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**GEOPHYSICAL SURVEY
SCARBOROUGH CASTLE
NORTH YORKSHIRE**

REPORT
May 2000

NGR: TA 04970 89240
Monument No: 13300

On behalf of:

ENGLISH HERITAGE
Yorkshire Region
37 Tanner Row
York
YO1 6WP



FIELD ARCHAEOLOGY SPECIALISTS LTD

University of York
King's Manor
York YO1 7EP

TELEPHONE: (01904) 433952
FACSIMILE: (01904) 433935
E-MAIL: arch18@york.ac.uk

Prepared by:

Toby Simpson BA

T. Simpson

Reviewed by:

Jonathan Clark MA DPhil

J. R. Clark

Authorised by:

Justin Garner-Lahire BA

J. Garner-Lahire

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1.0 INTRODUCTION

This document reports on a geophysical survey undertaken by Field Archaeology Specialists Ltd (FAS) on behalf of English Heritage. The survey was carried out within the Outer Ward of Scarborough Castle, North Yorkshire within the proposed development area of a new toilet block. Scarborough Castle is a Scheduled Ancient Monument (Monument No. 13300), as such English Heritage issued FAS with a Section 42 Licence for the survey (Appendix A). The survey was carried out between the 10th and 12th of May 2000.

1.1 AIMS AND OBJECTIVES

The purpose of the survey was to accurately locate sub-surface geophysical anomalies within the proposed development area of a new toilet block. It is hoped that assessment of the survey data and interpretation of geophysical anomalies will assist with the avoidance of the most archaeologically sensitive areas during the construction of the proposed toilet block and associated services.

1.2 LOCATION AND LAND USE

The survey area (NGR TA 04970/89240) is situated to the north-east of the Master Gunner's house within the outer ward of Scarborough Castle (Fig.1). It is currently under grass, although the ground cover at the north eastern end of Area A consists of longer grass and scrub. Unfortunately, the area to the NNE of the Master Gunner's house contained many survey obstacles. Although the building contractor's temporary accommodation had been removed, the area contained a substantial zig-zag compound fence as well as stock-piles of building materials.

1.3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Excavation on Castle Hill between 1919 and 1927 defined Bronze Age and Iron Age archaeological deposits along with the substantial remains of a Roman signal station. The signal station appears to have been re-used as a pre-Norman church which was replaced by a larger church associated with the construction of the castle during the early 12th century.

The proposed development area is situated in the Outer Ward of the castle. Although the curtain wall in this area has undergone numerous reconstructions, it is essentially early 13th century in date, built on the line of the original early 12th century curtain wall. The Outer Ward contained a substantial hall and chamber block by the early 13th century. The surveys of 1361 and 1538 appear to indicate that buildings were not present within the proposed development area, however, this area witnessed a significant amount of development during the 18th century.

The Master Gunner's house formed the core of a complex of buildings in this area of the castle. These included the Storehouse Range and a building at right angles to the Master Gunner's house, built against the northern stretch of the inner bailey curtain wall. A further building existed by 1746 (Fig.2)

