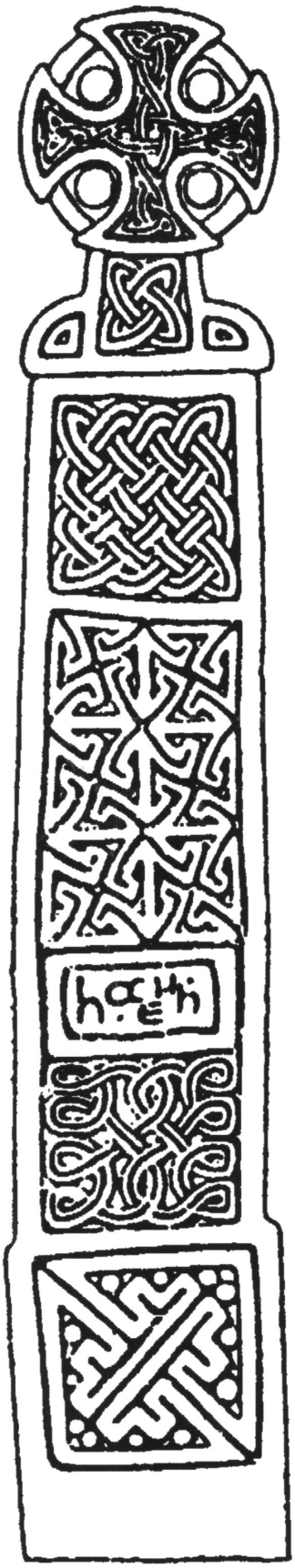

Archaeological Evaluation

Land adjacent to Ellesmere Business Park Oswestry Road Ellesmere Shropshire

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BORDER ARCHAEOLOGY

Contents

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1. Non Technical Summary

An archaeological programme of work was carried out on 2.2ha of land adjacent to Ellesmere Business Park in Shropshire, where aerial photography has revealed evidence of a double-ditched cropmark feature of unknown date and function.

The initial phase of work comprised a geophysical (magnetometry) survey, which identified a number of positive responses, suggesting the presence of cut features such as ditches and pits. These results, in conjunction with the aerial photographic evidence, were then used to assist in the locating of six evaluation trenches.

Of these, Trenches 1 & 2 were positioned with respect to the cropmark feature shown on the aerial photography and revealed the remains of two ditches possibly forming part of a double-ditched enclosure.

Trenches 3 and 4 were located in the southern part of the site, where the geophysical survey indicated several possible sub-rectilinear or curvilinear features. Trench 3 revealed part of a very large shallow ditch, measuring approximately 7m wide and 0.6m deep, while Trench 4 contained two ditches running parallel with a third, probably post-medieval ditch, cutting across the outer one.

The survey also indicated a series of pit-like features aligned roughly northwest/southeast in the northern area of the site and a trench (Trench 6) was opened in this area to investigate these features. However, what appeared to be pits were in fact patches of loose sand, which probably represented natural variations in the geological composition of the site.

The larger linear features revealed in the evaluation trenching appear to be enclosure or boundary ditches and parallels may be drawn between these features and other sub-rectangular and rectangular enclosure sites, existing as cropmarks, which have been identified from aerial photography just across the border in Flintshire and which may be of late prehistoric date.

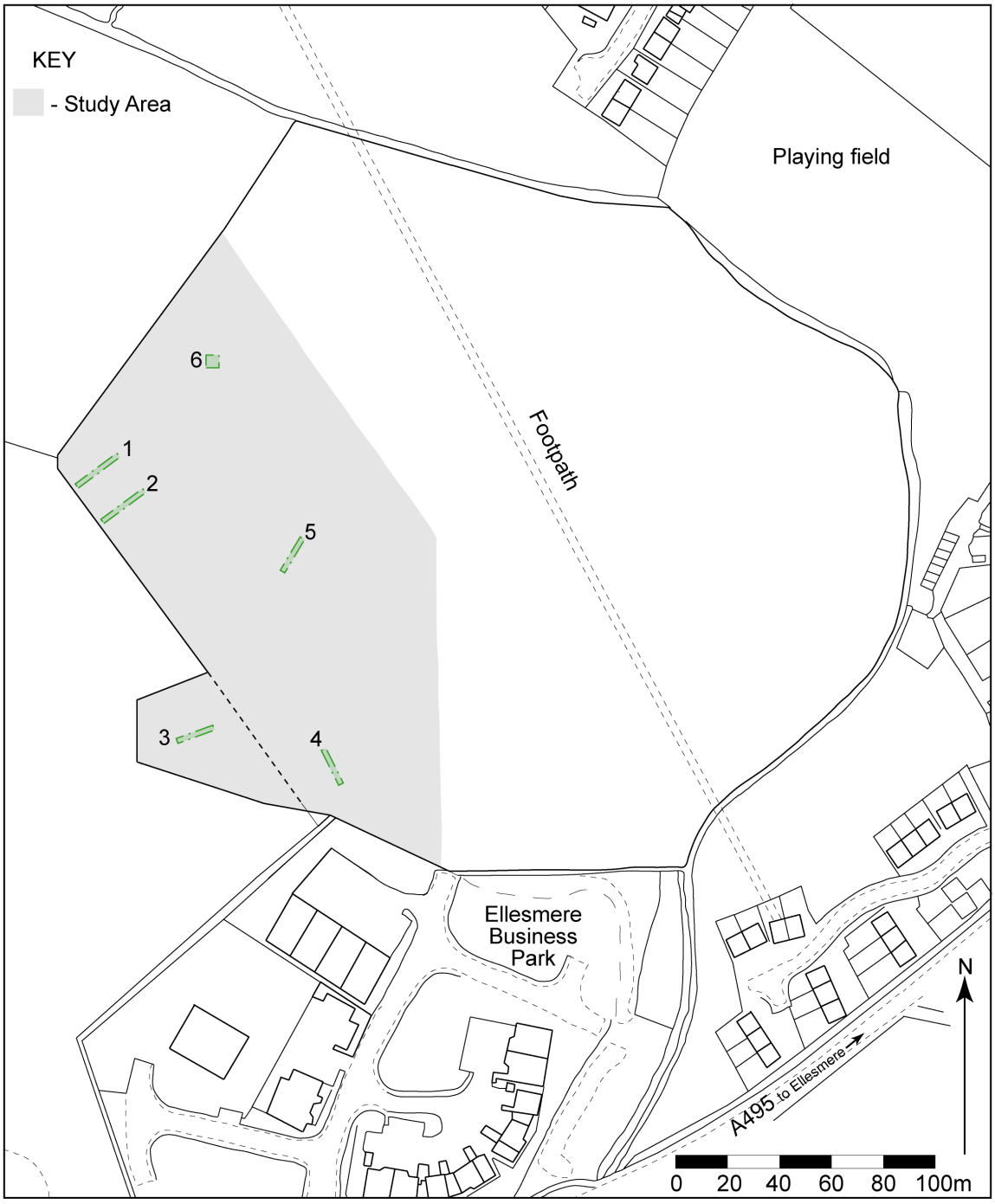

Fig. 1: Site location plan

2. Introduction

Border Archaeology was instructed by Mrs Jane Kenyon of Shropshire County Council (SCC) Estates Services to undertake an archaeological programme of work being a geophysical survey and a series of evaluatory trenches in regard of the proposed second phase of development at Ellesmere Business Park in pursuance of the brief issued by Mr Michael Watson, Historic Environment Officer, SCC.

The geophysical survey was provided to Michael Watson with appropriate information to assist in the locating of the evaluation trenching. A full copy of the geophysical results will be attached to this report.

The study area comprises approximately 2.25ha of land forming the western part of a field to the N of Ellesmere Business Park (**Fig. 1**). Aerial photography has revealed evidence of a double-ditched cropmark feature of unknown date and function, possibly forming part of a cropmark enclosure site. A further cropmark enclosure site (outside the study area) confirmed the potential of the general area for early settlement remains.

Copies of this report will be sent to Michael Watson and Mrs Jane Kenyon.

2.1 Soils & Geology

The soils are predominantly typical brown sands of the NEWPORT 1 series (551d), these being deep well-drained sandy and coarse loamy soils, with some sandy soils affected by groundwater. The underlying geology consists of a glaciofluvial drift. There are also typical stagnogley soils of the SALOP series (711m), consisting of slowly permeable seasonally waterlogged reddish fine loamy over clayey soils associated with fine loamy over clayey soils with slowly permeable subsoils overlying reddish till.

3. Methodology

Full written, drawn and photographic records were made in accordance with archaeological practices set out in *Standard and Guidance for archaeological field evaluation* (Institute of Field Archaeologists 2001). Border Archaeology adheres to the IFA *Code of conduct* and *Code of approved practice for the regulation of contractual arrangements in field archaeology.*

A stratigraphic record was made using a context numbering system. Archaeological deposits, features and structures were recorded in plan & section at a scale of 1:20. Features were photographed using high-resolution (10.3MPX) digital format.

Six evaluation trenches were opened in specified locations within the area of the proposed development. These were located with reference to the grid system previously established during the geophysical survey phase of work (see Appendix 2). Trenches 1 and 2 (20m x 2m) were orientated NE-SW and natural deposits were identified at a minimum depth of 0.6m below present ground level in Trench 1 and at 0.38m (NE end), deepening to 0.58m at the SW end, in Trench 2. Trench 3 (15m × 2m) was aligned WSW-ENE with natural deposits identified at 0.8m. Trench 4 (15m x 2m) ran NNW-SSE and natural was encountered at 0.4m (NNW end) and 0.65m (SSE end). Trench 5 (15m

x 2m) was orientated NNE-SSW, with natural deposits at 0.64m, and Trench 6 (5m x 5m), which was aligned on the site grid, revealed natural at a depth 0.56m.

All spoil and removed material were visually scanned for artefacts, which were recorded and, where appropriate, retained. A temporary benchmark was established on the site with a value of 93.91m AOD.

4. Evaluation results

4.1 Trench 1

Trench 1 was orientated NE-SW and measured 20m × 2m. A total of seven contexts were revealed, the uppermost of which (101) was a friable mid dark brown humic sandy silt topsoil containing occasional gravel extending >20m (NE-SW) x >2m (NW-SE) to a maximum depth of 0.28m.

Underlying this was (102) a friable mid pinkish-brown sandy silt subsoil with moderate sub-rounded gravels and small stones, extending >20m (NE-SW) x >2m (NW-SE) to a maximum depth of 0.4m.

