

LOW MOOR 'QL' BOMBING DECOY,
LOW MOOR, FYLINGDALES, NORTH YORKSHIRE

ARCHAEOLOGICAL SURVEY



Ed Dennison Archaeological Services Ltd
18 Springdale Way
Beverley
East Yorkshire
HU17 8NU

LOW MOOR 'QL' BOMBING DECOY,
LOW MOOR, FYLINGDALES, NORTH YORKSHIRE

ARCHAEOLOGICAL SURVEY

Report no: 2022/659.R01
Version: Final
Date: June 2023
Author: Ed Dennison & Shaun Richardson

Ed Dennison Archaeological Services Ltd
18 Springdale Way
Beverley
East Yorkshire
HU17 8NU

On behalf of

North York Moors National Park
The Old Vicarage
Bondgate
Helmsley
York YO62 5BP

**ARCHAEOLOGICAL SURVEY,
LOW MOOR 'QL' BOMBING DECOY,
FYLINGDALES, NORTH YORKSHIRE**

CONTENTS

EXECUTIVE SUMMARY

| | | |
|---|--|----|
| 1 | INTRODUCTION..... | 1 |
| 2 | ARCHAEOLOGICAL AND HISTORICAL BACKGROUND | 4 |
| 3 | DESCRIPTION OF DETAILED MEASURED SURVEY AREA | 15 |
| 4 | DESCRIPTION OF WALKOVER SURVEY AREA | 21 |
| 5 | DISCUSSIONS AND CONCLUSIONS | 25 |
| 6 | BIBLIOGRAPHY..... | 29 |
| 7 | ACKNOWLEDGEMENTS | 31 |

Appendices

| | |
|---|-----------------------------|
| 1 | EDAS Photographic Catalogue |
| 2 | EDAS Survey Proposals |

EXECUTIVE SUMMARY

In January 2022, Ed Dennison Archaeological Services (EDAS) Ltd were commissioned by Mr Miles Johnson, Head of Historic Environment at the North York Moors National Park Authority (NYMNP), to undertake an archaeological survey of the former Second World War 'QL' bombing decoy on Fylingdales Low Moor, some 3km to the south-west of Fylingthorpe and 3km south of Sneatonthorpe, North Yorkshire (NGR NZ 9150 0280 centred). The work, which involved a detailed measured earthwork survey and a walkover survey, was required to provide a detailed record of the decoy, to both enhance the existing records and to aid future management.

In addition to the 'QL' site, there is a 'Starfish' bombing decoy on Low Moor, c.1km to the west of the surveyed site, and potentially another 'QL' site to the west again near New May Beck Farm. The decoys formed part of the Middlesbrough system, and were designed to divert enemy bombers from the town's important chemical and steel-making centre some 23km (c.12 miles) to the north. Although the decoy's operating dates are not known with certainty, the Starfish site was probably in use from late 1941 until April 1943 whereas the QL site is believed to have operated between October 1942 and May 1943. Aerial photographs dating to September 1943 show tank tracks crossing both sites, suggesting that they had been abandoned by then.

QL decoys were designed to simulate urban or industrial lighting, through the use of various small hand-built and often ephemeral devices which produced shielded or partly concealed lighting, to replicate 'permitted' industrial lighting or poorly maintained blackout conditions in streets and houses. The lights were controlled via circuits and cables from a remote shelter using generators. Although not exclusively, many QL sites operated in conjunction with Starfish decoys, where fires were created, the QL decoy being designed to initially attract the bombers and the Starfish fires to encourage further bombing of an already burning target.

A total of seven different types of earthworks were recorded across the QL site, ranging from zigzag trenches with pits at either end, rectangular pits with straight or angled arm extensions, and circular or sub-rectangular mounds and depressions. It is difficult to draw any clear conclusions regarding these earthworks, as no other similar sites appear to have been surveyed nationally (or perhaps even survive), and standard layouts were explicitly avoided to prevent recognition.

