Disuse filling in former ore roasting pit [9406]	750	200	300
9408	Fill	Red-brown burnt clay at base of cut [9406]. Natural clay burnt at base of ore roasting pit	750	200	300
9406	**Cut**	E-W orientated linear cut. Shallow 'U' shaped profile. Construction cut of ore roasting pit	750	200	300
9405	Fill	Dark brown silty clay. Final filling of former ore roasting pit [9402]	400	*c.*100	300
9404	Fill	Mixed dark brown/black charcoal and silt. Debris from final firing in ore roasting pit [9402]	400	*c.*100	300
9403	Fill	Red-brown burnt clay at base of cut [9402]. Natural clay burnt at base of Ore roasting pit.	400	150	300
9402	**Cut**	E-W orientated linear cut. Shallow 'U' shaped cut. Construction cut of ore roasting pit.	400	150	300
9400	Layer	Yellowish brown sandy clay. Natural subsoil.	-	-	300

Trench 95

Max Dimensions					
Length	32m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95576.56 97765.62	**S**	95575.95 97735.63

Orientation	North – south
Reason for Trench	Targeting linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9501	Layer	Greyish brown silty clay. Topsoil/subsoil	-	250	0
9500	Layer	Reddish brown limestone/ironstone frags. Natural strata	-	Un-exc	250

Trench 96

Max Dimensions					
Length	47m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95620.42 97744.36	**E**	95670.42 97744.36

Orientation	East – west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9601	Layer	Greyish brown silty clay. Topsoil/subsoil	-	250	0
9600	Layer	Reddish brown limestone/ironstone frags. Natural strata	-	Un-exc	250

Trench 97

No overall photograph available

Max Dimensions					
Length	52m	**Width**	1.6m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95583.70 97806.55	**E**	95633.70 98806.75

Orientation	East – west
Reason for Trench	Targeting linear anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9701	Layer	Mid reddish brown silty clay. Topsoil	-	240	0
9700	Layer	Reddish brown clayey silt. Deeper to N. Colluvial subsoil	-	630+	240

Trench 98

Max Dimensions					
Length	40m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95677.46 97797.82	**E**	95707.46 97798.18

Orientation	East – west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9801	Layer	Greyish brown silty clay. Topsoil/subsoil	-	250	0
9800	Layer	Reddish brown ironstone/limestone frags. Natural strata	-	Un-exc	250

Trench 99

Max Dimensions					
Length	54m	**Width**	1.6m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95670.60 97846.61	**E**	95720.60 97846.42

Orientation	East – west
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
9901	Layer	Greyish brown silty clay. Topsoil/subsoil	-	300	0
9900	Layer	Grey brown ironstone/limestone frags. Nat strata	-	Un-exc	300

Trench 100

Max Dimensions					
Length	34.8m	**Width**	1.7m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95487.57 97925.05	**E**	95517.57 98925.05

Orientation	East to West
Reason for Trench	Testing double linear anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10006	Layer	Dark greyish brown sandy clay. Topsoil	-	350	-
10000	Fill	Mid brownish grey sandy clay. Disuse filling/silting of Ditch [10001]	1.25m	80	350
10001	**Cut**	NE-SW linear cut with shallow 'U' shaped profile. Ditch Construction cut	1.25m	80	350
10002	Fill	Dark reddish brown sandy clay. Disuse silting/filling of Ditch/Pit [20003]	1.98m	260	350
10003	**Cut**	Semi circular cut with asymmetrical profile. Construction cut of pit or ditch butt end	1.98m	260	350
10004	Fill	Mid reddish brown sandy clay.	1.43m	250	350
10005	**Cut**	NE-SW orientated linear cut with 'U' shaped profile. Ditch construction cut	1.43m	250	350
10007	Layer	Light reddish brown sandy clay. Natural strata	-	-	350

Trench 101

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.22m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95567.77 97933.16	**S**	95567.19 97883.16

Orientation	North to South
Reason for Trench	Targeting linear anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10100	Layer	Dark reddish brown silty sandy clay. Topsoil	-	-	300
10105	Fill	Reddish brown sandy clay. Final disuse filling/silting of ditch [10102]	1.3m	180	300
10101	Fill	Mid orange brown sandy clay. Primary silting of cut [10101].	1.2m	200	300
10102	**Cut**	E-W orientated linear cut with regular 'U' shaped profile. Ditch construction cut.	1.3m	*c.*380	300
10103	Fill	Mid greyish brown silty clay. Disuse filling/silting in Ditch [10104]	1.4	450	300
10104	**Cut**	E-W orientated linear cut with regular 'U' shaped profile. Ditch construction cut	1.4	450	300
10106	Layer	Red brown sandy clay. Natural subsoil	-	-	300

Trench 102

Max Dimensions					
Length	51.8m	**Width**	1.6m	**Depth**	0.35m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	95633.41 97949.90	**S**	95632.25 97899.91

Orientation	North to South
Reason for Trench	Targeting linear anomalies on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10204	Layer	Dark greyish brown silty sandy clay. Topsoil	-	250	-
10206	Fill	Red brown silty clay. Final disuse filling/silting of Ditch [20201]	1.5m	370	-
10200	Fill	Mid orange brown sandy clay. Primary silting of Ditch [10201].	1.08	220	380
10201	**Cut**	NE-SW linear cut with regular 'U' shaped profile. Ditch construction cut	1.5m	560	250
10202	Fill	Mid greyish brown silty clay. Disuse filling/silting of Ditch [10203]	1.0m	80	250
10203	**Cut**	E-W orientated linear cut with shallow irregular profile. Possible ditch construction cut, or may be area of deeper topsoil	1.0m	80	250
10205	Layer	Light greyish brown silty clay. Natural strata	-	-	250

Trench 103

Max Dimensions					
Length	10.5m	**Width**	9m	**Depth**	0.3m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
NW	95654.65 97969.05	**SE**	95664.65 97959.05

Orientation	Square trench
Reason for Trench	Targeting anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm	Depth BGL (mm)
10301	Layer	Greyish brown silty clay. Topsoil/subsoil	-	300	0
10303	Fill	Homogenous light grey clay. Modern disturbance	2m+	900	300
10302	**Cut**	Construction cut of modern feature. Agricultural?	2m+	900	300
10300	Layer	Reddish brown sand and ironstone/limestone frags. Natural strata	-	Un-exc	300

Trench 104

Max Dimensions					
Length	52m	**Width**	1.6m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	95725.68 97935.69	**E**	95775.68 97935.69

Orientation	East –west
Reason for Trench	Targeting anomaly from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10401	Layer	Greyish brown silty clay. Topsoil/subsoil	-	400	0
10402	Layer	Orange clayey silt. Collluvial subsoil	*c.*15m	700	400
10403	Layer	Orangy brown clay with freq. Limestone flecks. Colluvium/alluvium?	-	200	*c.*1.1m
10400	Layer	Cream/light grey sand and ironstone/limestone frags. Natural strata	-	Un-exc	*c.*1.4m

Trench 105

Max Dimensions					
Length	47m	**Width**	2.2m	**Depth**	0.4m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	SP 94598 97978	**S**	SP 94596 97932

Orientation	North to South
Reason for Trench	Targeting anomaly on geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10501	Layer	Light brown silty clay. Topsoil	-	250	-
10503	Fill	Variable fill of dark brown/black silty clay with red inclusions	1.2m	50	250
10502	**Cut**	Irregular shaped cut with shallow irregular profile. Uncertain function. May have furnace/kiln associations? Possible modern disturbance	1.2m	50	250
10505	Fill	Dark brownish orange silty clay.	700	200	250
10504	**Cut**	Irregular sub-circular circular cut with irregular profile. Possible furnace/kiln associations., but may be modern disturbance	700	200	250
10500	Layer	Yellowish brown silty clay	-	-	250

Trench 106

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	0.25m

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94736.76 97388.13	**S**	94736.03 97338.14

Orientation	North – south
Reason for Trench	Testing for continuation of linear anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10601	Layer	Dark reddish brown sandy clay. Topsoil	-	250	0
10600	Layer	Mid –light reddish brown sandy clay with limestone.ironstone frags. Natural subsoil	-	Un-exc	250

Trench 107

Max Dimensions					
Length	50m	**Width**	1.6m	**Depth**	250mm

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
N	94812.17 97361.64	**S**	94811.43 97311.64

Orientation	North – south
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10701	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*250	0
10700	Layer	Mid reddish brown silt clay. Natural subsoil	-	Un-exc	*c.*250

Trench 108

No overall photograph available

Max Dimensions					
Length	48	**Width**	1.6	**Depth**	300

Levels	
Trench base north	m OD
Trench top north	m OD
Trench base south	m OD
Trench top south	m OD

NGR Co-ordinates			
W	94702.28 97256.30	**E**	94752.28 97256.30

Orientation	North – south
Reason for Trench	Targeting anomalies from geophysical survey

Context	Type	Description and Interpretation	Max Width (mm)	Max Thckn (mm)	Depth BGL (mm)
10801	Layer	Dark reddish brown sandy clay. Topsoil	-	*c.*300	0
10800	Layer	Mid reddish brown silt clay. Natural subsoil	-	Un-exc	*c.*300

Appendix 2: The Roman Pottery by A.R.Fawcett

Introduction

This report primarily provides dating evidence for each context that contained pottery from the evaluation trenches at Wakerley, Northamptonshire. Dating is based (where applicable) upon both the identification of fabric and form. Thereafter the report contains a brief summary of the results of analysis and recommendations for further research.

The assemblage from each context was given a brief examination and subjected to basic quantification (a sherd count and weight per context). No attempt at detailed fabric description or comparison with material of a similar nature has been undertaken. A date range is provided for each fill and where appropriate comments are made as to the condition of the pottery. Other data, such as obvious fabrics and form types, are also included for each context (the keys for these are listed below).

Fabric & Form Key

LEZ SA 2	Lezoux samian ware category 2
LNV CC	Lower Nene Valley colour coated ware
UNS CC	Unsourced colour coated ware
LNV WH	Lower Nene Valley white ware
MAN WH	Mancetter-Hartshill white ware
UNS WH	Unsourced white ware
UNS OX	Unsourced oxidised ware
BSW	Black surfaced/Romanising grey wares
GRS	Unsourced sandy grey wares
HAR SH	Harrold shell tempered ware
UNS SH	Unsourced shell tempered ware
SOB GT	Southern British grog tempered ware
UNS CS	Unsourced coarse sand (hand-made)

Other fabrics as spelt out
B = dish, C = bowl, D = mortaria, E = bowl-jar, G = jar, H = beaker, T = cup

Conclusion

A total of 205 sherds with a weight of 4233g were recorded from the trial trenches. The pottery as a whole may be described as being between abraded and slightly abraded (the majority falling within the latter category). It would be fair therefore to conclude that most is in its original place of deposition. The diagnostic survival rate (rims) is about average, although most of this data is located in 6509, indeed few of the contexts display large assemblages.

Dating is predominantly divided between two distinct periods (not including unstratified data), the 2nd century and the late 3rd to 4th century AD (the late period accounts for the preponderance of dated contexts). Only 6312 appears to 'buck' this trend, and is dated to the LPRIA or just after; denoted by the presence of a grog tempered carinated cup.

Apart from the odd piece of non-diagnostic samian there is little else to be gleaned from the 2nd century material, fabrics being unsourced and jars being the only form.

The later Roman pottery, as might be expected is dominated by Lower Nene Valley colour coated ware and to a lesser extent the 'Harrold' style shell tempered ware. The 'Harrold' assemblage is solely made up of jars in the hook rim style. The Nene Valley products are mostly typical late

forms, jars, hemispherical bowls, flanged, and plain rimmed dishes. However, interestingly there are a high proportion of poor quality slips and the occasional inferior clay selection on these later forms. All this may indicate that a later date could be attributed to some of the ceramic data at the next stage of assessment (should this go ahead). Context 6405 contained a possible hand-made Saxon fabric, nonetheless only further excavation work may reveal more about this period on the site.

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Catalogue

Unstratified Sequence

Area 3
Metal Detector Find: Late Medieval

Glazed oxidised ware	2	10g	ND, abr-sli

Trench 31
US: Roman

BSW	1	4g	G, very

Trench 32
US: *Roman*

GRS	1	5g	ND, very

Trench 33
US: *Roman*

BSW, UNS WH	2	2g	ND, very

Trench 35
US: 17th to 18th century AD

Glazed black earthenware	1	5g	ND, abr

Trench 37
US: *c* Mid 12th-14th century AD

Glazed reduced ware	1	7g	ND, abr

Trench 40
US: Mid 12th to 14th century AD

Glazed oxidized ware	1	3g	ND, abr

Trench 42
Topsoil: Mid 13th to 15th century AD

Glazed oxidised ware	1	17g	Dish, very

Trench 59

US: Early/mid to end of 2nd century AD

MAN WH, UNS WH	3	177g	D [stamp remains R], abr

Trench 68

?Posthole fill: Roman

UNS SH	1	178g	G base, sli

Trench 108

Topsoil: Early-High Medieval

UNS OX	1	21g	?Dish, very

Individual Unattributed contexts

4703 Roman

UNS SH	1	9g	ND, abr

6305 Early to later 2nd century AD

LEZ SA 2, UNS SH	2	12g	ND, abr

6307 2nd to 4th century AD

GRS	3	69g	ND, sli

6311 Early/mid 2nd to late 2nd/early 3rd century AD

GRS, BSW, UNS SH	9	66g	Gbd, sli

6312 AD5-50/60

SOB GT UNS SH	8	75g	Tcar, G, sli

6315 Roman

UNS SH	1	37g	ND, sli

6318 Late 3rd to 4th century AD

HAR SH, LNV CC, GRS	10	87g	Ghk x3, sli

6325 3rd to 4th century AD

UNS CC, GRS	5	42g	G/E abr-sli

6327 Late 3rd to 4th century AD

LNV CC, HAR SH, GRS	10	221g	Bfl, Ghk, abr-sli

6403 Roman (looks late)

UNS OX/WH	1	36g	ND,*very unusual fabric, sli

6404 Late 3rd to 4th century AD

LNV CC, HAR SH	9	216g	Bpl, Chemis, abr-sli

6405 Late 3rd to 4th century AD (also present possible early Saxon fabric)

LNV CC, UNS CS	3	193g	ND, 1 x hand-made fabric abr-sli

6414 Roman (?late)

UNS SH, GRS, ?UNS CC	3	51g	ND, *one over fired fabric, sli

6418 4th century AD

LNV CC	4	106g	Chemis, G, sli

6503 Early to later 2nd century AD

LEZ SA 2, GRS	39	835g	Gcar, (most all same vessel) abr-sli

6509 4th century AD			
LNV CC, OXF RS, GRS, LNV WH	41	1428g	Bpl/fl, D, G, E, H, imbrex(tile) sli-gc
6510 Late 3rd to 4th century AD			
LNV CC, HAR SH, GRS	19	153g	Bpl, Ghk, sli
6511 Late 3rd to 4th century AD			
LNV CC, HAR SH	16	103g	ND, caster frag, overslip dec, sli
6803 Roman			
UNS CC, UNS SH	4	27g	ND, sli
6805 Roman			
GRS	1	33g	ND, sli
6809 Roman			
UNS WH	1	5g	ND, sli

Appendix 3: Quernstones by R J Zeepvat

Three sizeable fragments of a rotary quern were recovered from Trench 63, context 6325. The fragments comprise part of the lower stone and two pieces of the upper stone, all apparently from a single hand-powered rotary quern, made of millstone grit. All three fragments have damaged edges, and it is evident that the outer edges of both stones have been lost, so the original diameter of the rotary quern cannot be determined.

The lower stone has a flat lower surface and a worn upper surface, sloping away from the central hole. The central hole comprises a slightly wandering bi-conical piercing, showing that it has been bored from both sides in a two-stage operation.
Dimensions: thickness 68-100mm, max. surviving radius 180mm, hole dia 25mm (min).

The upper stone has parallel upper and lower surfaces, matching the angle of the upper face of the lower stone. The lower surface is pecked. The central hole is straighter than that of the lower stone, and though it was probably drilled from both sides, this is not as apparent.
Dimensions: thickness c.60mm, max. surviving radius c200mm, hole dia 25mm (min).

The context from which the stones were recovered was disturbed, so it is not possible to categorically state that they are of Roman date. However, they type and size of rotary hand quern that they represent is not uncommon on Roman sites. For example, stones of similar size and composition were found in securely dated Roman contexts at Bancroft villa, Milton Keynes (Williams & Zeepvat 1994, 370).

Reference:

Williams, R.J. and Zeepvat, R.J., 1994 *Bancroft: a late Bronze Age/Early Iron Age settlement, Roman villa and temple-mausoleum* (2 vols). Buckinghamshire Archaeol. Soc. Monog. Ser. **7** (Aylesbury).

Plate 1: Rotary Hand Quern. Lower Stone ***(scale 50mm)***

Plate 2: Rotary Hand Quern. Parts of Upper Stone *Scales = 50mm)*

Plate 3: Rotary Hand Quern. Upper and Lower Stones in Position *(Scales = 50mm)*

Appendix 4: Metalworking by J Cowgill

During the Late-Iron Age and Early Roman period and again in the 7th - 8th century, part of Wakerley must have been a wooded landscape which generated a significant amount of wealth in the form of iron, a metal much in demand. Iron at this date was smelted in small 'bloomery' furnaces built of clay, that consumed very large quantities of usually oak charcoal, to produce a small amount of iron during each smelt. Groups of furnaces with probable ore-roasting hearths (channel hearths) have been found right across the site above the 85m contour. At least two types of furnace have so far been identified, which is unusual on a single site. Interwoven amongst the iron industry is evidence of arable agriculture in the form of corn driers, but the presence of cereal chaff and grainin the Saxon channel hearths implies a direct relationship between the farmers and smelters (could they be one and the same?). Deep colluvium in-filled run off vallys run from south to north down the slope, the destabilising of the soil could have been the result of woodland clearance by the iron smelters or the local community for arable agriculture. Major fuel users, however, tend to preserve their resources not exhaust them and a coppicing system would have been expected to be employed by the iron smelters.

Furnaces in two Trenches were partially excavated. In Trench 63 two clusters of inter-cutting furnaces were found, an AMS date for one is Cal BC 170 to Cal AD 40 (at 2 sigma calibration). Both groups are less than $3m^2$, which reinforces just how small these industrial features are that may have produced tonnes of iron and significant quantities of slag. The excavated furnaces may have consisted of more than one type as only one - the latest- had been set nearly 0.5m into the limestone brash. The slags suggest that a non-tapping technology was employed. A circular pit also found in the Trench may have been used for ore roasting. Smithing, probably of the blooms, occurred close to these furnaces as is attested by the hammerscale assemblages.

In neighbouring Trench 65 slags had been discarded or placed centrally in a group of pits. Apart from the slag and a very limited amount of charcoal there were no other finds in the pits, which had little else in common being a variety of shapes and depths.

Radiocarbon dates suggest that in Trench 87 part of a Mid-Late Saxon iron-smelting site was uncovered. The evidence indicates that iron was smelted here in the furnaces using a slag-tapping technology, which is different to that employed in Trench 63. The arc of bloomery furnaces found around the perplexing central pit is an unusual arrangement. The almost total lack of hammerscale indicates that smithing occurred elsewhere, hammerscale is light and easily wind-borne and if it was being generated close to the site, some would be expected. Both the geophysical and field walking surveys were successful in predicting the location of these furnaces, with a scatter of tap slags being identified in the top soil around the Trench, this strongly contrasts with Trench 63 where the geophysics did not locate the furnaces and it is probable that this is due to the different slag types produced and site size.

Channel hearths, interpreted as possible ore-roasting pits, were only identified close to the Trench 87 furnaces, a Trench centrally placed in the site. Trenches 12 with 13 and 93 with 94 were at opposing ends and although no furnaces were found close to them high levels of slag were found concentrated over and around them during the fieldwalking phase. It is probable that furnaces will again be found close to them.

The Wakerley area is proving to be an important locale for the archaeological study of the iron-smelting industry. The site affords the opportunity for addressing many key questions concerning the development and chronology of the industry in this area. Not only the technologies employed (furnace types) and duration, but also its spatial organisation and its relationship to other activities (mainly agricultural) occurring in the countryside. The results of the evaluation highlight a number of points that reflect the importance of the site and its ability to address research questions.

Introduction.

The evaluation of *c*. 102 hectares at Wakerley was undertaken by Archaeological Services and Consultancy Ltd, and involved the excavation of 108 trial trenches. Previously a desk-based assessment, fieldwalking and a geophysical survey had been undertaken and these had highlighted areas of archaeological potential. The trenches, mostly linear, were located to explore both the areas deemed to have high potential and those that seemed to be devoid of archaeology. The site lies at an elevation of c. 100m and slopes down to the north to form the valley of the River Welland. The southern boundary of the site is wooded (Wakerley Great Wood) while a disused quarry forms the western limit and to the north is arable land. The southern part of the site comprises part of a former Second World War airfield, which is likely to have resulted in localised disturbance during its construction. The northern part is less disturbed and preservation is generally better, although all parts of the site are currently being degraded through plough action.

The significance of the area for early iron smelting has long been known. During the 1970s a number of areas adjacent to, and in part over-lapping the current evaluation, were excavated in advance of quarry extraction (Jackson and Ambrose 1978). Iron Age enclosures, Roman settlement including an aisled barn, pottery kilns and corn-driers were all revealed with nearby an Anglo-Saxon cemetery. Iron Age and possible Roman iron-smelting furnaces were also found although the early furnaces have since been problematical to interpret. The extraordinary large early Roman smelting complex at Laxton lies only two kilometers to the south (Jackson and Tylecote1988, Crew 1998) and its presence must have implications for this site. In these exploratory trenches at least 12 clusters of iron-smelting furnaces and other directly related features have been uncovered scattered across the entire site (in about 10% of all Trenches), although each is discrete and often covers a very small area. (Table 1). This gives some indication of the density of the activity here considering that the Trenches represent barely a 1% sample of the site. Potentially this hill-top site, overlooking the Welland Valley, is littered with small smelting sites making this a very important location for the understanding of the early development of this industry.

Table 1. Summary of the iron-smelting features by Trench.
Only those from which there are samples or hand-collected slag are discussed in this report. (For a general discussion see Fell 2006, 85 - 91).

Trench	Feature type	Slag collected	Dated.
12	Channel hearth [1206], charcoal filled pit [1205].	Y	Y
13	Channel hearth [1303].		
54	Furnace [5407].	Y	Y
63	Furnace groups [6301] and [6302], oven / ore roasting pit [6304].	Y	Y
65	Pits containing slag [6506], [6513], [6514], [6516], [6518], [6520], [6524], and [6527].	Y	
68	Furnace Groups [6807] and [6815], industrial feature at base of colluvium [6813].		
77	Charcoal filled pit [7702].		
83	Hearth / furnace base [8303].		
87	Furnace group [8702], slag and charcoal layers [8703] and [8704], pit [8722], channel hearths [8712], [8714] and [8717], charcoal [8718].	Y	Yx2
93	Channel hearths [9302], [9305], [9309], [9310] and [9311].	Y	Y
94	Channel hearths [9402] and [9406].	Y	
105	Channel hearth / hearth [10502], hearth / oven [10504].		

Although this report will concentrate on the iron-production industry, evidence for Roman agricultural activity was also found including corn driers and enclosure ditches and a substantial

quarry pit was also recorded. A number of archaeological features were obscured by colluvial deposits that may have been deposited during the Roman period, partially infilling a natural valley and a number of other shallower possible early run-off valleys.

Slag collection and Sampling Policy.

It was decided at the outset that the majority of the slag to be studied would be recovered by sampling any contexts that were identified as being potentially associated with metalworking and more specifically iron smelting or smithing. In Trench 68, however, the slag was left *in situ* within the unexcavated furnace. Pieces were only hand collected if they were exceptionally large or considered potentially 'interesting or different'. This strategy was adopted to ensure representative assemblages for each activity area were recovered, and perhaps as importantly, a manageable amount for examination was taken from the key contexts. Sample sizes were variable but generally they ranged between 10 - 30 litres, usually determined by context size. It was anticipated that radiocarbon dating any furnace, or group of furnaces would be difficult as mature oak with heartwood appears consistently to be the fuel used by iron smelters from the Iron Age to the medieval period. (Thermoluminescence dates were prohibitively expensive at this evaluation stage.) Samples for studying the iron production were therefore taken, but to ensure we had enough charcoal for dating, all the rest of the soil from the relevant contexts was kept to maximise recovery. In the end all these 'reserve' samples had to be processed because as predicted although a large amount of charcoal was extracted it was very difficult finding any short-lived specimens (small roundwood or twigs) suitable for AMS dating amongst all the oak heartwood (see dating below).

Fifteen industrial, with a further twelve environmental samples, were processed by the Environmental Archaeology Consultancy (Table 3) and the results from mainly the former are discussed in this report and the finds included in the catalogue (Appendix 1). The slags and associated finds (including the magnetic element of the residues) recovered in the non-industrial samples were also examined (Appendix 2) and sample 32 from Pit [6314] in Trench 63 was catalogued in detail as it may be contemporary with the furnace clusters nearby. The samples were taken as whole earth samples.

