

**FIELD HOUSE SURFACE MINE SCHEME,
COUNTY DURHAM**

**ARCHAEOLOGICAL EVALUATION:
SUMMARY REPORT**

June 2017

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PRE-CONSTRUCT ARCHAEOLOGY

**Archaeological Evaluation at Field House Surface Mine Scheme,
County Durham**

Summary Report

Central National Grid Reference: NZ 326 459

Site Code: FHQ 17

**Commissioning Client:
CgMs Consulting**

**On Behalf of:
Hargreaves Surface Mining Ltd**

**Contractor:
Pre-Construct Archaeology Limited
Northern Office
Unit N19a Tursdale Business Park
Durham
DH6 5PG**

Tel: 0191 377 1111



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**FIELD HOUSE SURFACE MINE SCHEME, COUNTY DURHAM
ARCHAEOLOGICAL EVALUATION: SUMMARY REPORT**

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Text prepared by:	Mike McElligott and Jennifer Proctor		June 2017
Text checked by:	Jennifer Proctor		26 June 2017
Graphics prepared by:	Tilia Cammegh and Josephine Brown		June 2017
Graphics checked by:	Josephine Brown and Hayley Baxter		June 2017
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**Pre-Construct Archaeology Limited
North Regional Office
Unit N19a Tursdale Business Park
Durham
DH6 5PG**

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1. NON-TECHNICAL SUMMARY

- 1.1 An archaeological evaluation was undertaken in May–June 2017 by Pre-Construct Archaeology Limited on land proposed for new surface mining at Field House Farm, Durham, centred at National Grid Reference NZ 326 459. The work was commissioned by CgMs Consulting on behalf of Hargreaves Surface Mining Limited as part of the planning process to inform the Local Planning Authority, Durham County Council, of the character, date, extent and degree of survival of any potential archaeological remains at the site. The site is located c. 5.5km north-east of the centre of Durham City, and lies to the south east of West Rainton village and the A690 road. It covers c. 52 hectares in size and is currently formed by parts of twelve fields and is bounded by Pittington Road, Robin Lane, Moorsley Road, agricultural land, and a former railway line.
- 1.2 A desk-based assessment prepared by CgMs Consulting in 2012 of the proposed surface mine established that the proposed development had the potential to impact the site of a possible prehistoric or Roman enclosure identified in the Durham Historic Environment Record. It also established that a 19th-century colliery, the Lady Seaham Pit, was located in the southern part of the site. The pit was sunk in 1836 and is recorded as an active pit on Ordnance Survey maps of 1861 and 1898. By the time of the 1923 map the pit buildings are shown as ‘disused’ and the railway branch line without track. The proposed development therefore also had the potential to impact on structural remains of the pithead along with associated infrastructure such as railway lines.
- 1.3 A geophysical survey of the site undertaken in 2013 by GSB Prospection did not detect any anomalies that related to the possible Prehistoric/Roman enclosure. Anomalies relating to the 19th-century colliery workings and railways were identified in the southern part of the site, but no further significant archaeological features were revealed by geophysical survey.
- 1.4 A Written Scheme of Investigation for the archaeological evaluation prepared by CgMs in 2015 and updated in 2017 was approved by Durham County Council. The archaeological evaluation aimed to identify the archaeological potential of the site across the area of the proposed surface mine. The evaluation comprised 103 archaeological trial trenches each measuring 50m by 2m providing an approximate 2% sample of the development site. The trenches were positioned to test anomalies recorded in the geophysical survey; features identified from historic maps; the possible Iron Age/Roman enclosure; and areas not identified as having specific archaeological potential (‘blank areas’).
- 1.5 Natural deposits and archaeological remains encountered at the site have been assigned to five phases of activity. Natural geological material (Phase 1) was

encountered within all trenches and the depth at which natural clay was encountered below existing ground level varied across the site, dependant on the presence of subsoil and modern dumped deposits. Where only topsoil was encountered, the natural sub-stratum was encountered at maximum and minimum depths below ground level of 0.46m in Trench 43 in the western part of the site and 0.25m in Trench 52 in the north-western part. In trenches where subsoil or modern dumping deposits were present natural sub-stratum was encountered at maximum and minimum depths below ground level of 0.75m and 0.36m.

- 1.6 Subsoil (Phase 2) directly overlying the natural-substratum was recorded in 31 trenches; Trenches 3, 7, 11, 34, 37, 48, 49, 57, 64, 86, 88, 89 & 98 in the northern half of the site and Trenches 19 – 27, 30, 31, 44, 73, 74, 100 & 101 in the southern half of the site.
- 1.7 Phase 3 activity comprised the remains of a ridge and furrow agricultural system which extended across the site. A regular system of roughly NW-SE aligned furrows was recorded across the site. The width and spacing of the furrows, c. 7-8m apart, are typical of that expected for a 'broad' ridge and furrow agricultural system of the medieval period. This extensive system of furrows was identified by geophysical survey across most areas of the site.
- 1.8 Archaeological features and structures encountered in the southern part of the site associated with the 19th-century Lady Seaham colliery have been assigned to Phase 4 activity for the purposes of this phase of archaeological work and summary report. It is evident from mapping evidence that extensive rebuilding of the pithead structures had taken place between the 1861 and 1898 Ordnance Survey maps and further investigation and analysis of the structural remains may allow refining of the phasing of structural remains at the site.
- 1.9 A small rectangular infilled brick structure recorded at the northern end of Trench 20 may represent an airshaft or vent. A substantial feature backfilled with colliery waste was located in the centre and western end of this trench. Sample excavation by machine revealed a vertical-sided cut and a stone culvert was observed along the base at its western edge. A large square feature is depicted on the 1861 map in this location and this may have been a large tank to contain water pumped from the pit; the 1861 map shows a narrow linear feature leading from the pithead to this tank which may have channelled water into the tank.
- 1.10 The well-preserved remains of pithead structures were recorded across Trench 21. Extensions to the trench were machined at the southern and towards the northern end of the trench to further expose these remains. A backfilled circular stone-lined mineshaft was recorded towards the northern end of Trench 21. Brick and stone walls which abutted to the north and south may have formed supports for the winding mechanism and the entrance into the shaft. To the east another infilled stone shaft

was partially exposed within the limits of the trench. To the south the western corner of a sandstone building was revealed. A large structure in this location is shown on the 1861 Ordnance Survey map and it is possible that these structural remains formed part of the earliest phase of colliery. A complex of other structures, walls and floor surfaces was exposed at the southern end of the trench, continuing beyond the edges of excavation. The structural remains exposed formed part of the southern end of a large irregular-shaped structure shown on the 1898 map. Individual rooms could be identified along with features such as machine bases. Sample excavation of overlying demolition deposits revealed well-preserved brick floor surfaces.

- 1.11 Features and deposits associated with the branch railway line leading to Lady Seaham pit, as shown on the 1861 and 1898 Ordnance Survey maps, were recorded in Trenches 23 and 24 to the east of the pithead structures. In Trench 23, three east-west aligned linear features may represent boundary or drainage features delimiting the wayleave and 'robber trenches' indicating the location of removed rails.
- 1.12 In summary, the evaluation established that no archaeological remains of significance were present across the majority of the site and no further archaeological mitigation will be required prior to the coal extraction. In the southern part of the site, well-preserved and extensive structural remains of the 19th-century colliery pithead were recorded. These archaeological remains are of significance at a regional level and further mitigation will be required. This will entail excavation and recording of the pithead structures and associated remains, post-excavation assessment and subsequent publication of the results of the archaeological investigation.

2. INTRODUCTION

2.1 Project Background

- 2.1.1 This report details the methodology and results of an archaeological evaluation undertaken by Pre-Construct Archaeology Limited (PCA) at the site of a proposed surface mine at Field House Farm, near West Rainton, Durham. The site covers c. 52 hectares in size centred at National Grid Reference NZ 326 459 (Figure 1).
- 2.1.2 The work was commissioned by CgMs Consulting on behalf of Hargreaves Surface Mining Ltd. as part of the planning process to inform the Local Planning Authority (LPA), Durham County Council, of the character, date, extent and degree of survival of any potential archaeological remains at the site.
- 2.1.3 A desk-based assessment (CgMs Consulting 2012) established that the proposed development had the potential to impact the site of a possible prehistoric or Roman enclosure identified by cropmarks on an aerial photograph and a 19th-century colliery, the Lady Seaham Pit, located in the southern part of the site. No traces of the enclosure were identified by geophysical survey but anomalies relating to the 19th-century colliery workings and railways were identified (GSB Prospection 2013).
- 2.1.4 A Written Scheme of Investigation (WSI) for the archaeological evaluation was approved by Durham County Council (CgMs 2015, updated 2017). The archaeological evaluation aimed to identify the archaeological potential of the site across the area of the proposed surface mine. The evaluation was to comprise 103 archaeological trial trenches, each measuring 50m by 2m, providing an approximate 2% sample of the development site.
- 2.1.5 As the location of the possible Iron Age/Roman enclosure was subsequently excluded from the proposed development, Trench 8 was not machined and 102 trenches were investigated (Figure 2)
- 2.1.6 This summary report has been prepared provide information on the structural remains of the pithead and associated infrastructure to inform a decision regarding further mitigation. For the purposes of this report the detailed plans of the structural remains have not been digitised and a simplified GPS plan of the features in Trench 21 has been included (Figure 3). The sample plans and sections through the plough furrows and the sections of the trenches which contained elements of the railway (Trenches 23 and 24) have not been digitised.
- 2.1.7 The **Online Access** to the **Index of Archaeological InvestigationS** (OASIS) reference number of the project is preconst1-287965.

2.2 Site Location and Description

- 2.2.1 The proposed development area is located c. 5.5km north-east of the centre of Durham City, and lies to the south-east of West Rainton village and the A690 road at National Grid Reference NZ 326 459 (Figure 1).
- 2.2.2 The area proposed for extraction covers c. 52 hectares in size and is currently formed by parts of twelve fields with associated tracks (Figure 2). It is bounded by Pittington Road to the west, Robin Lane to the north, Moorsley Road to the south, a former railway line and agricultural land to the east, and agricultural land to the north-east and north-west. Field House Farm, which is situated in the north-eastern part of the site, is accessed via a track off Robin Lane to the north.
- 2.2.3 At the time of the archaeological evaluation, the majority of the fields which form the proposed extraction area were in use as arable fields and contained crops. In the western part of the site was a ploughed field with no crop. A large circular mound in the far southern part of the site can be seen as a spoil heap on historic mapping from the 1861 map onwards to the south of the pithead of the Lady Seaham pit. Two grass runways for light aircraft were situated in the northern and eastern parts of the site (Phases 1 and 5 on Figure 2).

2.3 Geology and Topography

- 2.3.1 The British Geological Survey 1:50,000 scale digital mapping records the solid geology of the study site area as Mudstone, Siltstone and Sandstone of the Pennine Middle Coal Measures Formation. This is overlain by superficial deposits of glacial Till.
- 2.3.2 The site is located on the south-east facing side of a slight ridge, with ground sloping away to the south-east. Ground levels within the site lie between 102m AOD on the summit of the ridge around Field House Farm in the north-east part of the site, to 82m AOD in the south-eastern corner of the site. To the east of the site ground levels rise more steeply along an escarpment between High Moorsley and Pittington. The escarpment ridge lies at around 160m AOD.
- 2.3.3 The Pittington Beck flows southwards to the east of the far southern part of the site.