Underlying the subsoil were two distinct natural glaciofluvial deposits: (104) was a cohesive, mid pinkish-brown sandy silt with occasional small rounded gravels and manganese flecks and (103) was a cohesive / clastic pale yellow mottled with orange patches, sandy silt with occasional small rounded gravels. Both deposits extended >20m (NE-SW) x >2m (NW-SE) (depth not determined). These deposits were visible in the trench base in bands consistent with this type of geological composition.

Plate 1: Curvilinear ditch [107]

Cutting (104) was [107], a curvilinear ditch on a NW-SE orientation measuring 1.74m wide and 0.53m deep (**Plate 1**). Two fills were identified. The primary fill (106) consisted of a friable light greenish-pink sandy silt with very occasional gravel and small stones extending > 2m NW-SE x 1.4m NE-SW x 0.26m. The secondary fill (105) was a cohesive mid pinkish-brown sandy silt containing moderate gravels and occasional charcoal flecking extending >2m NW-SE x 2m NE-SW x 0.38m. Primary fill (106) contained a single animal bone.

4.2 Trench 2

Trench 2 was orientated NE-SW and measured 20m x 2m. The trench was located approximately 15m SE of Trench 1 and revealed 10 contexts. The first of these was (201), a friable mid greyish-brown sandy silt topsoil containing occasional medium sub-rounded stones and gravels, with very occasional charcoal flecking, extending >20m x >2m x 0.3m.

Underlying this was (202), a moderately to well-compacted mid pinkish-brown sandy silt with moderate gravelly inclusions and occasional post-medieval ceramic sherds and CBM fragments, measuring > 20m x >2m x 0.42m.

Plate 2: Ditch [205]

Two distinct natural deposits were identified in the form of banding across the trench. Deposit (204) was a cohesive mid pinkish-brown coarse sandy silt with moderate small sub-rounded stones and gravels extending >20m x >2m x 0.1m. Underlying (204) was (203), a cohesive light yellow sandy silt with orange mottling and occasional gravelly inclusions extending (visible extent) 1.6m (E-W) x >1m x 0.08m (maximum thickness).

Cutting (204) was [205], a linear ditch running NW-SE which measured >2m x 2.4m x 0.61m deep (**Plate 2**). The primary fill (207) consisted of a friable pale grey to pinkish-brown sandy silt containing very occasional rounded gravels and small stones extending

>2m x 1.98m x 0.33m. The secondary fill (206) consisted of a cohesive mid pinkish-brown sandy silt with moderate rounded gravels and small stones and occasional charcoal flecking. This deposit measured >2m x 2.4m x 0.28m.

A linear cut [208] aligned NW-SE was identified in the SW end of Trench 2. Also cutting (204), this feature measured >1.5m x 3.5m x 0.74m and two fills were identified. The primary fill (210) consisted of a clastic cohesive pale grey to pinkish-brown sandy silt with moderate rounded gravels and small stones and very occasional larger stones. This deposit measured >0.52m x 2.5m x 0.24m (maximum thickness). The secondary fill (209) was a cohesive mid pinkish-brown sandy silt with moderate rounded gravels and small stones extending >1.5m x 3.5m x 0.62m.

4.3 Trench 3

Trench 3 was orientated WSW-ENE and was located in the SW part of the study area. The trench measured 15m x 2m. Five contexts were identified, the uppermost of which was a topsoil deposit (301) consisting of friable dark brown sandy silt with occasional sub-rounded gravels and small stones, extending >15m x >2m x 0.4m.

Underlying the topsoil was a moderately compact dark brown sandy silt subsoil with occasional small rounded stones (302) extending >15m x >2m x 0.48m.

The natural encountered at the base of the trench (303) consisted of well-compacted red to yellowish-brown silty clay with occasional rounded pebbles extending >15m x >2m x 0.5m (as excavated).

Plate 3: Ditch [304]

Cutting (303) was a very wide but apparently quite shallow ditch [304], which appeared to run on a NNW-SSE orientation (**Plate 3**). This feature measured >8.56m x >2m x 0.54m but its actual extent was not fully established as it exceeded the limit of the

excavation. A single fill (305) was identified, consisting of a moderate to well-compacted light reddish-brown silty sand containing occasional charcoal fragments and approximately 20 per cent charcoal flecking. This deposit extended >8.56m x >2m x 0.54m.

4.4 Trench 4

Trench 4 was orientated NNW-SSE in the SE part of the study area on a S-facing slope and measured 15m x 2m. The trench revealed 17 contexts, the first of which was a topsoil layer (401) consisting of moderately compact dark brown sandy silt with occasional small rounded stones, extending >15m x >2m. The depth was 0.13m at the NNW end deepening to 0.34m at the SSE end.

The subsoil (402) had been heavily disturbed by modern agricultural activity and consisted of a moderately compacted dark brown sandy silt with occasional small rounded stones, measuring >15m x >2m x 0.21m. Plough marks running NW-SE were observed throughout this deposit.

Cutting (402) at the N end of the trench were three small circular features identified as post-medieval postholes (**Plate 4**). These measured 0.23m E-W x 0.19m x 0.12m [404], 0.29m E-W x 0.22m x 0.14m [405] and 0.15m E-W x 0.12m x 0.11m [406] and were filled by (407), (408) & (409), respectively, these fills consisting of loose to moderately compacted mid brown sandy silt with occasional small rounded stones.

Plate 4: Postholes [404], [405] and [406]

Two distinct natural soil deposits were identified: (403), located in the S part of the trench, consisted of well-compacted light to mid reddish-brown silty sand with frequent small to medium rounded stones and measured >12m x >2m x 1.34m (maximum depth). Underlying (403), and visible at the N end of the trench, was a compact light greyish-brown silty sand (412) containing frequent sub-rounded stones.

Two cuts were identified within (403). The first of these was a linear ditch [410] at the northernmost end of the trench running NE-SW. This feature measured >2m x 2.4m x 0.48m and contained two fills. The primary fill (417) was a well-compacted reddish-brown silty sand with frequent small to medium sub-rounded stones and gravels extending 1.56m NW-SE x >2m NE-SW x 0.18m. The secondary fill (411) consisted of moderate to well-compacted reddish-brown sandy gravel and measured 2.4m NNW-SSE x >2m NNE-SSW x 0.43m.

A second linear ditch [413] located at the southern end of the trench ran on a parallel orientation and measured >2m NNE-SSW x 3.9m x 0.59m. The ditch was filled by plastic light pinkish-brown clayey silt with frequent charcoal flecking and occasional small sub-rounded gravels (414).

A much later linear cut [415] running on a NNW-SSE orientation and cutting (414) was identified in the SW corner of Trench 4. This measured >3.4m NNW-SSE x >0.4m x 0.34m and its single fill (416) consisted of plastic light orangey-brown silty clay with occasional post-medieval CBM fragments and small sub-rounded and subangular stones.

4.5 Trench 5

Trench 5 was orientated NNE-SSW and measured 15m x 2m. Seven contexts were identified, the first of which was a moderately compacted dark brown sandy silt topsoil with occasional small rounded stones (501) extending >15m x >2m x 0.12m.

Plate 5: Pit [504]

Underlying (501) was a friable light greyish-brown sandy silt subsoil deposit (502) containing moderate gravels and small stones extending trench wide to a thickness of 0.28m. Cutting (503), a moderate to well-compacted reddish-brown silty sand with

occasional small rounded stones and charcoal flecking extending across the trench to a maximum thickness of 0.15m, was a small ovoid pit [504] of unknown date and function measuring 0.56m NW-SE x 0.4m NE-SW x 0.26m (**Plate 5; Figs 2 & 3**). This was filled by (505) a clean moderately compacted mid greyish-brown sandy silt.

Two natural deposits were identified: a loose to moderately compacted yellowish to greyish-brown sandy gravel containing occasional small rounded pebbles (506) and (507) a well-compacted reddish-brown sandy gravel containing frequent pebbles. Both deposits were excavated to a maximum depth of 0.2m.

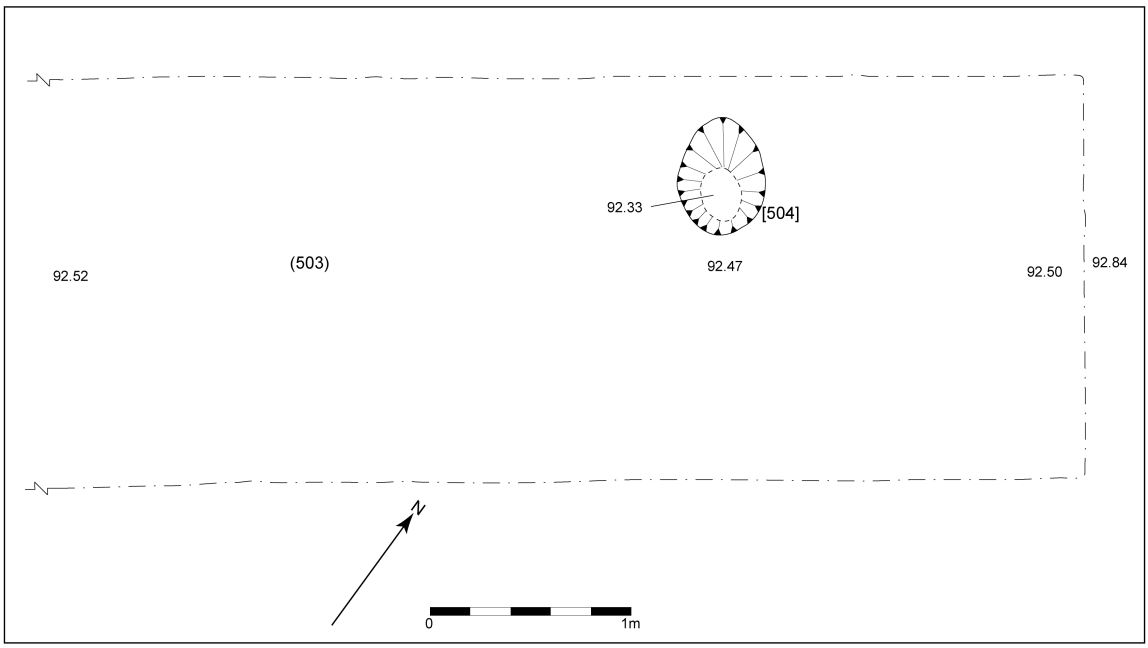

Fig. 2: Plan showing location of pit [504]