Processing and Recording Methodology.

All the samples from Wakerley were processed by flotation, none were bulk sieved and the residues were not washed using a high pressure hose (probably advisable in the future for the larger element of the largest >7mm fraction), resulting in a fairly dirty industrial finds assemblage. This method of washing, however, maximises on both the recovery of charcoal and other forms of charred botanical remains and the small, less studied, elements of industrial assemblages. Using the small mesh sizes will also have increased the possibility of recovering hammerscale and prill.

Trench	Samp	Cont	Tubs	Description of layer.
63	27	6303	3	Round, possible ore roasting pit [6304]. $
63	34	6328	1	Clay and burnt clay from ?*in-situ* furnace [6328].
87	48	8716	2	Fill of channel hearth [8717].
93	1	9304		Fill of channel hearth [9302]

$ Called a corndrier/furnace in context descriptions, but see Plate 17 (page 36), Fell 2006 vol 1.

Table 2. Samples examined but not processed**.**

Trench	Cont	Samp	C14	Volume ltr	Weight kg	Residue volume ml$	Residue weight gm$	Flot vol (ml)	Description of layer.
63	6329*	35	N	30	34	16000	20000	5	Primary fill of 'working hollow' [6330] in front of furnace [6333].
63	6332	37	Y	10	13	4700	7470	10	Fill of furnace [6333], but above sample 42 fill (6334).
63	6334	42	N	8	10	3000	4731	2.5	Primary fill of furnace [6333].
65	6505	25	N	10	13	4500	5618	10	Fill of pit [6506] with central slag lump.
65	6521*	33	N	10	12	3500	4787	1	Fill of pit [6520] with large slag lump.
65	6515	49	N	9	12	6000	8359	1	Disuse fill/ silt within Pit [6514] with slag lump.
65	6526	50	N	10	14	4000+	9182	1	Fill of pit [6513] with slag lump.
54	5404	3	Y	10 + 23&	12 + 23&	4000	4808	630	Black charcoal - burnt material in ?furnace [5407].
87	8703	22	N	40	48	21000	30970	1	Slag layer sealing furnaces etc in trench, layer directly above 8704.
87	8704	21	N	40	47	16500	20390	300	Charcoal and ash layer sealing furnaces etc in trench, below 8703.
87	8710	47	Y	2	2	600	740	125	Charcoal and tap slag from primary fill of furnace [8709].
87	8711	44	Y	10	10	700	986	520	Primary fill of channel hearth [8712].
12	1217	7	Y	10 + 36&	9 + 36&	400	712	315	Burnt debris from last firing of channel hearth [1206]
93	9306	2	Y	8	8	1000	1448	230	Black charcoal; primary fill of channel hearth [9305].
94	9404	10	N	10	10	1500	2620	330	Black charcoal from primary fill of channel hearth [9402].

Table 3a. Processed Samples: Samples associated with iron smelting ordered by probable date and trench.

Trench	Cont	Samp	Volume ltr	Weigh t kg	Residue volume ltr$	Residue weight gm$	Flot vol (ml)	Description
63	6307	36	26	31	7500	9884	23	Final disuse filling of ?corn drier [6308]
63	6312*	32	20	26	7000	9719	16	Mixed refuse deposit in (rubbish) pit [6314]
63	6319	29	3	4	600	833	To do	Lower fill of flue [6306], of corn drier [6308]
63	6331	40	8	8	1300	1560	To do	Primary fill/ debris from last ?firing of corn drier [6308]
64	6405	15	18	18	2700	3567	112.5	Final fill of quarry [6402]
64	6407	17	27	27	2500	3677	90	Fuel debris at base of corn drier [6406]
64	6408	16	27	33	6000	7160	40	Disuse fill within corn drier [6406]
64	6414	19	14	15	6000	6823	535	Fill of quarry [6402]
65	6511	28	8	9	2000	2835	80	Dump of charcoal at base of pit / ditch [6508]
68	6803	39	8	8.5	1500	2327	13	Debris from last firing in corn drier (6801)
68	6808	52	23	23	3000	3995	5	Layer
68	6814	53	20	22	1200	1994	12	Disuse/ silt within industrial feature [6813]

* Also pieces of hand-collected slag.
& Reserve processed to bulk charcoal for C14 (Residue volume not recorded, weighed or sorted).
$ Unsorted volume and weight

Table 3b: Non-industrial samples, - *i.e.* for seed species identification etc.

Four samples were not processed (Table 2). Washing would have damaged the contents of one (remains of *in situ* furnace [6328], sample 34), while it was considered important to keep the content of the other intact for examination and future study (channel hearths [8717] and [9302] and circular ?ore-roasting pit [6304]).

The industrial samples were therefore processed in the following manner. The samples were weighed and the volume measured prior to being washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.5mm mesh and an internal wet-sieve of 1mm mesh for the residue. Both the flots and residues were dried and the latter was subsequently re-floated to ensure the efficient recovery of charred material. The volume and weight of the residues were then recorded. The flots have been reported upon by Gemma Martin (this volume; see Table 6 for a summary).

The dried residues were sieved through 7mm, 2mm and 1mm meshes and the >7mm fractions were sorted by eye. Archaeological and environmental finds were picked out and bagged separately after being recorded on the sample assessment sheets. A magnet was run through the three residues (<2mm, 2-7mm and >7mm) for the extraction of magnetic material, in particular hammerscale and prill. The flot and some of the residues have been kept in their entirety, the latter only if it contained a significant quantity of smelting debris that may benefit from further sorting and /or research. The composition of the unsorted element of the residues has been described as they are very variable (see the relevant Trench section) and at this stage all residues with a significant industrial component have been retained. It will only be appropriate to determine a discard policy after further stages of work have been decided and undertaken.

The hand-collected slag and any associated debris was washed and dried. The slags and associated debris from the excavation and samples were identified solely on morphological grounds, by visual examination, sometimes with the aid of a x10 binocular microscope. It was then recorded on *pro forma* recording sheets and the information entered into a Microsoft Access database using the following encoded fields: Trench; Context; Sample number, Material; Count; Weight; Condition, Comments. A note of fuel type was recorded when fragments were incorporated within the slags or imprints present. The catalogue of the slags and related material from Trenches 63, 65 and 87 forms Appendix 1, while those from the Non-Industrial samples forms Appendix 2.

Dating.

Seven samples were initially submitted to Rowena Gale for the extraction of suitable pieces of charcoal for AMS radiocarbon dating, but only four samples were found to contain suitable material, so the 'reserve' samples from two contexts were then processed and fortunately from these short-lived specimens were found.

Charcoal identification for radiocarbon dating.

By Rowena Gale.

The samples were prepared using standard methods (Gale and Cutler 2000). Anatomical structures were examined using incident light on a Nikon Labophot-2 compound microscope at magnifications up to x400 and matched to prepared reference slides of modern wood. When possible the maturity of the wood was assessed (i.e. heartwood/ sapwood).

The samples varied in size from large to sparse and most of the charcoal was well preserved and some samples included fragments measuring up to 10mm in cross-section. Initially seven samples of charcoal were identified to species but short-lived material was only identified from samples 2, 37, 44 and 47 that were recommended for AMS dating (Table 5). All viable fragments from the remaining samples were examined but they consisted of oak heartwood and are therefore not

suitable. Further charcoal from samples 3 and 7 were then examined but although they were both fairly large the charcoal was found to be poorly preserved and fairly degraded making it difficult to assess the maturity of the wood. Viable fragments were examined and identified as oak (*Quercus* sp.), almost exclusively heartwood, but a few small pieces were extracted as being suitable for dating.

Trench	Cont	Samp	Feature Type	Pomoideae	*Prunus*	*Quercus*	Comments
12	1217	7	Channel hearth	-	-	Sapwood <1gm Root <1gm Heartwood 4gm	Root diameter 4mm, <20 years old. Remaining fragments too small for identification or to assess maturity.
54	5404	3	Fill of furnace	-	-	Sapwood <1gm Heartwood 8gm	Remaining fragments too small for identification or to assess maturity.
63	6332	37	Fill of furnace	<1gm	-	Sapwood <1gm Heartwood 1gm	The Pomoideae charcoal will provide the better date.
87	8711	44	Channel hearth	-	<1gm	Heartwood 8gm	*Prunus* twig: diameter 3mm, *c.* 2 growth rings.
87	8710	47	Fill of furnace	-		Sapwood <1gm Heartwood 4gm	
93	9306	2	Channel hearth	-	-	Sapwood 1gm Heartwood 15gm	Sapwood probably from fairly wide roundwood.
94	9404	10	Channel hearth	-	-	Heartwood 17gm	Remaining fragments too small for identification or to assess maturity.

Table 4. The charcoal recommended for dating (in bold type).

The charcoal samples were then submitted to Beta Analytic, and the following dates were obtained.

Trench	Cont	Samp	Feature Type	Beta No.	Conventional Radiocarbon Age	Age at 2 sigma calibration
12	1217	7	Channel hearth	222901	1270+/-40 BP	Cal AD 670 to 870
54	5404	3	Fill of furnace	222902	1380+/-40 BP	Cal AD 620 to 690
63	6332	37	Fill of furnace	222897	2050+/-40 BP	Cal BC 170 to Cal AD 40
87	8711	44	Channel hearth	222899	1140+/-40 BP	Cal AD 790 to 990
87	8710	47	Fill of furnace	222898	1220+/-40 BP	Cal AD 690 to 900
93	9306	2	Channel hearth	222900	1260+/-40 BP	Cal AD 670 to 880

Table 5. The AMS Radiocarbon dates.

The non-industrial finds from the samples.

It is immediately apparent when examining Table 6 that very few finds were recovered from any of the industrial features sampled, particularly when these are compared to the non-industrial samples, most of which are from corn driers, not pits receiving domestic rubbish. There are marginally more finds from Trenches 63 with a surprising eighteen sherds of Nene Valley ware of 2nd-3rd century date (identified by B. Hurman) amongst the primary fill (6334) from Furnace [6333]. Although the radiocarbon date for the upper fill (6332) suggests a Late Iron Age date (Table 5), the presence of a typical hobnail, with its domed head and curled shank, indicates that some Roman presence was at the site when this furnace went out of use. The stud/ hobnail from context 6505 again has a domed head but it is smaller in size and has a straight shank, suggesting that it was never attached to a shoe and therefore may not be a hobnail. The quantity of bone recorded is miniscule, given that flotation was the recovery method, and most pieces are small enough to have moved down through the soil. Cereal grains are absent from Trenches 63 and 65 and there is a noticeable paucity of charred weed seeds, with only the intrusive blind burrowing snail (*Cecilioides acicula*) being recovered from the flots from the Trench 65 samples. None of these samples were particularly charcoal rich, context (6332) being the sole exception, indeed the pits from Trench 65 appear to be barren of all finds apart from slag, with very little charcoal, so an initial suggestion that they were a type of pit furnace must be ruled out.

The furnaces and channel hearths from Trenches 54, 87, 12, 93 and 94 produced absolutely no non-industrial finds but had charcoal and not insignificant quantities of seeds in their flots, including fragile barley chaff. This suggests that the smelters had some contact with, or were a part of, or inter-related with the local husbandry regimes. Charcoal was recovered from these Trenches in large quantities and these assemblages include numbers of both large and cominuted pieces, initial identification suggests that the dominant type of wood used was *Quercus* heartwood (Gale above).

Iron smelting and Smithing Terminology.

Most of the slag from the various Trenches is probably a by-product of smelting iron ores in some form of bloomery-shaft furnace. Some of it will have been tapped out of an arch in the base of the furnace, into a pit alongside it while in other instances it may have collected in a pit below the furnace (the latter is thought to be the earlier technology). The early bloomery furnaces are often *very small* (an internal diameter of 0.3m is common) and are frequently very poorly preserved because the temperature at the base may be almost the lowest within the entire structure during a smelt. The highest temperatures will be around the air hole some way higher up the shaft, through which an air draught was forced with the aid of bellows. Each furnace would have been reused for numerous smelts. The outer diameter is seldom recordable because the clay on the outside will not have become fired and when the furnace is abandoned the outer walls will just slump. All furnaces will have been covered with some sort of shelter to protect them from the weather, although evidence for this seldom survives. The most common form of fuel was charcoal (coal was never used for this process), which was consumed in very large quantities (Crew 1991). The availability of this resource was probably the most important factor in determining the location of smelting sites, ores and clays for furnace building usually being available relatively widely.

To smelt iron the furnace has to be preheated and then the ore and further charcoal would be fed into it; the bellows meanwhile producing the draught. Two equally important operations occurred inside the furnace, the production of iron and the removal of the gangue (impurities within the ore *etc*) as liquated slag. The slag collected at the bottom of the furnace and was sometimes then tapped off into a pit or working hollow in the ground beside the furnace. The iron formed as a bloom (thus the term bloomery) attached to the inside wall of the furnace just below the air hole. When the bloom reached a large enough size the smelt ceases and the soft spongey bloom, a mixture of slag and iron, was extracted from inside the furnace for refining and smithing to make it into a workable

bar. This initial working of the iron is the primary-smithing stage but the slags produced are similar to those generated by secondary smithing; it is thought that this initial smithing was normally undertaken at the smelting site.

Secondary smithing is the term used to describe the manufacture by the smith of objects from bar iron, and any subsequent repair or recycling of iron. Iron smiths had a range of irons available to them varying from ferritic iron (relatively soft), phosphoric iron (an iron that inhibits carbon diffusion while increasing the hardness of ferritic iron) to steels (potentially very hard, but more brittle) (McDonnell 1988, McDonnell 1989). Steel is the optimum material for use in the production of cutting or working edges in tools, since it can be heat treated to produce optimum toughness. The methods of steel production and the extent of its use is poorly understood.

Secondary smithing produces a range of waste products, slag being the most common. The classic form is a plano-convex accumulation of slag, commonly called a 'hearth bottom', which is formed in the hottest part of the hearth just below the tuyere. The usual shape is a convex base with a flattish top often with a shallow depression formed by the blast of air from the bellows. Another common waste product is termed 'smithing slag lumps', which develop as free slag within the fuel filling the hearth. They are randomly shaped pieces of iron silicate generated during the smithing process which have failed to coalesce with the 'hearth bottom'. The high temperatures produced in the hearth can lead to considerable quantities of the clay wall and the tuyere melting, leading to the formation of vitrified-hearth lining and cinder, the latter a silica-rich slag. The above slags would all have formed in the hearth.

Although a very skilled smith can limit the amount of slag produced, an unavoidable waste product is hammerscale. When iron is heated by the smith the surface will oxidise, and this oxidised layer flakes off when it is beaten, producing thin flat plates of scale debris (plate hammerscale). Surface oxidisation can be minimised by careful placement of the iron in a reducing zone in the fire. Spheroidal hammerscale, small droplets of slag that have solidified and may be either hollow or solid, is also produced, but in smaller quantities, on secondary-smithing sites, when two pieces of iron are fire welded together (Starley 1995). On smelting sites it can be quite common, partly because spheroids may be produced within the furnaces but also because the operation of primary smithing the bloom to a bar is fundamentally a welding operation, and it is thought that this may account for their apparent abundance on these sites. When smithing the generation of slag and scale represents a loss from the stock iron being smithed, this can be as much as, or over 50% if a complex object is produced (pers. comm. H. Cole).

Archaeological iron smelting and smithing slags are usually a mixture of three (or more) 'phases'; an iron silicate mineral (usually Fayalite [$2FeO.\ SiO_2$]); an iron oxide mineral (usually Wustite [FeO], although Magnetite [Fe_3O_4] can occur); and a 'glassy' phase, that has no strict chemical composition. Assuming that a smelting slag is fully liquid, as it begins to cool at certain temperatures the silicate will start to solidify as crystals, followed by the iron oxide. The remaining liquid does not normally form crystals but occurs as an amorphous glassy phase. Thus at room temperature the slag consists of crystals of silicate and iron oxide in a glassy matrix.

Samples associated with iron smelting ordered by probable date and trench.

Trench	Cont	Samp	Residue volume ml	Flot vol (ml)	Pot £/#	Bone wt g	Fe £/#	Brick /tile wt g	Char-coal */$	Charr'd grain *	Cereal chaff *	Charr'd seed *	Egg shell wt g	Snails */#	Comments (cereals in order of frequency).
63	6329	35	16000	5	9/50	3			2/3			1		1/1	
63	6332	37	4700	10		?	2/7.5		4/5			1		5	Iron hob nail.
63	6334	42	3000	2.5	18/28				1/2					5/1	
65	6505	25	4500	10	4/2	3	1/1		1/2					5/	Iron stud (small hob nail?).
65	6521	33	3500	1		<1			0/1					5/	
65	6515	49	6000	1		<1			0/0					4/	
65	6526	50	4000+	1					0/1					?	
54	5404	3	4000	630					5/5			1		5/	
87	8703	22	21000	1					1/2	1		2		2/1	Indet. cereal fragments.
87	8704	21	16500	300					5/5	2^		3^		4	Barley, wheat, oat.
87	8710	47	600	125					5/5			1		1/1	
87	8711	44	700	520					5/5	3^	2^	4^		2/1	Barley, oat, wheat, barley chaff.
12	1217	7	400	315					5/5	2^		3^		5/	Oat, barley, wheat.
93	9306	2	1000	230		?			5/5	2	1	2		2	Barley, oat, wheat, wheat & barley chaff.
94	9404	10	1500	330					5/5	2	1	5			Barley, oat, wheat, barley chaff.

Non-industrial samples.

Trench	Cont	Samp	Residue volume ltr$	Flot vol (ml)	Pot £/#	Bone wt g	Fe £/#	Brick /tile wt g	Char-coal */$	Charr'd grain *	Cereal chaff *	Charr'd seed *	Egg shell wt g	Snails */#	Comments (cereals in order of frequency).
63	6307	36	7500	23	4/1	4.5	3/9		2/5	3	2	1		5	Wheat, barley, oat, wheat chaff.
63	6312	32	7000	16	6/11	57		694	3/5			1	?	5	Lead x2, <1g
63	6319	29	600	To do					3/5	4	3	3		4	Wheat, barley, oat, wheat chaff.
63	6331	40	1300	To do					3/5	5	3	3	<1	5	Wheat, barley, oat, wheat & barley chaff.
64	6405	15	2700	112.5	9/30	12			5/5	5	5	2		5	Wheat, barley, oat, wheat chaff.
64	6407	17	2500	90		2		51	3/5	5	3	3		5	Wheat, barley, oat, wheat chaff.
64	6408	16	6000	40	1/1.5	3			2/5	5	1	2		3	Wheat, barley, oat, wheat chaff.
64	6414	19	6000	535	9/53	153			5/5	2^	3^	5^		5	Wheat, wheat & barley chaff.
65	6511	28	2000	80	13/47	22			5/5	4	2	2		5	Wheat, barley, oat, wheat & barley chaff.
68	6803	39	1500	13	2/17	<1	3/5		2/4	5	4	2		3	Wheat, barley, oat, wheat chaff.
68	6808	52	3000	5	13/53	13	2/1.5		3/4	1	1	1	<1	4	Hob nails x2 Wheat, wheat chaff.
68	6814	53	1200	12	2/1	23			5/5	1		1		3	Wheat, barley.

£/# count/weight. *frequency 1 = 1-10; 2 = 11-50; 3 = 51-150; 4 = 151-250; 5 = >250 items. ^ estimated frequency.
*/# charcoal frequency: >2mm / <2mm. */# frequency/ species diversity 1=1-3; 2 =4-10; 3 = 11-25; 4 = 26-50; 5 = >50 species.

Table 6: The non-industrial finds from the samples (extracted from the Environmental Archaeology Consultancy Assessment Report).

Trench 54 Furnace.

This Trench was sited near to the southern boundary of the northern area, adjacent to Long Wood. The truncated remains of furnace/ oven [5407] was the only archaeological feature found within it. A single sample (context 5404, sample 3) was taken from this feature for dating purposes (Table 5) and to characterise its fill (Table 7); there are no hand-collected finds.

Cont	Sample	Fraction	Type	Count	Weight	Description
5404	3		Slag	2	<1g	Possibly ore?
5404	3		Fclay	16	2g	Most buff/brown coloured; some temper??
5404	3	>7mm	Residue	1500	3485g	Limestone; many burnt red. Discarded.
5404	3	2-7mm	Residue		1017g	Limestone; many burnt red; occasional flint. Discarded.
5404	3	<2mm	Residue		237g	Limestone; many burnt red; occasional flint/ charcoal. Discarded.
5404	3	2-7mm	MagMat		39g	Brown slag/ fired clay or pottery; ore.
5404	3	<2mm	MagMat		39g	No hammerscale identified.

Table 7. The content of Trench 54 Sample 3.

The sampled context is interpreted as fuel debris from the remains of a fire within the structure, apart from a few crumbs of fired clay (pottery??) this deposit is composed almost entirely of charcoal and limestone. The feature does not appear to be clay lined and no attempt has been made to insulate it. The lack of iron slag and roasted ore, both within or near the feature has to make its interpretation as a furnace tentative, although the excavators were confident that it was. The radiocarbon date, if correct, would suggest that this feature was roughly contemporary with the channel hearths and furnaces in Trench 87.

Trench 63 furnaces and pit and Trench 65 pits.

These Trenches were located adjacent to each other in the central part of the northern half of the site. Within Trench 63 were a large number and range of archaeological features including ditches, a corn drier and a robbed out stone wall as well as two furnace clusters, one cut by a later pit and an adjacent pit. Furnace group [6301] was excavated and sampled; the pit alongside the unexcavated furnaces [6302] was also sampled but categorised as a non-industrial sample. Large pieces of hand-collected slag, as well as sampled slag, were recovered from both trenches. The sampled slag and associated finds were only rinsed in the flotation tank and are therefore still quite dirty, so selected pieces have been more thoroughly washed and these have been recorded in greater detail (see Appendix 1).

The Catalogued Assemblage (Appendix 1, Summary Table 9).

The slag from both Trenches is dominated by what have been termed here pitslags? and fragments of them (catalogued as tap: charcoal-moulded flows), but some appear to have broken into segments (for example a piece from (6332) maybe 25% complete while 50% of another from (6528) survives). Table 8 gives the measurements of the more complete examples.

Context	Type	Weight	Measurements	Comments
6312	Pitslag?	5615g		Upper solid layer 70mm thick.
6329	Pitslag?	4388g	230 x 200 x 90mm	No basal flows; base rounded.
6329	Pitslag?	2589g	205 x 125 x 100mm	Basal flows missing.
6329	Pitslag?	3832g	240 x 175 x 140mm	Complete.
6332	Pitslag?	2115g		25% segment of upper layer; radius 110-120mm
6521	Pitslag?	2706g		Segment? Maximum width 220mm; total height 100mm.
6528	Pitslag?	6350g		50% segment; upper layer 50mm thick; width 290mm; total height 100mm.
6528	Pitslag?	1801g		Total height 75mm.
6329	Tap cake	9074g	300 x 260 x 100mm	Layers of tap slag.
6329	Hearth Bottom	95g	70 x 55 x 30mm	
6329	Hearth Bottom	981g	150 x 120 x 60mm	

Table 8. The measurements of the possible hearth bottoms and more complete smelting slags.

It is assumed that each pitslag is probably the by-product of a single smelt and that it formed in the base of the furnace although this is not certain. The majority have a dense upper section, *c*. 40-50mm thick, with either a flat or bowled slightly rusty-looking (but not magnetic) upper surface. Occasionally this layer is not present (for example (6312) weighing 612g). Below this is a network of a mass of slag flows moulded around and between generally very large charcoal imprints, or more rarely charcoal pieces. Close to the denser top the slag may resemble furnace slag (thereby some have been recorded as such), but the lower flows have obviously collected within and around a deep charcoal bed. Most of the smaller pieces of slag are flows that have become detached. Very few of the pitslags have pieces of furnace structure incorporated within them or attached to their outer surfaces. Associated with this assemblage, however, appear to be a number of 'complete' pieces of slag that are light in weight, these are probably completely vitrified and slagged pieces of furnace structure (for example four from (6329) weighing 295g).

In contrast to the pitslags there is one very large multi-layered tap cake that was almost certainly moulded by a rounded-based tapping pit sited beside a furnace. It is very large (300 x 260 x 100mm) and weighs over 9kg. This, plus ten other typical tap slag pieces (weighing 2660g) were recovered from the primary fill (6329) of the 'working hollow' [6330] just in front of furnace [6333].

Trench	Cont	Samp	Furnace slag		Furnace structure		Ore		Pitslag		Slag		Tap slag		Other
			no.	g	no.	g	no.	g	no.	g	no.	g	no.	g	
63	6312 *	32	3	1670					7#	12809	3	246	3	61	
63	6329	35	1	364	166	4986	120	2082	4#	11955	648	3516	23#	12233	25 fired clay (64g); 2 HB (1076g).
63	6332	37	1	1075	351	880	47	429	2	2577	6	352	9	373	21 fired clay (27g); 48 limestone (110g).
63	6334	42			375	820	69	1446			52	231	43	534	Concretion (59g).
65	6505	25	1	844	14	18	1	65					50	131	
65	6515	49					2	36	3	2087			95	436	
65	6521	33							2#	3220			80	203	
65	6526	50							1	2930			26	124	
65	6528	-							2#	8159					

HB: Plano-convex slag accumulation (commonly called hearth bottoms) - ?evidence for iron smithing.
* Non-industrial sample (from pit [6314] between the furnace clusters in Trench 63.
# Includes hand-collected slag.