2.4 Planning Background

- 2.4.1 Planning permission has been granted at appeal for a surface mine scheme involving surface mineral operations for the winning and working of 514,000 tonnes of coal and up to 83,000 tonnes of fireclay, ancillary site operations with progressive restoration and aftercare to agriculture, broadleaved woodland, hedgerows, water bodies, wetland and low nutrient grassland over a 3 year period at Field House Farm, by

Hargreaves Surface Mining Ltd (Planning Reference CMA/4/107, Durham County Council, 2014; Appeal reference APP/X1355/3001645, 5 January 2016).

2.4.2 In discussions with Durham County Council's Senior Archaeology Officer, it was established that a condition would be attached to any consent granted, requiring the developers to submit a Written Scheme for Archaeological Investigation (WSI) and to implement the agreed works prior to/during development as appropriate. The WSI (CgMs 2017) covered the following issues:

- proper identification and evaluation of the extent, character and significance of archaeological remains within the site (by means of a targeted trial trench evaluation)
- An assessment of the impact of the proposed development on any archaeological remains identified in the evaluation phase
- Mitigation proposals for the preservation, or for the excavation and recording of archaeological remains, and for analysis and publication of the findings
- A timetable for completion of the archaeological fieldwork, and arrangements for monitoring the archaeological works.

2.4.3 These discussions were reflected in the wording and requirements of Condition 3(d) of the planning permission.

2.4.4 The WSI detailed proposals for the first phase of archaeological works, covering the targeted trial trench evaluation. The results of the trial trench evaluation were to be reviewed with Durham County Council's Senior Archaeology Officer and an assessment made of the development impact on any archaeological remains. Should further archaeological measures be indicated to be necessary, a mitigation strategy was to be prepared, in keeping with the provisions of the planning condition. This mitigation strategy was to be detailed in a separate specification or project design to be submitted for the planning authority's approval.

2.5 Archaeological and Historical Background

Much of this background is taken from the DBA prepared by CgMs Consulting, the research and writing of those authors is acknowledged.

Early Prehistoric (Mesolithic to Bronze Age)

2.5.1 There are no records relating to prehistoric heritage assets or surface finds of early prehistoric artefacts from the site itself.

2.5.2 The Durham HER records a small scatter of Mesolithic and early Neolithic flint finds reported to have come from Pitlington, to the south-east of the site (Durham HER H121); further Mesolithic flint finds are reported from the Pitlington Hill area further to the east.

Iron Age to Roman

- 2.5.1 A rectilinear ditched enclosure of possible Iron Age or Roman date has been recorded to the north-east of Field House Farm (Durham HER H399). The features are recorded as cropmarks visible on aerial photographs, and are described as forming a rectilinear ditched enclosure with an internal circular feature which may represent a hut circle. It is however noted that the Coal Authority maps a former mine entrance in this vicinity and it is conceivable that this may provide an alternative interpretation of the cropmark features.
- 2.5.2 Evidence of a further probable prehistoric enclosure is identified around 900m to the north of the study site at West Rainton (HER H379). As with the rectangular enclosure (HER 399) above, this has been recorded from aerial photographs and its dating and interpretation remain to be confirmed.
- 2.5.3 The site lies within a landscape which is known to have been densely occupied by agricultural settlements and extensively farmed during the Late Iron Age and early Roman period. Numerous rectilinear enclosures have been identified on aerial photographs across the region (Burgess 1984, 163; Petts and Gerrard 2006, 37). Several examples of small ditched settlements, thought to represent single household farmsteads, were excavated by George Jobey from the 1950s to 1980s. These investigations were generally conducted as 'rescue excavations' ahead of the destruction of the sites by development and with limited time and resources excavation focused on the ditch circuit and internal areas. More recent large-scale developer funded excavations in advance of housing schemes and opencast mining have revealed evidence for a wider range of settlement types and, in some cases, for extensive field systems associated with settlements (Proctor 2009; Hodgson *et al.* 2013). These form an important component of a settlement pattern with evidence pointing to occupation at various sites from as early as the late Bronze Age. The archaeological assessment of the aggregate-producing areas of the county, which the site lies on the eastern extent of, concluded that there is potential for Iron Age settlement sites to be situated practically anywhere in this area (Hewitt 2011, 62). The Pig Hill/Haswell area, c. 5km to the south-east of the site, typifies the character, extent and density of later prehistoric activity in this part of County Durham. Pig Hill, is the site of a later prehistoric settlement which has scheduled monument status (National Monument No. 34586; County Durham HER 45045). The site contains complex remains of a double-ditched or palisaded polygonal enclosure, with internal cropmarks which probably represent traces of later Iron Age settlement. Investigations undertaken ahead of the Cowpen Bewley to Warden Law Gas Pipeline revealed three separate Iron Age settlement sites in the Haswell area, at Pig Hill (beyond the scheduled site), Harehill Moor and High Haswell Farm (Robinson *et al.* 2004). Evidence for later prehistoric activity was also recorded at the site of High

Haswell Wind Farm. The broader area was, therefore, clearly a focus for complex multi-phase occupation and landscape management in later prehistory

- 2.5.4 No other sites or finds of Iron Age/Roman date are recorded within the 1km search area around the site. The presence of the Iron Age/Roman site at Hilltop Farm (H389) provides some evidence for activity in the general area.

Saxon/Early Medieval and Medieval

- 2.5.5 There are no HER records relating to Saxon/Early Medieval or medieval period finds or site within the study site.
- 2.5.6 The only monument of medieval date recorded within the search area is the village of Moorsley (Tyne & Wear HER ref 278), a settlement known to have existed from the 14th century onwards.
- 2.5.7 The place names 'Pittington' - farmstead of Pitta's people - and 'Rainton' - farm of Regna's people suggest Anglo-Saxon origins for both of these settlements. There is no other evidence for settlement in the vicinity of the study site itself, and early settlement may be in the area of the later medieval and Post-medieval villages.
- 2.5.8 The site is located some distance from the villages of Pittington and Rainton and settlement in this area is therefore unlikely. However it is probable that the area was used for agriculture during the medieval period.

Post-Medieval

- 2.5.9 There are no HER records relating to post-medieval finds or sites within the site. Seven records relate to features or monuments of post-medieval date in the search area: four small quarries and one coal shaft on the edge of limestone escarpment east of the study site (Tyne & Wear HER 3226-3229) which are recorded as existing features on mid-19th-century maps; the settlement of High Moorsley (Tyne & Wear HER 278); and re-used arches from Rainton Hall, now attached to West Rainton church (Durham HER H35825).
- 2.5.10 Antiquarian maps dating from the 17th century onwards illustrate settlement at Pittington, and at Rainton from at least the 18th century. However these maps were surveyed and drawn at a small scale and provide no detail on land-use or activity within the study site itself.
- 2.5.11 By the end of the medieval period, the coal industry was already important both regionally and nationally, with early coal extraction and mining focused in the middle Wear and lower Tyne areas (Petts and Gerrard 2006, 92). The importance and intensity of the industry increased through the post-medieval period. Coal mining in the Rainton area is recorded in documentary records from the 15th and 16th centuries onwards, and important archaeological evidence for early mining survives at Mallygill Woods, 1.2km west of the site, with extensive remains of drift, small scale

opencast and simple shaft mines surviving as visible earthworks. A number of 'old shafts' identified on mid-19th-century Ordnance Survey maps (discussed further in the next section) may provide evidence for areas of pre-19th-century coal mining within the site.

19th to 20th-century Colliery

- 2.5.12 The Durham and Tyne & Wear HERs identify 21 records relating to features of 19th/20th century date within the 1km search area around the study site; the majority relate to the coal industry or to branch railway lines. The records include a branch railway (Tyne & Wear HER 3217) running through the site itself to serve a coal pit (the Lady Seaham Pit) located in the southern end of the site.
- 2.5.13 Documentary sources confirm the increasing growth of the coal mining industry within the site and surrounding area. The earliest recorded mines in the surrounding area were Rainton Adventure and Woodside Pits, and the Leitch Pit, opened in the 1810s and 1820s (Dowding, 1972). By the 1830s these had been joined by the Alexandrina, Belmont and Lady Seaham Pits of the Pittington Colliery (Dowding 1972, DCRO 2001). Output from these collieries led to substantial growth and expansion of the villages of Pittington and West Rainton.
- 2.5.14 The development of the study site through the 19th and 20th centuries can be traced from historic maps held in Durham County Record Office and historic Ordnance Survey maps.
- 2.5.15 The earliest map examined which shows the study site in detail is the 1838 West Rainton Tithe Map (DRO ref D/Lo/P89/1): this map shows the site subdivided into a series of relatively narrow fields aligned northwest-southeast to follow the slope of the site. The field names recorded in the 1838 Tithe apportionment (D/Lo/P89/2) are generally simple topographic descriptions (eg. "Low Far Pasture", "Hill House Field"...), although the field directly southeast of Field House Farm is recorded as "Pit Field". This pattern of fields is shown in virtually unchanged form on the first edition Ordnance survey 'County Series' map, published in 1861, and remain substantially unaltered on subsequent maps until the 1990s.
- 2.5.16 Throughout the 19th and 20th centuries, the majority of the site remained in agricultural use, with only the southern part used for coal mining (the 19th century Lady Seaham Pit, and its associated branch railway line).
- 2.5.17 The historic Ordnance Survey map sequence and maps of the Alexandrina pit underground working between the 1830s and 1860s (Durham County Record Office ref D/Lo/P137-148) also allow identification of a number of pits, shafts and other features associated with the coal industry that are located within the site.
- 2.5.18 The Lady Seaham Pit was sunk in 1836, and is recorded as an active pit on the 1861 and 1898 Ordnance Survey maps (Figures 5 and 6). The maps show a large circular

spoil heap with pit buildings immediately north-west, and a branch railway running east and then north as 'Pittington Bank'. The subsequent map of 1923 shows the pit buildings as 'disused' and the railway branch line without track; the 1951 and later maps illustrate the spoil heap, but no buildings.

- 2.5.19 The 1861 map also identifies two further 'old shafts' in the fields north of the Lady Seaham Pit, one of which remains identified on the OS maps of 1923 and 1951, and is named as 'Greenwells Field Pit' on the map of underground working of the Five Quarter Seam at the Alexandrina Pit (D/Lo/P139).
- 2.5.20 This underground working map records the locations of two other earlier workings 'Letch pit' near the south-east edge of the study site, and Greenwells House Pit directly south of Field House Farm (it is noted that the latter pit lies within the field named "Pit Field" on the Tithe apportionment, and presumably accounts for the name).
- 2.5.21 The location of a pair of further 'old shafts' is noted on one of the other Alexandrina pit workings maps (D/Lo/P138) where they were intersected by the underground working. This map also identifies 'Old Staple', an area of 'old workings' further to the north.
- 2.5.22 Two further old 'mine entrances' are identified in the north part of the site on Coal Authority mapping, north-east of Field House Farm, approximately in the area where cropmark evidence for a rectangular enclosure and internal circular feature has been identified (HER 399). Although this monument is currently interpreted as a prehistoric or Roman settlement enclosure, it is conceivable that the features may be associated with an early mine shaft. The other lies further north-west, towards Robin Lane, and is possibly just outside the study site boundary.
- 2.5.23 The single track railway branch of the Rainton & Seaham Railway (Tyne & Wear HER 3217), is shown serving the Lady Seaham Pit on the 1861 and 1898 Ordnance Survey maps. The railway ran north through the site on an earthwork embankment, Pittington Bank, which remained a relict landscape feature after closure of the railway branch at the end of the 19th century.
- 2.5.24 A second branch railway line, serving Belmont Colliery to the south-west of the site, is shown on the 1856 and 1861 maps (Belmont Bank). This branch had been removed by the time of the 1896 map, and all traces of railway and embankment had disappeared by the time of the 1923 map.