TA 0460/8960



TA 0520/8850

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Location map

Scale 1:5000



Field Archaeology Specialists Ltd



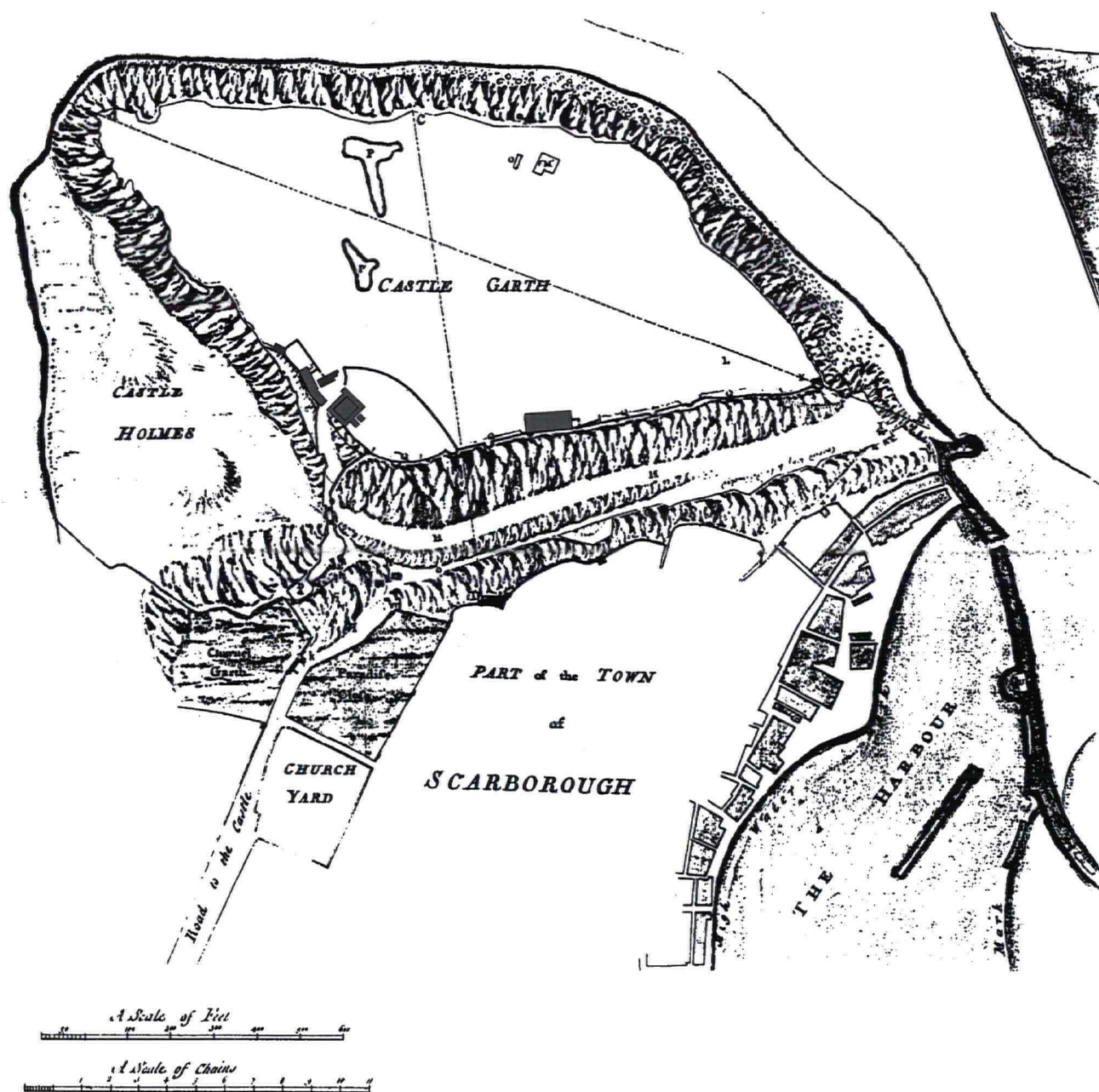


Fig.2: Location of buildings according to 1746 map (PRO Works 31/1139)

built against the west gable wall of the Master Gunner's house and referred to in the early 19th century as the Royal Invalid Artillery Barracks. Most relevant to the proposed development, two other structures existed within an enclosure extending from the north of the Master Gunner's house. One of these was the North Magazine which is thought to have been built in c.1745, possibly as a result of the 'old magazine' in the Mosdale hall being converted into a barracks block. A further building which was described in 1823 as the 'Shifting Room' was located immediately to the north of the North Magazine. This building was constructed by the Ordinance in 1813 and was designed for the airing of ammunition.

An elevation of the now-demolished North Magazine was included in the survey of 1821 which together with a view of the corner of this structure from the early 19th century, gives the impression that this building was a medieval structure. The building was constructed up against the curtain wall and included features such as a round-headed doorway and window with hood moulding which suggestive of a 12th century date. Given the fact that this building does not appear in surveys or on maps until 1745, the likeliest explanation is that it is an 18th century building which incorporates reused 12th century architectural details. It is interesting to note, however, that the survey of 1823 does not suggest that the magazine was built by the Board of Ordinance. Both the 'Shifting Room' and North Magazine appear to have been demolished during the later 19th century.

Unpublished excavations carried out by Pacitto in 1977-8 before the construction of toilets immediately to the north of the Master Gunner's house did not apparently discover evidence for the North Magazine, or any other buildings. However, the trenches concerned were probably too close to the house for Pacitto to have located this structure. They did suggest, however, the preservation of good 18th century deposits c.1.3m below the present ground surface.