Table: 9. Summary of the hand collected and sample residue contents from the Trenches 63 and 65 furnace and pits, including the finds extracted from the >7mm residue (for the full catalogue see Appendix 1). For the original sample and residue sizes see Table 2.

Trench	Cont	Samp	Fraction	Type	Weight	Description
63	6312	32		Residue subsample	297g	Slag; ore; furnace structure; limestone; tap balls.
63	6312	32	2-7mm	MagMat	78g	Brown slag; ore; furnace structure; 25 plate hammerscale.
63	6312	32	<2mm	MagMat	32g	50% scanned; 300+ plate + 15 spheroidal hammerscale.
63	6329	35	>7mm	Residue	1443g	Unsorted small pieces.
63	6329	35	2-7mm	Residue	1490g	Furnace structure/ fired clay/ slag/ ore/ limestone; few charcoal.
63	6329	35	<2mm	Residue	552g	Furnace structure/ fired clay/ slag/ ore/ limestone/ charcoal/ sand.
63	6329	35	>7mm	MagMat	50g	Ore; brown slag + tap.
63	6329	35	2-7mm	MagMat	237g	Ore; slags including tap balls + plates.
63	6329	35	<2mm	MagMat	95g	50% scanned; 200+ hammerscale; 50% plate + 50% spheroidal.
63	6332	37	>7mm	Residue	376g	Slag/ furnace structure; ore. Very dirty.
63	6332	37	2-7mm	Residue	570g	Furnace structure/ limestone; ore; slag.
63	6332	37	<2mm	Residue	188g	Furnace structure/ limestone; charcoal; ore.
63	6332	37	>7mm	MagMat	21g	Brown slag; ore; furnace structure; tap ball.
63	6332	37	2-7mm	MagMat	121g	Ore; tap; furnace structure; tap ball.
63	6332	37	<2mm	MagMat	39g	50% scanned; 50+ plate hammerscale + 10 spheroidal.
63	6334	42	>7mm	Residue	539g	Limestone; iron-rich concretion - discarded.
63	6334	42	2-7mm	Residue	586g	Fired clay (some pot?); ore; brown slag; limestone.
63	6334	42	<2mm	Residue	188g	Fired clay (some pot?); ore; brown slag; charcoal; limestone.
63	6334	42	>7mm	MagMat	26g	Brown slag/ iron-rich concretion.
63	6334	42	2-7mm	MagMat	77g	Ore; brown slag.
63	6334	42	<2mm	MagMat	30g	100% scanned; 25+ hammerscale; 50% plate + 50% spheroidal.
65	6505	25	>7mm	Residue	2362g	Limestone - discarded.
65	6505	25	2-7mm	Residue	1602g	Limestone; occasional fired clay; rare charcoal - discarded.
65	6505	25	<2mm	Residue	410g	Limestone; occasional fired clay; rare charcoal - discarded.

65	6505	25	2-7mm	MagMat	29g	Slag/ ore/ charcoal; includes a few tap balls.
65	6505	25	<2mm	MagMat	8g	100% scanned; 50+ plate hammerscale + 3 spheroidal.
65	6515	49	>7mm	Residue	2959g	Limestone - discarded.
65	6515	49	2-7mm	Residue	1920g	Limestone - discarded.
65	6515	49	<2mm	Residue	581g	Limestone; rare charcoal - discarded.
65	6515	49	2-7mm	MagMat	10g	Slag; 1 tap ball.
65	6515	49	<2mm	MagMat	5g	100% scanned; 5+ plate + 1 spheroidal hammerscale.
65	6521	33	>7mm	Residue	2909g	Limestone - discarded.
65	6521`	33	2-7mm	Residue	1075g	Limestone; rare charcoal - discarded.
65	6521	33	<2mm	Residue	508g	Limestone; rare charcoal - discarded.
65	6521	33	2-7mm	MagMat	3g	Slag.
65	6521	33	<2mm	MagMat	4g	100% scanned; no hammerscale.
65	6526	50	>7mm	Residue	3729g	Limestone - discarded.
65	6526	50	2-7mm	Residue	1586g	Limestone - discarded.
65	6526	50	<2mm	Residue	462g	Limestone; rare charcoal - discarded.
65	6526	50	2-7mm	MagMat	3g	Slag.
65	6526	50	<2mm	MagMat	2g	100% scanned; 3 plate hammerscale.

Table: 10. Description of the unsorted residues from the Trench 63 and 65 furnace and pit samples. The content is given in descending order (the residues are too dirty to give percentages). For the original sample and residue sizes see Table 2.

The ten tap fragments have a large number of furnace structure fragments on their bases and resemble the tap slag from Trench 87.

Most of the furnace structure fragments recovered from these Trenches were small and grey, cream or pink in colour. It is uncertain whether one or more fabrics is present. There is, however, one large piece that may once have been close to, or part of a furnace air hole (although no part of the hole - or an indication of its size - survives). The piece from context (6329) consists of a pinky cream layer that has spalled off the inner face of a furnace wall. This has been slag attacked to a depth of up to 40mm and now a dense slag layer is attached to this furnace clay. Inside and attached to this slightly curved layer is a thin hearth bottomed-shaped piece of magnetic slag that may be the residue of a bloom and represent the site from which the bloom was removed (assuming one was successfully made). The top of the furnace wall is glazed light green (c. 30mm thick) and it has a stepped profile, perhaps due to pieces fracturing off. This piece of furnace structure is delicate and has been wrapped in bubble wrap to protect it.

There are only two possible plano-convex slag accumulations (commonly known as hearth bottoms) that may be by-products of bloom or iron smithing, both from 'working hollow' [6330]. They are both the correct form and both have small to medium charcoal imprints or inclusions, rather than the very large ones found in the smelting slags. Neither are magnetic. There are also a few small indiscriminately-shaped brown slags (that are often magnetic) that could be by-products of either smelting or smithing amongst the magnetic element of the residues.

The Unsorted Residues (Table 10).

The finds were extracted from the >7mm fraction, the remainder of the residues were then subdivided using a magnet to form the magnetic and non-magnetic elements. The main components of the non-magnetic residues are slags, ore, furnace structure and/ or fired clay and charcoal in varying ratios and for each sample these are different indicating that there are subtle differences between the constituents of the context fills. The quantities recovered and the variety were much higher for the Trench 63 samples, those from Trench 65 comprised in the main pieces of limestone.

Likewise for the magnetic element which inevitably is mainly composed of slags and roasted ore. The key component sought in these, particularly within the <2mm fraction, was hammerscale which should be present if the initial smithing of the bloom to bar occurred close to the furnaces (perhaps using the residual heat in the furnace to heat the bloom in the early stages). Hammerscale was present in a significant quantity in all the Trench 63 samples - including Pit [6314], but only Pit [6506] in Trench 65 produced an appreciable amount. Secondary-smithing hammerscale assemblages are usually dominated by plate scale but on smelting sites the ratio of plate to spheroidal can be closer to 50:50 because spheroidal may be produced within furnaces during a smelt (pers. comm. P Crew) but it is also a by-product of welding (Starley 1995 , Dungworth and Wilkes 2005). Two assemblages have distinctive smelting scale assemblages, the 'working hollow' [6330] and the lower fill of the furnace (6334). The spheroidal count for the upper furnace fill (6332) is fairly high, but the hammerscale assemblages from the Pits [6314] and [6506] are more usual, this does not however, mean they were not generated by bloom smithing.

Site discussions.

A radiocarbon date of Cal BC 170 to Cal AD 40 was obtained from fill (6332) of furnace [6333] but 18 small Nene Valley ware 2nd - 3rd century sherds (identification Barbara Hurman) were recovered from the basal fill of the same furnace. Fill (6332) also contained a hobnail from a Roman shoe. Some other features in the Trench have also been dated to the Roman period on the

basis of small pottery assemblages. Whether any are contemporary with the furnaces is uncertain but it is a possibility.

The excavated furnace group in Trench 63 consisted of the remains of at least five inter-cutting furnaces which were in turn cut by a large later pit. (For a detailed description of all the furnaces see Fell 2006, 39-45.) The latest furnace [6333] was the deepest and closely parallels examples found during the earlier Wakerley excavations (Jackson and Ambrose 1978). It had been built in a hollow at least 0.45m deep cut into the limestone brash, had a thick white clay lining with vertical internal walls and a flat base. Traces of an arch facing west may have survived (it may have been quite large), in front of which a 'working hollow' [6330] was located but the sides of this hollow sloped steeply upwards from immediately in front of the arch allowing no standing and little 'working' space. Although this deep pit would have enabled access to the base of the furnace to allow it to be emptied, repaired *etc* it is very steep sided and the lack of a 'floor' space makes it difficult visualising how it functioned. These are, however, features that are present on other Wakerley examples. On the south side of the furnace at the very top of the surviving wall, was an area that had vitrified from the inside to some depth into the wall, indicating that this had been a very hot zone, perhaps the location of the air hole. If this interpretation is correct it might suggest that the air hole ran at an angle through the furnace wall, the entry point being above the ground surface on the outside of the furnace, while the air entered into it some distance below. This furnace was much deeper than any of the others in the cluster and thus it is better preserved. It may also have functioned in a different way because none of the others appeared to have a similar 'working hollow', however, the area was not completely excavated including an area of dark soil immediately to the northwest of furnace [6339] (Fell 2006, Plate 24, 41).

The three samples taken from furnace [6333] and the associated 'working hollow' show a degree of variability - the content of the upper and lower fills from within the furnace are quite different (Table 10) with, for example, much larger pieces of slag being recovered from the upper (6332) (average weight 243g) but all the pottery and a large quantity of small slag fragments from the lower (6334) (average weight 8g). Both understandably contain a large quantity of furnace structure. The significantly larger assemblage from 'working hollow' [6330] fill (6329) can be explained by the fact that it was a larger context and therefore produced a much larger sample (30 ltr as opposed to 8 and 10ltr). It has perhaps been infilled with what appears to be an assemblage of general smelting detritus generated by this technology and may include a representative sample of the smaller fractions (for example the slag balls and plates). The differences between these three assemblages is no doubt complex, and their interpretation can only benefit from the excavation of further furnaces.

Pit [6314] adjacent to the unexcavated furnace cluster [6301], contained only large pieces of slag (average weight 924g), but it was processed and recorded slightly differently so this may in part be misleading. Although originally described as a rubbish pit, it was clearly not receiving domestic refuse (Table 5) and slag (with a minimum amount of furnace structure and ore) was the main component of its fill. Interestingly the fill of the late Roman pit [6316] that cut furnace complex [6302] contained no slag. The content of Pit [6314] is completely different to the pits found in nearby Trench 65 (see below).

To the south of the furnaces Pit [6304] was recorded (only half lay within the Trench) with a diameter of *c*. 1.1m. It has been recorded as a furnace or corn drier in the context descriptions (Fell 2006, Plate 17, 36) but a more probable interpretation is that of ore roasting pit. The upper fill (6309) contained purple to black pieces of ore but unfortunately they were not sampled so their magnetism cannot be checked. The lower fill (6303) was kept as sample <27> which has not been

processed, but includes a large piece of pitslag? with additional smaller fragments and pieces of pink fired clay/ furnace structure suggesting it could have been contemporary with the furnaces. A possible interpretation for this feature therefore is that it functioned as a circular ore-roasting pit, serving the two clusters of furnaces in this Trench with some of the bonfire-roasted ore they required.

In Trench 65, just to the north east of Trench 63, a more limited range of features was found some Roman in date. Under consideration here are a group of eight pits and post holes five of which had substantial lumps of slag centrally placed within their fills (the three others were not excavated but no slag was visible within them). The possibility that they were the bases of some type of pit furnace was initially considered but none were clay lined and the natural strata at the base and around the sides showed no sign of heating or burning. The pit fills contained virtually no other finds (Tables 6, 9 and 10) and a limited amount of charcoal so clearly domestic refuse was not being discarded within them. The features vary in size and two may have contained just a single piece of slag, Pit [6514] fill (6515) and neighbouring Pit [6513] fill (6526), while Pit [6527] fill (6528) and Pit [6520] fill (6521) both had two. The small pieces of tap found with them are all charcoal-moulded flows that may have broken off the main pieces. The southern most feature in the group, and the closest to the furnaces in Trench 63, had a slightly more varied assemblage contained within it. Pit [6506] also had one main large piece of slag (possibly a pitslag? fragment although recorded as furnace slag), but also four pieces of tap slag similar to those from Trench 87 (see below) amongst the charcoal-moulded flows and pieces of furnace structure. This greater diversity is also apparent from the finer residue fractions and the magnetic matter, the latter containing smithing debris in the form of 50+ plates of hammerscale.

The reason for the placement or discard of the pieces of slag in this cluster of features remains problematic. Their central siting, however, rules out such pragmatic interpretations as post packing. The slag only became visible in the pits once the top soil had been removed, the depth to which the slag was originally buried is unknown.

Trench 63 and 65 Summary.

Iron was evidently once smelted in Trench 63 as is indicated by the two clusters of inter-cutting furnaces. These furnaces were found almost fortuitously at the northern limit of Trench 63, the Trench was enlarged when the edge of the first cluster was found, thus revealing the second furnace group [6301]. Both groups are less than $3m^2$, which reinforces just how small these industrial features are that may have produced tonnes of iron and significant quantities of slag. The excavated furnaces may have consisted of more than one type as only one - the latest- had been set nearly 0.5m into the limestone brash. The pitslags? suggest that a non-tapping technology was employed and instead the slag flowed downwards, perhaps inside the furnaces, to cool within a deep bed of charcoal. A circular pit also found in the Trench may have been used for ore roasting.

Smithing, probably of the blooms, occurred close to these furnaces as is attested by the hammerscale assemblages. Only two smithing slags, both hearth bottoms, were recorded.

In Trench 65 the pitslags, perhaps from neighbouring Trench 63 furnaces, were discarded or placed centrally in a group of pits. Apart from the slag and a very limited amount of charcoal there were no other finds in the pits, which had little else in common being a variety of shapes and depths.

Charcoal was the sole fuel identified and very large imprints of it in and on the pitslags? are very common. When identified mature oak is usually the preferred wood for iron smelting and that seems to have been the case here (see Gale above; Gale 2003).

The predictive tools used in advance of the excavation were not entirely successful in locating these concentrated intercutting furnace sites. With the surface area covered by them being so small the location of geophysics transacts and the intervals between readings become vital if they are to be identified; they are just too easy to miss. No slag concentrations were identified close to them during fieldwalking and this may be due to the manner in which pitslags? were discarded, or perhaps even the quantity of slag by-products produced in these furnaces (modern experiments trying to replicate bloomery iron production successfully make iron but seldom produces slag!). There are a range of possibilities for the lack of slag on the surface and this should be explored during further field work.

Trench 87 layers, furnaces and pit.

This Trench had the greatest concentration of archaeological features associated with the smelting of iron (Fell 1006, 64-71); there was no evidence for domestic or agricultural activities and the only dating evidence is the Radiocarbon date from furnace fill (8710) and the channel hearth fill (8711) (Table 5). Samples were taken from the slag layer (8703), central pit [8722], furnace [8709] and channel hearth [8712] (Tables 2, 11 and 12), no hand collected slag was recovered. The slag and associated finds were only rinsed in the flotation tank and are therefore still quite dirty, so selected pieces have been more thoroughly washed and these have been recorded in greater detail (see Appendix 1).

The Catalogued Assemblage (Appendix 1, Summary Table 11).

The slag assemblage from this Trench is dominated by tap slags that are generally black and glossy, non-magnetic and in a fresh condition. All of the tap has the usual ropey flowed appearance that is so characteristic of this type of slag. These flows are often layered, with the earlier flows evidently having time to cool and solidify before later flows were tapped on top and many are small to medium in size but some larger and broader ones are also present.

There are, however, a number of distinct characteristics that are not commonly found in tap assemblages. The bases of the flows are particularly glossy and while it is often clear at most sites that the tap slag has been tapped onto a fairly flat bed of charcoal, this is not apparent with this slag. Instead it seems to have been tapped onto small grey/ cream/ white pieces of disintegrated furnace structure and a thin layer of similar furnace fragments is also sometimes apparent layered between the different tap flows. The pieces of furnace clay are not vitrified and show no signs of being slag attacked, suggesting that the slag may have been fairly viscous when it flowed onto the bed formed of these fragments. There is also sometimes a remarkable amount of furnace structure incorporated within the pieces of tap and these tend to be larger than those on the base. There may be less furnace structure within the slags from the charcoal rich layer (context (8704)) than from the overlying slag layer (8703) but this could be a sample bias. The quantity of furnace structure on the base, and in many instances incorporated throughout the slag, is unusual and suggests that quite a lot of damage may have been done to the furnaces during, or between, the smelts. This could either be due to the nature of the clay used to build them (it appears to be quite silty and has a low iron content) or because of the technology/s employed.

The ropey flowed nature of some of the pieces, particularly some from (8703), is exaggerated and from both the base and the top of the pieces, it is evident that they are composed of layers of multiple long thin winding flows. Many of these have a very slightly V- shaped base (although a few are flat). The majority of the fragments of tap slag recovered are small in size (few individually weigh over 500g) and no large cakes of layered slag were recovered similar to the one

from Trench 63. These are thin for tap cakes, the maximum thickness recorded was 55mm, with around 20 – 30mm being the norm. Dribbles and blobs of tap are also quite common and there are a few non-magnetic tap prills.

A distinct type of tap slag is described in the catalogue comments section as volcanos, because of their shape. There are only two from these samples, both from context (8703) and they weigh 572g and 1580g, the latter the heaviest piece recovered from this Trench. This large piece also has large charcoal imprints within it and may have some rusty-brown furnace slag attached to one end. The volcanos are composed of small to medium sized flows that appeared to have flowed down a slope from a narrow source. These might suggest that there was a drop from the furnace into the tapping pit, although they can form within the furnace as has been shown by experimental work (The Wealden Iron Research Group smelt 15/09/02).

Furnace slag, namely pieces of slag that have cooled within the furnace and characteristically are large, have frequent ore and large charcoal inclusions and may be magnetic, are not uncommon finds on smelting sites. Only two small fragmentary pieces, however, were recovered in these

samples, both from (8703). The lack of this type of slag is unusual, perhaps a possibility is that they were fed back into the furnace during the following smelt, because it is unlikely the process resulted in none being formed.

There are two small fragile pieces of slag that are oval in section and weigh only 44g and 12g (contexts (8703) and (8704) respectively). Both have a very glossy purple-mid brown surface with a mid-light brown frothy core. They are unlike any smelting slag this author has encountered

The rest of the slag assemblage is composed of small knobbly, indiscriminately shaped rusty brown pieces of slag. Most are magnetic, some are cracking suggesting a metallic iron content and many incorporate small to medium sized charcoal inclusions or imprints. These could be pieces of furnace slag, or an equivalent that cooled or formed in the furnace or a by-product of bloom smithing. They are much more common finds in this Trench compared to Trench 63 and the smaller pieces form a significant component of the magnetic matter extracted from the residues (see below and Table 8).

An exceptional quantity of furnace structure has been recovered from this site as individual pieces and incorporated within the slags. Some maybe fired clay from the linings of other features. Most are a white/ grey/ cream colour although a few are an orangey-pink and they all appear to be made from a similar clay fabric with a very low iron content - presumably local, but this will need testing by a more thorough examination. Surfaces are not uncommon with most appearing flat, however, the small size of the pieces makes any reconstruction of the furnaces impossible. There is one piece which resembles a fragment of brick (context (8704), weight 237g). It has a yellowish core but this is almost totally concealed below slag with attached grey/ cream furnace fragments. A single piece from context (8711) may have imprints from wooden shuttering on its surface (weight 14g).
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Tr	Cont	Samp	Vol	Weight	Residue vol	Residue weight	Unsorted residue *	Magnetic element	Furnace slag		Furnace structure		Ore		Slag		Tap slag		Other
			ltr	kg	ltr	Kg	kg	kg	no.	g	no.	g	no.	g	no.	g	no.	g	
87	8703	22	40	48	21	30.97	3.029	0.896	2	241	1346	3143	5	119	537	1689	966	18986	1 pebble frag, 25g.
87	8704	21	40	47	16.5	20.39	4.571	2.917			251	874	213	1165	230	958	625	7845	49 limestone, 389g
87	8710	47	2	2	0.6	0.74	0.129	0.453			26	20	39	43	3	1			

* After the following categories have been extracted.
Furn: Furnace slag; Furnst: Furnace structure - some may be fired clay; Tap:Tap slag. All by-products of iron smelting.

Table: 11. Summary of the residue contents from Trench 87 layers, furnace and pit, including the finds extracted from the >7mm residue.

Trench	Cont	Samp	Fraction	Type	Weight	Description
87	8703	22	>7mm	Residue	913g	Tap and brown slags / ore; furnst and or fclay.
87	8703	22	2-7mm	Residue	1659g	Tap slag (including dribbles) and brown slags; charcoal; ore; furnst and or fclay.
87	8703	22	<2mm	Residue	427g	Charcoal; ore; slags - including tap plates and ?balls.
87	8703	22	>7mm	MagMat	481g	Brown slag; rare ore.
87	8703	22	2-7mm	MagMat	304g	Brown slag/ ore; few furnst; occasional tap plates (not hammerscale)
87	8703	22	<2mm	MagMat	111g	25% scanned for hammerscale. 29 possible pieces found (8 x spheroids) all probably tap flakes and balls.
87	8704	21	>7mm	Residue	1778g	Ore; tap slag; few furnst and or fclay; occasional flint. 5 pieces of limestone.
87	8704	21	2-7mm	Residue	3088g	Ore/ tap slag/ furnst and or fclay - in equal proportions?
87	8704	21	<2mm	Residue	705g	Ore/ tap slag/ furnst and or fclay - in equal proportions? Plus some charcoal.
87	8704	21	>7mm	MagMat	1084g	Ore; brown slag; 1 thick tap plate.
87	8704	21	2-7mm	MagMat	1437g	Ore; brown slag; occasional tap slag / limestone / furnst.
87	8704	21	<2mm	MagMat	396g	25% scanned for hammerscale. <10 possible pieces found, all probably tap flakes and balls.
87	8710	47	>7mm	Residue	4g	Furnst and or fclay; slag.
87	8710	47	2-7mm	Residue	85g	Furnst and or fclay; ore; charcoal
87	8710	47	<2mm	Residue	40g	Charcoal; furnst and or fclay; ore.
87	8710	47	>7mm	MagMat	227g	Ore.
87	8710	47	2-7mm	MagMat	226g	Ore; few furnst and or fclay; black slag flakes; rare charcoal.
87	8710	47	<2mm	MagMat	77g	25% scanned for hammerscale - none found. Ore; few furnst and or fclay; charcoal.

It may be worth a botanist examining some of the finer residues with a high charcoal content in a further phase of work.

Table: 12. Description of the unsorted residues from the Trench 87 layers, furnace and pit samples.
The content is given in descending order (the residues are too dirty to give percentages).

The Unsorted Residues (Table 12).

The main components of the non-magnetic residues are slags, ore, furnace structure and/ or fired clay and charcoal in varying proportions and for each sample these are different indicating that there are differences between the constituents of the context fills. Likewise for the magnetic element which inevitably are mainly composed of slags and ore. The key component sought in these, particularly the <2mm fraction, was hammerscale but almost no convincing scale was found with the few most probable pieces all coming from channel hearth [8712]. This strongly suggests that the bloom smithing occurred elsewhere.

Site discussion.

The two radiocarbon dates for this trench are Cal AD 690 to 900 for the fill of Furnace [8709] and Cal AD 790 to 990 for the fill of Channel hearth. [8712] (Table 5). No other datable finds were recovered.

All the cut features in Trench 87 were sealed by the charcoal-rich layer (8704) and the overlying slag deposit (8703), which suggests that the furnaces, pit, ditch and hearths were part of the same industry and functioned over the same date span. Although similar sized samples were taken from the two layers (40 litres) the weights of the residues give an early indication of the differences in composition between the two deposits (Table 11). The lower layer (8704) was described in the context records as being charcoal rich and very ashy (the latter would have washed away during flotation). It has a sorted and unsorted residue of roughly equal parts furnace structure (average weight 3.5g), ore (5.5g), miscellaneous slags (4.2g) with the tap slags (12.5g) being very slightly dominant. Ore fines and rusty-brown slags comprise the majority of the magnetic element. This was the only sample to include a number of pieces of limestone. The content of the sample from (8703), however, is dominated by the slags (average weight for the tap 19.6g), which will account for the higher total residue weight. Ore forms a minor component. This layer, described as comprising 80% slag on site, is probably the flattened remains of a slag heap that was used to infill the hollow, although the total quantity - given the number of possible furnace bases - is very small. There was very little slag in the top soil covering this Trench, certainly not enough to indicate that layer (8703) lay just below, even though the fieldwalking identified it as a high-density area (Fell 2006, Figure 4, 11). The limited quantity of slag combined perhaps with the absence of large cakes, suggests that most of the heap may have been removed at some date either for use as hard core or perhaps to be resmelted. (These slags will have an iron content of over 50% and were used by the blast furnace industry as an 'ore'.)