3. PROJECT AIMS AND RESEARCH OBJECTIVES

3.1 Project Aims

3.1.1 The project aimed to fulfil the requirements of the local planning authority by undertaking an appropriately specified scheme of archaeological work. The primary aims of the current scheme for investigation were:

- to target the known archaeological features and test blank areas identified within the geophysical survey,
- to ensure that the presence, extent, level of significance and degree of preservation of surviving buried archaeological remains within the development site are reliably established,
- to allow agreement upon the need for and scope of any archaeological mitigation required for the development site.

3.2 Research Objectives

3.2.1 The archaeological work at provides opportunities to address key research objectives as set out in *Shared Visions: The North East Regional Research Framework for the Historic Environment* (NERRF) (Petts & Gerrard 2006). The NERRF highlights the importance of research as a vital element of development-led archaeological work. It set out key research priorities for all periods of the past so that all elements of commercial archaeological work can be related to wider regional and national priorities for the study of archaeology and the historic environment. This document has determined that there has been little archaeological excavation of 19th-century coal mining sites across the region (Petts and Gerrard 2006, 93).

3.2.2 The NERRF Research Agenda has been identified that information about collieries of this period is a *Gap in knowledge*:

Due to the dismantling of the coal industry, subsequent regeneration policies and an active political hostility to recording colliery remains, almost the entire stock of 19th- and 20th century colliery buildings has been destroyed (Petts and Gerrard 2006, 177).

3.2.3 The NERRF Research Strategy for the Post-Medieval Period has identified Key Research Themes which address a range of archaeological topics. Of relevance to this project is PMii Industrialisation and PMviii. Industrial intensification *The coal industry is perhaps the industry which most characterises the post-medieval period in the North-East, but little is known about the historic environment and archaeology of its earliest phases* (Petts and Gerrard 2006, 183).

3.2.4 The *Archaeological Assessment of County Durham* (Hewitt 2011), includes research agendas which the project had the potential to contribute to, specifically NT5:

Nineteenth- and twentieth-century industry and NT6: Transport infrastructure and technology.

- 3.2.5 The project also had the potential to address research agenda contained in *The Archaeology of Mining and Quarrying in England Research Framework* (Newman 2016). As with NERFF, this report highlights the scarcity of archaeological investigation of pithead structures and notes that there has been little work in Durham (Newman 2016, 90). Of relevance to this project is

Research Aim 39: *Improve our knowledge of the chronology, extractive techniques and social impact of the coal industry from the Roman period to the 20th century.*

4. ARCHAEOLOGICAL METHODOLOGY

4.1 Trial Trenching Evaluation

- 4.1.1 The fieldwork was undertaken in compliance with the codes and practice of the Chartered Institute for Archaeologists and the relevant CIfA standard and guidance document (CIfA 2014b). PCA is a CIfA 'Registered Organisation'. All fieldwork and post-excavation was also carried out in accordance with the *Yorkshire, the Humber & The North East: Regional Statement of Good Practice* (Yorkshire, The Humber and the North-East 2009). The work was carried out from the 8th May to the 13th of June 2017.
- 4.1.2 A total of 102 evaluation trenches were set-out using a Leica Viva Smart Rover Global Navigation Satellite System (GNSS), with pre-programmed co-ordinate data determined by an office-based CAD operative. Trench 8 was not investigated as it was located in an area that was to be retained and was removed from the final layout.
- 4.1.3 The trenches measured c. 50m x c. 2.2m; The alignments of Trenches 1, 2 and 87 were altered due to the presence of two runways on the northern and eastern sides of the site. Trenches 94, 96 and 100 were split in two to avoid the runway on the eastern side of the site. The final trench locations as investigated are shown on Figure 2.
- 4.1.4 The 102 evaluation trenches were divided into five phases (Figure 2) which were to be investigated sequentially following new surveys by an ecologist; 15 trenches in Phase 1 (Tr. 1–16); 17 trenches in Phase 2 (Tr. 17–33); 23 trenches in Phase 3 (Tr. 34–55); 30 trenches in Phase 4 (Tr. 56–85), and 18 trenches in Phase 5 (Tr. 86–103).
- 4.1.5 Ground level in the trenches was reduced using a tracked 360° 30-ton mechanical excavator utilising a wide blade, toothless ditching bucket. The machine excavated carefully through the topsoil until either the top of the first significant archaeological horizon or the top of the natural geological sub-stratum was reached. All ground reduction was carried out under archaeological supervision.
- 4.1.6 The investigation of archaeological levels was by hand, with cleaning, examination and recording both in plan and in section, where appropriate. Investigations within the trenches followed the normal principles of stratigraphic excavation and were conducted in accordance with the methodology set out in the field manual of PCA (PCA 2009) and the Museum of London *Site Manual* (Museum of London 1994).
- 4.1.7 Deposits and cut features were individually recorded on the *pro-forma* 'Trench Recording Sheet' and 'Context Recording Sheet'. All site records were marked with the unique-number 'Site Code' (FHQ 17). All archaeological features were excavated by hand tools and recorded in plan at 1:20 or in section at 1:10 using standard 'single context recording' methods. The height of all principal strata and features was

calculated in metres above Ordnance Datum (m AOD) and indicated on appropriate plans and sections. The structural remains were also surveyed by GPS.

- 4.1.8 A detailed photographic record of the evaluation was prepared using SLR cameras (35mm film black and white prints for archive purposes) and by digital photography. All detailed photographs included a legible graduated metric scale. The photographic record illustrated both in detail and general context archaeological exposures and specific features in all trenches. A selection of digital photographs is included as Appendix 2 to this report.

4.2 Post-Excavation

- 4.2.1 The stratigraphic data generated by the evaluation is represented by the written, drawn and photographic records. A total of 261 archaeological contexts were defined in the 102 excavated trenches. Post-excavation work involved checking and collating site records, grouping contexts and phasing the stratigraphic data. A written summary of the archaeological sequence was then compiled, as described in Section 5. A trench summary is included as Appendix 3 to this report.
- 4.2.2 This summary report has been prepared provide information on the structural remains of the pithead and associated infrastructure to inform a decision regarding further mitigation. For the purposes of this report the detailed plans of the structural remains have not been digitised and a simplified GPS plan of the features in Trench 21 has been included (Appendix 1; Figure 3). At the time of writing the sample plans and sections through the plough furrows and the sections of the trenches which contained elements of the railway (Trenches 23 and 24) have not been digitised.
- 4.2.3 No ecofactual material was recovered from the evaluation trenches. Twenty six brick samples were recovered from 18 contexts in Trench 21. At the time of writing these had not yet been assessed by a ceramic building material specialist.
- 4.2.4 At the time of writing the Site Archive was housed at the Northern Office of PCA, Unit N19a Tursdale Business Park, Durham, DH6 5PG. The complete archive (including all material generated electronically during post-excavation) will be packaged for long term curation. In preparing the Site Archive for deposition, all relevant standards and guidelines documents referenced in the Archaeological Archives Forum guidelines document (Brown 2007) will be adhered to, in particular a well-established United Kingdom Institute for Conservation (UKIC) document (Walker, UKIC 1990) and the most recent ClfA publication relating to archiving (ClfA 2014b). When complete, the Site Archive will be deposited with the relevant museum, under the site code FHQ 17. The Site Archive will be organised as to be compatible with the other archaeological archives produced in the county. A completed transfer of title deed will accompany the Site Archive on deposition.

5. EVALUATION RESULTS: THE ARCHAEOLOGICAL SEQUENCE

During the evaluation, separate stratigraphic entities were assigned unique and individual 'context' numbers, which are indicated in the following text as, for example [123]. The archaeological sequence is described by placing stratigraphic sequences within broad phases, assigned on a site-wide basis in this case. An attempt has been made to add interpretation to the data, and correlate these phases with recognised historical and geological periods.

5.1 Phase 1: Natural Sub-stratum

5.1.1 Phase 1 represents the natural geological material exposed within all 102 trenches which generally comprised firm brownish orange and yellowish brown clay (Plate 1).

5.1.2 The maximum and minimum height of the upper interfaces of natural sub-stratum was 100.87m aOD in Trench 7 in the northern part of the site and 79.85m aOD in Trench 25 in the southern part of the site.

5.1.3 The depth at which natural clay was encountered below existing ground level varied across the site and was dependant on the presence of subsoil and modern dumped deposits. Where only topsoil was encountered, the natural sub-stratum was encountered at maximum and minimum depths below ground level of 0.46m in Trench 43 in the western part of the site and 0.25m in Trench 52 in the north-western part. In trenches where subsoil or modern dumping deposits were present (Trenches 3, 7, 11, 19 – 27, 30, 31, 34, 37, 44, 48, 49, 57, 64, 73, 74, 86, 88, 89, 98, 100 and 101), the natural sub-stratum was encountered at maximum and minimum depths below ground level of 0.75m in Trench 19 and 0.36m in Trench 92, respectively.

5.2 Phase 2: Subsoil

5.2.1 Subsoil directly overlying the natural-substratum was recorded in 31 trenches; Trenches 3, 7, 11, 34, 37, 48, 49, 57, 64, 86, 88, 89 & 98 in the northern half of the site and Trenches 19–27, 30, 31, 44, 73, 74, 100 & 101 in the southern half of the site. The subsoil comprised mid brown silty sand with a maximum thickness of 0.45m in Trench 86 and a minimum thickness of 0.10m in Trenches 92 and 101.

5.3 Phase 3: Undated Furrows

5.3.1 An extensive, regular arrangement of roughly northwest–southeast aligned furrows was recorded across the site in Trenches 2, 12 - 17, 19, 20, 22, 24, 26, 29, 30, 32, 34 – 43, 50, 53 – 62, 64, 66, 67, 69 – 71, 73, 76, 77, 81, 85, 87, 89, 94, 96 & 97 (see Figure 2). The furrows varied in size with the largest measuring c. 3.90m in width and the smallest measuring c. 0.94m in width. The furrows had a shallow U-shaped profile and a sample excavation across furrows in a selection of trenches confirmed surviving depths between 0.09m and 0.23m.

Trench	Furrow Context	Depth	Illustration
Trench 16	[163]	0.10m	Plate 2
Trench 18	[183]	0.11m	
Trench 34	[343]	0.09m	
Trench 56	[565]	0.23m	
Trench 97	[9707]	0.12m	

5.3.2 All the furrows contained similar firm mid greyish brown silty clay fills from which no datable artefactual material was recovered. The width and spacing of c. 7-8m apart, measuring from mid points, are typical of that expected for a 'broad' ridge and furrow agricultural system of the medieval period and it is likely the furrows recorded across the site are medieval in date.

5.4 Phase 4: 19th-century Colliery Activity

5.4.1 Phase 4 represents 19th-century colliery activity at the site comprising the remains of pithead structures and associated railway lines of the Lady Seaham Pit. The pit was sunk in 1836 and can be seen as an active pit on Ordnance Survey maps of 1861 and 1898 (see Figures 5 and 6). These show a large circular spoil heap with pit buildings immediately north-west, and a branch railway running east as the 'Rainton and Seaham Railway, Lady Seaham Branch' and then northwards. The map of 1923 shows the pit buildings as 'disused' and the railway branch line without track. Archaeological features and structures encountered in the southern part of the site associated with the 19th-century colliery have been assigned to Phase 4 activity for the purposes of this phase of archaeological work and summary report. It is however evident from mapping evidence that extensive rebuilding of the pithead structures had taken place between the 1861 and 1898 Ordnance Survey maps and further investigation and analysis of the structural remains may allow refining of the phasing of structural remains at the site.

