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**DARNLEY MAINS, GLASGOW: RESULTS OF AN ARCHAEOLOGICAL
EXCAVATION**

Laura Bailey

PROJECT SUMMARY SHEET

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Schedule	
Fieldwork	August 2013
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LIST OF ILLUSTRATIONS

Illus 1- Site location

Illus 2- Site plan

Illus 3- Feature [001] during 2006 evaluation and 2013 excavation

Illus 4- General shot of feature 001 in foreground and the excavation of Pit 007.

Illus 5- Feature [007] fully excavated

Darnley Mains, Barrhead, Glasgow

Archaeological Excavation

Summary

Headland Archaeology was commissioned by Bellway Homes to undertake a monitored topsoil strip in advance of development at Darnley Mains, Waulkmill Road/ Leggatston Road near Glasgow. Previous work undertaken on site by Headland Archaeology in 2006 revealed the remains of a feature interpreted as a possible limekiln and therefore further archaeological mitigation was required prior to development. The kiln was fully excavated during the works. A pit containing pottery dating to the 16th century, together with charcoal and burnt bone fragments was also recorded during the works. A number of pottery fragments broadly dated from the 13th to 16th century were also recovered from the interface between topsoil and subsoil.

INTRODUCTION

The site is located to the east of Barrhead, north-east of the Waulkmill Reservoir, directly to the west of the M77, and centred on NS 530 586. The site lies at a height of around 40m OD, within gently undulating pasture, which gradually slopes down towards the north (Illus 1). It is underlain by Devensian till overlying limestone bedrock of Carboniferous origin (British Geological Survey website; <http://www.bgs.ac.uk>).

The programme of works follows earlier phases of work which included a desk based assessment, prepared by RPS in 2006 (Hind 2006), walkover survey and subsequent evaluation, in the form of trial trenching, undertaken by Headland Archaeology in 2006. The 2006 evaluation revealed an isolated feature interpreted as a possible 'limekiln' within one trench in the western part of the development. No other features of archaeological significance were identified, that required further mitigation, within the western part of the application area.

The eastern part of the application area is being developed separately and further archaeological works in this part of the site are reported on separately (Headland Archaeology on behalf of Meridian Developments Ltd 2013).

Headland Archaeology was commissioned by Bellway Homes, to agree a programme of archaeological work with the West of Scotland Archaeology service (advisors to Glasgow City Council on archaeological matters for the eastern part of the application area and to encapsulate that programme within a Written Scheme of Investigation (WSI) to be submitted for agreement. The current works reported on here focus on the relocating of the possible kiln, its full excavation and recording together with a monitored topsoil strip of a 30m by 30m square centred on the kiln feature, with the aim of identifying any associated features in the vicinity. The works could have been undertaken as a watching brief during construction but it was

agreed with all parties that advance works would minimise possible delays to construction.

ARCHAEOLOGICAL BACKGROUND

Several sites of archaeological potential, largely of post-medieval and modern origin, were identified within the development area (eastern and western parts), and documented in the desk based assessment (Hind 2006). These included a cottage (Cloghills), trackway, farmstead, rig and furrow and circular cropmarks. The area was also used prior to WW2 as a rifle range, and latterly employed as pastoral land.

The 2006 archaeological works (Nicol 2006) comprised the excavation of 99 trenches, (totalling 6200 linear metres) covering a 5% sample of the development area. The works identified the wall footings of a structure relating to the cottage and a possible contemporary trackway, associated with the rifle range used prior to WW2. Poorly preserved narrow rig and furrow, which may suggest that the area was cultivated prior to improvements of the land in the early 19th Century, was also revealed during the evaluation. The evaluation also uncovered a possible limekiln base, the subject of this report. Although no finds were recovered during the evaluation to help date the feature, it was hypothesised that the kiln was post-medieval in date and used to produce lime for agricultural purposes.

OBJECTIVES

The primary objectives of the archaeological works were-

To locate, expose fully in plan, record and excavated the possible truncated limekiln recorded in the 2006 archaeological evaluation.

To record any outlying features that may be associated with the kiln.