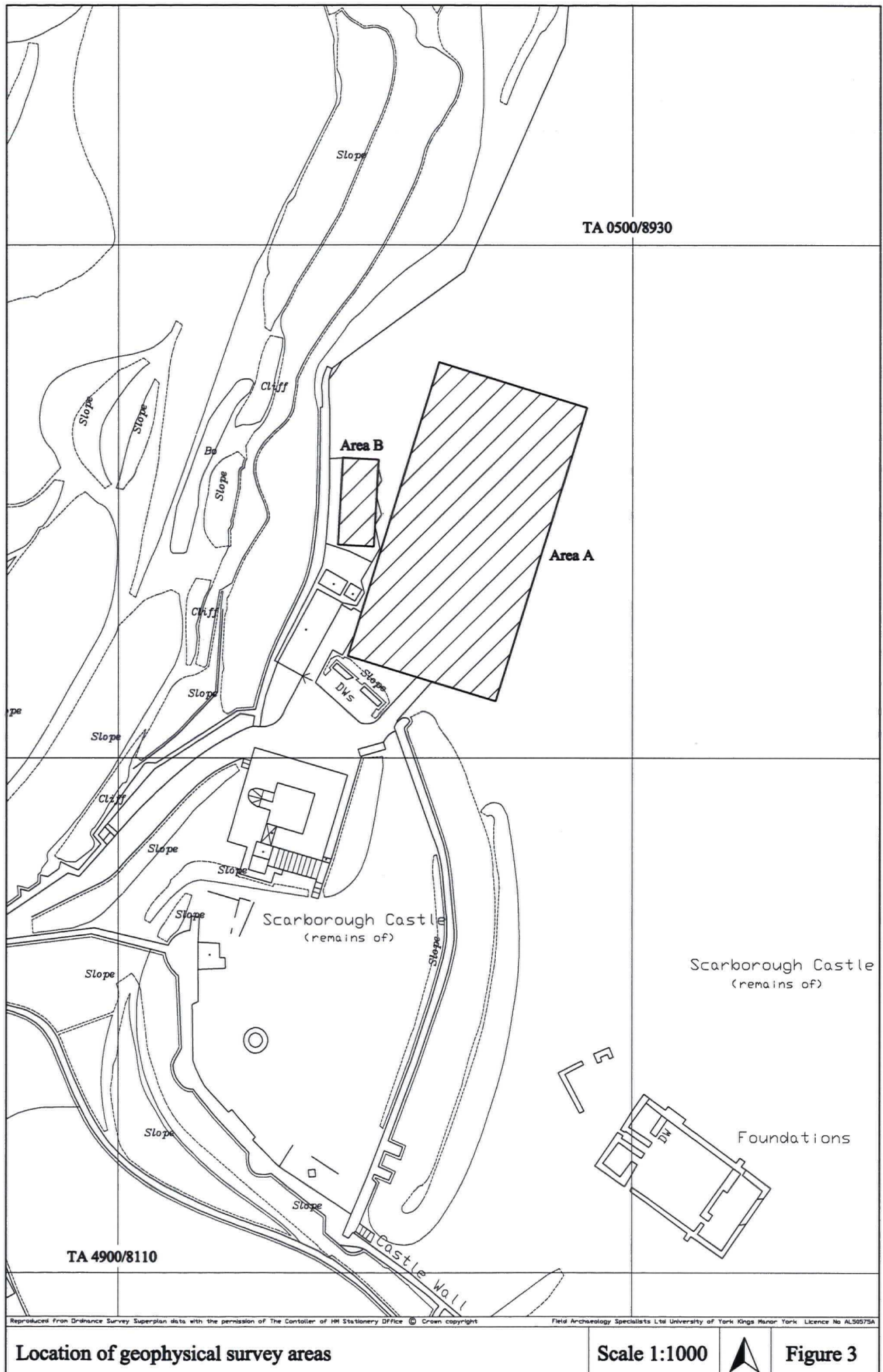
2.0 SURVEY PROCEDURE

2.1 SURVEY GRID

Grid points were set out at the corners of each survey area with a total station theodolite to form the framework of the survey grid. Where necessary, intermediate points were positioned using tapes, to complete the grid squares. This procedure ensured an internal grid point accuracy of $\pm 0.05\text{m}$ for the survey. The Keep and Master Gunner's house were surveyed using a total station theodolite in order to align the site grid to the Ordnance Survey National Grid.