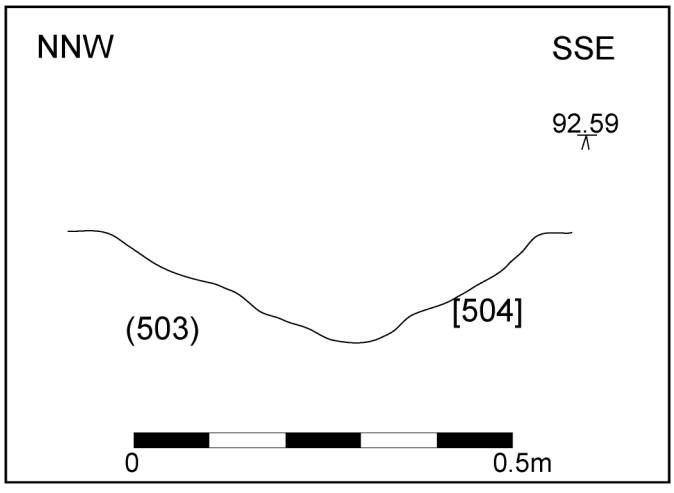

Fig. 3: WSW facing profile of pit [504]

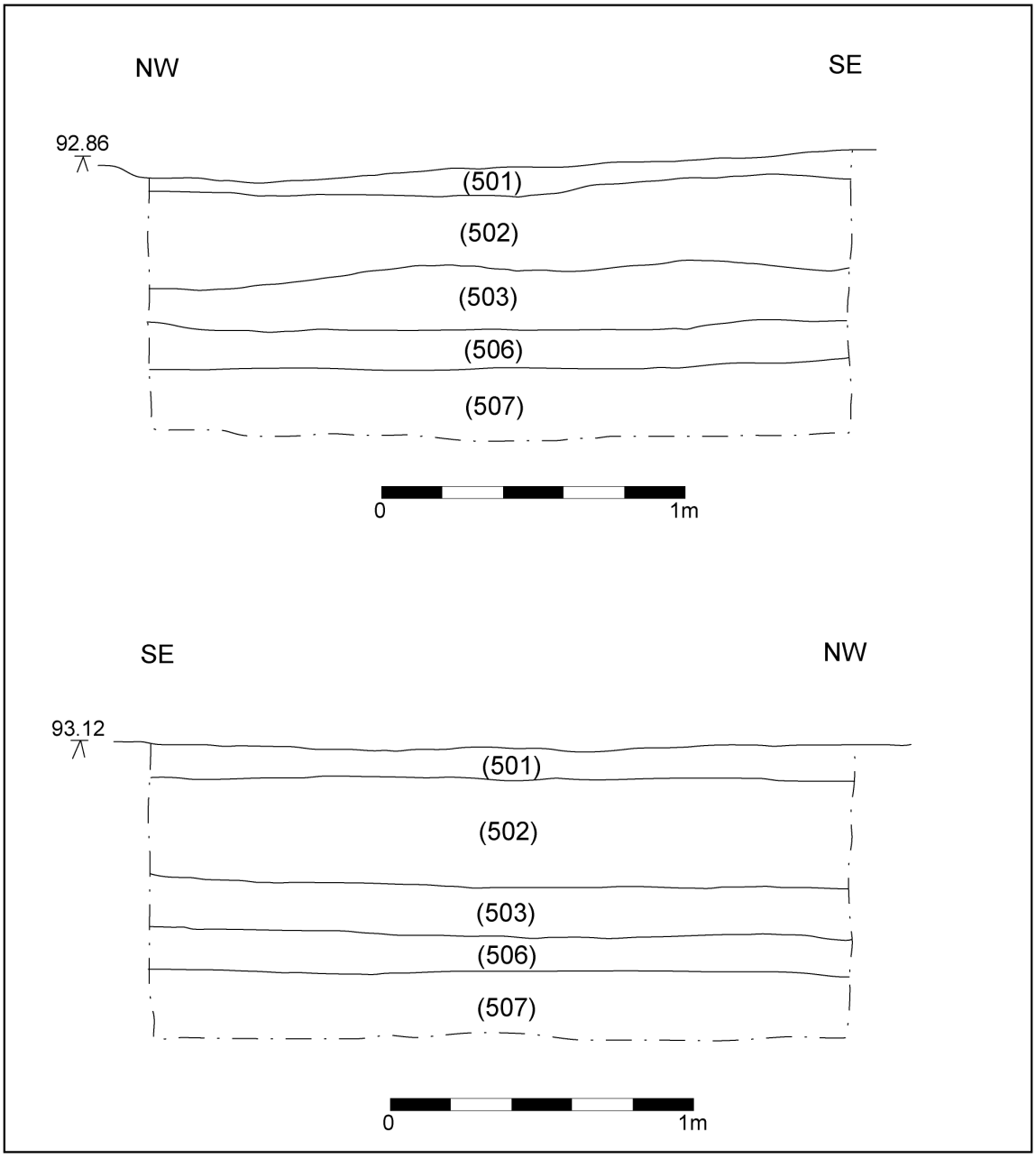

Fig. 4: SW & NE facing section Trench 5

4.6 Trench 6

Trench 6 measured 5m x 5m and revealed three contexts. The topsoil consisted of moderately compacted dark brown sandy silt (601) extended to a thickness of 0.3m. The subsoil (602) consisting of friable greyish-brown silty sand with occasional pebbles was also 0.3m thick.

Underlying the subsoil was a loose reddish to orangey-brown sandy gravel (603) measuring >0.9m deep, which contained several large circular patches of naturally occurring clean sand.