The resulting archive (finds and records) will be organised and deposited in the National Monuments Record of Scotland (NMRS) to facilitate access for future research and interpretation for public benefit.

METHOD

The limekiln was re-located using a dGPS. A 30m by 30m box, centred on the location of the limekiln, was excavated using a mechanical excavator equipped with a 1.8m wide, flat-bladed ditching bucket, working under direct archaeological supervision. Excavation continued until either the natural sub-stratum or significant archaeological deposits were encountered. The resulting surfaces were hand-cleaned where necessary and investigated for archaeological features.

Once the area was excavated and the possible limekiln relocated, excavation of archaeological deposits and features required to satisfy the research objectives continued by hand. The scale and scope of work was agreed with WoSAS.

The excavation area was extended, by a further 10m, centred on a pit uncovered during the works, in order to establish if archaeological remains continued beyond the original excavation limits.

Recording

The recording followed standards and guidance, set out by the Institute for Archaeologists (IfA) for conducting archaeological evaluations. All contexts and environmental samples were given unique numbers and described on *pro forma* record sheets. 35mm colour transparencies and prints were taken; a graduated metric scale was clearly visible where appropriate. Digital images were also taken for illustrative purposes. Please refer to appendix 1 for full site registers.

An overall site plan was recorded by differential GPS.

Finds were collected and bagged by context, and were stored appropriately according to specialist advice. Archaeologically significant deposits were bulk sampled, typically with a 30 litre sample volume, or 100 % of the context where significant artefactual remains were encountered.

RESULTS

Up to 0.30m of dark brown silty sand topsoil (008) was removed to reveal a substratum of clay. A total of 38 pottery fragments including redware sherds, broadly dated from the 12th to 15th century and two fragments of pottery dating to the 19th-20th century together with industrial waste (see Franklin below), were recovered from the interface between the topsoil and sub-soil. Ceramic field drains were apparent across the site, cut into the clay, indicating improvements in land drainage in the area in the recent past.

Kiln 001

The kiln [001] (Illus 2), half-sectioned during the 2006 works, was relocated and fully exposed (Illus 2). It measured 1.45m in diameter and was up to 0.14m deep. The cut was filled with large, heat-affected, sub-angular stones, forming a level surface, set into heat-affected clay subsoil (Illus 3). Mixed silty clay, charcoal and degraded stones (002) filled the interstices between the stones. Remains of a linear feature, possibly an air vent, measuring 0.20m wide, 1m long and 0.06m deep, extended from the eastern side of the feature (Illus 3).

Pit 006

An oval pit was located on the north-west of site (Illus 2), approximately 10m to the north-west of Kiln [001] (Illus 4). It measured 3.25m long, 0.85m wide and 0.08m deep. It was filled with dark brown silty clay (007) containing charcoal, burnt bone and pottery fragments dating to the 16th century. The pit was truncated in the central area by the cut for a ceramic field drain (Illus 5). As this feature was at the edge of the specified 30m x 30m box, the area was extended by 10m in all directions to check for

additional features as agreed in the WSI; however, no further features were uncovered.

FINDS ASSESSMENT

Julie Franklin

The assemblage amounted to 38 sherds (235g) of pottery with 25g of ironworking waste (Appendix 2). The pottery ranges in date from possibly as early as the late medieval period to the 19th century or later. Finds were recovered from two contexts: (007) and (008).

The finds from the fill of the pit (007) were few, only six sherds of pottery but were all consistent in dating. The fabric and forms present indicate this context is likely to have been deposited in the 16th century.

Finds from the topsoil (008) are more numerous but also more mixed. The finds include 30 sherds of locally made redware pottery, almost all of which derive from the same glazed and strap-handled jug. It lacks certain diagnostic features and can only be vaguely dated to the late medieval period, from the 13th to possibly as late as the 16th century. It may then be contemporary with the pottery from (007), but may well be older. Unfortunately this pottery is also associated with two sherds of modern pottery indicating the deposit is disturbed. Ironworking waste from the same context might relate to either period.