2.2 SOIL RESISTANCE SURVEY

The soil resistance survey was carried out within a 60m x 30m area to the north-east of the Master Gunner's house (Area A) and an 18m x 7m area within the compound to the north of the Master Gunner's house (Area B) covering an area of 1926m² (Fig.3)



Location of geophysical survey areas

Scale 1:1000



Figure 3

This survey was carried out using a soil resistance meter with digital storage and data transfer facilities (RM15 Advanced - manufactured by Geoscan Research). The RM15 was used with a multiplexer (MPX15) connected to a multiple probe array fitted with three probes (PA5). The use of a multiplexer and multiple probe array allows a series of different readings to be taken at the same point. In this case, two readings at 0.5m probe separation and one at 1.0m probe separation were logged at each point. This method produces two data sets ; firstly, a higher resolution data set with readings at 0.5m x 1.0m intervals (0.5m probe spacing); and secondly, a lower resolution data set with readings at 1.0m x 1.0m intervals (1.0m probe spacing). The first data set produces a higher definition image of soil resistance anomalies, whilst the second with wider probe spacing provides a coarser image of soil resistance at greater depth.

The raw data was processed using Geoplot version 2.02. This involved the adjustment of any differences in the average background reading between individual survey grids as well as inconsistencies caused by changing climatic conditions which were removed to facilitate clear presentation of the data sets.

The processed data was transferred to Surfer version 6.02 and was prepared for presentation. The resulting grey-scale images were inserted into an AutoCad basemap and output on a high resolution laser printer.

2.3 MAGNETOMETER SURVEY

The magnetometer survey was carried out within a 60m x 30m area to the north-east of the Master Gunner's house (Area A) covering an area of 1800m² (see Fig.2). The smaller area within the compound to the north of the Master Gunner's house (Area B) was not subject to magnetometer survey as it contained large quantities of steel scaffolding and ferrous debris which would have seriously distorted the results.

The survey was carried out using a fluxgate gradiometer with digital storage and data transfer facilities (FM36 with ST1 sample trigger - manufactured by Geoscan Research). Each 30m x 30m survey grid was undertaken using the parallel traverse method (unidirectionally) to ensure the capture of good quality raw data. Instrument readings were logged at 0.5m x 0.25m intervals (high resolution). On the completion of each survey grid the data was transferred from the FM36 to a portable computer where it was checked for defects.

The raw data was processed using Geoplot version 2.02 in order to make adjustments for any differences in the average background reading between individual survey grids and inconsistencies caused by instrument drift.

The processed data was transferred to Surfer version 6.02 and was prepared for presentation. The resulting grey-scale image was inserted into an AutoCad basemap and output on a high definition laser printer.

3.0 SURVEY RESULTS

3.1 SOIL RESISTANCE SURVEY RESULTS

Figure 4 presents the 0.50m probe spacing data set which reports on relatively shallow resistance anomalies, while Figure 5 shows the results of the 1.0m probe spacing data set. Greyscale plots of the raw data are shown in Appendix B. An interpretation map of soil resistance anomalies is shown in Figure 6. In some cases, anomalies have been allocated feature numbers (F1 etc) for ease of discussion and where thickness and weight of line represents the strength of individual anomalies.

AREA A

Feature 1 This low resistance linear anomaly is aligned NW/SE. F1 is more clearly defined in the 1m probe separation data set which suggests that it represents a negative feature, possibly a robbed out foundation trench.

Feature 2 This low resistance linear anomaly is aligned NE/SW. It is very similar to F1 and presumably represents the same type of feature.

In the north west corner of Area A there is an area of high resistance possibly associated with spreads of building debris. This anomaly coincides with a large shallow depression in the ground surface and may, therefore, represent a backfilled quarry. Several isolated high resistance anomalies are also present within the northern part of the survey area which may prove to be archaeological features but they could equally be patches of differential compaction which may relate to the curvilinear band of relatively high resistance in this area. The southern part of the survey area also contains an area of relatively high soil resistance which may be a wide feature such as a backfilled ditch or a spread of rubble or compacted soil.

AREA B

Area B contains four areas of high resistance which may be associated with buildings known to have existed in this area. The 1m probe spacing data set contains two very well defined isolated anomalies in the northern part of the survey area. Unfortunately, the limited size of this survey area results in difficulty in interpretation of anomalies.

3.2 MAGNETOMETER SURVEY RESULTS

The results of the magnetometer survey is presented as a grey-scale plot (Fig.7). A trace and greyscale plot of the raw data are shown in Appendix B. The anomalies are presented on the interpretative map (Fig.8) where they have been allocated feature numbers (F1 etc) for ease of discussion and where thickness and weight of line represents the strength of individual anomalies.