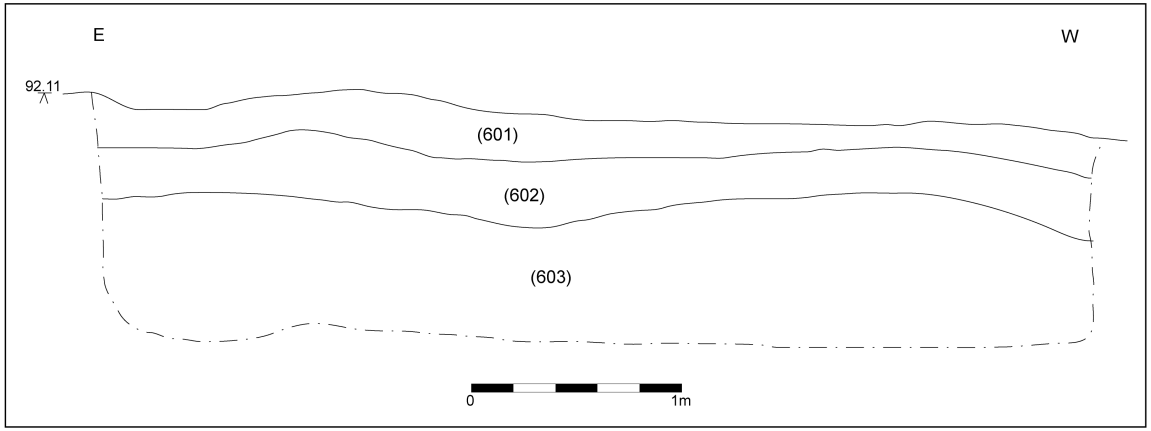

Fig. 5: N-facing section of Trench 6

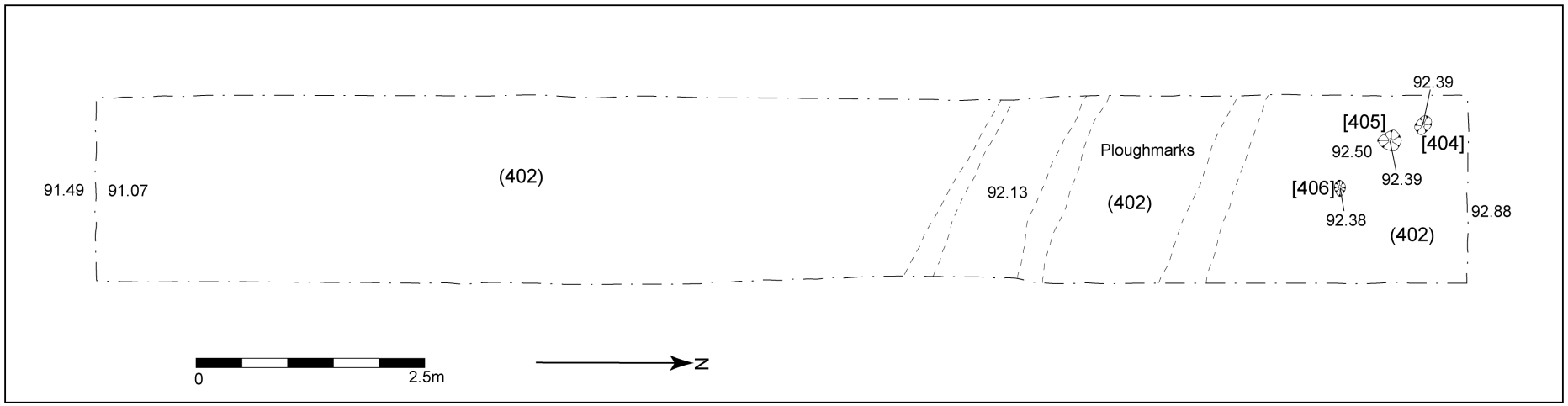

Fig. 6: Mid-excavation plan of Trench 4

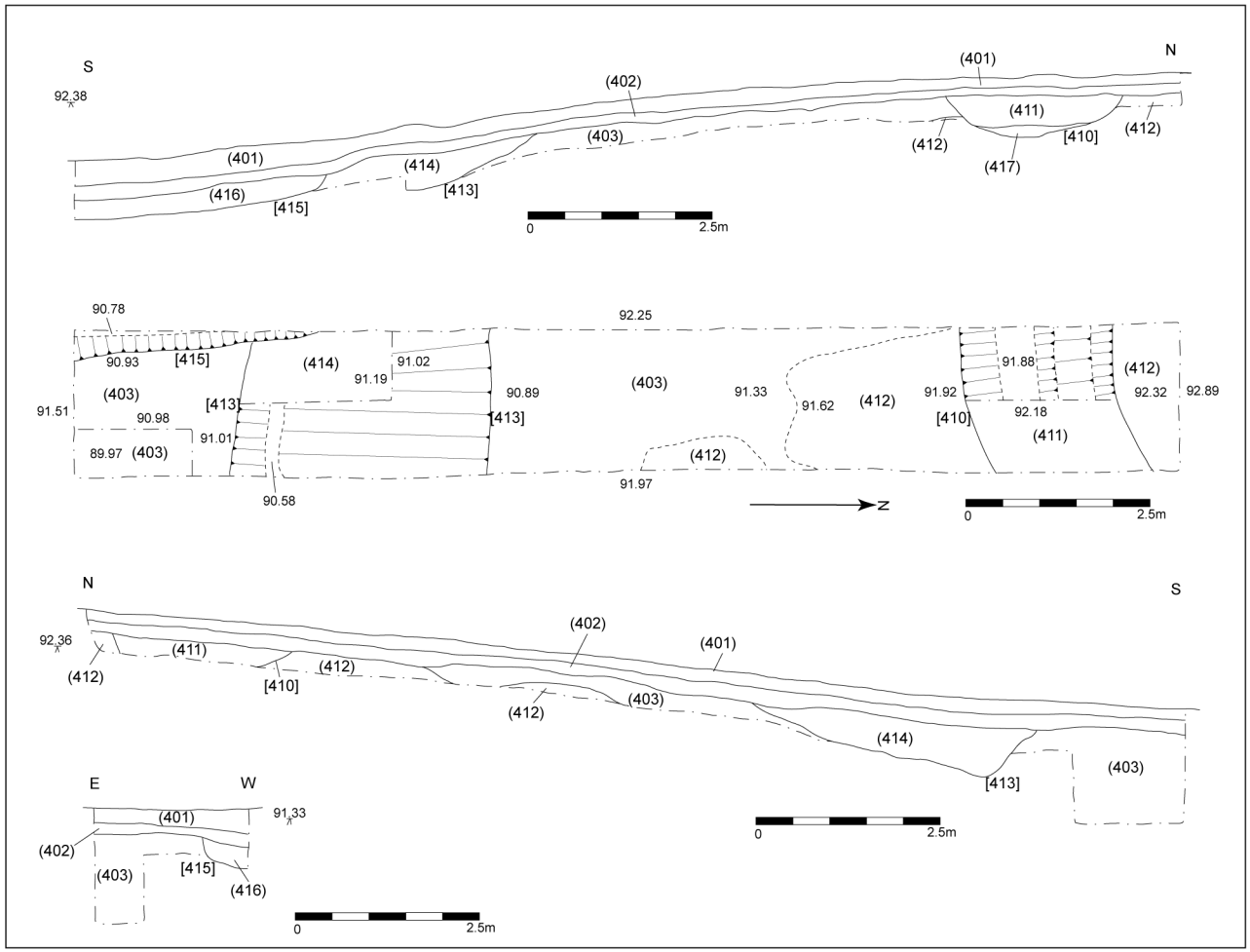

Fig. 7: Post-excavation plan of Trench 4 with W-, E- and N-facing sections

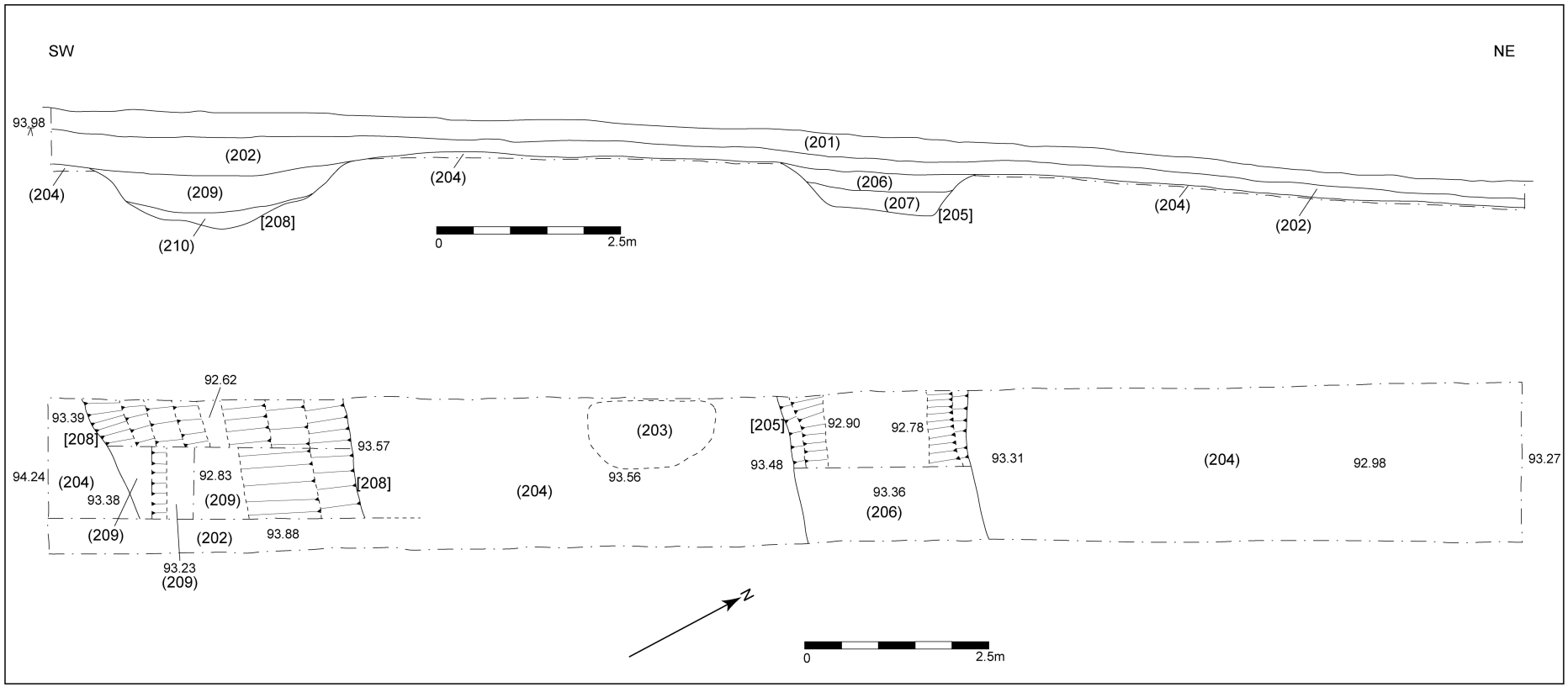

Fig. 8: Post-excavation plan of Trench 2 with SE-facing section

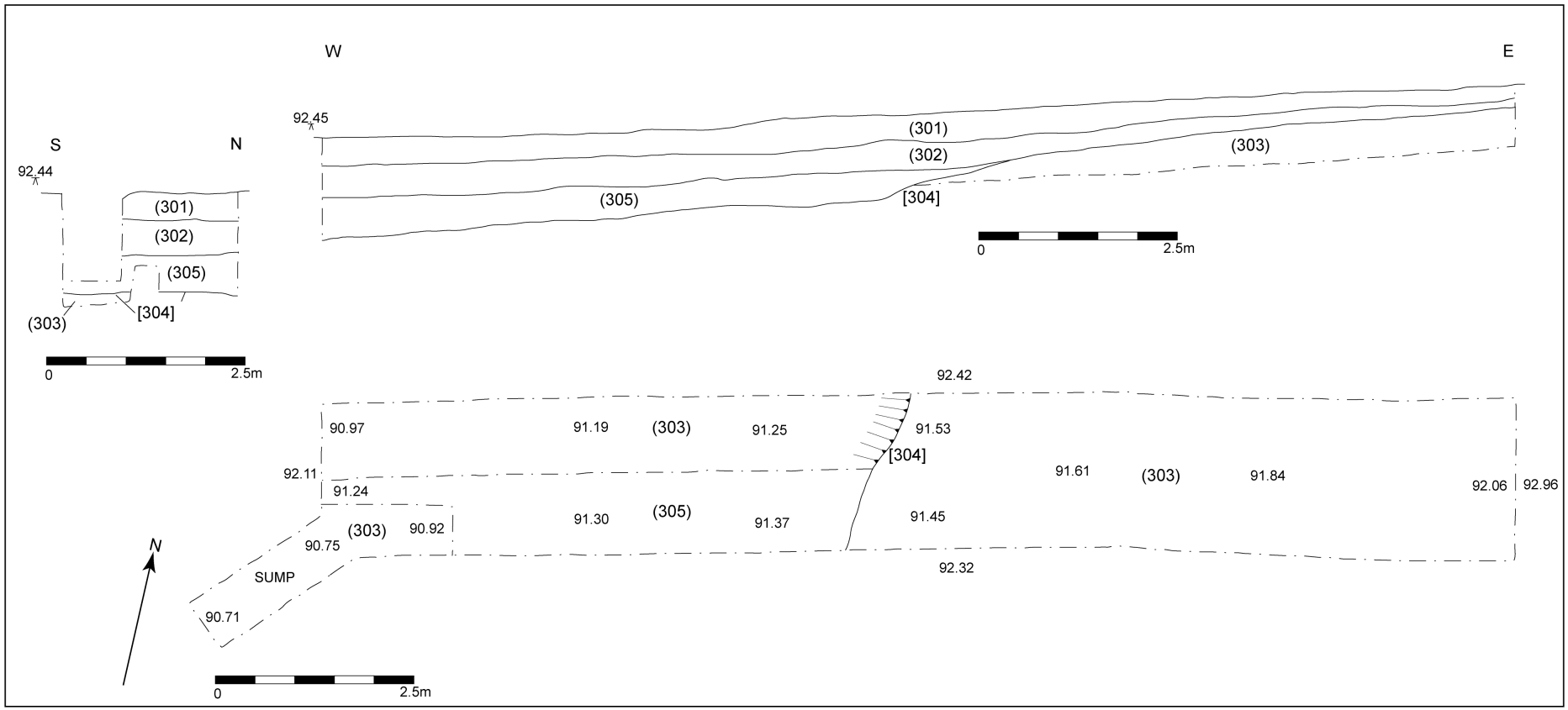

Fig. 9: Post-excavation plan of Trench 3 with S- and E-facing sections

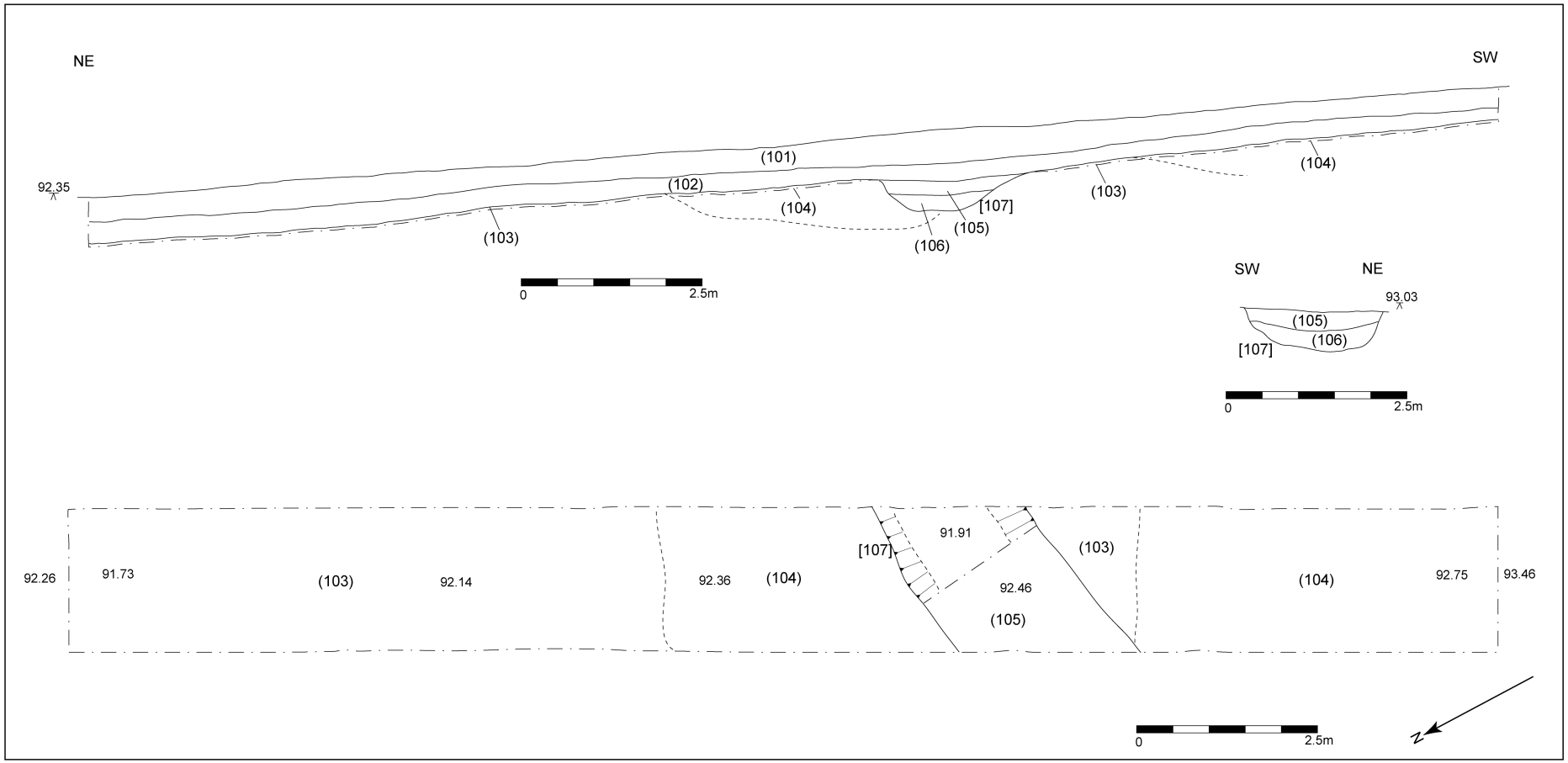

Fig. 10: Post-excavation plan of Trench 1 with NW- and SE-facing sections

5. Summary & Conclusion

Trench 1 contained a single curvilinear ditch [107] running NW-SE, which measured 1.74m wide and 0.53m deep. This appeared to be the continuation of a ditch in Trench 2 [205] located 15m to the S, which also ran NW-SE and measured 2.4m wide and 0.61m deep. The ditches were similar in form, with a relatively steeply sloping NE side breaking to a flattish base, with a more gradual reverse slope. The scale and form of these ditches suggest the enclosure of an area to the SW of Trenches 1 and 2, possibly as part of a larger ring ditch, as suggested by the aerial photographic evidence, probably as a boundary delineation or for enclosure of livestock (**Plate 6**).

Trench 2 also revealed a larger ditch [208] located approximately 6m SW of ditch [205]. This measured 3.5m wide and 0.74m deep and appeared to run NW-SE. The cut revealed a fairly symmetrical profile and ran parallel to [205]. It possibly comprises the inner ditch of a double-ditched enclosure as suggested by aerial photography (**Plate 6**).

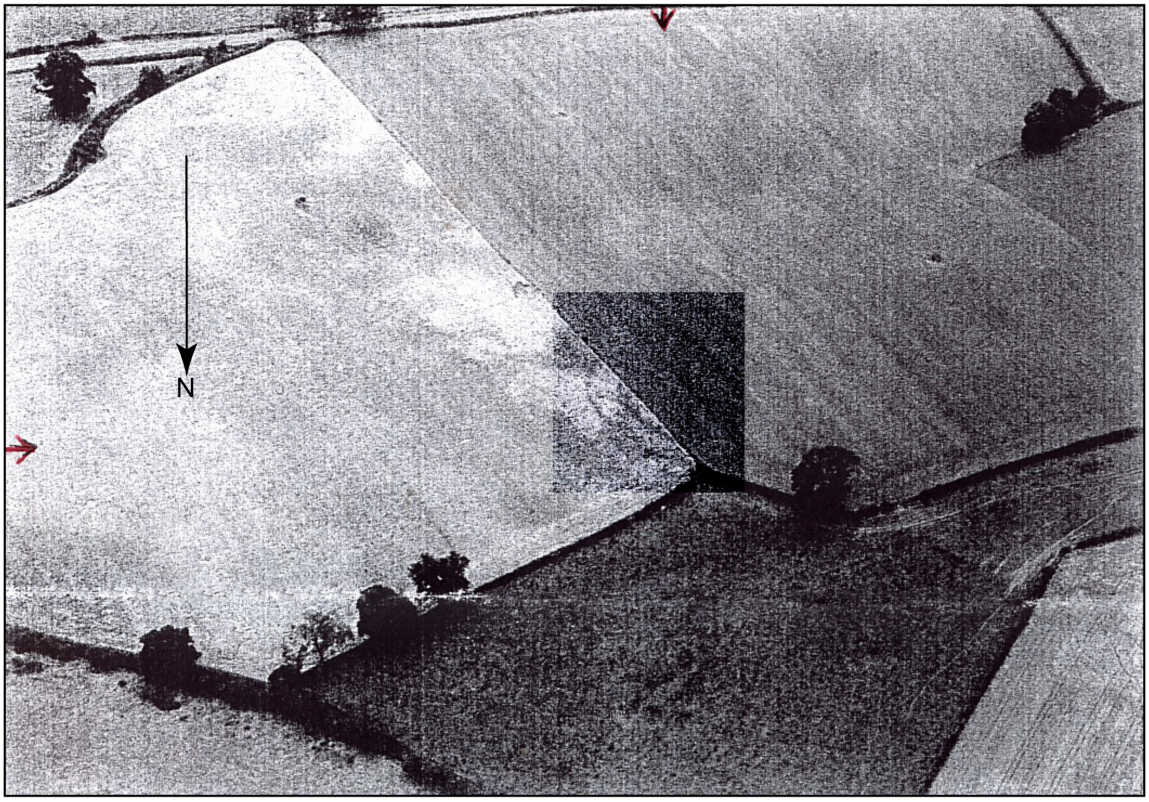

Plate 6: Aerial photograph showing possible double-ditched enclosure revealed in Trenches 1 & 2
(*Photograph supplied by Shropshire County Council*)

Trench 3 revealed a partial linear feature [304] measuring 8.56m wide (as excavated) and 0.54m deep at the SW limit of the excavation. The NE side of the cut profile had an average gradient of 1 in 8 and a wide flat base; the reverse slope fell outside the scope of the excavation. The fill (305) consisted of silty sand containing frequent organic charcoal flecking and deposits. The feature was cut from a well-compacted silty clay deposit (303), which was colour leached indicating that it was waterlogged. Linear [304] appeared to be a wide shallow ditch running NNW-SSE, probably representing a

significant enclosure or boundary delineation relating to settlement activity on the higher ground immediately to the NE or possibly a zone of activity on the ridge to the W.