The features and layers in this Trench survived because they were sited in a shallow hollow, probably man-made, that had prevented them from being destroyed by plough damage. There was no buried soil beneath any of the features or layers and the surface on which the smelters worked (unless it was 8704) was not positively identified. The irregular arc of five furnaces was on the periphery of the hollow and therefore had suffered a high degree of truncation with only the heat reddened bases surviving. There was no evidence that any of the furnaces had been substantially repaired or rebuilt, although the level of truncation may have destroyed this information especially if the later furnaces had been built higher up. Sample <47> of the lower fill of excavated furnace [8709] contained almost no slag but some furnace structure and ore, both of which dominated the unsorted residues (Table 12). The ore levels may be so high because possibly a layer of ore fines was maintained (or left) in the base of the furnace, and the slag was tapped onto this. The Laxton furnaces had a similar layer within them (Crew 1998).

The arc of furnaces surround a central-irregularly shaped pit that had been dug into the centre of the hollow, so that the ground 'in front' of each furnace sloped down towards it. Initially it was suggested that it could have functioned as a 'communal' tapping pit that was used by all the furnaces because the natural in the base of it was scorched to a red-brown. It is, however, over 2m away from the surviving edge of any of the furnaces and this seems too far for it to have performed this function. Hot slag straight from a tapped furnace could have been dragged into it to allow it to cool, which would then clear the working area in front of the furnaces from any dangerously hot slags. The upper part of the pit was filled with layer (8704).

To the north east of the pit and furnaces were three very similar, almost parallel, channel hearths ([8712], [8714] and [8717]) with a north-east to south-west alignment (see below). An east-west ditch sealed by 8704 cut the three hearths; no function for it was defined although drainage was considered a possibility. Hearth [8714] was also cut by an unexcavated deposit (8718), filled with charcoal, that extended beyond the limit of the Trench. This should be explored further in case it related to fuel provision and storage.

Trench 87 summary.

The dates suggest that this Trench uncovered part of a Mid-Late Saxon iron-smelting site, its true extent should be explored at a future date. There is plentiful evidence from this Trench to indicate that iron was smelted here in the furnaces found using a slag-tapping technology. The arc of bloomery furnaces around the perplexing central pit is an unusual arrangement, however, although the furnaces are probably too damaged for further technological details to be teased out of them, the pit certainly warrants further examination. During the process the furnaces, made from a white clay with a low iron content, suffered some level of damage which resulted in the large amount of, albeit small, structural pieces becoming incorporated in the slags. This no doubt necessitated a regime of repairs but presumably it was not significant enough to be problematic for the smelters. Similar quantities of furnace structure were found on the bases and incorporated within the tap slags found at Cross Leys Quarry, Wittering, just 8km to the north east of Wakerley. A feature containing the slag was dated to Cal AD 660 - 890 (Beta-175052; 1260+/-50BP).

It would be expected that primary smithing was undertaken at the smelting site, but there is no convincing evidence for it from this Trench. The only piece of slag that was tentatively identified as being a by-product of smithing was a proto-hearth bottom from context (8704), but with several hundred other pieces of rusty-brown slag of similar size this is probably purely coincidental. The almost total lack of hammerscale is the most convincing argument that the bloom smithing occurred elsewhere. Hammerscale is light and easily wind-borne and if it was being generated close to the site, some would be expected.

Charcoal was the sole fuel identified but imprints of it in and on the tap slags were rare and although large pieces are needed, inclusions in the rusty-brown slags were all small to medium in size. When identified mature oak is usually the preferred wood for iron smelting and that seems to have been the case here (see Gale above; Gale 2003).

Both the geophysical and field walking surveys were more successful in predicting the location of these furnaces, with a scatter of tap slags being identified in the top soil around the Trench, although less dense than may be anticipated for a smelting site. This strongly contrasts with Trench 63 and it is probable that this is due to the different slag types produced and scale (in surface area) of the sites.

The channel hearths in Trenches 12, 87, 93 and 94 (Table 13).

The only features definitely associated with iron smelting in Trenches 12, 93 and 94 were the channel hearths; a small pit in Trench 12 has tentatively been described as a furnace/ kiln because of its charcoal rich basal fill, but there was no clay lining in the pit. The three from Trench 87 were sealed under a charcoal-rich layer with slag above and nearby was an arc of five furnaces. The samples from Trenches 12, 87 and 93 were radiocarbon dated (Table 5) and fairly similar mid-late Saxon dates were obtained from them. None of the finds from these features have been catalogued in detail, instead they are just listed in Table 13 as part of the sample residue descriptions.

The channel hearths were cut into the underlying natural clay (and limestone brash in Trenches 12 and 13) and most are aligned to between north-east/ south-west and north-north-east / south-south-west suggesting the prevailing wind may have aided their function. The exception is [1303], which is due north south. The surviving measurements at the base of the modern topsoil are typically 4m long, 0.3m wide and up to 0.3m in depth. The well preserved examples have a symmetrical U-shaped section. Three of the hearths in Trench 93 are almost parallel as are the two in Trench 94 and three in Trench 87. One group found during the previous excavation were a linear row of three, but the orientation is not given, although it is explicitly stated that they contained no magnetic material (Jackson and Ambrose 1978, 54). At the nearby village of Bulwick parallel groups of four and one of five hearths were found (Jackson 1979), but the orientation of the groups were varied. It is uncertain how the groups of hearths in each Trench functioned in relation to one another.

The base and the sides of the hearths had been heat effected and burnt to a distinctive mauve purple colour. Charcoal, perhaps from the last firing of the hearths was the main component of the basal fills. The sample residue from Trench 12, fill (1207), is very mixed and dominated by limestone. The feature was very truncated and plough damage may have introduced some of these elements. The presence of tap slag perhaps suggests that furnaces exist on this part of the site, although none were found during the evaluation. In Trench 87 a sample from the most northern hearth ([8712], fill (8711)) was processed but only a small residue was recovered comprising furnace structure (or fired clay) and slag with some ore. The large amount of tap slag recovered probably reflects the fact that the feature was sealed by layers composed mainly of this type of slag. A second sample was taken from Hearth [8717] fill (8716) but was not processed. A dried subsample of it consists of a mass of charcoal with occasional lumps of deep red-mauve fired natural held in a clayey soil matrix (sample <48>). Roasted ore, mostly black in colour rather than an oxidised red, forms the washed magnetic component.The processed samples from Trenches 93 and 94 (fills (9306) and (9404) respectively) are very similar in content and both are dominated by the ore component. Magnetic (mostly red to black in colour) and non-magnetic ore is present with the average weight of the extracted pieces from both Trenches weighing an identical 2.1g. Pottery crumbs in (9306) and (9404) were too small to positively identify as such (pers. comm. A. Fawcett). There is some fired clay but no slag amongst the residues, unlike those from Trenches 12 and 87. The other significant component is charcoal, and the large flots were found to contain not only wood charcoal but also cereal grains and chaff (Table 6). This is present in all the channel hearths and suggests that arable waste was perhaps used as tinder, but perhaps more significantly it clearly indicates that the users of these hearths were closely involved with the local arable economy.

Tr	Cont	Samp	Fraction	Type	Count	Weight	Comments
12	1217	7	>7mm	Fclay	9	7g	Red, light and dark grey, cream and orange.
12	1217	7	>7mm	Furn st	1	4g	Cream coloured.
12	1217	7	>7mm	Lime st	160	450g	Discarded.
12	1217	7	>7mm	Ore	11	4g	Not magnetic; cream-black in colour.
12	1217	7	>7mm	Slag	12	21g	Magnetic brown slag.
12	1217	7	>7mm	Tap	16	38g	Small flowed pieces.
12	1217	7	2-7mm	Resi due		94g	Brown soil balls; ore; limest; charcoal; few fclay.
12	1217	7	>2mm	Resi due		34g	Charcoal; soil balls; ore; fclay.
12	1217	7	>7mm	Mag Mat	7	5g	Ore; slag; fclay.
12	1217	7	2-7mm	Mag Mat		32g	Soil; ore; few slag; occasional fclay/ furnst.
12	1217	7	<2mm	Mag Mat		14g	50% sorted for hammerscale; 1 x plate 1 x spheroid
12	1217	7		Flot	500+		Some large; oak; barley/ wheat grain.
87	8711	44	>7mm	Furn st	52	63g	And Fclay; pinky-orange / cream-white.
87	8711	44	>7mm	Ore	24	21g	Non magnetic; cream - red; gravel inclusions.
87	8711	44	>7mm	Ore	2	8g	Magnetic; red.
87	8711	44	>7mm	Slag	1	5g	Fawn and bubbly.
87	8711	44	>7mm	Tap	68	273g	Mainly small dribbles.
87	8711	44	>7mm	Resi due		15g	Furnst and or fclay; stone; slag.
87	8711	44	2-7mm	Resi due		202g	Furnst and or fclay ; charcoal; slag; ore.
87	8711	44	<2mm	Resi due		99g	Furnst and or fclay; charcoal; slag / ore.
87	8711	44	>7mm	Mag Mat		36g	Ore; brown / black slag; rare furnst; 1 tap plate.
87	8711	44	2-7mm	Mag Mat		174g	Ore; brown / black slag; few tap plates.
87	8711	44	<2mm	Mag Mat		87g	25% scanned for hammerscale. 15 possible pieces found (6 x spheroids).
87	8711	44		Flot	500+		Some large; oak; barley/ wheat grain; barley chaff.
93	9306	2	>7mm	Fclay	19	13g	Some pottery?
93	9306	2	>7mm	Lime st	5	2g	Discarded.
93	9306	2	>7mm	Ore	145	367g	Non-magnetic; cream - deep red in colour.
93	9306	2	>7mm	Ore	100	149g	Magnetic; red - black in colour.
93	9306	2	2-7mm	Resi due		268g	Ore; some limest / charcoal; few fclay.
93	9306	2	<2mm	Resi		207g	Charcoal; ore; some limest; few fclay.

				due			
93	9306	2	2-7mm	Mag Mat		214g	Ore; fclay and pottery?; rare charcoal / limest.
93	9306	2	<2mm	Mag Mat		133g	50% sorted for hammerscale; none found.
93	9306	2		Flot	500+		Some large; oak; barley/ wheat grain; wheat / barley chaff.
94	9404	10	>7mm	Fclay	6	4g	Some pottery??
94	9404	10	>7mm	Fclay	13	7g	Magnetic.
94	9404	10	>7mm	Flint	3	7g	Discarded.
94	9404	10	>7mm	Lime st	1	1g	Discarded.
94	9404	10	>7mm	Ore	335	616g	Non-magnetic; most cream - red colour; some iron-rich limestone.
94	9404	10	>7mm	Ore	245	653g	Magnetic; red colour - some large.
94	9404	10	>7mm	Pebb les	2	137g	Rounded; one suitable for ore crushing?
94	9404	10	2-7mm	Resi due		475g	Ore; some charcoal; occasional stone / fclay; slag rare
94	9404	10	<2mm	Resi due		242g	Charcoal / ore; occasional stone / fclay.
94	9404	10	2-7mm	Mag mat		308g	Ore; fclay; rare slag.
94	9404	10	<2mm	Mag Mat		108g	50% sorted for hammerscale; none found.
94	9404	10		Flot	500+		Some large; oak; barley/ wheat grain; wheat / barley chaff.

Table 13. Description of the residue contents from the channel hearths in Trenches 12, 87, 93 and 94. (For the original sample and residue sizes see Table 2.)

The base and the sides of the hearths had been heat effected and burnt to a distinctive mauve purple colour. Charcoal, perhaps from the last firing of the hearths was the main component of the basal fills. The sample residue from Trench 12, fill (1207), is very mixed and dominated by limestone. The feature was very truncated and plough damage may have introduced some of these elements. The presence of tap slag perhaps suggests that furnaces exist on this part of the site, although none were found during the evaluation. In Trench 87 a sample from the most northern hearth ([8712], fill (8711)) was processed but only a small residue was recovered comprising furnace structure (or fired clay) and slag with some ore. The large amount of tap slag recovered probably reflects the fact that the feature was sealed by layers composed mainly of this type of slag. A second sample was taken from Hearth [8717] fill (8716) but was not processed. A dried subsample of it consists of a mass of charcoal with occasional lumps of deep red-mauve fired natural held in a clayey soil matrix (sample <48>). Roasted ore, mostly black in colour rather than an oxidised red, forms the washed magnetic component.The processed samples from Trenches 93 and 94 (fills (9306) and (9404) respectively) are very similar in content and both are dominated by the ore component. Magnetic (mostly red to black in colour) and non-magnetic ore is present with the average weight of the extracted pieces from both Trenches weighing an identical 2.1g. Pottery crumbs in (9306) and (9404) were too small to positively identify as such (pers. comm. A. Fawcett). There is some fired clay but no slag amongst the residues, unlike those from Trenches 12 and 87. The other significant component is charcoal, and the large flots were found to contain not only wood charcoal but also cereal grains and chaff (Table 6). This is present in all the channel hearths and suggests

that arable waste was perhaps used as tinder, but perhaps more significantly it clearly indicates that the users of these hearths were closely involved with the local arable economy.

The interpretation of these features is problematic but it is thought that they are associated with the iron-smelting industry simply because when they have been found furnaces have usually been present near by (for example at Bulwick, Jackson 1979). A completely unrelated use is, however, a possibility and they could have functioned as, for example, corn driers. The natural in the base of the channels is always oxidised to some depth and is a deep mauve red to purple in colour, a similar colour to the roasted ore. This suggests they were used for an oxidisation process and the most obvious seems to be ore roasting, however, the fills appear to contain very few ore stones or fines. This interpretation, or bloom smithing, was suggested for those found during the earlier excavations at Wakerley (Jackson and Ambrose 1978, 165) and by Cleere and Crossley (1995, 35-6) for similar elongated, but more elaborate hearths found at Bardown. An alternative that has been suggested for other sites where they have been found (most notably Bulwick and on the Continent), where again a large amount of charcoal was found in the feature fills, is charcoal production pits. This does not altogether accord well with the evidence of the deeply oxidised feature bases because charcoal production is a reduction process. Also charcoal is usually made in mounds to minimise the surface area from which the oxygen has to be excluded. Elongated pits do not appear to be a practical method to employ to produce this valuable resource required in large quantities by the iron smelters.

Furnaces were only identified close to the Trench 87 channel hearths, a Trench centrally placed in the site. Trenches 12 with 13 and 93 with 94 were at opposing ends and although no furnaces were found close to them high levels of slag were found concentrated over and around them during the fieldwalking phase. The evaluation trenches were limited in extent - the probable presence of furnaces should be considered during the next stage of work.

The Wakerley Evaluation and its Landscape: A Statement Updated.

The Wakerley area is proving to be an important locale for the archaeological study of the iron-smelting industry. Significant excavations of large and unique iron-smelting furnaces at Laxton (Jackson and Tylecote 1988, Crew 1998) and the both traditional and more puzzling smelting evidence from the industrial and agricultural site adjacent to the current site (Jackson and Ambrose 1978) had highlighted this importance. The current evaluation at Wakerley, on a site of some 102 hectares, has reinforced this importance. It is extraordinary that in about 10% of these exploratory trenches, so many furnaces and other directly related features have been uncovered. Interwoven amongst them is further evidence for the agricultural history of the site across the whole area. Considering that barely a 1% sample of the site has been revealed, it is clear that the scale of the evidence for the smelting industry on the site may be very large. The site therefore affords the opportunity for addressing many key questions concerning the development and chronology of the industry in this area. Not only the technologies employed (furnace types) and duration, but also its spatial organisation and possible movement, and its relationship to other activities (mainly agricultural) occurring in the countryside. The results of the evaluation highlight a number of points that reflect the importance of the site and its ability to address research questions.

- The area being evaluated is large (102 hectares) and evidence for iron-smelting has been found above the 85m contour right across the site, in the form of very small discrete and localised groups of features. The channel hearths being found in the most south-western Trenches 12 and 13, in Trenches 93 and 94 in the north-east and in Trench 105 and 87 in between. The furnaces that have been identified at this stage are mainly in the central area in Trench 54, inter-cutting clusters in Trench 63 and 68, Trench 83, and a circular group in

Trench 87. The area on the Geophysics plot that suggests the least archaeological activity is the zone closest to where furnaces have previously been found (Jackson and Ambrose 1978), but a dense scatter of slag was found here during the fieldwalking stage. No furnaces were identified close to the channel hearths on the perimeter of the site, however, again very high density slag scatters were found in these locations, suggesting they are present.

- The slag scatter covers a large area, but the surface evidence belies the size and perhaps density of smelting sites below it. The furnace structures that have been found are very small and the production sites appear to be small localised discrete areas, particularly if the successive furnaces are intercutting (those in Trench 63 cover an area less than $3m^2$). There is a difference in visibility to both predictive tools between the tap slag producing Mid-Late Saxon sites and the earlier Late Iron Age - Roman pitslag? furnaces. The latter have proved to be invisible so far and identifying them will continue to be problematic and many may only be found when the topsoil is stripped for quarrying. The large amount of slag generated on the Saxon sites would have formed heaps beside the smelting area, which have over time become spread. Furnace site are disproportionately small for the quantity of waste they generated. The original heaps will seal the landscape below and if on virgin ground due to, for example woodland clearance, the area will appear devoid of archaeology once the topsoil is removed. The furnaces will, however, be nearby but probably not where the slag concentration is at its greatest (the slag heap). Wherever a high density of slag was recorded during fieldwalking at least one discrete group of furnaces is likely to exist.

- Almost any date is a possibility for these iron-smelting industries from the Iron Age through to the medieval period as currently we have a very poor dating framework for the industry in this locality into which to fit this site. Initial dates from the evaluation allow some early consideration of the longevity of the iron-production industries on this site, with the earliest suggesting a Late Iron Age date for the start (although the pottery dates are later) for Trench 63. Some very similar iron-smelting furnaces explored in the earlier Wakerley excavations (Jackson and Ambrose 1978) were considered to have been of this date, but as far as the author is aware this has never been confirmed. The date for the channel hearths and furnaces in Trenches 12, 54, 87 and 93 imply that smelting was also occurring in the Mid-Late Saxon period, which tallies with some other dates from other Rockingham Forest sites (Foard 2001). The duration of activity at each individual smelting site still needs to be addressed. On the limited evidence so far there appears to have been no continuity, with the two individual episodes seeming to be entirely independent.

- A number of different furnace types have been found producing different slag by-products. Intercutting furnaces were found in Trenches 63 and 68, one in Trench 63 was cut almost 0.5m into the limestone brash and it is likely that some of the pitslags found collected within its base. There has been considerable puzzlement over some of the furnaces excavated at the over-lapping Wakerley site published by Jackson and Ambrose (1978) where furnaces similar to this deep example were found. It is hoped that this site will lead to a better understanding of the other Wakerley furnaces. A large cake of tapping slag was also recovered from Trench 63, suggesting that there may be more than one type of furnace present in this Trench or close by. Nearby in Trench 65 pitslags? were found centrally placed or discarded in pits varying in size and shape. In Trench 87 a group of slag-tapping furnaces appears to form a circle around a large pit, a very unusual arrangement. Finding more than one furnace type on a site is unusual.

- Differing furnace types may be due to a number, or combination, of factors including chronological differences, contemporary experimentation or because different technologies were in use (*i.e.* different furnace types) to make different irons. Intercutting furnaces indicate the repeated use of the same location and a small concentrated production site. This may indicate that the locale was used over some time span or that the smelters chose to return to the same location. Clusters of the same type of furnace in different locations could also represent a cycle of smelters under a master moving around woodland or different episodes in time with different smelters. Dating any furnaces and if possible the duration for which a site was used is therefore a high priority.

- The stages involved in iron production include ore extraction and roasting; tree/ coppice felling and charcoal production; extraction of clay for furnace building and repairs and finally the smelting of the iron. The evidence found so far consists of a variety of smelting furnaces; an ore roasting pit in the form of the possible circular hearth in Trench 63 and the groups of channel hearths scattered across the site. Evidence for ore mining and charcoal production have not been found. If small scale the former may be found on the site while the latter may have occurred in the neighbouring woods. The Forestry Commission sponsored survey of Great Wakerley Wood identified numbers of 'swallow holes' within, and it is entirely probable that some may be ore-extraction pits or were used for charcoal production. At Bulwick, a neighbouring village, Jackson identified iron ore extraction pits of varying sizes, including a bell-shaped pit identified in the quarry section that had evidently been used for extracting both ore (at the base of the pit) and the sandy clays above this layer for furnace building (Jackson 1979, 34). Identifying and excavating bell-pits could be problematical if they are present on the site. Structural evidence associated with the furnaces has also remained elusive so far.

- The smithing of the bloom to billet or bar is thought to have been undertaken at, or close to, the smelting site. Evidence for this in the form of hammerscale and smithing slags was only found associated with the Trench 63 furnaces, none was present in Trench 87. Assuming the dates are correct, it appears as though the industry was organised in a different manner in the Mid-Late Saxon period, compared to that of the Late Iron Age/ Roman, with all smithing taking place away from the smelting site but one presumes still close by. This may, however, depend on who is controlling the industry and for what purpose the iron is put to (local demand or export).

- It should be possible to postulate whether the industry existed within woodland or farmland and how close it was to settlement. The amount of contemporary domestic rubbish in features close to the furnaces is valuable in this respect. The initial impression given by the evaluation is that very little domestic refuse is reaching any of the features on the site, suggesting that the main foci for occupation is elsewhere (Table 6 and Fawcett this volume). A Late Iron Age enclosed settlement existed lower down the slope (Jackson and Ambrose 1978) and it is likely that any later settlement chose a similar more sheltered location.

- The relationship of the iron-production to other land users is important. Evidence for agricultural activities from the Wakerley sites include a large aisled barn, suggestive of settlement of some size and status, and a number of well preserved corn driers some possibly contemporary with and sited close to furnaces (Trench 63). Ditches around the site may define field systems related to the agricultural regimes being practised. The presence of the grain and chaff in most of the channel hearths implies a direct relationship between the

farmers and smelters (could they be one and the same?). The presence of a large limestone quarry in the centre of the site reflects how multi-functional the landuse was.

- Into this equation must be fitted the need for woodland as fuel by the local community, the late 1st - 2nd century potters, the iron smelters and for other, for example constructional, purposes. Initial work on the charcoal assemblage has indicated that mature oak heartwood was the preferred fuel of the smelters, this has significant implications when considering woodland management and the continuity of available fuel to maintain the iron production over any time span (Cowgill 2003).

- The extraordinary major early iron-production complex at Laxton is only 2 km to the south, and the main phase of iron production is thought to have started around the middle of the 1st century. There is a suggestion that the iron may have been for military use (Crew and Jackson 1998) or even Roman Army involvement in the smelting operation due to the scale of the enterprise (pers. comm. P. Crew). Up to eight very large furnaces (2m internal diameter) were found and according to conservative estimates each furnace, in a 24-hour cycle, may have consumed 500kg of ore and 600kg of charcoal (over 4 tonnes of wood) (Crew 1998). This complex, being so close, must have had a considerable impact on the contemporary Wakerley inhabitants.

- The deep colluvium in-filled run offs running from south to north down the slope, incorporate an important sequence of surfaces and deposits that will aid the dating and interpretation of local land use and clearance. The destabilising of the soils could have been a result of woodland clearance by the iron industry or local community for arable agriculture. If, as has been postulated by this author on the basis of Rackham (Rackham 1980, Cowgill 2003) major fuel users tended to preserve their resources, not exhaust them, a coppicing system would have been expected to be employed by the iron smelters. The trees may, however, have been cleared by the Laxton smelters if there was some sort of army input as they may have seen it as a transitional activity, with greater profits to be made as they moved on. Laxton, if there was an army presence may also have acted as an inpetus for arable agriculture as it may have been seen as an ideal location to grow grain supplies for the legions with transport links to the North (the River Welland and Ermine Street) being so close by.

- Some of the furnaces at Wakerley are very well preserved, although in shallow plough soils. The good survival combined with the distribution of the evidence across the site allows a wide range of factors involving the industry to be reconstructed. If a deep rip plough is used on these areas this information will be destroyed.

The survival and potential extent of the evidence for the iron-smelting industry indicated by this evaluation and other excavations in the locality, show that it is of major importance (Jackson and Ambrose 1978, Jackson 1979, Jackson and Tylecote 1988, Crew 1998). The Northamptonshire iron-production industry has not been given the prominence it deserves because it has always been over shadowed by the industries based in the Weald and Forest of Dean, largely due to the work of H. Cleere and very enthusiastic groups working in those areas. It is now becoming clear that in the area of Rockingham Forest equally productive and no doubt wealth generating industries existed, and that these appear to have been operating over a long, but as yet unknown period of time.