- 5.4.2 Trench 20: A rectangular structure [205] constructed with handmade bricks, with external dimensions of 3.30m x 2m and internal dimensions of 2.60m x 1.40m, was recorded at the northern end of Trench 20 (Figures 4–6; Plate 3). This may represent an infilled airshaft or vent; a structure at this location can be seen on the 1861 map. A substantial feature [209] infilled with colliery waste was located in the centre and western end of the trench extending across the width of the trench for a distance of 17.80m NW-SE (Figures 4–6; Plate 4). Sample excavation by machine revealed a vertical-sided cut 1.30m deep and a stone feature [2003], probably a culvert, was observed along the base at its western edge (Plate 5). Further investigation was not possible due to the instability of the loose material which infilled the cut and the feature was backfilled after being recorded from the top of excavation. A large square feature is depicted on the 1861 map in this location and this correlates to the excavated feature and to a large anomaly identified on the geophysical survey (Figure 4). It is possible that this feature may be a water tank to hold water pumped from the mine.
- 5.4.3 Trench 21: The well-preserved remains of pithead structures were recorded across Trench 21. The southern end of the trench and an area towards the northern end of the trench were extended to further expose the remains. The structures continued to the west, east and south-east beyond the limits of excavation.
- 5.4.4 A substantial circular stone structure [2131] was recorded towards the northern end of Trench 21 (Figure 3; Plates 6 and 7). This had c. 0.80m-thick walls, external diameter of 4.20m (13ft 9 inch) and internal diameter of 2.88m (9ft 5 inch); the material infilling the structure was not excavated. This appeared to be a backfilled mineshaft. Enclosing the shaft to the north were two 0.87m-wide brick and stone walls which extended to the north-west [2130] and south-east [2129] for a total distance of c. 7m. To the south, at the eastern edge of the shaft were elements of brick walls [2127] and [2128] and to the west walls [2126] and [2139] forming two L-shaped structures which may have formed part of an entrance into the mineshaft. A building in this location is shown on the 1861 Ordnance Survey map (Figure 5) and it is possible that these structural remains formed part of the earliest phase of colliery.
- 5.4.5 Another probable infilled mineshaft was partially exposed a short distance to the east of [2131]. This comprised the north-west quadrant of a circular stone structure [2192] with 0.60m thick walls which extended beyond the limits of excavation to the east (Figure 3; Plate 8). The visible external dimensions were 2.50m east-west and c. 2.40m north-south. At the southern end of the circular element was a NE-SW aligned wall [2190], exposed for a distance of 3m and continuing to the south beyond the limits of excavation.
- 5.4.6 A group of linear features [2203], [2196], [2200], 0.70–0.90m wide and set at right angles to each other, was located to the west of the infilled mineshafts. Sample

excavation revealed these to be shallow cuts. The relationship between these features and the structural remains was not established within the exposed area.

- 5.4.7 The western end of a square sandstone structure [2188] was partially exposed c. 5m to the south of the mineshafts (Figure 3; Plate 9). This measured 5m NE-SW with returns at each end running south-east, exposed for a distance of c. 2m, to form the corner of the structure. Two courses of wall up to 0.60m wide built with roughly hewn blocks and randomly coursed were exposed.
- 5.4.8 At the southern end of the trench a complex of structures, walls and floor surfaces was exposed over an area which measured 17m NW-SE by 15m NE-SW, continuing beyond the edges of excavation to the west, east, north-east and south-east (Figure 3; Plate 10). Map evidence demonstrates that the structural remains exposed formed part of the southern end of a large irregular-shaped structure shown on the 1898 map which measured a maximum of 35m NE-SW by 22m NW-SE (Figure 6).
- 5.4.9 The structures were covered by a demolition layer [2115]; most of the deposit overlying the walls was excavated to expose the lines of the walls. Sample excavation of the demolition material between the walls revealed well-preserved brick floor surfaces and exposed some relationships between features.
- 5.4.10 The building was evidently divided into a series of rooms defined by brick walls. At the western side of the structure was a large rectangular room defined by walls [2164], [2166], [2113] and [2178] (Figure 3). This had external dimensions of 12m NE-SW by 7m NW-SE and internal dimensions of 11m x 6.50m. All of the walls were brick built and c. 0.37m wide with the exception of wall [2178] which formed the northern side of the room; this was up to 0.70m wide and comprised a stone wall with an overlying course of bricks. It is possible that this stone wall comprised part of an earlier phase of building at this location. Towards the eastern side of the room, and running parallel to the room, wall [2111] may have formed part of an internal division. In the south-east corner of the room was a rectangular brick plinth [2104] which measured 2.46m x 1.20m x 0.80m maximum exposed height (Plate 11). An opening through this structure was visible in the south-east corner and the presence of iron fittings on the top of the structure suggests that it may have been a machine base. To the west and also internal to the room was another brick structure [2103] which measured 6.20m x 1.40m x 0.45m maximum exposed height (Plate 12). Fittings on top of this suggested a similar function.
- 5.4.11 Adjacent to the large room to the south-west was a narrow area defined by walls [2170] and [2168] which measured 6.40m x 1.40m internally. Wall [2170] which formed the north-west corner was of noticeably different construction; this was a wide, stone-built wall (Plate 13). As with wall foundation [2178] to the north, it is possible that this was part of an earlier structure.

- 5.4.12 Attached to the large room to the east was a series of walls which defined rooms of various dimensions and shapes, including a long narrow corridor with brick floor [2114] which measured 1m wide internally (Plate 14). Brick floor [2153] was exposed for distance of 3m x 3m and [2163] for 6m x 2m, continuing beyond the limits of excavation.
- 5.4.13 In the south-western corner of Trench 21, brick walls [2175] and [2176] may have formed part of a staircase (Plate 15). A semi-circular brick wall [2172] was partially exposed in the near vicinity along with a stone and brick wall [2170] (see Plate 13).
- 5.4.14 Features and deposits associated with the branch railway line leading to Lady Seaham pit, as shown on the 1861 and 1898 Ordnance Survey maps, were recorded in Trenches 23 and 24. In Trench 23, located 90m to the east of the pithead structures in Trench 21, three east-west aligned linear features were recorded in section, truncating the natural sub-soil. The southernmost element [234] was 1.56m wide, 0.3m deep and had vertical sides (Plate 16). It may represent a boundary delimiting the wayleave of the railway. At a distance of c. 9m to the north, feature [236] was more irregular in profile which measured a maximum of 1.80m wide and 0.18m deep. This may represent the position of dismantled tracks. The northernmost linear feature [238], located 3.20m to the north of [236], had a U-shaped profile and was 1.80m wide and 0.28m deep (Plate 17). This may represent a drainage ditch delineating the northern side of the track.
- 5.4.15 Deposits which formed part of the railway embankment were recorded along the south-eastern part of Trench 24, located c. 40m to the east of Trench 23, for a distance of c. 20m. Deposits of coal, burnt clay, clinker and industrial waste formed the ballast deposits for the embankment which had a maximum expose thickness of 0.60m.
- 5.4.16 In Trench 80, located c. 250m to the north of the pithead, a large circular pit containing clinker, coal waste and brick fragments was recorded in the southern end of the trench (Plate 18). The maximum recorded dimension within the limit of the trench was 4.70m and the maximum excavated depth was 0.40m. It is possible that this represents a backfilled mineshaft, although research carried out for the DBA did identify a shaft in this particular location and there was no indication of a stone or brick lining within the upper excavated part of this feature.
- 5.4.17 In Trench 88, located in the north-western part of the development site, a 0.40m wide stone culvert [884] ran across the width of the trench on a NW-SE alignment
- 5.4.18 In Trench 9, located in the northern part of the site, part of a substantial ash/ rubble filled feature [92] was exposed at the south-east extent of the trench.

5.5 Phase 5 Modern Agricultural Activity

- 5.5.1 Topsoil, which was on average 0.40m thick across the site, comprised dark greyish brown sandy silt. The maximum and minimum height for the ground surface was recorded at 101.48 aOD at the northern end of the site (Trench 56) and a minimum of 80.37m aOD in the southern end of the site (Trench 25).

6. DISCUSSION AND RECOMMENDATIONS

6.1 Discussion

- 6.1.1 No archaeological features of significance were recorded across the majority of the investigated area.
- 6.1.2 Traces of medieval furrows were recorded in Trenches 2, 12–17, 19, 20, 22, 24, 26, 29, 30, 32, 34–43, 50, 53–62, 64, 66, 67, 69–71, 73, 76, 77, 81, 85, 87, 89, 94, 96 & 97. These were aligned NW-SE and this extensive system of furrows was identified by geophysical survey across most areas of the site. The width and spacing of the furrows, c. 7-8m apart, are typical of that expected for a 'broad' ridge and furrow agricultural system of the medieval period. The site was located between the medieval settlements of Pittington and Rainton and was evidently used as agricultural land associated with either or both of these settlements. Continual ploughing of the site in the post-medieval period and modern times has evidently removed all traces of upstanding ridge and furrow earthworks, leaving just the bases of furrows visible as 'cut' features in the natural sub-stratum which were detected by geophysical survey.
- 6.1.3 Archaeological remains representing the below-ground structural remains of 19th-century pithead buildings and associated features were encountered in the southern part of the proposed extraction site. The structural remains were very well-preserved and extended across a wide area, encountered at depths of between 0.20m and 0.55m below present ground level.
- 6.1.4 The Lady Seaham pit was sunk in 1836 and the 1861 Ordnance Survey depicts in detail pithead structures and associated features and infrastructure. The pithead was rebuilt sometime between the 1861 and 1898 maps as the later map shows a very different layout. Correlation of the archaeological remains with historic mapping and geophysical survey has demonstrated that structures and features associated with both phases of pithead survive at the site.
- 6.1.5 Archaeological remains from the earliest phase of activity of the Lady Seaham Pit, as depicted on the 1861 Ordnance survey map, were recorded in the Trench 20. The substantial vertical-sided pit with stone culvert at the base forms part of a large structure, c. 18m square, shown on the 1861 map. This feature was also detected as an anomaly by geophysical survey. The form of the feature and its depiction on the map (it is not shown as a building) indicates that this is likely to be a water tank to contain water pumped from the mine. Water had to be pumped to the surface in mines where it was not possible to drain water via underground channels (Palmer *et al.* 2012, 129). The stone culvert recorded in the base of the tank would have drained the water away from the pithead. The map shows a narrow linear feature extending north-west from a building to the south-east of the tank, then turning at a right angle to run towards it. This presumably represents a culvert or pipe to carry water pumped

from the pit into the tank. Part of this feature was detected by geophysical survey as a narrow NW-SEW aligned anomaly. By the time of the 1898 map, the tank and building complex to the south-east were no longer in existence.