Trench 4 contained several post-medieval and modern features within a heavily disturbed subsoil (402). A number of modern plough marks were observed and three small circular cuts, [404], [405] & [406], at the northern end of the trench, which were probably postholes of post-medieval date. A ditch cut [415] ran NW-SE across the SW corner of the trench and contained small fragments of post-medieval CBM within the fill (416); the ditch was truncated from above by ground disturbance probably caused by modern cultivation.

Ditch [415] cut through an earlier ditch [413] running NE-SW, which measured 3.9m wide and 0.59m deep. The NW side of the ditch sloped gently to a flattish base, with a steep SE slope, and the feature was filled by a plastic clayey silt (414) containing charcoal organic flecking; there was colour leaching visible in the natural, suggesting some waterlogging. Running parallel to ditch [413] was a NE-SW curvilinear ditch [410] measuring 2.4m wide and 0.48m deep, the curvature of which was visible within the 2m width of the trench. The profile appeared to be symmetrical and bowl-shaped. These two ditches, [410] and [413], were set approximately 6m apart, suggesting that they formed part of a double-ditched enclosure relating to the higher ground to the NW. No finds were recovered from Trench 4 but the form of the two ditches suggests a prehistoric origin.

Trench 5 contained a single ovoid pit [504] measuring 0.56m x 0.4m x 0.26m, of unknown date or function. This was filled by a clean greyish-brown sandy silt (505) and was cut from a thin reddish silty sand (503) overlying natural deposits. No evidence of the discrete pit-like features shown in the geophysical (magnetometer) survey results (marked as 5 on Fig. 05, Appendix 2) was identified and these were probably caused by natural variations in the underlying geological composition.

Trench 6 contained no archaeological features; two large circular features revealed by the geophysical survey were found to be natural deposits of clean sand within the gravel (603).

These features appear to represent the remnants of one or several enclosures of unknown date, which may have functioned as settlement enclosures or as corrals for livestock.

It is possible that there may be a connection between these features and the cropmarks of a sub-rectangular enclosure of unknown date, situated approximately 200m to the NW of the site at NGR SJ 386 348, previously identified during an aerial reconnaissance project carried out by the RCHME in the mid-1990s.

Parallels may be drawn between these cropmark features and other sub-rectangular and rectangular enclosure sites, existing as cropmarks, which have been identified from aerial photography just across the border in Flintshire. These sites are located at Pigeon House (Hanmer), SW of Horseman's Green, and on Blackhurst Farm, Bettisfield (Maelor South) and interpreted as being possible settlement enclosures of late prehistoric (Iron Age) or possibly Romano-British date.

No evidence of the cropmark features at Ellesmere was identified on historic mapping.