A significant factor is that at Wakerley it is evidently a shared landscape. Iron-production often occurred deep in the forests with no associated settlement or agricultural activity nearby. How the

iron-smelters here fitted in to, or around the agricultural regimes at the site is intriguing. Who, for example, was responsible for the deep colluvial deposits in the gullies? Did the smelters clear the woodland (they are usually protective of their fuel sources) or did the agriculturalists? How does Laxton's demands fit into this equation?

The site under threat forms only part of the industrial landscape. It is very likely that further furnace sites exist on the southern, eastern and western sides of the wood above the contour of the Laxton site (*c*. 67m OD). The adjacent woodland and surrounding farmland may contain evidence for the charcoal production that serviced the industry, and perhaps the quarrying that supplied the ores. Survey work within the woods has identified 'swallow holes' that may deserve investigation as possible ore quarrying sites or pits constructed for charcoal production. The site under threat should be seen as a part of this landscape and considered within this framework. It may be an opportunity to link developer funded work with a broader programme of survey and research to study the whole industrial landscape funded through other avenues.

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Appendix 1.

Catalogue of the slag recovered from Trenches 63, 65 and 87 during the Evaluation at Wakerley

Area	Context	Sample	Type	No	Weight	Craft	Comments
63	6312		PITSLAG?	1	1330	FESMELT	TAP MOULDED BY MASS V LGE CHARC IMPRINTS
63	6312		PITSLAG?	1	5615	FESMELT	DENSE SOLID TOP 70MM TH; FLATTISH TOP; LGE CHARC IMPRINTS ON BASE; LIME CONCRETIONS ON BASE
63	6312		PITSLAG?	2	3748	FESMELT	DENSE RUSTY UPPER; FLATTISH TOP; PART OF CHARC MOULDED BASE
63	6312	32	FURN?	3	1670	FESMELT	MASS LGE CHARC IMPRINTS IN DENSE SLAG - NO FLOWS; TOP SURF HAS CHARC IMPRINTS
63	6312	32	PITSLAG?	1	566	FESMELT	SOLID DENSE LUMP
63	6312	32	PITSLAG?	1	612	FESMELT	FLOWS MOULDED BY CHARC INCLDING TOP - NO DENSE PLATE ON TOP
63	6312	32	PITSLAG?	1	938	FESMELT	BASAL FLOWS MOULDED BY CHARC; EXCEPTIONALLY LGE CHARC IMPRINT IN DENSE LAYER ABOVE
63	6312	32	SLAG	1	168	FESMELT	VIT FURNST
63	6312	32	SLAG	2	78	FESMELT	MAG; PURPLE ORE INCL
63	6312	32	TAP	3	61	FESMELT	MOULDED BY CHARC
63	6329		FURNST	1	558	FESMELT	WASHED; VIT FACE MISSING; SLAG PENETRATION VARIABLE; MAX TH 55MM; NO OBVIOUS REPAIRS; FABRIC PINK - CREAM
63	6329		FURNST	1	2228	FESMELT	WASHED; 3 LAYERS; OUTER PINK/GREY TH FURNST; CENTRAL 40MM TH; INSIDE MAG BLOOM FRAG? TOP FURNST GREEN
63	6329		PITSLAG?	1	2589	FESMELT	WASHED; MASS LGE CHARC IMPRINTS ON BASE; DENSE RUSTY TOP; V FEW FURNST INCL; BASAL FLOWS MISSING (BROKEN
63	6329		PITSLAG?	1	3832	FESMELT	WASHED; COMPLETE**; MASS LGE CHARC IMPRINTS ON BASE; CHARC MOULDED FLOWS; CONCAVE DENSE RUSTY TOP; V FEW
63	6329		PITSLAG?	1	4388	FESMELT	WASHED; FREQ V LGE CHARC IMPRINTS; SMALL FURNST INCL; NO FLOWS; BASE ROUNDED; TOP DENSE RUSTY LAYER - NOT
63	6329		TAP	1	9074	FESMELT	WASHED;CONCAVE ROUNDED MOULDED BASE; 1 LGE CHARC INCL; TAPPED INTO PIT? MULTI-LAYERED TAP? FLOWS INCORP -
63	6329	35	FIRE	25	64		MOST OXID
63	6329	35	FURN?	1	364	FESMELT	WASHED; MASS MEDIUM/LGE CHARC IMPRINTS - MOULDED SLAG FLOWS
63	6329	35	FURNST	1	551	FESMELT	WASHED; MOST SLAG; BREAKS SLAGGED OVER
63	6329	35	FURNST	48	702	FESMELT	SOME SURFS; SOME GLAZED; FEW ?LAYERED
63	6329	35	FURNST	115	947	FESMELT	FEW SURFS
63	6329	35	HB	1	95	FESMITH	WASHED; THIN; PCB SHAPE; 55 X 70 X 30MM; NO FURNST
63	6329	35	HB	1	981	FESMITH	WASHED; 120 X 150 X 60MM; LGE PCB SHAPE; FLAT TOP; V-SHAPED BASE; NO FURNST; MEDIUM/SMALL CHARC IMPRINTS
63	6329	35	ORE	20	375		MAG; RED-BLACK
63	6329	35	ORE	100	1707		NOT MAG; RED
63	6329	35	PITSLAG?	1	1146	FESMELT	WASHED; FLAT BASE; MOULDED FAIRLY STRAIGHT BACK? TOP BOWLED RUSTY DENSE; FEW CHARC IMPRINTS OR FURNST INCL
63	6329	35	POT	9	50		
63	6329	35	SLAG	3	279	FESMELT	WASHED; FURN? V LGE CHARC IMPRINTS
63	6329	35	SLAG	4	146		WASHED; MAG; FESMELT/FESMITH
63	6329	35	SLAG	4	295	FESMELT	WASHED; LIGHT; HIGH MOLTEN FURNST CONTENT
63	6329	35	SLAG	5	402		WASHED; COMPLETE PIECES; NOT TAP; FESMELT/FESMITH
63	6329	35	SLAG	7	709	FESMELT	WASHED; TAP?
63	6329	35	SLAG	625	1685		MIXED SLAGS
63	6329	35	TAP	3	179	FESMELT	WASHED; FLOWS MOULDED BY CHARC; LOTS FURNST
63	6329	35	TAP	9	320	FESMELT	WASHED; FLOWS MOULDED BY CHARC; RARE FURNST
63	6329	35	TAP	10	2660	FESMELT	WASHED; MULTI-LAYERED FLOWS; MOULDED TOP AND/OR SIDES/BASE; FURNST INCL ON BASE; TH 50MM; 60MM
63	6332	37	FIRE	21	27		SOME POT? SURFS
63	6332	37	FURN?	1	1075	FESMELT	WASHED; MASS V LGE CHARC IMPRINTS; FLOWS CHARC MOULDED
63	6332	37	FURNST	1	65	FESMELT	WASHED; FLAT VIT FACE

63	6332	37	FURNST	350	815	FESMELT	MOST GREY/CREAM; FEW SURFS
63	6332	37	IRON	1	6		MAG
63	6332	37	LIMEST	48	110		DISCARDED
63	6332	37	ORE	7	37		MAG; RED
63	6332	37	ORE	40	392		RED
63	6332	37	PITSLAG?	1	462	FESMELT	WASHED; FURNST INCL; DENSE RUSTY TOP
63	6332	37	PITSLAG?	1	2115	FESMELT	WASHED; DENSE RUSTY TOP LAYER; NO CHARC MOULDED FLOWED BASE; O.25% OF COMPLETE CAKE - RADIUS 110-120MM
63	6332	37	SLAG	6	352	FESMELT	WASHED; VIT FURNST - DEEP SLAG PENETRATION
63	6332	37	TAP	3	82	FESMELT	WASHED; CHARC MOULDED FLOWS
63	6332	37	TAP	3	102	FESMELT	
63	6332	37	TAP	3	189	FESMELT	
63	6334	42	CONCRETI	7	59		IRON RICH; PART MAG
63	6334	42	FURNST	375	820	FESMELT	SOME FIRED CLAY OR POT? MOST GREY - SOME PINK
63	6334	42	ORE	12	75		MAG; RED
63	6334	42	ORE	57	1371		RED
63	6334	42	POT?	8	6		FEW SURFS; TINY FRAGS
63	6334	42	SLAG	1	12		WASHED; V MAG - IRON?
63	6334	42	SLAG	2	82	FESMELT	WASHED; GLASSY/GLAZED; VIT FURNST
63	6334	42	SLAG	22	68		MAG; BROWN; FESMELT/FESMITH; IRON INCL?
63	6334	42	SLAG	27	69		BROWN; FESMELT/FESMITH
63	6334	42	TAP	3	303	FESMELT	WASHED; LOTS FURNST ON BASE
63	6334	42	TAP	5	91	FESMELT	WASHED; MOULDED BY CHARC; RARE FURNST
63	6334	42	TAP	35	140	FESMELT	SOME DRIBBLES; SOME CHARC MOULDED
65	6505	25	BONE	2	1		1 X CALCINED
65	6505	25	FURN?	1	844	FESMELT	11 FRAGS OF 1 PIECE; FLOWS MOULDED BY V LGE CHARC IMPRINTS; SURFS ABRADED?
65	6505	25	FURNST	14	18	FESMELT	GREY/ CREAM/ PINK
65	6505	25	ORE	1	65		RED; NOT MAG
65	6505	25	POT?	4	2		TINY SHERDS?
65	6505	25	TAP	50	131	FESMELT	4 NORMAL TAP + FURNST INCL; MOST CHARC MOULDED FLOWS
65	6515	49	ORE	1	6		BLACK; MAG
65	6515	49	ORE	1	30		BLACK; NOT MAG
65	6515	49	PITSLAG?	1	1825	FESMELT	10 FRAGS OF 1 PIECE; PART OF ABOVE (262G)? SLAG FLOWS MOULDED BY V LGE CHARC IMPRINTS/ INCL; CHARC IMPRINTS ON
65	6515	49	PITSLAG?	2	262	FESMELT	CHARC MOULDED FLOWS; FLAT SURF HAS MASS LGE CHARC INCL - TOP/ BASE?
65	6515	49	TAP	95	436	FESMELT	CHARC MOULDED FRAGS - PART OF ABOVE?
65	6521		PITSLAG?	1	514	FESMELT	BASE SEEMS DENSE WITH MOULDED FLOWS ON TOP?? LOTS FURNST BITS INCL ON BASE; V LGE CHARC IMPRINTS + INCL
65	6521		PITSLAG?	1	2706	FESMELT	PARTIALLY ABRADED? SEGMENT OF CAKE; DENSE TOP; LGE CHARC MOULDED BASAL FLOWS; 100MM TH; MAX WIDTH 220MM;
65	6521	33	TAP	80	203	FESMELT	CHARC MOULDED FRAGS
65	6526	50	PITSLAG?	1	2930	FESMELT	FURNST ON SIDE; DENSE RUSTY TOP STEPPED - NOT MAG; LOWER PART LGE CHARC IMPRINTS BUT MOST FLOWS BROKEN
65	6526	50	TAP	26	124	FESMELT	MOST CHARC MOULDED FLOWS
65	6528		PITSLAG?	1	8	FESMELT	SMALL MAG PIECE (IRON?) SPALLED OFF TOP OF 6350G PIECE
65	6528		PITSLAG?	1	1801	FESMELT	TOP NOT ESPECIALLY DENSE - CHARC IMPRINTS; MASS FLOWS CHARC MOULDED FORMING BASE
65	6528		PITSLAG?	1	6350	FESMELT	BOWL TOP; DENSE UPPER MAX 50MM TH; BASE MASS FLOWS MOULDED BY LGE CHARC; C. 50% CAKE WIDTH 290MM; RADIUS
87	8703	22	FURN	2	241	FESMELT	WASHED; RUSTY-BROWN; LGE CHARC IMPRINTS

87	8703	22	FURNST	3	112	FESMELT	WASHED; VERY VIT; 30MM TH
87	8703	22	FURNST	100	88	FESMELT	SUBSAMPLE; ALL LOW FE CONTENT; SILTY WHITE-GREY OR PINKY-ORANGE; VITRIFIED ALL LARGE CREAM-PINK; ONE FABRIC?
87	8703	22	FURNST	1243	2943	FESMELT	AS ABOVE
87	8703	22	ORE	1	39	FESMELT	WASHED; ROASTED?
87	8703	22	ORE	4	80	FESMELT	ROASTED / DARK RED; NOT MAGNETIC
87	8703	22	PEBBLE	1	25		SMALL QUARTZ PEBBLE FRAG
87	8703	22	SLAG	60	642	FESMELT	RUSTY BROWN; HIGH % MAG; SOME CHARC IMPRINTS - NONE LGE; FEW CRACKING; SOME FURN OR FESMITH??
87	8703	22	SLAG	477	1047	FESMELT	SMALL DIRTY PIECES OF SLAG + FURNST
87	8703	22	TAP	1	8	FESMELT	WASHED; DRIBBLE
87	8703	22	TAP	1	44	FESMELT	WASHED; OVAL SHINEY GLOSSY SECTION; 38MM X 28MM; MID PURPLE-BROWN SURFACE; VERY BUBBLY CORE - VERY ODD**
87	8703	22	TAP	1	45	FESMELT	WASHED; FLAT GLASSY GREY PLATE - COLOUR DUE TO MASS OF FURNST?
87	8703	22	TAP	1	47	FESMELT	WASHED; MAG; PART RUSTY BROWN
87	8703	22	TAP	1	130	FESMELT	WASHED; LARGE FLOW; SLAG MOULDED BASE
87	8703	22	TAP	1	169	FESMELT	WASHED; SHALLOW V-SECTIONED BASE; MAX 28MM TH; TOP GLOSSY MID BROWN; MASS FURNST ON BASE
87	8703	22	TAP	1	284	FESMELT	WASHED; FLOWS HAVE MOULDED SIDES; 60MM WIDE; 30MM TH
87	8703	22	TAP	1	323	FESMELT	WASHED; MASS FURNST; GLASSY GREY BASE; MIXED FLOWS; 30MM TH
87	8703	22	TAP	1	345	FESMELT	WASHED; BROAD LGE FLOW; FURNST ON BASE; 45MM THICK
87	8703	22	TAP	1	425	FESMELT	WASHED; LOTS FURNST; PART RUSTY BROWN BUT NOT MAG
87	8703	22	TAP	1	513	FESMELT	WASHED; FLAT BASE; LOTS FURNST; MIXED FLOWS; 30MM TH
87	8703	22	TAP	1	572	FESMELT	WASHED; SHALLOW V-SECTIONED BASE; LOTS FURNST; 30MM TH; VOLCANO? SOME NARROW THIN FLOWS
87	8703	22	TAP	1	612	FESMELT	WASHED; SHALLOW V-SECTIONED BASE; MULTIPLE FLOWS; FURNST ON BASE; 100MM WIDE; 30MM TH
87	8703	22	TAP	1	665	FESMELT	WASHED; SHALLOW V-SECTIONED BASE; MULTI LAYERED; LOTS FURNST; MEDIUM-BROAD FLOWS; 35MM TH
87	8703	22	TAP	1	1580	FESMELT	WASHED; LGE CHARC IMPRINTS; PART FURN SLAG? PART VOLCANO? LGE FURNST INCL; MOST RUSTY-ORANGE-BROWN OR
87	8703	22	TAP	2	250	FESMELT	WASHED; LGE CHARC IMPRINTS; RUSTY BROWN
87	8703	22	TAP	2	909	FESMELT	WASHED; LOTS FURNST - SOME LGE INCL; 45MM + 55MM THICK
87	8703	22	TAP	947	12065	FESMELT	SHALLOW FLOWS; SOME NARROW - MANY BROAD; BLACK + CHUNKY; FURNST ON BASES; FEW DRIBBLES; BASES OFTEN SLAG
87	8704	21	FURNST	251	874	FESMELT	60% GREY-WHITE; OTHERS PINK-ORANGE; FEW VIT FACES
87	8704	21	LIMEST	49	389		+ 2 FLINT FLAKES
87	8704	21	ORE	1	63	FESMELT	WASHED; DARK PURPLE
87	8704	21	ORE	212	1102	FESMELT	50% MAGNETIC; PURPLE/RED; MOST PROB ROASTED
87	8704	21	SLAG	1	12	FESMELT	WASHED; OVAL SECTION? SHINEY TRANSLUCENT SURFACE; MID PURPLE-BROWN SURFACE; VERY BUBBLY CORE - VERY ODD
87	8704	21	SLAG	1	12	FESMELT	WASHED; RUSTY BROWN; NOT MAG
87	8704	21	SLAG	1	237	FESMELT	WASHED; SLAG COATED FURNST? RIGHT-ANGLE SECTION; 85MM LONG; LOTS FURNST INCL; CORE FABRIC YELLOWISH =
87	8704	21	SLAG	12	335	FESMELT	WASHED; RUSTY BROWN; MAGNETIC; SOME CRACKING; OCCASIONAL CHARC IMPRINTS; 1 X PROTOHB SHAPE; FURN OR
87	8704	21	SLAG	215	362	FESMELT	DIRTY IRREG SHAPED LUMPS; MANY RUSTY-BROWN; FEW CHARC IMPRINTS - NONE LARGE; SOME FURN OR FESMITH SLAGS??
87	8704	21	TAP	1	86	FESMELT	WASHED; LGE-MEDIUM FLOWS; BASE SLAG MOULDED
87	8704	21	TAP	1	126	FESMELT	WASHED; LGE CHARC IMPRINT ON TOP; LGE FURNST INCL WITHIN SLAG - SMALL ON BASE
87	8704	21	TAP	1	254	FESMELT	WASHED; LGE FLOWS; SEVERAL LGE FURNST INCL
87	8704	21	TAP	6	819	FESMELT	WASHED; LGE FLOWS; MOST FURNST ON BASE; 1 EXAMPLE FURNST BETWEEN FLOW LAYERS
87	8704	21	TAP	14	219	FESMELT	WASHED; KNOBBLY RATHER THAN FLOWED SURFACES; FURNST INCL
87	8704	21	TAP	67	1551	FESMELT	+ FURNST - MOST ON BASE; MORE LIKE SAMP 22 SLAGS?
87	8704	21	TAP	535	4790	FESMELT	BLACK; SOME WIDE FLAT FLOWS - ALMOST NO FURNST; SOME SLAG MOULDED BASES; DRIBBLES QUITE COMMON; MOST
87	8710	47	FURNST	26	20	FESMELT	OR FIRED CLAY; ORANGE OR CREAM - FEW GREY

87	8710	47	ORE	39	43	FESMELT	ALL ROASTED BRIGHT RED
87	8710	47	SLAG	3	1	FESMELT	
87	8711	44	FURNST	1	14	FESMELT	SHUTTERED BLACK SURFACE? BELOW PINK-ORANGE TO PINKY-CREAM CORE; SURFACE 33MM X 21MM
87	8711	44	FURNST	51	49	FESMELT	OR FIRED CLAY; EQUAL % PINKY-ORANGE CREAMY-WHITE AND GREY
87	8711	44	ORE	26	29	FESMELT	ALL ROASTED RED
87	8711	44	SLAG	1	5	FESMELT	FAWN; BUBBLY
87	8711	44	TAP	68	273	FESMELT	MAINLY SMALL DRIBBLES; FURNST INCL; 1 WITH LGE CHARC IMPRINT

Codes used in the above catalogue.

Charc	Charcoal
Fe	Iron
Fesmith	Evidence for smithing iron
Fire	Fired clay
Frag	Fragment
Furn	Furnace slag (by-product of iron smelting)
Furnst	Furnace structure
HB	Plano-convex slag accumulation (commonly known as a hearth bottom)
Incl	Inclusions
Irreg	Irregular
Limest	Limestone
Lge	Large
Mag	Magnetic
Pitslag	Slag that solidified in a pit below or beside the furnace
Prob	Probably
Th	Thick
Surf/s	Surface/s
V	Very
Vit	Vitrified

Appendix 2.

Catalogue of the Slag and Magnetic Matter from the Non-Industrial Samples. (Those from Context 6312, sample 32 are included in Appendix 1).

Trench	Context	Sample	Type	Fraction	Count	Weight	Comments
63	6307	36	Tap slag		9	29g	
63	6307	36	Furnst		2	6g	Vitrified face.
63	6307	36	Mag Mat	2-7mm		3g	Ore; few slag fragments.
63	6307	36	Mag Mat	<2mm		3g	c. 16 plate hammerscale.
63	6319	29	Slag		2	1g	
63	6319	29	Mag Mat	<2mm		<1g	c. 3 plate hammerscale.
63	6331	40	Mag Mat	<2mm		3g	c. 14 hammerscale including 3 spheroidal.
64	6405	15	Ironstone		16	32g	Discarded.
64	6405	15	Pot		1	<1g	
64	6405	15	Mag Mat	2-7mm		3g	Ore; few slag fragments.
64	6405	15	Mag Mat	<2mm		3g	c. 3 plate hammerscale.
64	6407	17	Slag		3	<1g	
64	6407	17	Mag Mat	2-7mm		8g	Ore; fired clay; rare slag.
64	6407	17	Mag Mat	<2mm		5g	c. 5 plate hammerscale.
64	6408	16	Tap		2	4g	
64	6408	16	Pot		1	<1g	
64	6408	16	Mag Mat	2-7mm		6g	Ore.
64	6408	16	Mag Mat	<2mm		9g	c. 17 plate hammerscale.
64	6414	19	Mag Mat	<2mm		2g	Natural - discarded.
65	6511	28	Slag		4	<1g	
65	6511	28	Ironstone		5	16g	Discarded.
65	6511	28	Mag Mat	2-7mm		6g	Ore; few slag; 3 plate hammerscale - 1 large.
65	6511	28	Mag Mat	<2mm		5g	c. 55 hammerscale including 1 spheroidal.
68	6803	39	Slag		3	3g	
68	6803	39	Mag Mat	2-7mm		11g	Ore; some slag; 1 tap ball; 1 plate hammerscale.
68	6803	39	Mag Mat	<2mm		6g	c. 100 hammerscale including 8 spheroidal.
68	6808	52	Ironstone		19	83g	Discarded.

68	6808	52	Tap		40	113g	Some furnst inclusions; some charcoal moulded; 1 tap ball.
68	6808	52	Mag Mat	2-7mm		12g	Ore; few slag; 3 plate hammerscale - 1 large.
68	6808	52	Mag Mat	<2mm		4g	c. 55 hammerscale including 3 spheroidal.
68	6814	53	Tap		4	9g	
68	6814	53	Ironst one		22	107g	Discarded
68	6814	53	Mag Mat	2-7mm		12g	Ore; few slag.
68	6814	53	Mag Mat	<2mm		7g	c. 65 hammerscale including 8 spheroidal.

Furnst: furnace structure; MagMat: magnetic element of the sample residue.

Appendix 5 Environmental Archaeology Assessment by James Rackham

Introduction

A programme of archaeological trail trenching conducted by Archaeological Consultancy Services Ltd on land at Wakerley, Northamptonshire, revealed extensive evidence for Late Iron Age or early Roman and mid-Saxon industrial activity in the form of furnaces and linear features interpreted as channel hearths, as well as Romano-British agricultural activity with a number of corn driers and enclosures ditches and pits also identified. A total of twenty-seven environmental bulk-soil samples taken from a range of features were selected for assessment and were submitted to the Environmental Archaeology Consultancy for processing and assessment (Table 1).

Sample no.	Context	Trench	Sample vol. in L.	Sample wt. in kg	Description/Provisional Interpretation	Provisional date
2	9306	93	8*	8	black charcoal, primary fill of channel hearth [9305]	mid-Saxon
3	5404	54	33*	35	black charcoal, burnt material in ?furnace [5407]	mid-Saxon
7	1217	12	46*	45	burnt debris from last firing? of channel hearth [1206]	mid-Saxon
10	9404	94	10*	10	black charcoal from primary fill of channel hearth [9402]	mid-Saxon?
15	6405	64	18	18	final filling of quarry [6402]	late 3-4th C AD/Saxon?
16	6408	64	27	33	disuse filling within corn drying oven [6406]	Roman?
17	6407	64	27	27	fuel debris at base of corn drying oven [6406]	Roman?
19	6414	64	14	15	fill of quarry [6402]	Roman -late?
21	8704	87	40	47	Charcoal and ash layer sealing furnaces, below 8703	Saxon?
22	8703	87	40	48	Slag layer sealing furnace, etc above 8704	Saxon?
25	6505	65	10	13	fill of pit [6506] with central slag lump	LIA/e Rom?
28	6511	65	8	9	dump of charcoal at base of pit [6508]	late 3-4th C AD
29	6319	63	3	4	lower fill of flue [6306], for corn drier [6308]	Roman?
32	6312	63	20	26	mixed refuse deposit in (rubbish) pit [6314]	LIA
33	6521	65	10	12	fill of pit [6520] with large slag lump	LIA/ e Rom.?
35	6329	63	30	34	primary fill of 'working hollow' [6330] in front of furnace [6333]	LIA/ e Rom.?
36	6307	63	26	31	Final disuse filling of ?corn drier [6308], accumulated following collapse of stone lining.	2-4thC AD
37	6332	63	10*	13	fill of furnace [6333], but above sample 42 - fill 6334	late Iron Age
39	6803	68	8	8.5	Debris from last firing in corn drying oven (6801)	Roman
40	6331	63	8	8	Primary fill/debris from last? firing of corn drier [6308]	Roman?
42	6334	63	8	10	primary fill of furnace [6333]	LIA/e Rom?
44	8711	87	10*	10	primary fill of channel hearth [8712]	mid-l Saxon
47	8710	87	2	2	charcoal and tap slag from primary fill of furnace furnace [8709]	mid-Saxon
49	6515	65	9	12	Disuse filling/silt within pit [6514] with slag lump	LIA/e Rom?
50	6526	65	10	14	Disuse filling/silting within pit [6513] with slag lump	LIA/e Rom?
52	6808	68	23	23	Layer	late 4th C AD
53	6814	68	20	22	Disuse/silt within industrial feature [6813]	?