- 6.1.6 Secure phasing of the complex archaeological remains encountered across Trench 21 has not been possible with the evidence recovered during the evaluation of this area. However, the map evidence suggests that the archaeological features encountered at the northern end of the trench may be associated with the earliest phase of activity as shown on the 1861 map. A group of NW-SE and NE-SW aligned shallow linear features at the western side of the trench are on the same alignment as the pithead structures shown in this area on the 1861 map. Overlay of historic mapping shows that the two circular stone infilled mine shafts were situated at the northern end of a rectangular structure shown on the 1861 map. This building measures c. 20m NE-SW x 12m NW-SE. The fully exposed shaft had an internal diameter of 2.88m (9ft 5 inches) and elements of walls on the northern and southern sides presumably supported the timber props for the 'headgear', the winding mechanism, and on the southern side also formed an entrance. Early timber-lined shafts would be either square or rectangular and later circular shafts were lined with stone or brick and many were less than 3m (10ft) in diameter (Newman 2016, 99). Double shafts were used as safety measure so that in the event of collapse there would be another exit route; by the 19th century single shaft pits were uncommon (Griffin 1971, 29).
- 6.1.7 To the east of the shafts, elements of the Lady Seaham Branch of the Rainton and Seaham Railway were recorded within Trenches 23 and 24. In Trench 23 three linear features may have variously represented boundary and drainage ditches as well as perhaps the location of removed rails. The thick deposits of ballast encountered in Trench 24 were presumably necessary due to the topography in this area. This railway transported the coal out of the colliery down to staithes at Seaham harbour. Historic maps show the railway running eastwards out of the pithead complex then curving to run north. The 1861 map shows the railway line as a single track branching into three tracks close to the pithead, a short distance to the west of Trench 23.
- 6.1.8 The 1861 map shows the pithead as a group of three rectangular structures of various sizes in the earliest phase of activity at the Lady Seaham pithead. The two structures situated to the west of the largest one may be engine and boiler houses and geophysical anomalies in this area indicate the presence of the structural remains of these buildings. One of the railway tracks runs through the southern end of the largest structure, and continues beyond to the north-west, running parallel with another track. The 1856 Ordnance Survey 25 inch series shows the word 'Wheel' at the point where the tracks terminate in the north-west adjacent to the edge of the road, at the current site boundary. The map shows a large square structure with a

projection on the northern side at a distance of c. 25m north of the 'wheel'; traces of rubble in the field in the vicinity may represent demolition debris from this building. To the south-east of the water tank the 1861 map shows two small narrow structures of uncertain function.

- 6.1.9 Considerable rebuilding of the pithead took place sometime between the 1861 and 1898 Ordnance Survey maps with the three smaller buildings replaced by a single larger structure of irregular shape which measured a maximum of 35m NE-SW by 22m NW-SE. The well-preserved remains of this structure were encountered in the southern end of Trench 21 across an area which measured 17m NW-SE by 15m NE-SW, continuing beyond the edges of excavation. The building was evidently divided into rooms and corridors internally and walls, floor surfaces and probable machine bases were identified.
- 6.1.10 The rebuilding of the pithead may have been instigated by changes in technology. From the 18th century onwards, steam-powered engines were used to haul coal and water up the shafts (Palmer *et al.* 2012, 129). The introduction of Newcomen's engine in 1712 meant that substantial engine houses were constructed at many coal pits (Newman 2016, 102). These early engine houses had the rocking beam located on the top floor and were taller and narrower than later types of engine houses as the boiler was located beneath the cylinder, rather than separately housed. The introduction of rotary engines by James Watt in the mid-18th-century brought steam-powered winding to the coal industry, which was a much more fuel efficient system (Palmer *et al.* 2012, 129). Later engine houses usually had the winding drum mounted above the cylinder, resulting in a tall engine house and headstock. In some collieries, the beam engine was replaced by horizontal engines in the 19th century; these often had twin cylinders and were housed in tall single-storey buildings (Palmer *et al.* 2012, 129). At sites such as Lady Seaham Pit where the engine house has been demolished, there is good potential that the massive foundations for the engine will survive (Newman 2016, 102).
- 6.1.11 Steam engines required a boiler house, the size of which would be dependent on the size of the engine. Early engines used haystack boilers but in the early 19th century the Cornish boiler was developed which was cylindrical with a single fire tube and suitable for small pumping engines (Newman 2016, 102). The Lancashire boiler introduced in 1844 had double fire tubes and was therefore of larger capacity. Boiler houses tended to be of relatively lightweight construction, so that the boiler could be replaced, and the chimney is the most likely element to survive, along with the masonry seating's for the boiler and drains (Newman 2016, 102).

6.2 Recommendations

6.2.1 The evaluation has established that no archaeological remains of significance are present within the majority of the investigated areas and, with the exception of the southern end of the site; no further archaeological mitigation is required.

6.2.2 The archaeological remains of the 19th-century colliery located in the southern part of the site are considered to be of regional significance. As stated in the NERFF:

Despite the importance of the region's industrial past, both as a force shaping local society and as a national and international technological innovator, there are still many notable lacunae in our knowledge, the most surprising being our understanding of the coal industry. Due to the dismantling of the coal industry, subsequent regeneration policies and an active political hostility to recording colliery remains, almost the entire stock of 19th- and 20th century colliery buildings has been destroyed, even down to the landscaping of associated spoil heaps. We are left in the paradoxical position of knowing more about the material remains of the earlier phases of the coal industry than the later ones, though there has been relatively little excavation work overall. (Petts and Gerrard 2006, 177).

The project will also address research agenda contained in *The Archaeology of Mining and Quarrying in England Research Framework* (Newman 2016). As with NERFF, this report highlights the scarcity of archaeological investigation of pithead structures and notes that there has been little work in Durham (Newman 2016, 90). Of relevance to this project is

Research Aim 39: *Improve our knowledge of the chronology, extractive techniques and social impact of the coal industry from the Roman period to the 20th century.*

6.2.3 Further archaeological mitigation in the form of a strip, map and record exercise will be required to preserve the archaeological remains by record prior to the proposed development. A post-excavation assessment report will be produced and it is anticipated that the results of the investigations will be published in the *Durham Archaeological Journal*.

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8. ACKNOWLEDGEMENTS AND CREDITS

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PCA Credits

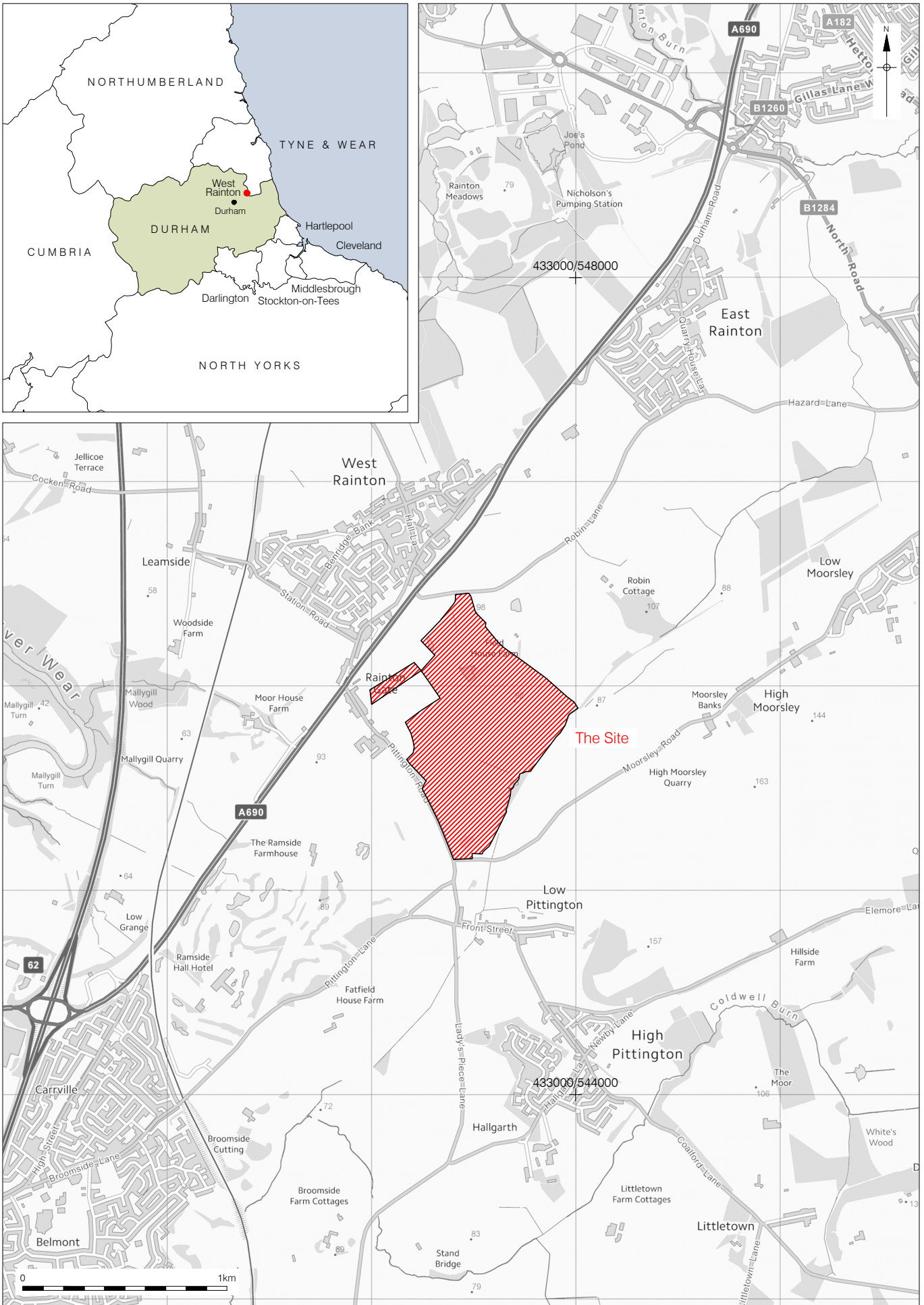
Project Manager: Jennifer Proctor

Fieldwork: Mike McElligott (Site Supervisor), Eva M. González Suárez, Aaron Goode, James Hopper, Danni-Louise Parker, Derek Moscrop, Robert Scott and Scott Vance .