PALAEOENVIRONMENTAL ASSESSMENT

Laura Bailey and Tim Holden

Method

Two samples, amounting to 20 litres and 60 litres respectively were taken during the excavation of a Kiln 001 (002) and a Pit 006 (007). Twenty litres from each were processed for environmental assessment. The aims of the assessment were primarily to evaluate the potential of the material to provide evidence regarding the function of the features; to assess the presence, preservation and abundance of any environmental remains in the samples and to assess whether any of the palaeoenvironmental materials present can assist in the dating of the feature.

The samples were subjected to flotation and wet sieving in a Siraf-style flotation machine. The floating debris (the flot) was collected in a 250 µm sieve and, once dry, scanned using a binocular microscope. Any material remaining in the flotation tank (retent) was wet-sieved through a 1mm mesh and air-dried. This was then sorted and any material of archaeological significance removed.

Results

The results of the sample processing are provided in Tables 1 (Retent finds) and 2 (Flotation finds) (Appendix 3). Suitable material for Accelerated Mass Spectrometry (AMS) dating is also identified in each table.

Charred plant remains

A large number of wood charcoal fragments, of a suitable size for AMS dating, were present in both the flots and retents of both samples (Tables 1 and 2), taken from the fill (007) of Pit 006 and fill (002) of Kiln 001. Visual inspection of charcoal fragments from both samples suggests that the assemblage consists of oak and non-oak species.

Other finds

Other materials recovered include cinders, burnt bone, burnt limestone and coal/shale.

Cinders

Cinders, presumably from the burning of coal, were recovered from both the flot and retents of the Kiln (002) and the retents from the fill (007) of Pit 006.

Burnt Bone

A small amount of burnt mammal bone was recovered from the fill (007) of Pit 006. The burnt bone is too fragmentary to identify to species level.

Coal/ shale

Large amount of possible coal/ shale was observed in the retents from the fill (002) of Kiln 001.

Burnt limestone

Several fragments of burnt limestone were observed in the retents from both the pit fill (007) and Kiln fill (002).

Magnetic residue

A small amount of magnetic residue was present in both samples. This is thought likely to represent ferrous rich stone in the local geology.

Discussion

The environmental evidence supports the archaeological evidence, which suggests that the feature [001] is a limekiln, as the samples contained burnt limestone along with coal and charcoal, which would have provided a fuel source.

Pit [007] contained a mixed assemblage that included burnt bone, pottery dating to the 1600's (see Franklin above) together with burnt limestone, charcoal, coal and cinders that are likely to have come from the kiln. The presence of industrial waste suggests that the pit was open during or after the kiln was in use.

DISCUSSION

No finds were recovered from the feature interpreted as a limekiln. However fragments of burnt limestone, charcoal, cinders and burnt shale recovered from the environmental samples indicate that the feature was a limekiln.

Limekilns were used to turn calcareous rock, usually limestone or chalk (where the material is in its insoluble and solid, calcium carbonate state) into calcium oxide or quicklime by heating to temperatures of about 900 degrees. The quicklime, also called lump lime because of the lump-like form of the material produced in the kiln, reacts with water to produce a fine powder of calcium hydroxide or slaked lime (Holden 2013).

Limekilns were used in England from the Roman period onwards. During the medieval period demand for lime increased as large quantities of mortar were needed for the construction of stone castles, city walls and religious buildings. Towards the end of this period, lime was also produced for agricultural purposes, where lime was added to neutralise acidic soils and to improve the structure of heavy clay soils (English Heritage 2011). In Scotland, lime was processed from an early date for use in building (Holden 2013). However, farm limekilns became commonplace in the 18th century following the agricultural boom resulting from the French and Napoleonic wars (1793-1815) (Cruikshank *et al* 2004).