*Sub-sample

Table 1: Samples taken for environmental and industrial assessment

Methods

The soil samples were processed in the following manner. Sample volume and weight was measured prior to processing. The samples were washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.5mm mesh and an internal wet sieve of 1mm mesh for the residue. Both the residues and flots were dried and the residues subsequently re-floated to ensure the efficient recovery of charred material, with the exception of samples 21, 22, 25, 33, 35, 42, 49 and 50, which were processed primarily for industrial evidence and not

refloated. A number of samples were also sub-sampled (see Table 1). The dry volume of the flots was measured and the volume and weight of the residue recorded. A total of 468 litres of soil was processed in this way.

The residue was sorted by eye, and environmental and archaeological finds picked out, noted on the assessment sheet and bagged independently. A magnet was run through each residue in order to recover magnetised material such as hammerscale and prill and a count made of the number of flakes or spheroids of hammerscale collected. The residue was then discarded. The flot of each sample was studied using x10 magnifications and the presence of environmental finds (i.e. snails, charcoal, carbonised seeds, bones etc) was noted and their abundance and species diversity recorded on the assessment sheet. The flots were then bagged and along with the finds from the sorted residue, constitute the material archive of the samples.

The individual components of the samples were then preliminarily identified and the results are summarised below in Tables 2 -4. Botanical nomenclature follows Stace (1997).

Results

The samples that have been assessed from Wakerely fall into three groups. A group that were primarily taken because of the industrial character of the feature or deposit, specifically features with evidence for iron smelting and associated activity such as ore roasting; a second group of more typical settlement features such as pits and quarry pits and finally the samples collected from a series of corn drying structures which were uncovered in three of the evaluation trenches.

These features broadly fall into a probable late Iron Age/early Roman phase of iron smelting activity, a middle and later Roman period of agricultural activity and finally a middle Saxon period of further iron smelting activity.

The probable late Iron Age/early Roman evidence is associated with iron smelting evidence, particularly furnaces and pits with lumps of slag, in Trenches 63 and 65. The samples are characterised by an abundance of iron smelting slags, a fairly high magnetic component, and the presence of hammerscale in varying quantities (Table 2). Occasional fired earth, pottery and a very little animal bone was also present. Charred grain and chaff is absent from these samples, and there is relatively little charcoal associated with these deposits (Table 3). Identifiable environmental material is limited to a few charred seeds, pig, vole, house and wood mouse bones. A single pit [6314] in Trench 63 has been interpreted as a late Iron Age rubbish pit, and in contrast to the samples from the industrial features this produced bones of pig, sheep/goat, cattle, house mouse, pottery, brick or tile and lead as well as an abundance of slag and hammerscale. This might imply an association between domestic activity and industrial activity on the site at this time, although the bulk of the probable late Iron Age/early Roman samples have little or no evidence for domestic rubbish.

The later Roman phase of activity on the site has been sampled in trenches 63, 64, 65 and 68. The ceramic dating indicates a broad range of date between the 2nd century and the 4th, with most of the evidence being attributed to the late 3rd-4th century AD, but the corn driers particularly are not securely dated and have been classified as Roman. These deposits are all non-industrial although six of the samples derive from deposits associated with corn driers.

Two of the remaining four derive from a quarry pit near one of the corn driers in Trench 64, and the others from a pit and layer in trenches 65 and 68.

Feature type	Trench	Sample no.	Cont. no.	Samp. Vol. (L)	Resi-due vol. (ml)	Pot £/#	Fe £/#	Mag. Wt. g.	H'scale no.	Slag wt. g.	Fuel ash slag*	Brick/ tile wt. g.	Fired earth wt. g.	Bone wt g.	Comment	Phase
Samples associated with iron smelting and industrial activity																
channel hearth	12	7	1217	46	400			56	2	64						Saxon
	87	44	8711	10	700			295	15	289			69			Saxon
	93	2	9306	8	1000			360						?	Possible ore – 546g.	Saxon
	94	10	9404	10	1500			1035		5			3.5		Ore – 702g.	Saxon
Furnaces & associated flues	54	3	5404	33	7000			19	1	1				<1		Saxon
	87	47	8710	2	600			535		9					Flint x 1.	Saxon
	63	37	6332	10	4700		2/7.5	183	60+	5490			22	check	Iron hobnail	LIA/Rom?
	63	42	6334	8	3000	18/28		107	25+	1697			646			LIA/e Rom?
	63	35	6329	30	16000	9/50		390	200+	12523			111	3		LIA/e Rom?
Pits with slag lumps	65	33	6521	10	3500			7		210				<1		LIA/e Rom?
	65	49	6515	9	6000			15	6	2815				<1		LIA/e Rom?
	65	50	6526	10	4000			5	3	3184						LIA/e Rom?
	65	25	6505	10	4500	4/2	1/1	37	50+	1153				3	Fe stud.	LIA/e Rom?
Industrial layers/ features	87	21	8704	40	16500			1826	10	10640			33			Saxon?
	87	22	8703	40	21000			903	29	21788						Saxon?
Non-industrial samples																
Corn driers and associated features	63	29	6319	3	600	4/2		<1	5	1				<1		Roman?
	63	36	6307	26	7.5	4/1	3/9	6.5	37	35			316	4.5	Hob nail x 1.	2-4th C
	63	40	6331	8	1300	3/6		3	14					<1		Roman?
	64	16	6408	27	6000	1/1.5		14.5	10	8	P		334	3	Fire-cracked pebble x 1.	Roman?
	64	17	6407	27	2500			13.5	9	1		51	93	2	lots of fuel ash slag	Roman?
	68	39	6803	8	1500	2/17	3/5	17	85+	9			12	<1		Roman
Quarry pit adj. to [6404]	64	15	6405	18	2700	9/30		6	9	128			26	12		late 3-4th C
	64	19	6414	14	6000	9/53		2						153		late? Roman
Misc. pit features and layer	63	32	6312	20	7000	6/11		105	350+	5179		694	12	57	Lead x2, <1g.	LIA
	65	28	6511	8	2000	13/47		11.5	50	18.5			4	22		late 3-4th C
	68	52	6808	23	3000	13/53	2/1.5	16.5	46	198			17	13	Hob nails x 2.	late 4th C
	68	53	6814	20	1200	2/1		19	37	119			61	23		?

£/# count/weight of pot and iron;

Table 2: Finds from the processed samples arranged by feature type, phase and trench.

Feature type	Trench	Sample no.	Cont. no.	Samp. vol. in l.	Flot vol. (ml)	Char-coal */$	Charr'd grain *	Cereal chaff*	Charr'd seed *	Egg shell wt. g.	Snails */#	Comment
Saxon												
Channel hearths	12	7	1217	46	315	5/5	2^		3^		3/2	Oat, barley, wheat, corn cockle?, dock, vetch/pea, daisy family, stinking chamomile; oak charcoal, *C. acicula*
	87	44	8711	10	520	5/5	3^	2^	4^		2/1	Barley, oat, wheat, barley chaff, chickweed, corn spurrey, knotgrass, black bindweed, dock, vetch/pea, medick/trefoil, selfheal, plantain, stinking chamomile, thistle, knapweed, daisy family, sedge, grasses; oak charcoal, *C. acicula*
	93	2	9306	8	230	5/5	2	1	2		2/2	Barley, oat, wheat, rye?, barley chaff, hazel, dock, cabbage/mustard, vetch/pea, medick/trefoil, selfheal?, plantain, stinking chamomile, knapweed; *C. acicula*
	94	10	9404	10	330	5/5	2	1	5			Barley, oat, wheat, barley chaff, corn cockle?, knotgrass, dock, vetch/pea, medick/trefoil, small leguminous seed, plantain, cleavers, stinking chamomile, knapweed, daisy family, grasses. Oak charcoal.
Furnaces	54	3	5404	33	630	5/5			1		5/3	Hazelnut; *C. acicula*
	87	47	8710	2	125	5/5			1		1/1	Goosefoot family; *C. acicula*
Industrial layers/ features	87	21	8704	40	300	5/5	2^		3^		3/1	Barley, wheat, oat, dock, cabbage/mustard type, vetch/pea, medick/trefoil, knapweed, stinking chamomile, daisy family, grasses; *C. acicula*
	87	22	8703	40	1	1/2	1		2		2/1	Indet. cereal frags, meadow/creeping/bulbous buttercup, blinks, cabbage/mustard type?, stinking chamomile, daisy family; *C. acicula*
Later Roman												
Corn driers and associated features	63	29	6319		16	3/5	4	3	3		4/1	Wheat, barley, oat, wheat chaff, dock, small leguminous seed, field gromwell, cleavers, grass; *C. acicula*
	63	36	6307	26	23	2/5	3	2	1		5/3	*Wheat, barley, oat, wheat chaff, dock, cabbage family, carrot family, daisy family; house mouse, field vole,* C. acicula
	63	40	6331		22.5	3/5	5	3	3		5/2	*Wheat, barley, oat, wheat & barley chaff, corn cockle?, dock, field gromwell, cleavers, daisy family, brome, grasses; sheep/goat, house mouse,* C. acicula
	64	16	6408	27	40	2/5	5	1	2		3/2	Wheat, barley, oat, wheat chaff, chickweed, knotgrass, cleavers, brome, grasses; house mouse, field vole, lizard (slow worm), *C. acicula*
	64	17	6407	27	90	3/4	5	3	3		5/2	Wheat, barley, oat, wheat chaff, pink family, dock, vetch/pea, selfheal?, field gromwell, stinking chamomile, daisy family, brome, grasses; rodent, slow worm, frog/toad, *C. acicula*
	68	39	6803	8	13	2/4	5	4	2		3/2	Wheat, barley, oat, wheat chaff, dock, field gromwell, grasses; wood mouse, vole, *C. acicula*
Quarry pit adj. to [6404]	64	15	6405	18	112.5	5/5	5	5	2		5/3	Wheat, barley, oat, wheat chaff, dock, cabbage/mustard type, cleavers , thistle, daisy family, grasses; cattle, sheep/goat, shrew, rodent, frog/toad, *C. acicula*
	64	19	6414	14	535	5/5	2^	3^	5^		5/3	Wheat, wheat & barley chaff, hazelnut, goosefoot family, dock, small leguminous seed, selfheal?, plantain, brome, grasses; cattle.
Misc. pit features and layer	65	28	6511	8	80	5/5	4	2	2		5/2	Wheat, barley, oat, wheat & barley chaff, hazelnut, goosefoot/oarche, dock, field gromwell, sedge, brome, grasses; pig, cattle, mouse, small fish, *C. acicula*
	68	52	6808	23	5	3/4	1	1	1	<1	4/2	Wheat, wheat chaff, blinks, grass?; sheep/goat, cattle, rodent, cf chicken eggshell, *C. acicula*

Feature type	Trench	Sample no.	Cont. no.	Samp. vol. in l.	Flot vol. (ml)	Char-coal */$	Charr'd grain *	Cereal chaff*	Charr'd seed *	Egg shell wt. g.	Snails */#	Comment
Late Iron Age/early Roman												
Furnaces and associated flues	63	35	6329	30	5	2/3			1		5/1	Indet. seeds; house mouse, wood mouse, *C. acicula*
	63	37	6332	10	10	4/5			1		5/1	Medick/trefoil, stinking chamomile; wood mouse, vole, *C. acicula*
	63	42	6334	8	2.5	1/2					5/2	C. acicula
pits with slag lumps	65	33	6521	10	1	0/1					5/1	*Pig,* C. acicula
	65	49	6515	9	1	0/0					4/1	C. acicula.
	65	50	6526	10	1	0/1					5/1	C. acicula.
Industrial	65	25	6505	10	10	1/2					5/2	Charred (organic?) amorphous material; rodent, *C. acicula*
Misc. pit	63	32	6312	20	16	3/5			1		4/2	Goosefoot family (modern?), brome; pig, sheep/goat, cattle, house mouse, *C. acicula*
Not Phased												
disuse deposit	68	53	6814	20	12	5/5	1		1		3/2	Wheat, barley, indet. seed; cattle, field vole, bank vole, *C. acicula*

*frequency – 1=1-10; 2=11-50; 3=51=150; 4=151-250; 5=>250 items; */$ frequency - charcoal >2mm/<2mm; */# frequency/species diversity – 1= 1-3, 2= 4-10, 3= 11-25, 4= 26-50, 5=>50 species, types, etc; ^estimated frequency

Table 3: Environmental finds from the processed samples arranged by feature type and trench.

These samples are characterised by pottery, fired earth, some animal bone, some iron smelting slags and small quantities of magnetic material with hammerscale relatively common but not abundant. All these deposits, not surprisingly for the corn driers, contain relatively large assemblages of charred cereal debris, including both grain and chaff (Table 3). The bone finds include cattle, sheep/goat, pig, a small fish vertebra, and wood mouse, house mouse, field vole, bank vole, frog/toad and slow worm. Charcoal is much more abundant than in the earlier deposits, with quarry pit [6404] particularly full of charcoal (Table 3). These assemblages appear to indicate a mixture of domestic, agricultural processing and industrial debris. It is possible that the hammerscale in these deposits relates to smithing activity associated with the settlement and agricultural activity rather than the slags which may well be residual in these contexts from the earlier period of iron smelting on the site. There does not appear to be any positive evidence for any of the iron smelting activity taking place in the last two, or even three, centuries of the Roman period.

The last group of samples are dated by radiocarbon and association to the middle Saxon period. Material from the channel hearths in Trenches 12, 87 and 93 and from a furnace in Trench 54 have been dated by radiocaron analysis to the middle Saxon period (see Cowgill 2007). By association the channel hearth in Trench 94 has also been assigned a saxon date, and the samples from associated industrial deposits in Trench 87 have been assumed to be contemporary with the dated deposits for this assessment. These samples are characterised by a lack of pottery, a substantial magnetic component, small quantities of slag, except in the slag layers across the north part of the trench where the bulk of the deposit was composed of tap slag (Table 3), a little iron ore, and a little hammerscale and fired earth. Animal bone is almost absent. Charcoal is very abundant except in one sample, and interestingly charred cereal grain is present in all the samples, and chaff in three. This relatively large and consistent component of charred cereal debris in the absence of domestic rubbish such as bone, pottery and small finds is perhaps unexpected and contrasts with the complete absence of such debris from the earlier phase of smelting activity on the site.

Botanical Remains

The volume of the flots ranges from 1 millilitre to 630 millilitres and twenty-two of the twenty-seven flots contain varying quantities of charred botanical remains, which include charred cereal grain, chaff and weed seeds (Table 3). The overall preservation of the botanical remains is good, as demonstrated by the presence of fragile cereal components such as detached coleoptiles (sprouted embryos of cereal grains) and cereal chaff, which has been recorded in many of the samples. The preliminary identifications of the cereal grain indicate the presence of wheat (*Triticum* spp.), which appears to be predominantly spelt (*Triticum spelta*), with traces of emmer (*T. dicoccum*) and bread wheat-type (*T. aestivum sl.*) also present, as well as barley (*Hordeum* spp.), oat (*Avena* sp.) and a trace of possible rye (*Secale cereale*), the latter which has been identified in one flot (from channel hearth [9305]). The barley appears to be a hulled variety and the presence of lateral ('twisted') grains indicates six-row barley (*Hordeum vulgare*). It has not been possible to determine if the oats are a wild or cultivated variety due to the absence of oat chaff, upon which the distinction can be made providing the surviving diagnostic elements are preserved. The preliminary assessment indicates that wheat seems to be the dominant cultigen in terms of frequency, and appears to be the most abundant species with regards to numbers of cereal grains in all of the flots,

except those from the features identified as channel hearths, where barley and oat grains out number wheat grains.

The chaff assemblages largely consist of chaff of a glume wheat species such as spelt or emmer, and at this stage of analysis it chiefly appears to be that of spelt, and further analysis should clarify this. There is a single instance of free-threshing wheat chaff which supports the provisional identifications of (free-threshing) bread-type wheat grains, although the grains and chaff are from disparate samples. Overall, barley chaff forms a minor component of the chaff assemblages and it is particularly fragmented, but does occur consistently in samples from the channel hearths where wheat chaff is absent and wheat grains form a minor component of the grain assemblages.

The size of the weed seed assemblages are variable but the suites of species provisionally identified are not dissimilar and include species that inhabit disturbed/waste ground, notably species such as goosefoots/oraches (*Chenopodium/Atriplex* spp.), dock (*Rumex* spp.), knapweed (*Centaurea* spp.) and thistles (*Carduus/Cirsium* spp.), as well as species commonly associated with arable or cultivated land, including corncockle (*Agrostemma githago*), chickweed (*Stellaria* spp.), knotgrass (*Polygonum* spp.), black bindweed (*Fallopia convolvulus*), field gromwell (*Lithospermum arvense*), cleavers (*Galium aparine*) and brome (*Bromus* spp.). Grassy habitats are also inferred by the presence of meadow/creeping/bulbous buttercup (*Ranunculus acris/repens/bulbosus*), small seeded vetches/peas (*Vicia/Lathyrus* spp.), medick/trefoil (*Medicago/Trifolium*) and selfheal (*Prunella vulgaris*), although it should be noted that the species mentioned are not confined to one specific habitat. In addition, several fragments of hazelnut shell (*Corylus avellana*) have been recovered from several flots and probably constitute a food residue.

Charcoal consistently occurs in each of the flots, and is particularly abundant in samples from the channel hearths ([1206], [8712], [9305] and [9402]), the large quarry pit [6402], quarry pit/ditch [6508], as well as furnaces [5407], [6333] and [8709], together with layer (8704). The assemblages are primarily comminuted charcoal, and species including oak (*Quercus*), plum/cherry/sloe (*Prunus*) and Pomoideae, (a subfamily which includes genera *Crataegus* (hawthorns), *Malus* (apples), *Pyrus* (pears) and *Sorbus* (whitebeams)), have provisionally been identified from the channel hearths and several furnace fills (furnaces 5407, 6333 and 8709) (Gale, 2006), although mature oak tends to dominate the charcoal from the iron production areas. There appears to be little charred herbaceous material, although small amounts were noted in the fills of channel hearths [8712], [9305] and [9402] as well as from fill (6414) within quarry [6402].

Each of the flots contain some intrusive material including insect remains, worm capsules, the blind burrowing snail *Cecilioides acicula* and remains of uncharred botanical material including root material and weed seeds of fumitory (*Fumaria* spp.), nettle (*Urtica* sp.), goosefoot/orache, chickweed, campion (*Silene* spp.), knotgrasses (*Polygonum* spp.), bramble (*Rubus* spp.), fool's parsley (*Aethusa cynapium*) and elder (*Sambucus nigra*).

Discussion

Samples associated with iron smelting and industrial activity

Channel hearths

The four flots taken from channel hearth features within Trenches 12, 87, 93 and 94 are rich in charcoal and contain grain assemblages that are dominated by barley and oat with wheat forming a minor component only. The chaff assemblages consist entirely of barley chaff, which is fragmented and could perhaps be due to the feature type, which may have been subject to more mechanical action and disturbance than other features such as corn driers which are enclosed and more protected from the effects of weathering and trampling. The exclusive presence of barley chaff in the ore roasting pits and its relative scarcity in the remaining features is intriguing, especially considering that chaff of free-threshing cereals such as bread wheat, rye and barley, are more fragile than that of glume wheats and consequently are less likely to survive the charring process (Broadman and Jones, 1990) and subsequent taphanomic processes. The significance of this apparent dominance of non-wheat species in these unusual and rare features merits further investigation. It could be attributed to differential treatment and/or processing of cereals and uses of the by-products - such reserving the barley chaff for fuelling the channel hearths; or it might be because the hearths are mid-Saxon in date rather than the earlier Late Roman and late Iron Age/early Roman deposits sampled elsewhere on the site. The fact that the identifiable wheat includes bread wheat-type grains as well as possible rye, which are species generally associated with Saxon and Medieval periods (Greig, 1991), suggests that this change in dominance may be related to changing cereal preference in the Saxon period.

Furnaces, associated features

The group of six samples taken from the furnaces and associated flues (3, 35,37 42 and 47) and four pits with slag lumps (25, 33, 49 and 50) from four disparate Trenches (54, 63, 65 and 87) are the sparsest in terms of botanical remains and are characterised by the absence of cereal grain and chaff and very small numbers of weed seed which include goosefoot/orache, medick/trefoil and stinking chamomile as well as a single fragment of hazelnut shell. Unfortunately the weed assemblages are too small to provide useful ecological information with regards to the local environs that the furnaces were situated within during their period(s) of use. It is also important to consider whether the lack of cereal remains is an accurate reflection of the composition of the original assemblages, or if it is a factor of preservation since the cereal components, either if accidental inclusions or deliberately used for tinder for lighting the furnaces, are highly unlikely to survive the intense heat generated within the furnaces. Other industrial features uncovered across the site do contain remains of cereals but it is difficult to determine if the lack of cereal remains in the furnaces is a real phenomenon or a product of preservation. Interestingly these assemblages include furnaces of two different periods, the late Iron Age/early Roman and the mid-Saxon periods. The two groups are similar, but the Saxon samples have a much higher charcoal component than the earlier group.

Industrial layers and features

The two samples (21 and 22) from mid-Saxon layers derived from furnace waste yielded some botanical remains, with layer (8704) being slightly richer than the layer of slag (8703). The flot from layer (8704) is dominated by barley, with bread or emmer-type wheat grains also present but which require further identification, and a weed assemblage characterised by

daisy family including knapweed and stinking chamomile, dock and leguminous seeds including vetch/pea and medick/trefoil. The layers are from Trench 87 from which a sample from a channel hearth was also taken (sample 44) and it appears that certainly samples 44 and 21 compliment each other in terms of the composition of the cereal and weed seed assemblages. Determining the origin of the botanical assemblages is problematic and they may be derived from a variety of sources, such as residual material incorporated into the industrial layers or derived from re-worked material during the formation of the channel hearths. The weed assemblages of samples 21 and 44 could feasibly be associated with the cereals and represent crop processing residues or alternatively be incidental inclusions from the surrounding environs, in which case either scenarios present an opportunity to reconstruct arable husbandry regimes or the local habitat from a feature and deposit which are distinct from many of the samples due to the dominance of non-wheat species. The absence of any debris, other than these cereal remains, classifiable as domestic suggests that the cereals here are being used as fuel or tinder in the hearths, although the 'Saxons' may have tried to dry small quantities of grain over these hearths despite their primary function as industrial hearths.

Non-industrial samples

Corn driers and associated features

The bulk of the non-industrial samples derive from the Roman and later Roman features, particularly the corn driers and a quarry pit near the corn drier in Trench 64. A total of six samples were taken from three separate features identified as corn driers from Trenches 63, 64 and 68. The flots are characterised by abundances of cereal grain and smaller quantities of cereal chaff and weed seeds. Wheat, predominantly spelt at this stage of assessment, dominates the cereal assemblages, whilst hulled barley and oat form lesser components. The fills described as deposits associated with the final firing (6331, 6407 and 6803) are the most reliable in terms of identifying arable husbandry regimes. It seems that these final firing deposits are comparable, and it may be possible to distinguish multiple phases of use, perhaps with the barley and oat representing residues from previous firings, unless the wheat, barley and oats were grown as maslin crops or crop processing residues from the final stages of crop processing were used as fuel. A small proportion of the wheat and to a lesser degree the oat grains from corn drier [6406] had germinated as were those from the final fill of adjacent quarry pit [6402], and these may be the remnants of fuel with the residues from a spoiled crop and crop processing waste used to fuel the corn drier. It seems unlikely that the grain is malted as the proportion of sprouted grain is small but this will require confirmation. The weed seed assemblages from the corn driers are also comparable and lower ‘final firing’ fills all contain field gromwell, whilst dock, cleavers, daisy-type and brome occur frequently as well and are species often associated with arable fields.

No crop processing residues from the earlier stages of crop processing have been readily identified at this preliminary stage of investigation, perhaps these activities were carried out away from the area under current investigation, but straw would also have been a useful resource for fodder, bedding, thatching and even fuel.