Report: Mike McElligott and Jennifer Proctor

Illustrations: Josephine Brown and Tilia Cammegh

APPENDIX 1
FIGURES

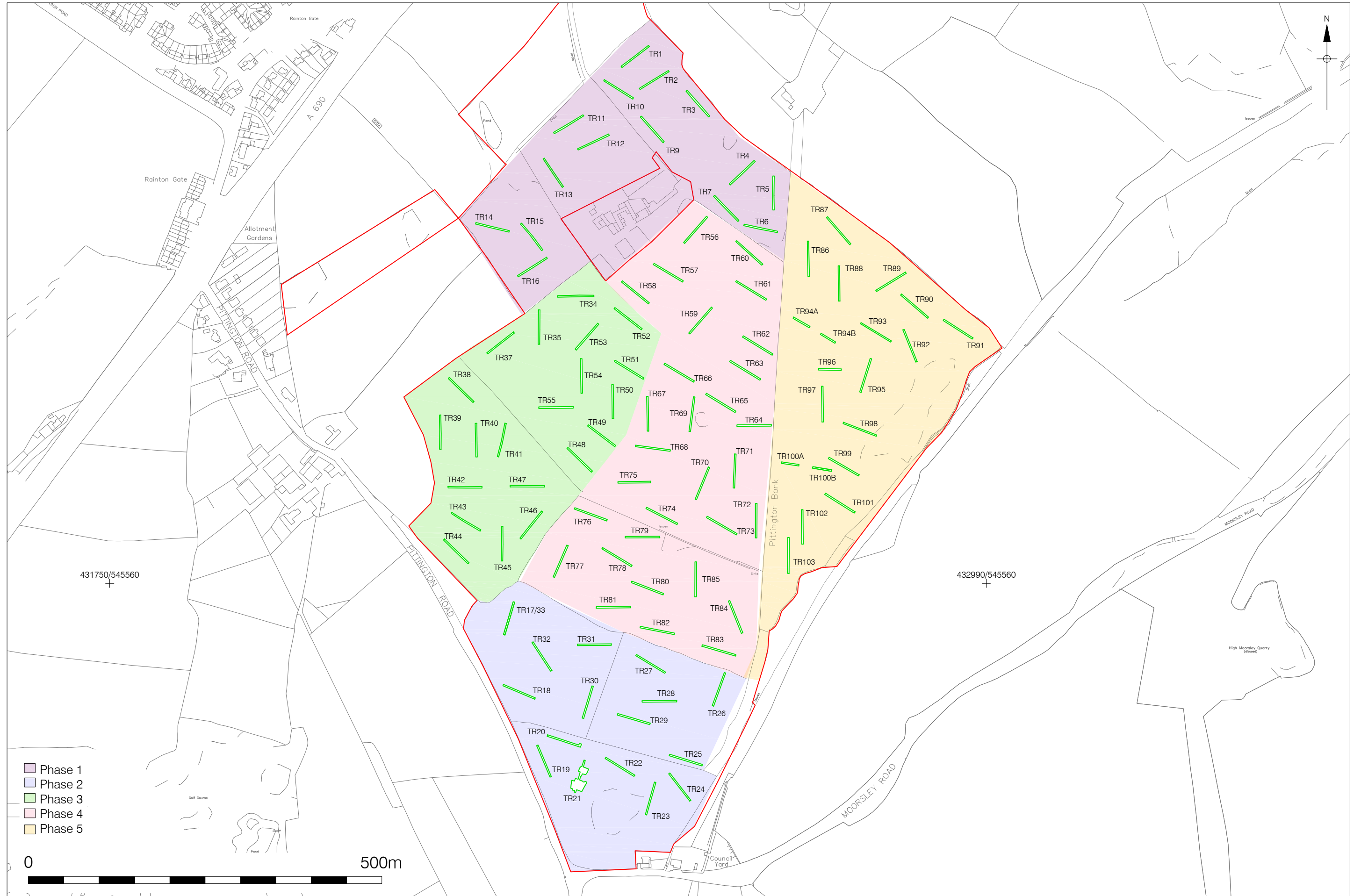


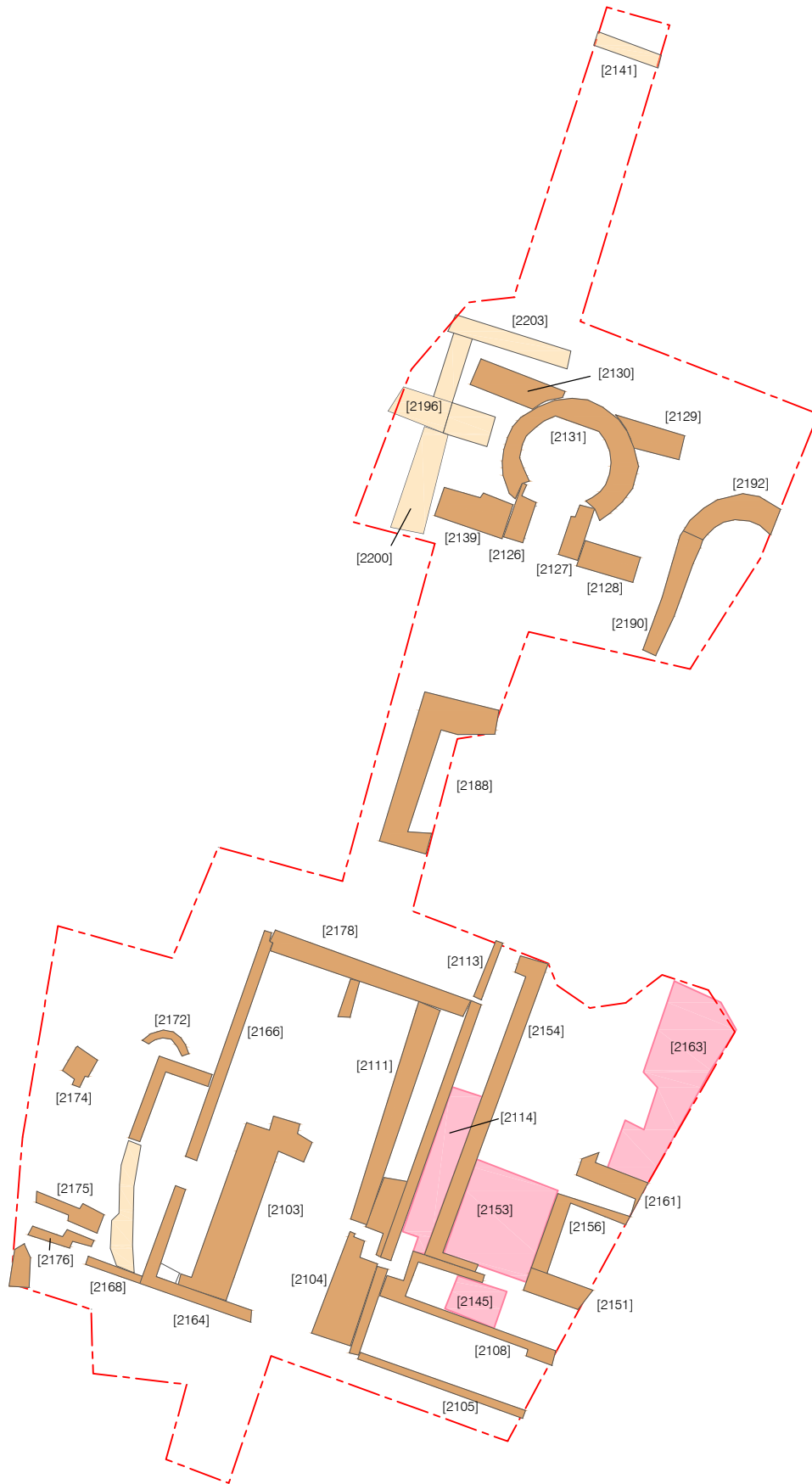
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19/06/17 TC