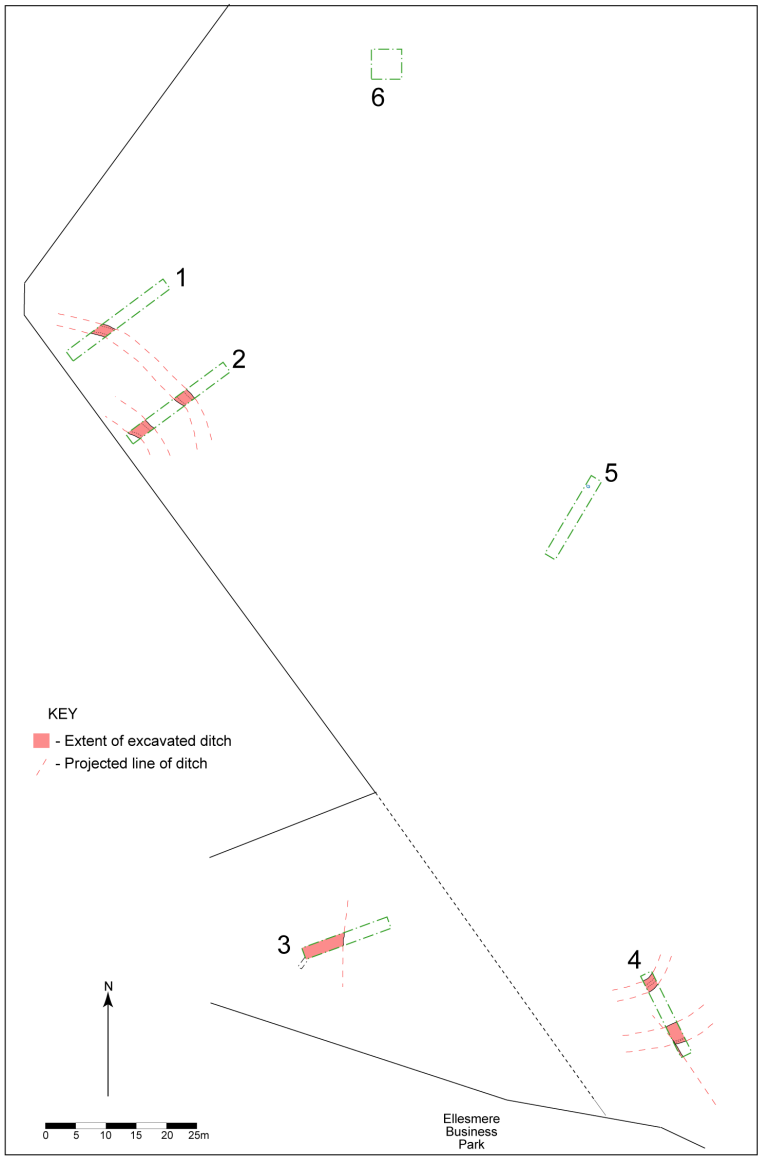

Fig. 6: Plan showing location of ditch features

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7. Bibliography

SSEW, 1983, *Soil Survey of England and Wales*, Silsoe

8. Cartography

Ordnance Survey 1st edition 25-inch map of 1875, Shropshire 13.2

Ordnance Survey 2nd Edition 25-inch map of 1901, Shropshire 13.2

Ordnance Survey 3rd Edition 25-inch map of 1926, Shropshire 13.2

9. Appendix 1: Context Register

CONTEXT NO	DESCRIPTION
Trench 1	
(101)	Friable, mid dark brown humic sandy silt with occasional sub-rounded gravels and very occasional charcoal flecking and fragments. Deposit extends across trench measuring up to 0.28m in thickness. Overlies (102).
INTERPRETATION:	*Topsoil.*
(102)	Friable, mid pinkish-brown sandy silt with moderate sub-rounded gravels and small stones. Deposit extends across trench measuring up to 0.42m in thickness. Underlies (101), overlies (105).
INTERPRETATION:	*Subsoil.*
(103)	Cohesive/clastic, pale yellow mottled with orange patches, sandy silt with occasional small rounded gravels. Thickness and extent undefined. Underlies (104).
INTERPRETATION:	*Natural glaciofluvial deposit.*
(104)	Cohesive, mid pinkish-brown sandy silt with occasional small rounded gravels and manganese flecks. Thickness and extent undefined. Overlies (103), cut by [107].
INTERPRETATION:	*Natural.*
(105)	Cohesive mid pinkish-brown sandy silt with occasional small rounded gravels, small stones and charcoal flecking. Deposit extends >2m NW-SE x 2m NE-SW x 0.38m. Underlies (102), overlies (106), fills [107].
INTERPRETATION:	*Secondary fill of curvilinear ditch incorporating redeposited naturals.*
(106)	Friable, light greenish-pink sandy silt with very occasional small sub-rounded gravels and small stones. Single fragment of animal bone. Deposit extends >2m NW-SE x 1.4m NE-SW x 0.26m. Underlies (105), fills [107].
INTERPRETATION:	*Primary fill of curvilinear ditch [107]. Deposit consists of very fine silty material indicating a fairly rapid deposition of colluvium.*
[107]	Curvilinear cut oriented NW-SE measuring >2m x 0.98 (SE), 1.74m (NW) x 0.53m, break of slope at top moderate at W sharp at E, sides concave, break of slope base gradual on S side and more abrupt on N side, base slightly bowled. Cuts (104), filled by (105) & (106).
INTERPRETATION:	*Cut of curvilinear ditch possibly forming part of larger ring ditch. The relative shallowness of the ditch does not imply any great defensive function and points to a more likely usage as a stock enclosure*
Trench 2	
(201)	Friable mid greyish-brown sandy silt with occasional sub-rounded gravels and small stones. Deposit extends across trench measuring up to 0.3m in thickness. Overlies (202).
INTERPRETATION:	*Topsoil.*
(202)	Moderate to well compacted mid pinkish-brown sandy silt with moderate sub-rounded gravels and small stones and occasional

CONTEXT NO	DESCRIPTION
	post-medieval ceramic sherds and CBM fragments. Deposit extends across trench measuring up to 0.42m in thickness. Underlies (201), overlies (206), (209).
INTERPRETATION:	*Subsoil.*
(203)	Cohesive light yellow sandy silt mottled with orange patches, occasional small rounded gravels. Visible dimensions 1.6m (E-W) x >1m x 0.08m (maximum thickness). Underlies (204).
INTERPRETATION:	*Natural.*
(204)	Cohesive mid pinkish-brown sandy silt with moderate rounded gravels and small stones. Deposit extends trench-wide to a thickness of 0.1m. Underlies (202), overlies (203), cut by [205], [208].
INTERPRETATION:	*Natural.*
[205]	Linear cut measuring >2m (NW-SE) x 2.4m (SW-NE) x 0.61m, break of slope at top sharp, sides concave, break of slope base gradual, base slightly bowled. Cut orientated NW-SE. Cuts (204), filled by (206), (207).
INTERPRETATION:	*Cut of linear ditch of unknown date and function. Due to the close proximity of ditch [208], it is possible that these features form a double-ditched enclosure.*
(206)	Moderately compacted (cohesive) mid pinkish-brown sandy silt with moderate rounded gravels and small stones and occasional charcoal flecking. Deposit measured >2m (NW-SE) x 2.4m (SW-NE) x 0.28m. Underlies (202), overlies (207), fill of [205].
INTERPRETATION:	*Secondary fill of ditch [205]. Material from this deposit is very similar to (204) indicating that natural deposits were redeposited into ditch [205].*
(207)	Friable pale grey pinkish-brown sandy silt with very occasional rounded gravels and small stones. Deposit measured >2m (NW-SE) x 1.98m (SW-NE) x 0.33m. Underlies (206), fill of [205].
INTERPRETATION:	*Primary fill of ditch [205].*
[208]	Linear cut measuring >1.5m (NW-SE) x 3.5m (NE-SW) x 0.74m, break of slope top gradual to moderate, sides 45-50°, break of slope base gradual, base slightly concave. Cut orientated NW-SE. Cuts (204), filled by (209), (210).
INTERPRETATION:	*Cut of linear ditch in SW end of Trench 2. Due to the close proximity of ditch [205], it is possible that these features form a double-ditched enclosure.*
(209)	Cohesive mid pinkish-brown sandy silt with moderate rounded gravels and small stones. Deposit measures >1.5m (NW-SE) x 3.5m (NE-SW) x 0.62m. Underlies (202), overlies (210), fills [208].
INTERPRETATION:	*Secondary fill of ditch [208] incorporating redeposited subsoil. Material appears 'unsorted' suggesting a gradual accumulation.*
(210)	Clastic/cohesive pale grey pinkish-brown sandy silt with moderate rounded gravels and small stones and very occasional larger stones. Deposit measures >0.52m (NW-SE) x 2.5m (NE-SW) x 0.24m (maximum thickness). Underlies (209), fill of [208].
INTERPRETATION:	*Primary fill of [208].*
Trench 3	
(301)	Friable dark brown sandy silt with occasional sub-rounded gravels and small stones. Deposit extends across trench measuring up to

CONTEXT NO	DESCRIPTION
	0.4m in thickness. Overlies (302).
INTERPRETATION:	*Topsoil.*
(302)	Moderately compacted dark brown sandy silt with occasional small rounded stones. Deposit extends trench-wide up to a maximum thickness of 0.48m. Underlies (301), overlies (305).
INTERPRETATION:	*Subsoil.*
(303)	Well-compacted red to yellowish-brown silty clay with occasional rounded pebbles. Thickness and extent undefined. Cut by [304].
INTERPRETATION:	*Natural sandy gravels.*
[304]	Linear cut measuring >8.56m (NNW-SSE) x >2m x 0.54m, break of slope at top gradual to moderate, sides moderately sloping, break of slope base gradual, base flat slightly uneven. Cut probably orientated NNW-SSE, although difficult to discern. Cuts (303), filled by (305)
INTERPRETATION:	*Cut of wide linear ditch. Due to limited exposure, it is extremely difficult to determine the orientation and nature of this feature.*
(305)	Moderate to well-compacted light reddish-brown silty sand with occasional charcoal fragments and 20% charcoal flecking. Deposit measures >8.56m x >2m x 0.54m. Underlies (302), fills [304].
INTERPRETATION:	*Fill of linear [304].*
Trench 4	
(401)	Moderately compacted dark brown sandy silt with occasional small rounded stones. Deposit extends trench wide up to a maximum thickness of 0.48m. Overlies (407), (408), (409).
INTERPRETATION:	*Topsoil.*
(402)	Moderately compacted dark brown sandy silt with occasional small rounded stones. Deposit extends trench wide up to a maximum thickness of 0.21m. Cut by [404], [405], [406], overlies (411), (416).
INTERPRETATION:	*Subsoil deposit with several visible plough marks running from NW to SE.*
(403)	Firmly compacted mid to light reddish-brown silty sand with frequent small and medium sub-rounded stones. Deposit visible in the southern end of the trench measuring >12m x >2m x 1.34m (maximum visible in sondage). Cut by [410], [413], overlies (412).
INTERPRETATION:	*Natural.*
[404]	Circular cut measuring 0.23m (E-W) x 0.19m (N-S) x 0.12m, break of slope at top sharp, sides vertical, break of slope base sharp, base slightly concave. Cuts (402), filled by (407).
INTERPRETATION:	*Cut of post-hole of unknown date.*
[405]	Circular cut measuring 0.29m (E-W) x 0.22m (N-S) x 0.14m, break of slope at top sharp, sides vertical, break of slope base sharp, base slightly concave. Cuts (402), filled by (408).
INTERPRETATION:	*Cut of post-hole of unknown date.*
[406]	Circular cut measuring 0.15m (E-W) x 0.12m (N-S) x 0.11m, break of slope at top sharp, sides vertical, break of slope base sharp, base slightly concave. Cuts (402), filled by (409).
INTERPRETATION:	*Cut of post-hole of unknown date.*
(407)	Loose to moderately compacted mid brown sandy silt with occasional small rounded stones. Deposit measures 0.23m (E-W) x 0.19m (N-S) x 0.12m. Underlies (401), fills [404].