Miscellaneous pit features and layer

Unphased feature [6813] contains a very small quantity of wheat, barley and unidentifiable weed seeds and provides very limited economic or ecological information. Two pits from Trenches 63 and 65 were sampled as well as a layer from Trench 68. Pit [6314] described as containing a 'mixed' refuse deposit contains very limited botanical evidence, which cannot be readily interpreted as domestic waste or crop processing waste.

The late Roman sampled dump of charcoal at the base of pit [6508] proved to be relatively rich in terms of cereal grain with small amounts of wheat and barley chaff as well as a weed assemblage comparable to those from the corn driers and is likely to represent a dump of waste associated with crop processing and will provide a useful comparison to the fills of quarry pit [6402]. The contemporary layer (6808) from Trench 68 contains small amounts of cereal grain including spelt wheat, wheat chaff and weed weeds, which may represent re-worked material and provides only limited economic evidence and the weed assemblage is too small to provide ecological reliable information.

Mollusca

The snails recovered from the samples are discussed separately. They have been scanned and individual species in each sample identified but not quantified. Many samples had no snails or the ubiquitous blind burrowing snails *Cecilioides acicula*, which as has been discussed above almost certainly represents an intrusion into the deposits. This species is very abundant in several samples. The other identified taxa are recorded below in Table 4.

The snail assemblages from the Late Iron Age and LIA/early Roman smelting sites are small but the taxa present are typical of open country grassland environments with shells of *Vallonia excentrica* and *Hellicella itala*. In the later Roman period samples the assemblages tend to be richer and a wider range of taxa are present. Several of these samples are still dominated by the shells of open country taxa, with species such as *Pupilla muscorum*, *Vertigo pygmaea* being added to the species list. Three samples however have produced a different suite. Samples 36 (6307), 15 (6405) and 19 (6414) are dominated by shells of taxa that are more typical of shaded and woodland environments. The latter two samples derive from the large quarry pit 6404 in Trench 64 and it is possible that the immediate environment around the pit was conducive to shade loving species, perhaps because it became overgrown. These two trenches are near each other, and the appearance of the shells of woodland taxa in other samples from Trench 64 and the nearby Trench 65 (Table 4) suggests that this small valley area may have become wooded or scrubby in the late Roman period. The snail fauna associated with the corn drier deposits almost certainly relate to a post-use phase of the structures since no shells show signs of burning.

Two of the mid-Saxon channel hearths have produced reasonable snail assemblages. The sample from Trench 93 is dominated by taxa of open country environments, while that from Trench 54 indicates a shaded woodland habitat. These trenches are some distance apart and this very limited evidence suggests that the landscape was probably a patchwork of grassland and woodland in the Saxon period.

phase	LIA	LIA/e Rom?	LIA/e Rom?	LIA/e Rom?	LIA/e Rom?	LIA/e Rom?	LIA/e Rom?	2-4	3-4	Rom	Rom	Rom	Rom	l4th	lRom	lRom	Sax	Sax	?
type	non	ind	ind	ind	ind	ind	ind	non	non	non	non	non	non	non	non	non	ind	ind	non
feature	pit	pit	pit	hol	furn	pit	pit	cd	pit	cd	cd	cd	cd	lay	quar	quar	ch	ch	ov
sample no.	32	25	33	35	42	49	50	36	28	16	17	39	40	52	15	19	2	3	53
Open country & catholic																			
Cecilioides acicula	+	+	+	+	+	+	+	+	+			+	+	+	+		+	+	+
Vallonia excentrica	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Vallonia costata											+		+		+	+			
Pupilla muscorum								+			+	+	+		+	+		+	
Vertigo pygmaea								+								+	+	+	
Helicella itala	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
Trichia hispida		+			+			+	+	+	+	+	+	+	+	+	+	+	+
Cochlicopa sp.										+	+				+	+			
Cochlicopa lubrica																+			
Cochlicopa lubricella																+			
Cepeae hortensis/nemoralis									+						+	+			
Truncatellina																+			+
Hygromia sp.													+	+					
Woodland & shade loving																			
Clausilidae								+							+	+	+	+	
Discus rotundatus					+			+	+						+			+	
Carychium sp.															+			+	
Acanthinula sp.															+			+	
Retinella nitidula																+		+	
Oxychilus alliarus	+							+		+	+		+		+			+	
Vitrea sp.															+	+		+	
Helicigona lapicida															+				
Retinella pura								+							+	+			
Oxychilus cellarius								+		+			+		+				
Aegopinella hammonis											+								
Pomatia elegans									+										
Punctum pygmaeum								+											+
								W					W?		W	W		W	

ind = industrial; non = non-industrial; pit = pit; cd = corn drier; furn= furnace; lay = layer; ch = channel hearth; hol = hollow; oc = oven/hearth;
W = woodland assemblage

Table 4. Identified snail taxa other than *Cecilioides acicula* recorded in the samples.

Mollusca

The snails recovered from the samples are discussed separately. They have been scanned and individual species in each sample identified but not quantified. Many samples had no snails or the ubiquitous blind burrowing snails *Cecilioides acicula*, which as has been discussed above almost certainly represents an intrusion into the deposits. This species is very abundant in several samples. The other identified taxa are recorded below in Table 4.

The snail assemblages from the Late Iron Age and LIA/early Roman smelting sites are small but the taxa present are typical of open country grassland environments with shells of *Vallonia excentrica* and *Hellicella itala*. In the later Roman period samples the assemblages tend to be richer and a wider range of taxa are present. Several of these samples are still dominated by the shells of open country taxa, with species such as *Pupilla muscorum*, *Vertigo pygmaea* being added to the species list. Three samples however have produced a different suite. Samples 36 (6307), 15 (6405) and 19 (6414) are dominated by shells of taxa that are more typical of shaded and woodland environments. The latter two samples derive from the large quarry pit 6404 in Trench 64 and it is possible that the immediate environment around the pit was conducive to shade loving species, perhaps because it became overgrown. These two trenches are near each other, and the appearance of the shells of woodland taxa in other samples from Trench 64 and the nearby Trench 65 (Table 4) suggests that this small valley area may have become wooded or scrubby in the late Roman period. The snail fauna associated with the corn drier deposits almost certainly relate to a post-use phase of the structures since no shells show signs of burning.

Two of the mid-Saxon channel hearths have produced reasonable snail assemblages. The sample from Trench 93 is dominated by taxa of open country environments, while that from Trench 54 indicates a shaded woodland habitat. These trenches are some distance apart and this very limited evidence suggests that the landscape was probably a patchwork of grassland and woodland in the Saxon period.

Animal bones

A small assemblage of 363 animal bone and one oyster shell were recovered during the evaluation. These derived from ten contexts from five of the evaluation trenches. The majority of the material derives from contexts assigned to the late Iron Age and Roman periods with three bones from the mid-Saxon complex in Trench 87. The bones have been identified and recorded (Appendix 1) and are summarised below in Table 5.

period	unph	LIA	LIA/e Rom	2nd	l3-4th	l Rom	4th	4th	Saxon?	Saxon?
context	5901	6312	6528	6503	6317	6403	6509	6510	8704	8706
Horse		1	2			11	1			
Cattle	1	6	9	1		62	6	1	2	1
Cattle size		2	11		1	99	4			
Sheep/goat		1	32		4	4	2	1		
Sheep			5							
Sheep size		3	14		1	7	3	1		
Pig			7		1	8	2	1		
Red deer						2				
Fox								1		
Unidentified			1		1	38	2			
Oyster	1									
Total	2	13	81	1	8	231	20	5	2	1

Table 5. Frequency of identified fragments of hand collected animal bone.

The majority of the identified bone derives from cattle, with sheep or goat the next most frequent. Other taxa include horse, pig, red deer and fox, and a single valve of oyster shell. Juvenile immature and adult animals are present. Several of the bones have been chewed by dogs but in general the bones is reasonably well preserved.

Context 6528 derives from an excavated pit where the bones were placed around the edges of a large slag lump in the centre of the pit. There is no immediate indication that this group of bones is in any way special but it does include appreciably more bones of sheep or goat than cattle, which runs against the trend in the data, and several bones from two individuals, an adult and a lamb, may be present in the group, which could imply some selection. This dominance of sheep may be typical of the period since on the earlier excavations at the site (Jackson and Ambrose 1978) sheep bones outnumbered cattle in the late Iron Age contexts. The sheep remains in this assemblage are clearly from gracile animals typical of the end of the Iron Age and early Roman period, but some of the cattle bones derived from fairly large beasts somewhat larger than the typical 1st millennium animals. These derive from the later Roman deposits and probably indicate the introduction of new stock types or selective breeding. These are areas that can be studied should further excavations take place on the site. The largest group of bones was recovered from a deposit in the quarry fills of Trench 64. This deposit includes two bones of adult red deer, indicating that these animals were hunted and also suggesting the proximity of woodland.

Amongst the non-industrial Roman samples four produced cattle bones, three sheep and one pig, while two samples of the late Iron Age/early Roman industrial samples produced pig, one produced cattle and one shseep/goat. No identifiable domestic animal bones were recorded from the mid-Saxon samples. A single vertebra of a small fish indicates that fish were being caught and eaten in the Roman period, but this will have to be specifically identified to establish whether it is a freshwater or marine species. The presence of an oyster shell among the hand collected remains is evidence for the site at least trading directly or indirectly with coastal areas. The other identified taxa from the samples relate to the local environment on the site. They include house mouse in several samples suggesting occupation or at least buildings nearby, others produced wood mouse, field vole, bank vole, shrew, slow worm and frog/toad. The wood mouse, bank vole and slow worm suggest some cover, while the field vole is typical of grasslands. The other species are less specific to a habitat.

Overall discussion

The disparate nature of sampling a series of evaluation trenches across such a large site means that any conclusions must be tempered by the circumstances of the sample recovery and the limited nature of the evidence. The discussion below should be seen as a framework to test and correct, and certainly not as a definitive statement about the site.

At a simplistic level the environmental evidence suggests an open late Iron Age/early Roman landscape with iron smelting being undertaken and exploiting local oak woodlands represented only by its charcoal. There is very little domestic activity associated with the industrial evidence at this period, and apart from a few animal bones being placed in pits with slag the debris of settlement and agriculture is missing from the samples. The consistency of this absence by comparison with the later Roman activity on the site suggests that the industrial and settlement evidence may not be contemporary and the preliminary phasing framework used here may be correct. In the middle to late Roman period the samples have produced limited evidence for industrial activity, but are rather dominated by evidence for

agricultural processing and domestic settlement. The results show the cultivation of spelt wheat, barley and probably oats, with occasional emmer and bread wheat in the assemblages. The crop processing assemblages associated with the corn driers confirm their interpretation. They show very limited evidence for malting, in that although a few grains had germinated in one or two of the assemblages these had not progressed to the stage required for malting, and probably represent slightly spoilt grain rather than malted grain. Many of the charred seed remains must have arrived on site associated with the cereal crop. Cattle dominate the small bone assemblages, with sheep, pig, horse and dog, the latter based upon the evidence of gnawing. Also present red deer bones indicate some hunting, while the oyster shell indicates some long distance trading. The terrestrial snails from several of the later Roman features suggest a shaded or woodland habitat and if we except that some of these assemblages formed after the features they were found in went out of use, this perhaps suggests some scrub or woodland regeneration on the site in the late or immediate post-Roman period. These woodland type assemblages are associated with the corn driers and also the quarry deposits in Trench 64 and might reflect a general disuse or rundown character to the sites. Snail assemblages indicating a more open grassland environment in the Roman period are also present and the specific interpretation of these assemblages is hampered by a lack of dating definition, and the problems of establishing whether deposits formed after the final use of features or contemporary with the activity they represent. In the mid-Saxon period there are again both open country and woodland snail assemblages associated with a phase of iron smelting and its associated activities across the whole site. There is limited settlement evidence associated with this phase of industrial activity, but the consistent occurrence of charred cereal grain and some chaff on the industrial sites indicates the availability of material from local crop processing activities. Spelt wheat is not at this preliminary stage conclusively identified from any of these mid-Saxon samples, which are dominated by barley, including barley chaff, and include oats, probable rye and bread wheat. This change in the relative importance of the cereal types on the site is consistent with a pattern found elsewhere across England and tends to support the radiocarbon dating and by association the phasing of the other deposits to the mid-Saxon period.

Neither phase of industrial activity on the site can be positively associated with any contemporary domestic occupation, and both phases of activity appear to be specifically industrial in character with little evidence of associated settlement evidence on the industrial sites. Only the mid-Saxon smelting sites have produced agricultural evidence in the form of crop processing debris which indicates the availability of this material to the site and might suggest that the smelting is being conducted by or at least in association with the local Saxon farmers in the area. In between these two periods of industrial activity the landscape appears to have been given over to farming.

This rather imaginative story sequence based on a few poorly phased samples from a disparate range of evaluation trenches affords a framework that should be tested by any future excavations on the site. The obvious questions about the site are:

1. Does the site go through a cycle of industrial, agricultural and industrial activity from the late Iron Age to the Saxon period or are these activities contemporary but spatially separate?

2. Are these activities associated with a cycle of vegetation change from an open late Iron Age landscape with local woodland resources fuelling the smelting industry, to

an open agricultural landscape with cereal farming, followed by late Roman abandonment of the landscape, scrub expansion and woodland regeneration. Finally followed by Saxon clearance and use of the woodland to fuel the Saxon iron smelting industry, with local agriculture and cereal production.

3. To what extent is the whole site area a patchwork at all periods, with smelting being undertaken adjacent to woodland resources while other areas are open agricultural land, and can the pattern of archaeological and environmental evidence reconstruct such a patchwork or mosaic? The size of the site is large and this type of landscape study becomes feasible in such a situation.

4. Can we define the character of the agricultural settlements, their status, their chronology and their economy, and to what extent do these economies change through time, including any changes in the exploitation of both animal and plant crop types.

There are several ways in which to tackle these questions. The colluvial sequences in the dry valleys of the site afford perhaps the best locations for studying the terrestrial snail faunas which could be used to illustrate the broad vegetational/landscape type history of the site, and also the chronology of colluviation and the episodes of ground stabilisation that mark the periods when no agriculture or clearance is being undertaken on the site. These sequences alongside the more specific dated feature and ditch samples should give both a general and more detailed mosaic of the changing character of the landscape, episode of clearance, etc. In the absence of deposits suitable for pollen analysis the snails afford the best means of looking at this landscape.

The charcoal assemblages from a programme of sampling both industrial, domestic and agricultural features through the periods of occupation should pick up not only the selective nature of the fuel for different purposes but also any marked changes in the availability and character of the fuel resources of the sites. The early evidence from this evaluation suggests that the iron smelters are selecting mature oak for their fuel, but the corn driers and domestic fires are likely to exploit other resources.

That the site includes an important agricultural settlement is evident from Jackson's earlier work nearby (Jackson and Ambrose 1978) where they found Iron Age enclosures with several round houses and a Roman site which included a major aisled barn structure. The three corn driers on the evaluation and those excavated on the adjacent site in the 1970's clearly illustrate the need for grain storage and processing, clear evidence with the crop processing waste described here for cereal production on the site.

Any programme of new excavation on the site should have a programme of sampling to ensure that the questions above can be addressed and the superficial interpretation of the evaluation results are tested. The landscape framework for the industrial activity on the site that has been put forward by Cowgill (2007) should be seen within a similar framework for the domestic, agricultural and natural landscape history of the site and the sampling should be designed to encompass both objectives.

If no further work fieldwork is envisaged then the quality of the evidence that has been extracted from those samples processed for this assessment and probably several of the

samples that currently remain unprocessed is such that these should be reported in detail, probably including a further programme of radiocarbon dating to resolve some of the chronological issues.

Aspects that could be recommended are as follows:

- Confirm date of corn driers in order to ascertain if they are contemporary with each other and with the industrial features.
- Analysis of the charcoal from industrial and non-industrial features; fuel selection, different for industrial, agricultural and possibly domestic purposes? Specifically samples 2, 7, 10 and 44 from the channel hearths; 3 and 47 from furnaces [5407] and [8709] respectively; 21 from industrial layer (8704); 16, 17 and 40 from corn driers [6406] and [6308]; 15 and/or 19 from quarry pit [6402]; 28 from pit/quarry/ditch [6508].
- Identification and quantification of botanical remains, particularly from the channel hearths, corn driers and quarry pit [6402]. Identify stages of crop processing, arable husbandry regimes such as seasonality, ploughing and harvesting techniques, 'producer' or 'consumer' site?
- Investigate possible differences between crops, notably dominance of barley in the mid-Saxon features and difference between these and the corn drier assemblages.
- Evidence for earlier stages of crop processing – situated away from focus of industrial activity?
- Sampling of channel hearths – investigate role of crop processing waste
- 'Continuity and change' – changes in arable husbandry from late Iron Age – intensification in Roman period and finally the mid-Saxon assemblages, equate to changes in arable regimes? More extensive with possible woodland clearance for fuel for industrial activity?
- Environs that furnaces and corndriers situated in - wooded, clearings, away from settlement(s)?- quantification of the snail assembages
- Compare with previously excavated sites at Laxton and Wakerley etc.
- Species identification of the single fish bone -is it freshwater or marine - evidence for trade or local fishing?
- Process the remaining samples from any well dated contexts or industrial or agricultural features - this represents 17 further samples from the site including industrial, domestic and agricultural features.

The main areas of further work relate primarily to the charcoal and charred plant remains which have not been quantified for this assessment and also the terrestrial snail evidence.

Acknowledgments
We should like to thank Alison Foster and Trude Maynard for the sample washing, processing and sorting. Rowena Gale kindly identified some of the charcoal from the site, specifically for the selection of material for radiocarbon dating
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Key to codes used in the cataloguing of animal bones and marine shells

SPECIES:

SPECIES CODE			SPECIES CODE	
MAN	human		DOVE	Dove species
EQU	Horse		FER	Feral dove
EQSZ	Horse size		PART	Partridge
BOS	Cattle		SWAN?	Swan?
BOSL	Cattle-large		WOOD	Woodcock
CSZ	cattle size		CURL	Curlew
SUS	Pig		WADE	wader
OVCA	sheep or goat		CROK	Crow or rook
OVI	Sheep		CORV	Crow or rook
CRA	Goat		JACK	Jackdaw
SSZ	sheep size		OWL	Owl indet.
FEL	Cat		BUZZ	Buzzard
CAN	Dog		GULL	Gull sp.
AUR	Aurochs			
AUR?	Aurochs?		TURD	Turdidae
CER	red deer		BIRD	Identifiable but not id'd
DAM	Fallow deer		PASS	Passerine
CLS	roe deer		LBIRD	Large bird
LEP	Hare		UNIB	Bird indet
ORC	Rabbit			
LAG	Lagomorph		FROG	Frog
CARN	Carnivore		FRTO	Frog or toad
FOX	Fox			
POLE	Polecat/ferret			
WEA	weasel		GAD	Gadid, cod family
BADG	Badger		LING	Ling
SEAL	seal		HADD	Haddock
SQU?	Squirrel?		RAY	ray
BEAV	Beaver		FISH	Fish
ROD	Rodent		UNIF	Fish indet
RAT	Rat			
AGR	Field vole		OYS	oyster
ARV	Water vole		COK	Cockle
MUS	House mouse		MUSS	Common Mussel
SORA	Common shrew		WHELK	Common whelk
MOLE	Mole		HEL	Helix aspersa
SMA	Small mammal		HELIX	Helix sp.
UNI	Unknown		HELN	Helix nemoralis
			SNAIL	snail
CHIK	Chicken			
CHKZ	Chicken size		FOSS	Fossil bone
GOOS	Goose, dom			
GOOS?	Goose, dom.?			
GSSZ	Goose size			
GSSP	Goose species			
GOSZ	Goose, poss. Wild			
DUCK	Duck, domestic sp.			
DUCK?	Duck?			
DKSP	Duck species			
DSP	Duck species indet			
MALL	Duck, dom.			
TURK	Turkey			

BONE ELEMENT:

BONE CODE		BONE CODE	
SKEL	skeleton	SCP	scapula
SKL	skull	HUM	humerus
ANT	antler	RAD	radius
ANT?	antler?	ULN	ulna
ATT	antler tine	RUL	radius and ulna
HC	horn core	C/T	carpus/tarsus
TEMP	temporal	C23	carpus 2+3
FRNT	frontal	CAR	carpus
PET	petrous	CPA	accessory carpal
PAR	parietal	CPI	intermediate carpal
OCIP	occipital	CPR	radial carpal
ZYG	zygomatic	CPU	ulnal carpal
NAS	nasal	MTC	metacarpus
PMX	premaxilla	MC1-5	metacarpus 1-5
MAN	mandible	MTP	metapodial
MNT	mandibular tooth	MPL	lateral metapodial
DLI	deciduous lower incisor	INN	innominate
DLPM1-4	deciduous lower premolar 1-4	ILM	ilium
LI	lower incisor (and 1-3)	PUB	pubis
LC	lower canine	ISH	ischium
LPM1-LPM4	lower premolar 1-4	FEM	femur
LM1-LM3	lower molar 1 - molar 3	PAT	patella
MAX	maxilla	TIB	tibia
DUI	deciduous upper incisor	FIB	fibula
UI	upper incisor (1-3)	LML	lateral malleolus
UC	upper canine	AST	astragalus
DUPM	deciduous upper premolar	CAL	calcaneum
DUPM1-4	deciduous upper premolar 1-4	CQ	centroquartal
UPM1-UPM4	upper premolar 1-4	TAR3	tarsus 3
UM1-UM3	upper molar 1 - molar 3	T4	tarsus 4
MXT	maxillary tooth	TAR	tarsus
TTH	indeterminate tooth	MTT	metatarsus
INC	incisor	MT1-5	metatarsus 1-5
HYD	hyoid	MTL	lateral metatarsus
ATL	atlas	SES	sesamoid
AXI	axis	PH1	1st phalanx
CEV	cervical vertebra (and 3-7)	PH2	2nd phalanx
TRV	thoracic vertebra (and 1-13)	PH3	3rd phalanx
LMV	lumbar vertebra	PHL	lateral phalanx
SAC	sacrum	LBF	long bone
CDV	caudal vertebra	UNI	unidentified
VER	vertebra		
STN	sternum	CLV	clavicle
CC	costal cartilage	COR	coracoid
RIB1	first rib (2 etc)	CMP	carpo-metacarpus
RIB	rib	CMC	carpo-metacarpus
		WPH1-3	wing phalanges 1-3
URO	urostyle	WPH	wing phalanx
		LSA	lumbosacrale
DENT	dentary		
CLEI	cleithrum		
RAY	fin ray		
SHELL	shell		
UV	upper valve		
VAL	valve		

NUMBER: number of fragments in the entry

SIDE: W - whole L - left side R - right side F - fragment

FUSION: records the fused/unfused condition of the epiphyses
P - proximal; D - distal; E - acetabulum; N - unfused; F - fused; C - cranial; A - posterior

ZONES: records the part of the bone present.
The key to each zone on each bone is on page 4

BUTCHERY: records whether a bone has been chopped (CH), cut (KN), worked (W), burnt (C)

GNAWING: records if a bone has been gnawed by dogs (DG), cats (FEL) or rodents (RG)

TOOTH WEAR - Codes are those used in Grant, A. 1982 The use of tooth wear as a guide to the age of domestic animals, in B.Wilson, C.Grigson and S.Payne (eds) *Ageing and sexing animal bones from Archaeological sites*, 91-108.

Teeth are labelled as follows in the tooth wear column:

Deciduous	Permanent
f ldpm2/dupm2	F lpm2/upm2
g ldpm3/dupm3	G lpm3/upm4
h ldpm4/dupm4	H lpm4/upm4
	I lm1/um1
	J lm2/um2
	K lm3/um3

MEASUREMENTS :Any measurements are those listed in A.Von den Driesch (1976*) A Guide to the Measurement of Animal Bones from Archaeological Sites*, Peabody Museum Bulletin 1, Peabody Museum, Harvard, USA
Some measurments have been taken on juveniles. Measurements marked L1 are the greatest length of long bones lacking one unfused epiphysis – the measurement being taken from the epiphyseal junction. Measurements marked L2 are the greatest length of the long bones between epiphyseal junctions when both epiphyses are unfused.