The simplest method of producing lime was by using a clamp kiln. Clamp kilns consisted of layers of fuel and limestone pieces stacked together in a mound and covered with clay or turf. Clamp kilns were temporary structures; as they were broken open to remove the lumps of burnt limestone. Archaeological remains of a clamp kiln may comprise 'a hearth on the floor of a pit, measuring up to 2.5m in diameter and up to 2m in depth. The surrounding soil may show evidence of burning by a change in colour and loose piles of rock may be present (English Heritage 2011)'. In many cases the hearth is the only part of a limekiln to survive. The few finds that occur within kilns tend to be lime and partly fired limestone blocks, bones, pottery, tile, shell, slag, burnt clay, glass fragments and iron objects. Charcoal is occasionally found preserved in the hearth area (English Heritage *ibid*). The remains of the limekiln uncovered at Darnley Mains fit well with the description of those associated with clamp kilns.

The location of limekilns was generally determined by the proximity of raw materials, with limestone or chalk outcrops and a source of fuelwood nearby. Nearby Waulkmill Glen is designated as a SSSI because of the outstanding Carboniferous geological section found within it, representing the best outcrop of the Upper Limestone formation in central Scotland. Two key limestones are present within the glen, the Lyoncross and Calmy limestone outcrops. Siltstones and coals (the Arden Coals) are also present in the area. Darnley has a long history of mining with limestone and coal extracted since the early 17th century. By the late 19th century, a tramway extended from a quarry to take extracted lime to the Darnley Lime works

on the east side of the Brock Burn. During the early 20th century there was an increase in mining and quarrying in the area and the Darnley fire clay and lime works were established (East Renfrewshire Council 2013).

A bleachfield complex was also present in the area, first depicted on Richardson's 1795 map. It was at this bleach works at Darnley that Charles Tennant (1768-1838) produced the chemical combination of chlorine and lime powder, obtained from local quarries, which led to the development of bleaching powder (East Renfrewshire Council 2013). Therefore, the use of lime for various industrial processes was long established in the area.

Lime burning generated unpleasant fumes and acrid smoke, therefore kilns were situated away from occupation areas. However, some kilns were established to provide lime mortar for the construction of nearby buildings and therefore may be indicative of a structure, perhaps the settlement at Cloghills (western part of the development, not reported on here), also depicted on Richardson's 1795 map, in the nearby vicinity.

The mixed finds within the topsoil, dating from the 13th to 16th and 19th to 20th centuries suggests the area was extensively cultivated and manured, indicating that settlement was located in the vicinity. However, evaluation and excavation in the surrounding area indicates that occupation was not in the immediate vicinity, thus suggesting that the limekiln was an isolated feature and was therefore probably for agricultural use.

The function of pit 007 still remains unclear; its shallow nature suggests that it may have been a natural depression with industrial waste, pottery and burnt bone incidentally incorporated into it. The presence of burnt limestone fragments and coal within the pit suggests that it may have been open when the limekiln was in use. However, no firm dating evidence for the kiln was recovered; therefore, it is unclear whether the features are contemporary.

CONCLUSION

Discussions on site with WoSAS during the fieldwork focussed on the function of the kiln and whether analyses of the industrial waste from the adjacent pit may throw light on the function and date of the kiln. If the kiln turned out to be a pottery production kiln from either the medieval or post-medieval period, it would have been a very rare and important discovery indeed and some further targeted monitoring of topsoil stripping of this area during construction would have been merited. Therefore, much emphasis was placed on the processing and analyses of soil samples recovered from the kiln floor and adjacent pit.

All the evidence however – see Discussion above - suggests that the feature is probably an isolated clamp kiln for lime production, given its form, location, proximity to raw materials required for lime production and the presence of burnt limestone and fuel (coal and charcoal).

In light of the above, and the lack of any other identifiable features from the 2006 site investigations, no further monitoring is recommended.

REFERENCES

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Maps

Richardson, T. 1795 *Map of the town of Glasgow and Country seven miles around*.