Figure 1
Site Location
1:2,000,000 & 1:25,000 at A4



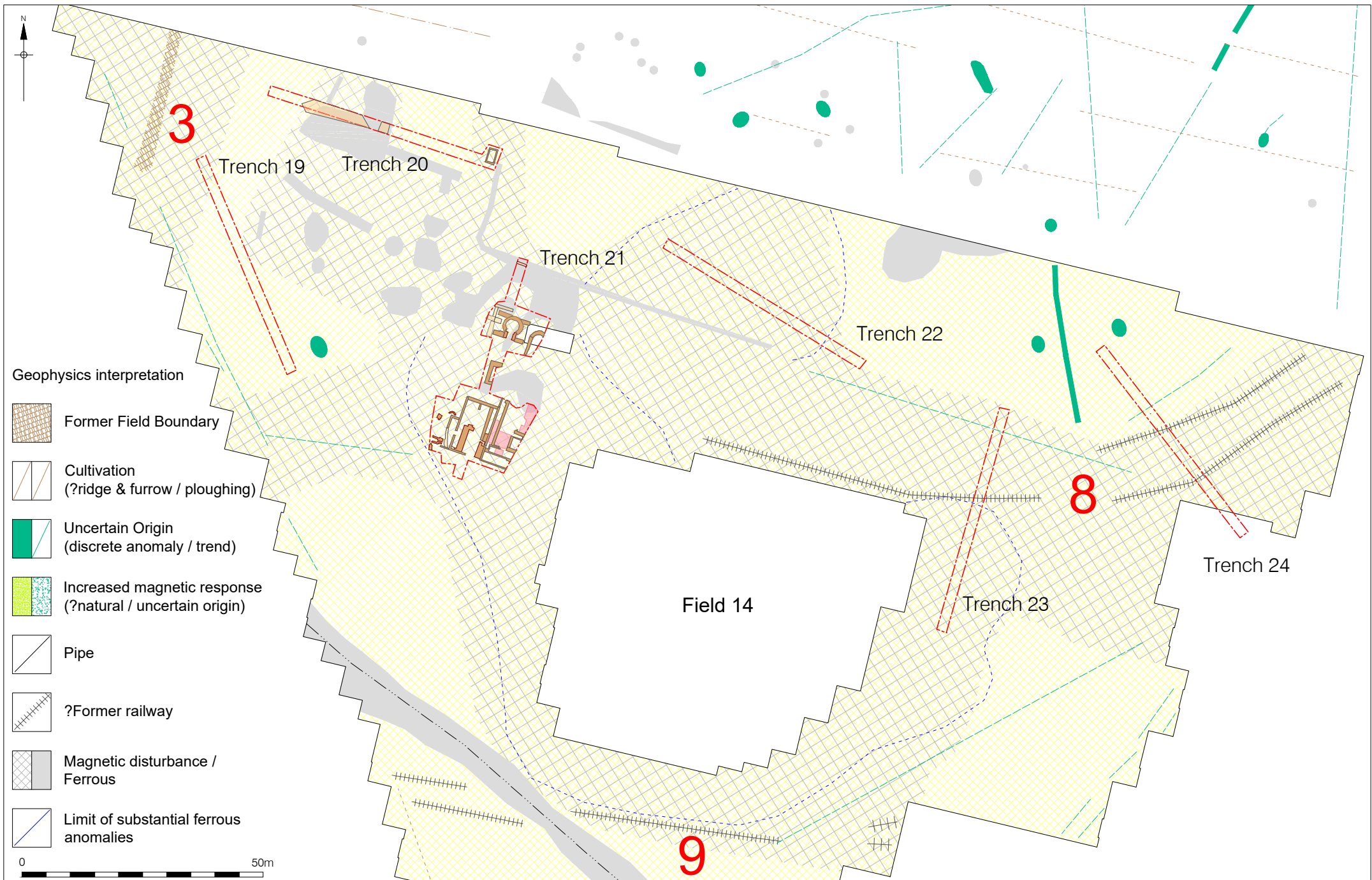


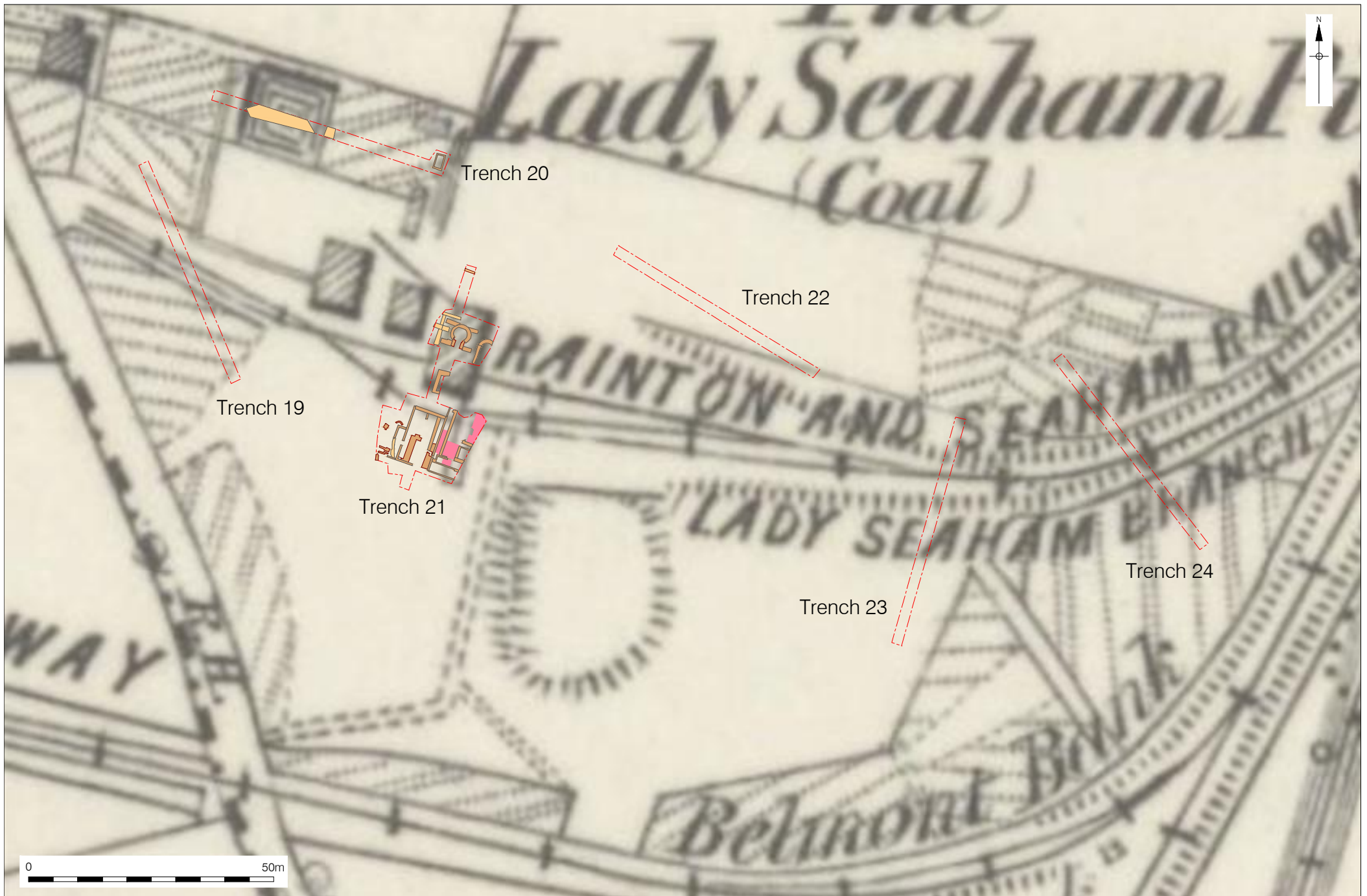
-  masonry wall
-  floor surface
-  other feature

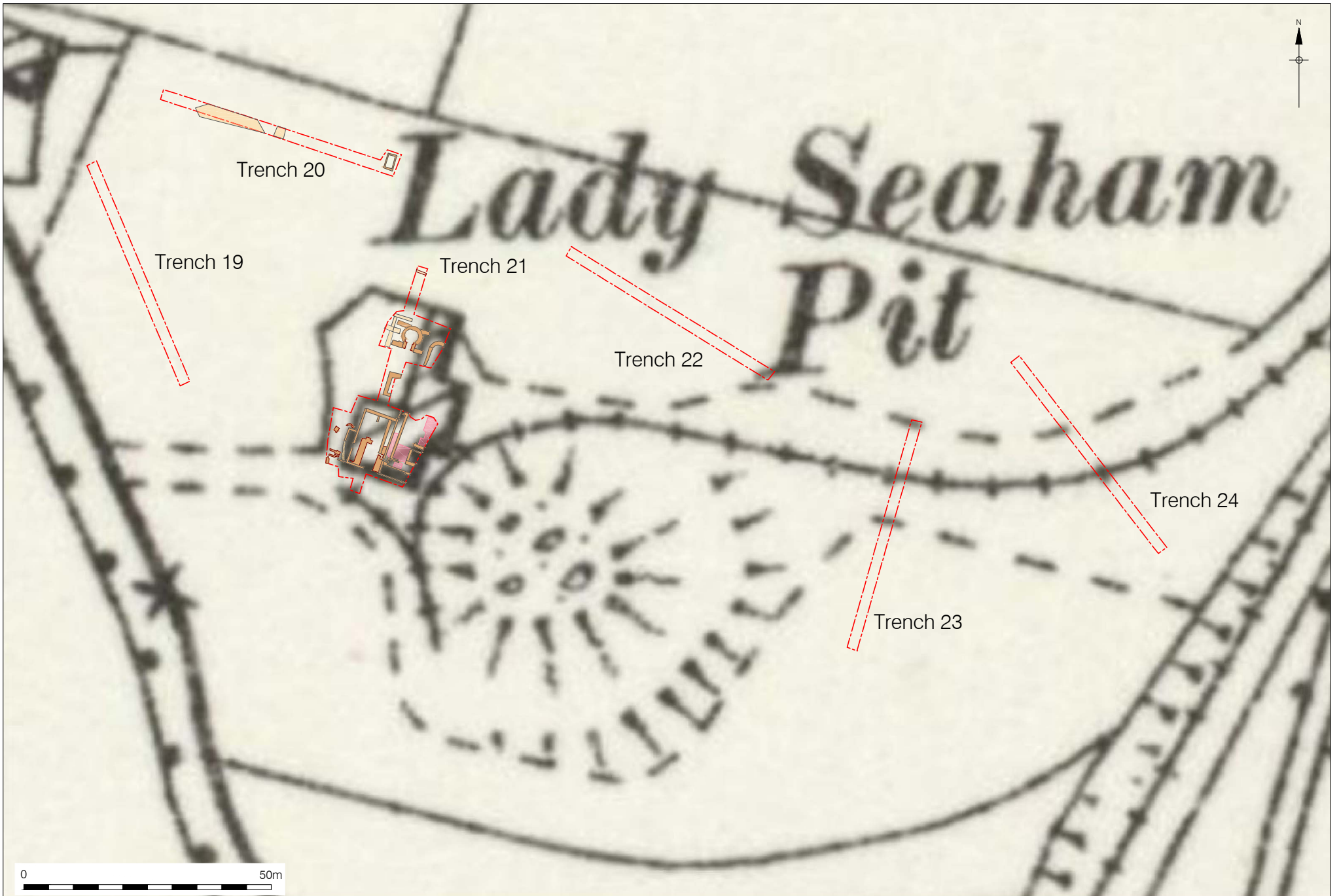
0 10m

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Figure 3
Plan of Trench 21
1:200 at A4







APPENDIX 2
PLATES



Plate 1. Trench 63, example of geological sub-stratum, looking north-west, 1m scale



Plate 2. Trench 16, sample section of furrow [163], looking north-west, 1m scale



Plate 3. Trench 20, structure [205], possible infilled airshaft, looking south-east, 1m and 2m scale



Plate 4. Trench 20, infill of possible drainage tank [209], looking south-east, 1m scale



Plate 5. Trench 20, partial excavation of water tank [209] with stone culvert [2003] along western edge, looking north-west, 2m scale



Plate 6. Trench 21, pithead structures including shaft [2131] within northern extension, looking south-east, 2m scale



Plate 7. Trench 21, pithead structures including infilled shaft [2131] within northern extension, looking south-west, 2m scale



Plate 8. Trench 21, possible infilled shaft [2192] and wall [2190] within northern extension, looking south, 2m scale



Plate 9. Trench 21, structure [2188], looking north-east, 1m scale



Plate 10. Trench 21, pithead structures in southern extension, looking south-east, 2m scale



Plate 11. Trench 21, possible machine base [2104], looking south, 1m scale



Plate 12. Trench 21, possible machine base [2103], looking north-east, 1m scale



Plate 13. Trench 21, pithead structures with stone wall [2170], looking south-east, 2m scale



Plate 14. Trench 21, pithead structures with brick corridor, floor [2114], looking south-west, 1m scale



Plate 15. Trench 21, pithead structure, walls [2175] and [2176], looking south-west, 1m scale



Plate 16. Trench 23, railway boundary feature [234], looking west, 1m scale



Plate 17. Trench 23, railway boundary feature [238], looking west, 1m scale



Plate 18. Trench 80, feature [802], looking north-east, 2m scale



Plate 19. Trench 88, culvert [884], looking south-west, 2m scale

APPENDIX 3
TRENCH SUMMARY

FHQ 17: TRENCH SUMMARY

Trench	Context	Natural		Context	Subsoil			Context	Ploughsoil			Notes
		highest	lowest		highest	lowest	thickness		highest	lowest	thickness	
1	11	97.94	97.62					10	98.27	97.98	0.32m	Empty trench
2	21	100.02	99.48					20	100.35	99.88	0.31m	2 furrows (1.1m and 1.75m wide)
3	32	100.68	100.47	31	100.59	100.62	0.20m	30	100.87	100.8	0.28m	1 ceramic field drain (0.16m wide)
4	41	100.35	99.63					40	100.71	99.9	0.26m	1 ceramic field drain (0.2m wide)
5	51	97.53	95.73					50	97.79	95.96	0.30m	2 field drains (0.22m and 0.16m wide)
6	61	96.89	95.67					60	97.16	94.25	0.30m	1 field drain (0.22m wide)
7	72	100.87	97.93	71	99.3	97.37	0.17m	70	101.24	97.61	0.24m	1 field drain (0.21m wide)
8												Trench omitted from final layout
9	91	100.47	99.68					90	100.79	100.55	0.38m	Dump layer at southern end of the trench (9.3m long by 0.5m thick)
10	101	99.48	97.14					100	99.97	97.65	0.33m	2 field drains (both 0.34m wide)
11	112	97.17	96.57	111	97.26	97.22	0.27m	110	97.56	97.52	0.30m	1 field drain (0.2m wide)
12	121	99.19	98.34					120	100.57	99.44	0.32m	7 furrows (0.9m - 2.4m wide); 2 field drains (0.3m and 0.34m wide)
13	131	100.66	98.27					130	101.02	98.65	0.29m	1 furrow (1.2m wide)
14	141	99.5	98.59					140	99.88	98.89	0.38m	5 furrows (1.6m - 2.4m wide); 3 field drains (all 0.18m wide)
15	151	99.65	99.54					150	100	99.8	0.29m	2 furrows (1.8m wide); 3 field drains (0.20m - 0.21m)
16	161	99.82	98.51					160	100.23	98.73	0.28m	8 furrows (0.7m - 2.1m wide); 1 field drain (0.25m wide)
17	171	93.63	91.69					170	94.13	91.88	0.30m	3 furrows (0.9m - 1.2m wide); 1 field drain (0.3m wide)
18	181	88.92	88.74					180	89.48	89.3	0.41m	3 shallow linear features (0.5m - 1m wide); 1 furrow (c.1.2m wide); 1 land drain (0.2m wide)
19	192	87.65	86.58	191	86.91	86.41	0.29m	190	88.37	86.87	0.46m	2 furrows (both 1.2m wide); 1 field drain (0.2m wide)
20	202	88.03	86.65	201	87.26	86.82	0.27m	200	88.41	87.07	0.25m	Backfilled brick mine shaft/vent, substantial square pit with stone culvert at the base; 1 furrow (2.04m wide)
21	2102	85.91	85.57	2101	86.66	86.32	0.25m	2100	86.87	86.33	0.30m	Several 19th-century colliery structures including a backfilled mine shaft; 4 associated postholes; 3 linear features
22	222	86.08	84.54	221	86.05	85.68	0.09m	220	86.51	85.05	0.46m	2 furrows (1.1m and 1.9m wide) and 1 field drain (0.2m wide) and a reddish sandy clay deposit (0.15m thick)