PATHOLOGICAL: A 'P' indicates that the bone fragment carries a pathology

COMMENTS: This may include a short description of the fragments, any pathologies, butchery or gnawing evidence

PRESERVATION: records the condition of the bone in the following manner

1- enamel only surviving
2- bone very severely pitted and thinned, tending to break up; teeth with surface erosion and loss of cementum and dentine
3- surface pitting and erosion of bone, some loss of cementum and dentine on teeth
4- surface of bone intact, loss of organic component, material chalky, calcined or burnt
5- bone in good condition, probably with some organic component

ZONES - codes used to define the zones on each bone

SKULL	1. paraoccipital process	METACARPUS	1. medial facet of proximal articulation, MC3
	2. occipal condyle		2. lateral facet of proximal articulation, MC4
	3. intercornual protuberance		3. medial distal condyle, MC3
	4. external acoustic meatus		4. lateral distal condyle, MC4
	5. frontal sinus		5. anterior distal groove and foramen
	6. ectorbitale		6. medial or lateral distal condyle
	7. entorbitale		
	8. temporal articular facet	FIRST PHALANX	1. proximal epiphysis
	9. facial tuber		2. distal articular facet
	0. infraorbital foramen		
		INNOMINATE	1. tuber coxae
MANDIBLE	1. Symphyseal surface		2. tuber sacrale + scar
	2. diastema		3. body of illium with dorso-medial foramen
	3. lateral diastemal foramen		4. iliopubic eminence
	4. coronoid process		5. acetabular fossa
	5. condylar process		6. symphyseal branch of pubis
	6. angle		7. body of ischium
	7. anterior dorsal acsending ramus posterior M3		8. ischial tuberosity
	8. mandibular foramen		9. depression for medial tendon of rectus femoris
VERTEBRA	1. spine	FEMUR	1. head
	2. anterior central epiphysis		2. trochanter major
	3. posterior central epiphysis		3. trochanter minor
	4. centrum		4. supracondyloid fossa
	5. neural arch		5. distal medial condyle
			6. lateral distal condyle
SCAPULA	1. supraglenoid tubercle		7. distal trochlea
	2. glenoid cavity		8. trochanter tertius
	3. origin of the distal spine		
	4. tuber of spine	TIBIA	1. proximal medial condyle
	5. posterior of neck with foramen		2. proximal lateral condyle
	6. cranial angle of blade		3. intercondylar eminence
	7. caudal angle of blade		4. proximal posterior nutrient foramen
			5. medial malleolus
HUMERUS	1. head		6. lateral aspect of distal articulation
	2. greater tubercle		7. distal pre-epiphyseal portion of the diaphysis
	3. lesser tubercle		
	4. intertuberal groove	CALCANEUM	1. calcaneal tuber
	5. deltoid tuberosity		2. sustentaculum tali
	6. dorsal angle of olecranon fossa		3. processus anterior
	7. capitulum		
	8. trochlea	METATARSUS	1. medial facet of proximal artciulation, MT3.
	9. coronoid fossa		2. lateral facet of proximal articulation, MT4
	0. teres tubercle		3. medial distal condyle, MT3
RADIUS	1. medial half of proximal epiphysis		4. lateral distal condyle, MT4
	2. lateral half of proximal epiphysis		5. anterior distal groove and foramen
	3. posterior proximal ulna scar and foramen		6. medial or lateral distal condyle
	4. medial half of distal epiphysis		
	5. lateral half of distal epiphysis		
	6. distal shaft immediately above distal epiphysis		
ULNA	1. olecranon tuberosity		
	2. trochlear notch- semilunaris		
	3. lateral coronoid process		
	4. distal epiphysis		

Appendix 1: Catalogue of hand collected animal bones

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WK	5901	BOS	MAN	1	R		56						ASCENDING RAMUS AND PART OF HORIZONTAL-FRAGMENTED- 13 PIECES	3
698WK	5901	OYS	LV	1	W								LOWER VALVE	4
698WK	6312	BOS	HUM	1	F		0						PROX SHAFT FRAGMENT	4
698WK	6312	BOS	HUM	1	R		69		DG				DISTAL SHAFT-EPI CHEWED OFF	4
698WK	6312	BOS	LMV	1	F		5						POST NEURAL ARCH WITH POST ZYGAPOPHYSES	4
698WK	6312	BOS	SCP	1	L		4	CH	DG				FRAGMENT NECK-DISTALVENTRAL CHOPPED-CHEWED	4
698WK	6312	BOS	SKL	1	L								PART OF ZYGOMATIC ARCH	4
698WK	6312	BOS	TIB	1	F								MIDSHAFT FRAGMENT	4
698WK	6312	CSZ	LBF	1	F				DG				CHEWED SHAFT FRAGMENT	4
698WK	6312	CSZ	RIB	1	F								SPLIT SHAFT FRAGMENT	4
698WK	6312	EQU	MTT	1	L	DF	3	S			Bd-40.2 Dd-32.9		DISTAL END-SAWN FROM SHAFT-BONE WORKING WASTE?	4
698WK	6312	OVCA	FEM	1	R	PNDN	34						SHAFT-BOTH ENDS UNFUSED	4
698WK	6312	SSZ	LBF	1	F				DG				CHEWED SHAFT FRAGMENT	4
698WK	6312	SSZ	LBF	1	F				DG				INDET-SHAFT FRAGMENT	4
698WK	6312	SSZ	RIB	1	L								MIDSHAFT-PITTED AND POROUS	4
698WK	6317	CSZ	RIB	1	F								SHAFT FRAGMENT	4
698WK	6317	OVCA	RAD	1	F								MIDSHAFT FRAGMENT	4
698WK	6317	OVCA	SCP	1	L	DF	123						GLENOID AND NECK	4
698WK	6317	OVCA	TIB	1	R		4						PROX SHAFT- 5 PIECES	3
698WK	6317	OVCA	UM2	1	L					J12			COMPLETE	4
698WK	6317	SSZ	LBF	1	F								SHAFT FRAGMENT	4
698WK	6317	SUS	CAL	1	R		23						PROX END LOST	3
698WK	6317	UNI	LBF	1	F								SHAFT FRAGMENT	4
698WK	6403	BOS	AST	1	L		1				L1-68.6 L2-63.1 Bp-45.6 Bd-42.1 Dd-33		COMPLETE	4
698WK	6403	BOS	AST	1	R		1				L1-61.9 L2-57.7 Bp-39.8 Bd-36.3 Dd-28.8		COMPLETE	4
698WK	6403	BOS	ATL	1	W		12345						PERIPHERAL DAMAGE	4
698WK	6403	BOS	CAL	1	L		23		DG				PROX END CHEWED OFF	4
698WK	6403	BOS	CAL	1	L		23		DG				PROX END CHEWED OFF	4
698WK	6403	BOS	CEV	1	F	CNAN	45						CENTRUM AND ARCH	4
698WK	6403	BOS	CEV	1	L								PART NEURAL ARCH	4
698WK	6403	BOS	FEM	1	F								PROX SHAFT FRAGMENT	4
698WK	6403	BOS	FEM	1	F	PF	1						PART OF HEAD	4
698WK	6403	BOS	FEM	1	R	PN	3						PROX SHAFT AND PART MIDSHAFT	4
698WK	6403	BOS	HC	1	F								MID PART- 3 PIECES-LARGISH	4
698WK	6403	BOS	HUM	1	R	DF	789	C			BT-82 HT-50		DISTAL END-CHARRED	4
698WK	6403	BOS	HYD	2	F								SHAFT	4

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WKAA	6403	BOS	INN	1	L								ACETABULAR FRAGMENT OF ISCHIUM	4
698WKAA	6403	BOS	INN	1	L	EF	459						ACETAB-LARGE- 2 PIECES	4
698WKAA	6403	BOS	INN	1	L		7						ISCHIAL SHAFT-LARGE	4
698WKAA	6403	BOS	INN	1	L		9						ILIAL FRAG ACETAB	4
698WKAA	6403	BOS	LM1	1	R					I15			BROKEN	4
698WKAA	6403	BOS	LPM3	1	L					F			WELL WORN-BUT UNEVEN-POST WORN MORE-UPPER TOOTH BROKEN?	4
698WKAA	6403	BOS	MAN	4	F								FRAGMENTS VENTRAL ASC RAMUS	4
698WKAA	6403	BOS	MAN	1	F		4						PART OF CORONOID	4
698WKAA	6403	BOS	MAN	4	F								FRAGMENTS HORI RAMUS	4
698WKAA	6403	BOS	MAN	1	L		5						CONDYLE	4
698WKAA	6403	BOS	MAN	1	L		4						BASAL HALF CORONOID	4
698WKAA	6403	BOS	MAN	1	L		6						ANGLE	4
698WKM	6403	BOS	MAN	1	L		23			F4g16I14 J11K6			FRAGMENTED HORI RAMUS- 13 PIECES	4
698WKAA	6403	BOS	MAN	1	R		5	CH					POST PART ASC RAMUS-CHOPPED DOWN OUTSIDE	4
698WKAA	6403	BOS	MAN	1	R		678			I17J5			HORI RAMUS WITH M1 AND 2- ANGLE CHEWED OFF	4
698WKAA	6403	BOS	MAN	1	R		7						ANT FRAG ASC RAMUS	4
698WKAA	6403	BOS	MAN	1	R								MEDIAL AND VENTRAL PART HORI RAMUS- 2 PIECES	4
698WKAA	6403	BOS	MAN	1	R		8						POST FRAG ASC RAMUS	4
698WKAA	6403	BOS	MAN	1	R		123						DIASTEMA AND SYMPHYSIS	4
698WKAA	6403	BOS	MAN	1	R		6						ANGLE	4
698WKAA	6403	BOS	MPL	5	F								SHAFT FRAGMENT	4
698WKAA	6403	BOS	MTC	2	F								MIDSHAFT FRAGMENT	4
698WKAA	6403	BOS	MTC	1	F								LATERAL HALF SHAFT	4
698WKAA	6403	BOS	MTC	1	R	DF	345				Bd-64.9		DISTAL END	4
698WKAA	6403	BOS	MTC	1	R		2	C					PART PROX END AND SHAFT-DISTAL SLIGHTLY CHARRED- 2 PIECES	4
698WKAA	6403	BOS	MTT	2	F								MIDSHAFT FRAGMENT	4
698WKAA	6403	BOS	MTT	1	F				DG				DISTAL SHAFT-END CHEWED OFF	4
698WKAA	6403	BOS	MTT	1	R		12		DG				PROX HALF-PROX END CHEWED	4
698WKAA	6403	BOS	MTT	1	R		12						PROX HALF- 6 PIECES	4
698WKAA	6403	BOS	MTT	1	R		12		DG				PROX END AND SHAFT-DISTAL CHEWED	4
698WKAA	6403	BOS	SCP	1	F		3						ANT SPINE FRAGMENT	4
698WKAA	6403	BOS	SKL	1	F								FRONTAL FRAGMENT	4
698WKAA	6403	BOS	SKL	1	R								INFRA ORBITAL FRAG ZYGOMATIC	4
698WKAA	6403	BOS	TIB	1	L	DF	56				Bd-59 Dd-43.2		DISTAL END- 2 PIECES-SL CHARRED	4
698WKAA	6403	BOS	TRV	1	F	CNAN	4						CENTRUM	4
698WKAA	6403	BOS	ULN	1	F								PROX MIDSAHAFT FRAGMENT	4
698WKAA	6403	CER	PH1	1	R	PF	12				GL-57.3 Bp-20.3		COMPLETE	4
698WKAA	6403	CER	RAD	1	L	DF	456				Bd-51.3 Dd-35.8		DISTAL THIRD	4

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WKAA	6403	CSZ	CDV	1	F								PART OF CAUDAL VERT	4
698WKAA	6403	CSZ	HUM	1	F	DF		C					FRAGMENT DISTAL END-CHARRED	4
698WKAA	6403	CSZ	LBF	11	F								SHAFT FRAGMENT	4
698WKAA	6403	CSZ	LBF	1	F			C					INDET-CHARRED FRAGMENT	4
698WKAA	6403	CSZ	LBF	8	F			C					CHARRED INDET SHAFT FRAGMENTS	4
698WKAA	6403	CSZ	LMV	1	F								ZYGAPOPHYSIS	4
698WKAA	6403	CSZ	LMV	1	L								BASAL PART TRANS PROCESS	4
698WKAA	6403	CSZ	RIB	7	F								SHAFT FRAGMENT	4
698WKAA	6403	CSZ	RIB	11	F								SPLIT SHAFT FRAGMENT	4
698WKAA	6403	CSZ	SKL	5	F								FRAGMENT	4
698WKAA	6403	CSZ	TRV	1	F								ZYGAPOPHYSIS	4
698WKAA	6403	CSZ	TRV	1	F								ANT FRAG NEURAL ARCH	4
698WKAA	6403	CSZ	TRV	1	R								ANT NEURAL ARCH	4
698WKAA	6403	CSZ	UNI	8	F								INDET	4
698WKAA	6403	CSZ	UNI	1	F								INDET	4
698WKAA	6403	CSZ	UNI	4	F								INDET	4
698WKAA	6403	CSZ	UNI	1	F								INDET	4
698WKAA	6403	CSZ	UNI	4	F			C					INDET CHARRED FRAGMENTS	4
698WKAA	6403	CSZ	UNI	31	F								INDET	4
698WKAA	6403	EQU	CPR	1	W		1						COMPLETE	4
698WKAA	6403	EQU	INN	1	F	EF							ACETAB FRAGMENT	4
698WKAA	6403	EQU	INN	1	L	EF	9						ACTAB FRAGMENT OF ILIUM	4
698WKAA	6403	EQU	INN	1	R		7						ISCHIIAL SHAFT	4
698WKAA	6403	EQU	LC	1	W								COMPLETE-WORN	4
698WKAA	6403	EQU	MPL	1	F								SPLINT BONE	4
698WKAA	6403	EQU	MTC	1	R		1						PROXIMAL THIRD	4
698WKAA	6403	EQU	PH1	1	L	PF	12	CH	DG		GL-77.4 Bp-60.5		COMPLETE-DISTAL CHEWED-PROX ARTIC CHOPPED ANT POST	4
698WKAA	6403	EQU	RAD	1	F								MIDSHAFT FRAGMENT	4
698WKAA	6403	EQU	RAD	1	L	DN	4						PART DISTAL EPI	4
698WKAA	6403	EQU	TRV	1	F	CJAN	4						CENTRUM	4
698WKAA	6403	OVCA	DLPM4	1	R					g13			COMPLETE	4
698WKAA	6403	OVCA	LM2	1	R					J5				4
698WKAA	6403	OVCA	LM2	1	R					I11			COMPLETE	4
698WKAA	6403	OVCA	MAN	1	R		2						PART OF DISTEMA AND VENTRAL RAMUS	4
698WKAA	6403	SSZ	LBF	2	F								SHAFT FRAGMENT	4
698WKAA	6403	SSZ	RIB	5	F								SPLIT SHAFT FRAGMENT	4
698WKAA	6403	SUS	LC	1	L								MALE-DAMAGED	4
698WKAA	6403	SUS	LC	1	R								COMPLETE-MALE	4
698WKAA	6403	SUS	MAN	1	F		11						SYMPHYSEAL FRAGMENT	4

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WKAA	6403	SUS	MAN	1	R		7			J7K2			POST PART HORI RAMUS	4
698WKAA	6403	SUS	MAN	1	R		2			G7			ANT FRAG HORI RAMUS WITH PM4 AND PM ALVEOLI	4
698WKAA	6403	SUS	MAN	1	R								POST VENTRAL FRAG HORI RAMUS	4
698WKAA	6403	SUS	SKL	1	F								LACRYMAL	4
698WKAA	6403	SUS	SKL	1	R					I9J7			FRAMENT OF MAXILLA WITH M1 AND 2	4
698WKAA	6403	UNI	HC	1	F								INDET FRAGMENT	4
698WKAA	6403	UNI	UNI	36	F								INDET FRAGMENTS	4
698WKAA	6403	UNI	UNI	1	F								INDET	4
698WKAA	6503	BOS	MAN	1	R		7			J12K10			M2 AND M3 WITH ANT ASC RAMUS	4
698WKAA	6509	BOS	CPR	1	W		1						COMPLETE	4
698WKAA	6509	BOS	HUM	1	R								PART OF ZONE 9	4
698WKAA	6509	BOS	MAN	1	L		567			J2			ASC RAMUS AND UNERUPTED M2- 5 PIECES	4
698WKAA	6509	BOS	MTC	1	R		12						PROX END	4
698WKAA	6509	BOS	SKL	1	F								BASI-OCCIPITAL FRAGMENT	4
698WKAA	6509	BOS	TRV	1	L	CNAN		CH					LEFT SIDE CENTRUM-CHOPPED DOWN MIDDLE	4
698WKAA	6509	CSZ	INN	1	F								PUBIC FRAG-? BOS	4
698WKAA	6509	CSZ	LBF	1	F								SHAFT FRAGMENT	3
698WKAA	6509	CSZ	RIB	1	F								SHAFT FRAGMENT- 2 PIECES	4
698WKAA	6509	CSZ	TRV	1	F								BASE OF SPINE	4
698WKAA	6509	EQU	CAN	1	F								WORN CANINE	4
698WKAA	6509	OVCA	MAN	1	R					gh12I11			ANT TOOTH ROW	4
698WKAA	6509	OVCA	UM2	1	R								CUSPS BROKEN	4
698WKAA	6509	SSZ	RIB	3	F								SHAFT FRAGMENT	3
698WKAA	6509	SUS	MAN	1	R					H7I10			PART HORI RAMUS WITH TOOTH PM4 AND M1	4
698WKAA	6509	SUS	SKL	1	L		8						TEMPORAL FACET	4
698WKAA	6509	UNI	HC	1	F								FRAGMENT	4
698WKAA	6509	UNI	UNI	1	F				DG				INDET	4
698WKAA	6510	BOS	SCP	1	F			CH					BASAL PART OF SPINE-VENTRAL AND DORSAL SURFACE SCORED AND CHOPPED	4
698WKAA	6510	FOX	MAN	1	R		123						MOST OF HORIZOMTAL RAMUS-CUT MARK ON VENTRAL SURFACE	4
698WKAA	6510	OVCA	LM2	1	L					J12			COMPLETE	4
698WKAA	6510	SSZ	RIB	1	F			CH					MIDSHAFT-DISTAL CHOPPED	4
698WKAA	6510	SUS	MAN	1	L								VENTRAL PART OF DIASTEMA REGION	4
698WKAA	6528	BOS	CPA	1	W	1							WHOLE	4
698WKAA	6528	BOS	FEM	1	R	PF	3						FRAGMENT PROX SHAFT	4
698WKAA	6528	BOS	LM2	1	R					J11			COMPLETE	4
698WKAA	6528	BOS	LM3	1	R					K6			COLUMN BROKEN	4
698WKAA	6528	BOS	MAN	1	F								LATERAL FRAG HORI RAMUS	3
698WKAA	6528	BOS	MAN	1	L		4						CORONOID	3
698WKAA	6528	BOS	MTC	1	F								POST FRAGMENT PROX END	4

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WKM	6528	BOS	SCP	1	L								PROXIMAL CRANIAL MARGIN OF BLADE	4
698WKM	6528	BOS	SES	1	W								DISTAL SESAMOID	4
698WKM	6528	CSZ	FEM	1	F	DF							PART OF ZONE 7	4
698WKM	6528	CSZ	LBF	1	F									4
698WKM	6528	CSZ	LBF	1	F								SHAFT FRAGMENT	3
698WKM	6528	CSZ	LBF	3	F								SHAFT FRAGMENT	4
698WKM	6528	CSZ	RIB	3	F								SPLIT SHAFT FRAGMENT	4
698WKM	6528	CSZ	UNI	1	F								INDET-UNFUSED?	3
698WKM	6528	CSZ	UNI	1	F								SHAFT?	4
698WKM	6528	EQU	MAN	1	F								POST VENTRAL FRAG	4
698WKM	6528	EQU	PH2	1	W	PF	12		DG				DISTAL ARTIC CHEWED	4
698WKM	6528	OVCA	CAL	1	R	PF	123				GL-52.9 Dp-14.5 Dd-20.7		COMPLETE	4
698WKM	6528	OVCA	CEV	1	R	CFAF		CH					RIGHT SIDE-CHOPPED DOWN MIDDLE	4
698WKM	6528	OVCA	FEM	1	F								PROX SHAFT FRAGMENT	4
698WKM	6528	OVCA	FEM	1	L	PF	2						PART PROX END	4
698WKM	6528	OVCA	FEM	1	L	DF	4567						DISTAL END	4
698WKM	6528	OVCA	FEM	1	R	PF	1						HEAD	4
698WKM	6528	OVCA	FEM	1	R	DF	567						PART OF DISTAL END	4
698WKM	6528	OVCA	HUM	1	L	PF	123						PROX END	4
698WKM	6528	OVCA	HUM	1	L	DF	6789				BT-24 HT-14.5		DISTAL THIRD-GRACILE	4
698WKM	6528	OVCA	HUM	1	L	DJ	6789						DISTAL THIRD-GRACILE	4
698WKM	6528	OVCA	HUM	1	R	PNDJ	567890						SHAFT AND DISTAL END-GRACILE	3
698WKM	6528	OVCA	HUM	1	R		69		DG				MID AND DISTAL SHAFT-DISTAL CHEWED-GRACILE	4
698WKM	6528	OVCA	INN	1	L	EF	23579						ILIAL AND ISCHIAL SHAFTS- 3 PIEES	3
698WKM	6528	OVCA	INN	1	L	EN	239						ILIAL SHAFT	4
698WKM	6528	OVCA	INN	1	R	EF	3459		DG				ILIUM AND ACETAB-ENDS CHEWED	4
698WKM	6528	OVCA	LI	1	L								MED WEAR	4
698WKM	6528	OVCA	LMV	1	F	CNAN	12345	CH					CENTRUM AND ARCH-POST VENTRAL CHOPPED	4
698WKM	6528	OVCA	MAN	1	L		23			fgh12			ANT RAMUS WITH DEC PREMOLAR ROW	4
698WKM	6528	OVCA	MAN	1	L		123467			GH12I13J12K11			COMPLETE- 2 PIECES- CALCULUS ON TEETH	4
698WKM	6528	OVCA	MAN	1	R		123						DIASTEMA AND SYMPHYSEAL FRAGMENT	4
698WKM	6528	OVCA	PMX	1	R								COMPLETE	4
698WKM	6528	OVCA	SCP	1	L	DF	12345						DISTAL 2 THIRDS- 2 PIECES-GRACILE	4
698WKM	6528	OVCA	SCP	1	R	DF	12345						DISTAL HALF- 3 PIECES	4
698WKM	6528	OVCA	SKL	1	L								ZYGOMATIC ARCH	4
698WKM	6528	OVCA	TIB	1	L	PN	4						PROX HALF SHAFT-GRACILE-JUV	4
698WKM	6528	OVCA	TIB	1	L	DF	567						DISTAL THIRD-GRACILE	3
698WKM	6528	OVCA	TIB	1	L	PNDN	47				L2-124		COMPLETE SHAFT-GRACILE	4

site	context	species	bone	no.	side	fusion	zone	butchery	gnawing	toothwear	measurement	pathological	comment	preservation
698WKAA	6528	OVCA	TIB	1	L	PF	1234						PROX HALF- GRACILE	3
698WKAA	6528	OVCA	TIB	1	R	PFDF	1234567				L-174 Bp-33.6 SD-11.6 Bd-20.3		COMPLETE-2 PIECES-GRACILE	3
698WKAA	6528	OVCA	TIB	1	R		4						PROX THIRD SHAFT	
698WKAA	6528	OVCA	TIB	1	R		123						PROX END	4
698WKAA	6528	OVCA	TRV	1	F								BASE OF SPINE-GRACILE	4
698WKAA	6528	OVI	MTT	1	F								MIDSHAFT-GRACILE	4
698WKAA	6528	OVI	SKL	1	F								BASIOCCIPITAL	4
698WKAA	6528	OVI	SKL	1	L		6						FRONTAL AND PART PARIETAL AND BASE HORN CORE- 2 PIECES	4
698WKM	6528	OVI	SKL	1	LR		00			GH12I13J12K12			BOTH MAXILLAE WITH TOOTH ROWS- 9 PIECES	4
698WKAA	6528	OVI	SKL	1	R		6						FRONTAL AND PARIETAL FRAGMENT- 2 PIECES-HORNED	4
698WKAA	6528	SSZ	LBF	3	F								SHAFT FRAGMENT	4
698WKAA	6528	SSZ	LBF	1	F								SHAFT FRAGMENT	4
698WKAA	6528	SSZ	RIB	3	F								SHAFT	4
698WKAA	6528	SSZ	RIB	6	F								MIDSHAFT FRAGMENT	4
698WKAA	6528	SSZ	TRV	1	F								PART OF SPINE	4
698WKAA	6528	SUS	HUM	1	L	DF	6789				BT-29.2 HT-25		DISTAL THIRD	4
698WKAA	6528	SUS	HUM	1	L								LATERAL FRAGMENT DISTAL SHAFT	4
698WKAA	6528	SUS	MAN	1	L		6						ANGLE	4
698WKAA	6528	SUS	RAD	1	R				DG				SPLIT MIDSHAFT-PROX CHEWED	4
698WKAA	6528	SUS	RIB	1	R								PROX HALF SHAFT	3
698WKAA	6528	SUS	SKL	1	F								NASAL	4
698WKAA	6528	SUS	SKL	1	R								FRAGMENT WITH BROKEN M3-M3 ERUPTED AND IN WEAR	4
698WKAA	6528	UNI	UNI	1	F								INDET	4
698WKAA	8704	BOS	HUM	1	R		69						DISTAL SHAFT- 2 PIECES-VERY PITTED	2
698WKAA	8704	BOS	HUM	1	R								MEDIAL FRAG OF DISTAL SHAFT	2
698WKAA	8706	BOS	HUM	1	F								MIDSHAFT- 10 PIECES	2