CONTEXT NO	DESCRIPTION
INTERPRETATION:	*Fill of [404].*
(408)	Loose to moderately compacted mid brown sandy silt with occasional small rounded stones. Deposit measures 0.29m (E-W) x 0.22m (N-S) x 0.14m. Underlies (401), fills [405].
INTERPRETATION:	*Fill of [405].*
(409)	Loose to moderately compacted mid brown sandy silt with occasional small rounded stones. Deposit measures 0.15m (E-W) x 0.12m (N-S) x 0.11m. Underlies (401), fills [406].
INTERPRETATION:	*Fill of [406].*
[410]	Curvilinear cut measuring >2m (NE-SW) x 2.4m (NW-SE) x 0.48m, break of slope at top sharp, sides moderately sloping 45-50°, break of slope base gradual, base flat slightly uneven. Cut orientated NE-SW. Cuts (403), filled by (417), (411).
INTERPRETATION:	*Cut of curvilinear ditch possibly forming part of larger ring ditch. The relative shallowness of the ditch does not imply any great defensive function and points to a more likely usage as a stock enclosure.*
(411)	Moderate to well-compacted reddish-brown sandy gravel. Deposit measures >2m (NE-SW) x 2.4m (NW-SE) x 0.43m thick. Overlies (417), fill of [410].
INTERPRETATION:	*Secondary fill of [410].*
(412)	Well-compacted light greyish-brown silty sand with frequent sub-rounded stones. Deposit visible in northern end of trench extending >7.4m x >2m x undefined depth. Underlies (403).
INTERPRETATION:	*Natural gravels.*
[413]	Linear cut measuring >2m (NNE-SSW) x 3.9m x 0.59m, break of slope at top sharp at southern end and gentle at northern end, sides steeply sloping at southern end and gently sloping at northern end, break of slope base sharp at southern end and imperceptible , base flat slightly concave. Cut orientated NNE-SSW. Cuts (403), filled by (414), (415), (416).
INTERPRETATION:	*Linear ditch cut on a similar alignment to [410]. Probable prehistoric boundary ditch.*
(414)	Plastic pale pinkish-brown clayey silt with frequent charcoal flecking and occasional small sub-rounded gravels. Deposit measures >2m (NNE-SSW) x 3.9m x 0.59m. Cut by [415], fill of [413]
INTERPRETATION:	*Fill of [413].*
[415]	Linear cut in southern end of trench measuring >3.4m (NNW-SSE) x >0.4m x 0.34m (maximum thickness), break of slope at top sharp, sides steeply sloping, break of slope at base gentle, base undefined. Cut orientated NNW-SSE. Cuts (414), filled by (416).
INTERPRETATION:	*Cut of linear ditch. Fill indicates a post-medieval date for this feature.*
(416)	Plastic pale orangey-brown silty clay with occasional post-medieval CBM fragments and small sub-rounded and subangular stones. Deposit measures >3.4m (NNW-SSE) x >0.4m x 0.34m (maximum thickness). Underlies (402), fills [415].
INTERPRETATION:	*Fill of post-medieval linear feature.*
(417)	Well-compacted reddish-brown silty sand with frequent small to medium sub-rounded stones and gravels. Deposit extends >2m (NE-SW) x 1.56m (NW-SE) x 0.18m (maximum thickness).

CONTEXT NO	DESCRIPTION
	Underlies (411), fills [410].
INTERPRETATION:	*Primary fill of [410].*
Trench 5	
(501)	Moderately compacted dark brown sandy silt with occasional small rounded stones. Deposit extends trench wide up to a maximum thickness of 0.12m. Overlies (502).
INTERPRETATION:	*Topsoil.*
(502)	Friable light greyish-brown sandy silt, moderate sub-rounded gravels and small stones. Extends across trench measuring up to 0.28m in thickness. Underlies (501), overlies (505).
INTERPRETATION:	*Subsoil.*
(503)	Moderate to well compacted reddish-brown silty sand with occasional small rounded stones and 1% charcoal flecking. Deposit extends trench wide up to a maximum thickness of 0.15m. Overlies (506), cut by [504].
INTERPRETATION:	*Soil horizon overlying natural deposits. Pit [504] indicates some human activity at this level.*
[504]	Ovoid cut measuring 0.56m (NW-SE) x 0.4m (NE-SW) x 0.26m, break of slope at top sharp, sides 45°, break of slope base moderate, base slightly concave. Cuts (503), filled by (505).
INTERPRETATION:	*Cut of small ovoid pit of unknown date and function.*
(505)	Moderately compacted mid greyish-brown sandy silt. Deposit measured 0.56m (NW-SE) x 0.4m (NE-SW) x 0.26m. Underlies (502), fills [504].
INTERPRETATION:	*Fill of pit [504].*
(506)	Loose to moderately compacted yellowish to greyish-brown sandy gravel, occasional small rounded pebbles. Deposit extended trench-wide up to a maximum thickness of 0.2m. Underlies (503), overlies (507).
INTERPRETATION:	*Natural gravels.*
(507)	Well-compacted reddish-brown sandy gravel with frequent small to medium rounded pebbles. Deposit extends trench-wide up to a maximum thickness of 0.2m. Underlies (506).
INTERPRETATION:	*Natural gravels.*
Trench 6	
(601)	Moderately compacted dark brown sandy silt with occasional small rounded stones. Deposit extends trench-wide up to a maximum thickness of 0.3m. Overlies (602).
INTERPRETATION:	*Topsoil.*
(602)	Friable greyish-brown silty sand with occasional small rounded pebbles and 2% charcoal flecking. Deposit extends trench-wide up to a maximum thickness of 0.3m. Underlies (601), overlies (603).
INTERPRETATION:	*Subsoil.*
(603)	Loosely compacted reddish to orangey-brown sandy gravel deposit with 5% decayed sandstone. Deposit extends trench-wide to a thickness of >0.9m. Underlies (602).
INTERPRETATION:	*Natural gravels. This deposit consists of hard-packed gravels with irregular (often sub-circular) patches of clean sand. This may help to explain geophysical readings, which suggested the presence of pit-like features in this area.*

10. Appendix 2: Magnetometer Survey

David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons), Archaeological Surveys Ltd

10.1 Summary

A geophysical survey was carried out over 2.2ha on land adjacent to Ellesmere Business Park in Shropshire. The detailed magnetometry survey located a number of positive responses that may suggest cut features such as ditches and pits, however their form does not allow for confident interpretation and their archaeological potential cannot be determined.

10.2 Introduction

10.2.1 Survey background

Archaeological Surveys Ltd was commissioned by Border Archaeology on behalf of Shropshire County Council to undertake a geophysical survey of an area of land to the N of Ellesmere Business Park in Shropshire. The site has been outlined for a second phase of development of the business park by Shropshire County Council. This survey formed part of an assessment of any potential archaeology that may be affected by the development.

10.2.2 Survey objectives and techniques

The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site.

Magnetometry is an efficient and effective technique well proven for archaeological prospection. The fieldwork and report generally follow English Heritage, 1995: *Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1.*

10.2.3 Site location, description and survey conditions

The site is located to the N of Ellesmere Business Park which is N of the A495, Oswestry Road on the western side of Ellesmere. The site is centred on Ordnance Survey grid reference SJ 38885 34515.

The geophysical survey covers an area of approximately 2.2ha. The majority of the area lies within a pasture field with a small separate section at the western end of the site lying within a field of maize stubble. The western and eastern limits of the surveyed area were scaled from mapping and are not represented by field boundaries.

The northern half of the site is generally flat, the southern half contains a low knoll and slopes down towards the S. The two survey sections are separated by a wire fence; other land boundaries forming the limit of the survey area are constructed by a combination of hedgerow and wire fencing. The SE and SW parts of the survey area were waterlogged during the survey period.

10.2.4 Site history and archaeological potential

Background information supplied by the client indicates the presence of a double ditched cropmark of uncertain date and function and the potential for early settlement remains.

10.2.5 Geology and soils

The underlying geology are Permian and Triassic sandstones (BGS 2001) with overlying deposits of Boulder Clay with some possible deposits of Glacial Sands and Gravels in the southernmost part of the site (BGS 1977).

The site appears to be on the cusp of two types of overlying soils. Across the N of the site are from the Salop association and to the S from the Newport 1 association, which are typical stagnogley soils and typical brown sands, respectively. The Salop soils consist of slowly permeable, seasonally waterlogged reddish fine loamy over clayey soils. The Newport 1 soils consist of deep well drained sandy and coarse loamy soils (Soil Survey of England and Wales 1983).

Magnetometry produces variable results over drift deposits of boulder clay and may be poor when this is derived from Permian and Triassic solid geology. The effectiveness of magnetometry may also be influenced by soil moisture, where waterlogging occurs frequently, and where the moisture content of soils is high, enhancement of magnetic susceptibility may not occur or may be suppressed.

10.3 Methodology

10.3.1 Technical synopsis

Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below.

Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased and the iron minerals become magnetic in the presence of the earth's magnetic field. Accumulations of magnetically enhanced soils within features such as pits and ditches can produce magnetic anomalies that can be mapped during magnetic prospection.

Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth or associated with other industrial processes. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT) which are equivalent to 10-9 Tesla (T).

10.3.2 Equipment configuration, data collection and survey detail

The detailed magnetic survey was carried out using a Bartington Grad601-2 gradiometer. This instrument effectively measures a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally. The instrument is extremely sensitive and is able to measure magnetic variation to 0.1nanoTesla (nT). All readings are saved to an integral data logger for analysis and presentation

The instrument is operated according to the manufacturer's instructions with consideration given to the local conditions. An adjustment procedure is required prior to collection of data in order to balance the sensors and remove the effects of the Earth's magnetic field, further adjustment is required during the survey due to instrument drift often associated with temperature change. It is often very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that can be associated with large ferrous objects, geological/pedological features, 'magnetic' debris within the topsoil and natural temperature fluctuations. Imperfect balance results in a heading error often visible as striping within the data; this can be effectively removed by software processing and generally has little effect on the data unless extreme. Archaeological Surveys use a non-magnetic tripod with an additional supporting structure to raise the instrument during the set-up procedure; this has been found to improve the sensor balance.