APPENDIX 1: SITE REGISTERS

1.1 Context Register

Context Number	Description
1	Circular cut 1.45m in diameter and 0.14m deep, with gradually sloping sides and round base (same as [003] from evaluation). Filled with deposit (002). The base comprised heat affected reddish-brown clay. A linear feature 1m long, 0.15m wide and 0.02m deep, extended from the east side of the feature.
2	Stone deposit in base of feature [001] - previously half-sectioned during the 2006 evaluation. Consists of several flat and angular stones generally measuring 0.27m x 0.20m x 0.25m. All stones were reddish purple in colour - probably the effect of intense heating. Mixed silty clay, charcoal and degraded stone filled the interstices between the stones. The deposit ranged in depth from 0.14m to 0.25m.
3	Dark greyish brown clay. Natural sub-soil.
4	Void
5	Void
6	Oval, shallow pit. Measuring 3.25m long, 0.85m wide and up to 0.08m deep. Aligned NE-SW, shallower at SW end (0.02m). Filled with deposit (007).
7	Dark brown silty clay fill of Pit [006] containing charcoal, burnt bone and pottery fragments.
8	Dark brown loam, topsoil, up to 0.30m thick. Several pottery fragments were recovered from the interface of this deposit and natural.

1.2 Photographic Register

Photo No.	Direction facing	Description
001	S	Pre-excavation shot of Kiln [001]
002	SW	Kiln [001] following clean
003	N	Kiln [001] following clean
004	N	Detail, south side of Kiln [001]
005	N	Detail, south side of Kiln [001]
006	W	Detail, east side of Kiln [001]
007	N	Kiln [001] post- excavation shot
008	W	Pit [006] pre-excavation shot
009	NE	General site shot
010	NW	General site shot
011	SE	General site shot
012	W	Pit [006] mid-excavation shot
013	W	General site shot
014	W	General site shot
015	E	Pit [006] mid-excavation shot
016	W	General site shot

017	W	General site shot
018	E	Excavation of Pit [006]
019	E	Pit [006] post- excavation
020	E	Pit [006] post- excavation
021	S	Field drain cutting pit [006]
022	W	General site shot- Post-excavation.
023	N	General site shot- Post-excavation.

1.3 Sample register

Sample No.	Context No.	Description
001	002	Fill of Kiln [001]
002	007	Fill of Pit [006]

APPENDIX 2: FINDS CATALOGUE

Context	Quantity	Weight (g)	Material	Object	Description	Spot Date	Period
7	6	24	Pottery (PM)	PMO	various redware sherds, including two jar rims with internal bevel, abraded	16th	PM
8	2	20	Pottery (Mod)	Various	whiteware, black trans printed	19 th /20th	Mod
8	30	191	Pottery (Medi)	LMR	redware sherds, mostly from same jug, soft fabric, abraded, pale red with white internal surface, olive external glaze, varying to orange	13th/16th	Medi
8		25	Industrial Waste	Iron Slag?	small lumps, very light weight		

Abbreviations: LMR = Late Medieval Redware; PMO = Post-Medieval Oxidised Ware

APPENDIX 3- ENVIRONMENTAL RESULTS

Table 1- Retent Sample Results

Context Number	Sample Number	Feature	Sample Vol (l)	Stone		Burnt bone	Charcoal		Material available for AMS Dating	Cinders	Coal	Comments
				Burnt Limestone	Mag res	Mammal	Quantity	Max Size (cm)				
2	1	Fill of Kiln [001]	20	++++	++		++++	1.5	Charcoal ++	++	++++	Only a representative sample of coal/ shale and burnt limestone was retained.
7	2	Fill of Pit	20	+++	++	++	++++	1	Charcoal ++, Burnt	++++		

		[006]						bone ++		
Key: + = rare (0-5), ++ = occasional (6-15), +++ = common (15-50) and ++++ = abundant (>50) NB charcoal over 1cm is suitable for identification and AMS dating										

Table 2- Flot Sample Results

Context Number	Sample Number	Feature	Total flot Vol (ml)	Cinders	Charcoal Quantity	Charcoal Max size (cm)	Material available for AMS	Comments
2	1	Fill of Kiln [001]	25	+++	-	-	-	
7	2	Fill of Pit [006]	200		++++	2.5	Charcoal ++	Charcoal oak and non-oak
Key: + = rare (1-5), ++ = occasional (6-15), +++ = common (16-50) and ++++ = abundant (>50) NB charcoal over 1cm is suitable for identification and AMS dating								