FHQ 17: TRENCH SUMMARY

Trench	Context	Natural highest	lowest	Context	Subsoil highest	lowest	thickness	Context	Ploughsoil highest	lowest	thickness	Notes
23	232	83.02	81.83	231	83.26	81.86	0.22m	230	83.63	82.23	0.37m	3 shallow linear features probably associated with the colliery railway and 2 land drains (0.19m wide)
24	242	82.24	79.1	241	82.5	79.5	0.26m	240	82.86	79.86	0.36m	Ballast deposits associated with railway line; 1 linear feature; 2 furrows (1.6m and 4.2m wide)
25	252	82.86	79.85	251	82.9	80.03	0.21m	250	83.24	80.37	0.34m	1 linear feature (1m wide)
26	262	80.75	80.16	261	80.89	80.75	0.26m	260	81.23	81.09	0.34m	1 furrow (0.9m wide); 2 field drains (both 0.2m wide)
27	272	84.93	83.21	271	84.88	83.34	0.20m	270	85.24	83.7	0.36m	3 land drains (0.16m wide)
28	281	84.89	82.49					280	85.35	82.73	0.32m	3 land drains (0.16m wide)
29	291	86.02	84.8					290	86.56	84.8	0.33m	1 furrow (1.4m wide)
30	302	86.93	86.46	301	87.28	87	0.26m	300	87.7	87.42	0.42m	1 furrow (1.4m wide)
31	312	90.66	87.41	311	90.71	87.6	0.26m	310	91.03	87.92	0.32m	Empty trench
32	321	91.64	90.67					320	92.05	90.89	0.30m	2 furrows (1.3m & 1.7m wide)
33	331	92.51	91.42					330	92.78	91.76	0.26m	Empty trench
34	341	99.62	98.61	344	99.71	98.66	0.22m	340	100.03	98.99	0.33m	4 furrows (1.8m - 3.1m)
35	351	98.59	97.96					350	98.96	98.24	0.29m	1 shallow linear feature (0.60m); 4 furrows (1.5m - 2m wide)
36	361	96.94	95.99					360	97.24	96.44	0.30m	5 furrows (1.7m - 3m wide); 3 field drains (0.2m - 0.53m wide)
37	372	98.07	97.58	371	98.02	97.64	0.30m	370	98.4	98.02	0.38m	7 furrows (1.1m - 2.5m wide); 3 field drains (0.2m - 0.38m wide)
38	381	100.38	98.85					380	100.7	99.1	0.42m	1 furrow; 1 field drain (0.2m wide)
39	391	100.02	99.51					390	100.5	100.19	0.44m	5 furrows (1.3m - 2.9m wide); 1 field drain (0.2m wide)
40	401	98.95	98.49					400	99.18	98.93	0.38m	3 furrows (1.3m - 2m wide)
41	411	97.52	97.25					410	97.9	97.16	0.36m	7 furrows (0.9m - 3.1m wide)
42	421	99.73	98.24					420	100.08	98.49	0.37m	3 furrows (1m - 1.7m wide)
43	431	97.95	96.94					430	98.47	97.25	0.46m	1 furrow (1.5m)
44	441	96.18	94.97	441	96.41	95.06	0.20m	440	96.72	95.37	0.31m	Empty trench
45	451	96.4	95.83					450	96.74	96.05	0.31m	Empty trench
46	461	94.84	92.83					460	95.14	93.1	0.42m	1 modern linear feature
47	471	97.44	93.06					470	97.71	94.45	0.31m	Empty trench
48	482	91.16	88.24	481	91.44	89.42	0.24m	480	91.76	89.74	0.32m	3 land drains (0.20m wide); subsoil visible for 22m on the eastern side
49	492	92.17	89.74	491	92.29	90.04	0.34m	490	92.61	90.36	0.32m	1 land drain (0.2m wide)

FHQ 17: TRENCH SUMMARY

Trench	Context	Natural highest	lowest	Context	Subsoil highest	lowest	thickness	Context	Ploughsoil highest	lowest	thickness	Notes
50	501	96.37	92.47					500	96.08	92.67	0.33m	3 furrows (1.1m - 2.4m wide); 2 field drains (0.5m wide)
51	511	98.16	95.46					510	98.46	95.82	0.36m	Empty trench
52	521	99.5	98.88					520	99.78	99.15	0.25m	Empty trench
53	531	99.44	97.68					530	99.7	97.95	0.30m	8 furrows (1.3m - 2.4m wide)
54	541	97.09	94.79					540	97.38	94.98	0.28m	4 furrows (1.2m - 2.9m wide); 1 field drain (0.3m wide)
55	551	95.98	93.61					550	96.31	93.95	0.31m	6 furrows (1.2m - 2.5m wide)
56	561	100.85	100.37					560	101.48	101.05	0.35m	1 linear feature (1.06m wide); 6 furrows (1.3m - 2.8m wide)
57	572	100.79	98.15	571	101.04	98.33	0.20m	570	101.44	98.73	0.40m	2 furrows (1.1m - 1.5m wide); 1 land drain (0.8m wide)
58	581	100.2	98.13					580	100.53	98.53	0.37m	3 furrows (1.8m - 2m wide); 3 land drains (0.33m wide)
59	591	97.92	97.28					590	98.27	97.64	0.37m	7 furrows (1m - 2.2m wide)
60	601	97.06	94.09					600	97.39	94.41	0.40m	1 furrow (2.4m wide)
61	611	96.56	93.04					610	96.86	93.28	0.34m	1 furrow (2.1m wide)
62	621	93.34	90.05					620	93.87	90.35	0.40m	1 furrow (1.7m wide)
63	631	93.56	88.51					630	93.84	88.66	0.29m	1 land drain (0.2m wide)
64	642	86.12	85.55	641	86.55	85.86	0.30m	640	86.98	86.29	0.43m	1 furrow (partially visible); 2 field drains (0.16m wide)
65	651	92.74	87.51					650	93.16	87.63	0.27m	Empty trench
66	661	96.78	95.07					660	97.1	96.25	0.30m	1 linear feature (0.62m wide); 1 furrow (1.9m wide)
67	671	93.51	92.73					670	94	93.23	0.39m	2 furrows (3.5 & 3.9m wide); 1 field drain (0.56m wide)
68	681	92.8	91.3					680	93.31	91.45	0.42m	Empty trench
69	6901	93.94	92.9					6900	94.37	93.26	0.31m	1 linear feature (0.47m wide); 2 pits (partially visible); 7 furrows (2.1m - 2.9m wide)
70	701	86.51	86.01					700	86.78	86.19	0.39m	3 furrows (1.8m - 1.9m wide)
71	711	85.05	83.49					710	85.65	83.89	0.34m	5 furrows (2m - 3.4m wide)
72	721	82.93	82.3					720	83.34	82.69	0.31m	Empty trench
73	732	84.27	81.85	731	84.27	82.03	0.27m	730	84.59	82.35	0.32m	1 furrow (1.6m wide); 3 field drains (0.2m - 0.3m wide)
74	742	85.97	85.54	741	86.5	85.42	0.31m	740	86.8	85.72	0.30m	4 field drains (0.2m wide)
75	751	88.33	87.52					750	88.64	87.87	0.38m	1 linear feature (0.76m wide)

FHQ 17: TRENCH SUMMARY

Trench	Context	Natural highest	lowest	Context	Subsoil highest	lowest	thickness	Context	Ploughsoil highest	lowest	thickness	Notes
76	761	89.31	88					760	89.75	88.16	0.37m	2 furrows (2.1m wide); 5 field drains (0.2m wide)
77	771	92.48	91.31					770	92.86	91.51	0.38m	1 furrow (1.3m wide)
78	781	87.77	85.73					780	88.2	86.35	0.34m	1 field drain (0.17m wide)
79	791	86.74	85.02					790	87.12	85.43	0.31m	Possible feature (not excavated due to flooding); 3 field drains (0.18m wide)
80	801	82.77	84.98					800	86.25	85.66	0.37m	1 circular pit (4.7m wide); a coal spread; 1 field drain (0.15m wide)
81	811	88.53	85.58					810	89.04	86.27	0.38m	2 furrows (1.4m wide)
82	821	85.17	84.39					820	85.62	84.71	0.33m	2 field drains (0.22m wide)
83	831	81.99	81.5					830	82.74	81.93	0.37m	2 field drains (0.12m & 0.24m wide)
84	841	82.64	82.17					840	83.29	82.5	0.40m	1 field drain (0.56m wide)
85	851	83.94	83.56					850	84.21	83.9	0.35m	7 furrows (1.8m - 3m wide); 1 field drain (0.2m wide)
86	861/863/864	92.93	91.2	862	92.85	91.66	0.45m	860	93.15	91.96	0.30m	Subsoil visible for 24m in southern end; 1 field drain (0.2m wide)
87	871	93.56	91.95					870	93.91	92.29	0.33m	2 furrows (1.17m wide); 1 field drain (0.2m wide)
88	882	91.31	90.88	881	91.56	90.98	0.25m	880	91.86	91.28	0.30m	1 stone-lined culvert (0.4m wide)
89	8902	91.17	90.12	8901	91.34	90.08	0.12m	8900	91.74	90.48	0.40m	1 furrow (0.95m wide)
90	9001	90.25	87.39					9000	90.59	87.78	0.33m	Empty trench
91	9101	86.97	85.13	9102	87.13	85.15	0.22m	9100	87.47	85.49	0.34m	Empty trench
92	9202	87.47	84.62	9201	88.41	84.95	0.10m	9200	88.67	85.21	0.26m	Empty trench
93	9301	90.05	87.23					9300	90.33	87.75	0.34m	Empty trench
94	941	85.13	84.58					940	85.63	84.81	0.42m	1 furrow (partially visible)
95	9501	87.33	85.93					9500	87.72	86.29	0.37m	Empty trench
96	961	88.19	87.91					960	88.57	87.6	0.41m	1 furrow (partially visible)
97	9701	87.72	86.64					9700	87.94	86.95	0.32m	4 furrows (0.94m - 2m wide)
98	9801	84.44	83.19	9802	86.51	83.62	0.43m	9800	86.78	83.89	0.27m	Empty trench
99	9902	84.83	83.9					9901	85.34	84.11	0.31m	Empty trench
100	10001	85.89	84.56	10002	85.77	84.52	0.11m	10000	86.1	84.85	0.33m	Empty trench
101	10101	86.5	86.13	10102	86.36	86.09	0.10m	10100	86.76	86.49	0.40m	Empty trench
102	10201	85.4	82.15					10200	85.96	82.42	0.40m	Empty trench
103	10301	82.37	80.97					10300	82.84	81.25	0.40m	Empty trench

PCA

PCA SOUTH

UNIT 54
BROCKLEY CROSS BUSINESS CENTRE
96 ENDWELL ROAD
BROCKLEY
LONDON SE4 2PD
TEL: 020 7732 3925 / 020 7639 9091
FAX: 020 7639 9588
EMAIL: info@pre-construct.com

PCA NORTH

UNIT 19A
TURSDALE BUSINESS PARK
DURHAM DH6 5PG
TEL: 0191 377 1111
FAX: 0191 377 0101
EMAIL: info.north@pre-construct.com

PCA CENTRAL

THE GRANARY, RECTORY FARM
BREWERY ROAD, PAMPISFORD
CAMBRIDGESHIRE CB22 3EN
TEL: 01223 845 522
FAX: 01223 845 522
EMAIL: info.central@pre-construct.com

PCA WEST

BLOCK 4
CHILCOMB HOUSE
CHILCOMB LANE
WINCHESTER
HAMPSHIRE SO23 8RB
TEL: 01962 849 549
EMAIL: info.west@pre-construct.com

PCA MIDLANDS

17-19 KETTERING RD
LITTLE BOWDEN
MARKET HARBOROUGH
LEICESTERSHIRE LE16 8AN
TEL: 01858 468 333
EMAIL: info.midlands@pre-construct.com