The Bartington gradiometer undergoes regular servicing and calibration, which is carried out by the manufacturer. A current assessment of the instrument is shown in Table 1 below.

Date of calibration/service	21st May 2007
Sensor type	Bartington Grad - 01 – 1000 Nos. 084 and 085
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

The instrument was considered to be in good working order prior to the survey with no known faults or defects.

Data were collected at 0.25m centres along traverses 1m apart. The survey area was separated into 30m by 30m grids, giving 3600 recorded measurements per grid. This sampling interval is very effective at locating archaeological features and is the recommended methodology for archaeological prospection (English Heritage, 1995).

The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. The GPS is used in conjunction with Leica's Smartnet service where positional corrections are sent via a mobile telephone link. Positional accuracy of around 10 – 20mm is possible using the system.

The fixed orientation of survey grids based on the OSGB36 datum was considered appropriate given that the orientation of land boundaries and obstructions was variable and consequently partial survey grids were unavoidable. In addition there is an optimum N–S traverse direction for magnetic survey (English Heritage,1995). Survey in this

direction exploits the greater contrast of magnetic features, which is a function of their presence within the Earth's magnetic field. A fixed grid across the site also simplifies its relocation should that be required.

10.3.3 Data processing and presentation

Magnetometry data downloaded from the Grad 601-2 data logger are analysed and processed in specialist software known as ArcheoSurveyor. The software allows greyscale and trace plots to be produced for presentation and display. Survey grids are assembled to form an overall composite of data (composite file) creating a dataset of the complete survey area. Appendix B contains specific information concerning the survey and data attributes and is derived directly from ArcheoSurveyor, this should be used in conjunction with information provided by Figure 02.

Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed as processing can modify anomalies. The following schedule sets out the data and image processing used in this survey:

- clipping of processed data at ±3nT to enhance low magnitude anomalies,
- clipping of trace plots at ±50nT in order to minimise strong readings obscuring low magnitude responses,
- de-stagger is used to enhance linear anomalies,
- zero median/mean traverse is applied in order to balance readings along each traverse.

(Reference should be made to Appendix B for details on the processing used for each survey area).

10.3.4 Data processing explanation notes

Clipping
Clipping replaces the values outside the specified minimum and maximum with those values. The process is useful for displaying detail as extreme values are removed allowing greyscale shades to be allocated to a narrower range of values, which improves the definition of anomalies.

Zero Median/Mean Traverse
The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise slight differences between the set-up and stability of gradiometer sensors and can remove striping.

De-stagger
Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount.

An abstraction and interpretation is offered for all geophysical anomalies located by the survey. A brief summary of each anomaly with an appropriate reference number is set out in list form within the results (Section 3), to allow a rapid assessment of features within the survey area.

'Raw' data have been shown as a traceplot and 'processed' data have been shown as a greyscale plot followed by an abstraction and interpretation plot.

Graphic raster images in Bitmap format are initially prepared in ArcheoSurveyor. Regardless of survey orientation, data captured along each traverse are displayed and processed by ArcheoSurveyor from left to right. This corresponds to a direction of S to N in the field for the survey. Prior to displaying against base mapping, raster graphics require a rotation of 90° anticlockwise to restore N to the top of the image. Greyscale images are rotated upon insertion into AutoCAD LT; traceplots are rotated using ArcheoSurveyor. Rotated traceplots are derived from interpolated datasets and can be considered as representative only as the raw data will have been modified to a minor degree.

The raster images are combined with base mapping using AutoCAD LT 2007 creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. Quality can be compromised by rotation of graphics in order to allow the data to be orientated with respect to grid N; this is considered acceptable as the survey results are effectively georeferenced allowing relocation of features using GPS, resection method etc. A digital archive, including raster images, is produced with this report allowing separate analysis if necessary.

10.4 Results

10.4.1 General overview

The detailed magnetic survey was carried out over an area of approximately 2.2ha (**Figs. 02-05**). Geophysical anomalies located can be generally classified as positive and negative anomalies of an uncertain origin, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines. Anomalies located have been numbered and will be outlined below in more detail.

The listing of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross reference to the abstraction and interpretation plot. Sub-headings are then used to group anomalies with similar characteristics for each survey area.

Anomalies with an uncertain origin

Positive anomalies
Negative anomalies 

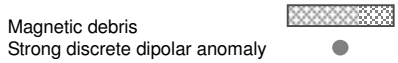
The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features but equally relatively modern features, geological/pedological features and agricultural features should be considered.

Anomalies with a modern origin

Magnetic disturbance
Strong multiple dipolar linear anomaly - pipeline/service 

The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux, which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present.

Anomalies associated with magnetic debris



The response often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. Magnetic debris often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response is caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.

10.4.2 List of anomalies

Anomalies with an uncertain origin

(1) In the S of the site, a positive sub-rectilinear or possible curvilinear anomaly is evident. It is possible that this is associated with anomaly (2) to the W.

(2) A positive broadly curvilinear anomaly possibly extends from anomaly (1). There are several strong discrete dipolar anomalies adjacent to anomaly (2) suggesting modern material may be incorporated into it.

(3) In the centre of the site, a cluster of short positive linear anomalies and a negative linear anomaly can be seen.

(4) In the N of the survey area, a zone of positive response has been located. This may suggest some type of ground disturbance but the direct cause is uncertain.

(5) Four discrete low magnitude positive responses appear pit-like in form. It is possible that they relate to a fragmented linear anomaly and may continue to the S as anomaly (8).

(6) A positive response in the centre of the survey area

(7) The site contains many weak discrete positive anomalies that may suggest pit-like responses. It is possible that these are of geological/pedological origin.

(8) A positive linear anomaly is orientated NW to SE and appears to extend towards positive pit-like anomalies (5). It is possible that the anomaly has been caused by agricultural activity.

(9) Short positive linear anomalies of uncertain origin

Anomalies associated with magnetic debris

(10) A small patch of magnetic debris is located in the western part of the survey area and indicates a spread of magnetically thermoremnant material. It is not possible to ascertain the origin of this material.

(11) The site contains many strong discrete dipolar anomalies that are likely to be responses to ferrous objects within the topsoil.

Anomalies with a modern origin

(12) Widespread magnetic disturbance from a strong multiple dipolar linear anomaly is a response to a buried service/pipeline.

(13) Magnetic disturbance close to the southern edge of the survey area

10.5 Conclusion

The magnetometry survey located a number of geophysical anomalies although the majority of these could not be confidently interpreted. In the S of the site, two positive anomalies may be responses to the magnetically enhanced fill of a cut feature or features. In addition, many discrete pit-like anomalies were located, however it is not possible to characterise them as archaeological features, as a geological/pedological origin is also possible. Intrusive investigation may be required in order to further understand the nature of the magnetic anomalies.

10.6 References

British Geological Survey, 1977, Geological Survey Ten Mile Map, South Sheet, First Edition (Quaternary), Scale 1:625 000.

British Geological Survey, 2001, Solid Geology Map, UK South Sheet,1:625 000 scale, 4th edition.

English Heritage, 1995, Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1.

Soil Survey of England and Wales, 1983, Soils of England and Wales, Sheet 2 Wales.

10.7 Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature, known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition, thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils, which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

10.8 Appendix B – survey and data information

Filename:	Mag-proc.xcp
Instrument Type:	Grad 601 (Magnetometer)
Units:	nT
Surveyed on:	29/01/2008
Assembled on:	29/01/2008
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 0.00 m spacing.
Dummy Value:	32702
Origin:	Zero

Dimensions

Composite Size (readings):	840 x 150
Survey Size (meters):	210 m x 150 m
Grid Size:	30 m x 30 m
X Interval:	0.25 m
Y Interval:	1 m

Stats

Max:	3.00
Min:	-3.00
Std Dev:	1.63
Mean:	-0.16

Processes: 13
1 Base Layer
2 Clip from -10 to 10
3 DeStripe Median Traverse: Grids: 16.xgd 17.xgd 18.xgd 21.xgd 22.xgd 23.xgd
4 DeStripe Median Traverse: Grids: 14.xgd 15.xgd
5 DeStripe Median Traverse: Grids: 26.xgd 01+27.xgd 24.xgd 04+25.xgd
6 DeStripe Median Traverse: Grids: 20.xgd
7 DeStripe Mean Traverse: Grids: 13.xgd Threshold: 0.5 SDs
8 DeStripe Mean Traverse: Grids: 02.xgd Threshold: 0.5 SDs
9 DeStripe Mean Traverse: Grids: 05.xgd Threshold: 0.5 SDs
10 DeStripe Mean Traverse: Grids: 07.xgd Threshold: 0.5 SDs
11 DeStripe Mean Traverse: Grids: 08.xgd 09.xgd Threshold: 0.5 SDs
12 DeStripe Mean Traverse: Grids: 06.xgd Threshold: 0.5 SDs
13 Clip from -3 to 3

Source Grids: 25
1 Col:0 Row:1 grids\26.xgd
2 Col:0 Row:2 grids\01+27.xgd
3 Col:0 Row:3 grids\02.xgd
4 Col:0 Row:4 grids\03.xgd
5 Col:1 Row:1 grids\24.xgd
6 Col:1 Row:2 grids\04+25.xgd
7 Col:1 Row:3 grids\05.xgd
8 Col:1 Row:4 grids\06.xgd
9 Col:2 Row:1 grids\10.xgd
10 Col:2 Row:2 grids\07.xgd
11 Col:2 Row:3 grids\08.xgd
12 Col:2 Row:4 grids\09.xgd
13 Col:3 Row:0 grids\12.xgd
14 Col:3 Row:1 grids\11.xgd
15 Col:3 Row:2 grids\13.xgd
16 Col:3 Row:3 grids\14.xgd
17 Col:3 Row:4 grids\15.xgd
18 Col:4 Row:0 grids\19.xgd
19 Col:4 Row:1 grids\16.xgd
20 Col:4 Row:2 grids\17.xgd
21 Col:4 Row:3 grids\18.xgd
22 Col:5 Row:0 grids\20.xgd
23 Col:5 Row:1 grids\21.xgd
24 Col:5 Row:2 grids\22.xgd
25 Col:6 Row:1 grids\23.xgd

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