Five main alignments or rows of earthworks were recorded, laid out broadly parallel and on a north-south orientation, with two other alignments to the north-west and south. These alignments all contain a mixture of the identified earthwork types. Within the walkover survey area, a further cluster of decoy earthworks was noted with an approximate right-angled formation.

It would appear that the earthworks represent the remains of various 'leaky lighting' devices, arranged in rows to simulate urban terraced housing. The rectangular pits seen in many examples could be the sites of semi-sunken 'box lights', 'reed lights', 'skylights' or 'open door' devices but do the arm extensions relate to wiring, maintenance access or the creation of shadows? One earthwork contained a buried cast-iron frame, revealed by rabbit activity, suggesting that at least some devices were partially buried. There was a general absence of cable runs or wiring trenches, so it is assumed that they were simply laid on the ground between the devices and to and from the distant control shelter. The QL decoy may have been simulating the St Hilda's area of Middlesbrough, which at that time contained many north-east/south-west aligned terraced streets, with the Starfish site, c.1km to the west, correlating to the adjacent 'Iron Masters' district on the south side of the River Tees where several important iron works and steel foundries were located. Between them, the two decoys appear to have attracted some enemy attention, as at least two possible strings of bomb craters were noted in the QL site, others have

been noted around the Starfish site, many can be seen to the north on the 1943 aerial photographs, either side of the B1416 road.

The presence of numerous vehicle and tank tracks over parts of both decoy sites shows that this part of Fylingdales Low Moor was intensively used for tank training from 1943 onwards. It is therefore quite possible that some of the features identified in the QL complex could reflect this post-decoy use. Some of the sub-circular depressions are more sharply defined than many of the other earthworks, and so might result from mortars or grenades being fired at the tanks. Similarly, some of the decoy earthworks may have been modified as firing positions, and other features, near a crossing point of the Kirk Moor Beck to the south of Thorn Key Wath, might represent observation posts from which tank movements could be monitored or again fired upon.

1 INTRODUCTION

Background to the Project

- 1.1 In January 2022, Ed Dennison Archaeological Services (EDAS) Ltd were commissioned by Mr Miles Johnson, Head of Historic Environment at the North York Moors National Park Authority (NYMNP), to undertake an archaeological survey, comprising a detailed measured earthwork survey and a walkover survey, of the former Second World War 'QL' bombing decoy on Fylingdales Low Moor, some 3km to the south-west of Fylingthorpe and 3km south of Sneatonthorpe, North Yorkshire (NGR NZ 9150 0280 centred) (see figures 1 and 2). The work was required to provide a detailed record of the decoy, to both enhance the existing records and to aid future management.
- 1.2 The decoy is not subject to any statutory protection, although a larger 'Starfish' bombing decoy c.1km to the west, with which the QL site was linked when operational, is a Scheduled Monument (SM1019757). The site lies within the North York Moors National Park, and the Starfish site is recorded on the NYMNP Historic Environment Record (sites 6851 and 18073) and also Historic England Research Record (HERR 1345990).

Site Location

- 1.3 The QL decoy site covers a large area of open moorland the west side of the A171 Whitby to Scarborough road, just north of Kirk Moor Gate and either side of Kirk Moor Beck.
- 1.4 The detailed measured survey area measured c.175m north-south by 120m east-west, and was set at an elevation of c.168m AOD on the north side of a tributary of the Kirk Moor Beck (formerly Ramsdale Beck), to the immediate west of the A171 road (see figure 2). Although surrounded by higher land to the north, west and south, there is a view to the north-east along the valley of Ramsdale to the coast, some 4.15km away. This survey area comprised unenclosed moorland used for sheep grazing, mostly covered with short rough grass although there were areas of heather around the northern fringe. Within the survey area, the ground surface was generally relatively level, but with an east-facing natural scarp set along the western edge, and a steeper natural scarp sloping down to the Kirk Moor Beck tributary along the south side. A deep north-south aligned valley, called Nigh Middle Sike, also forms the west side of the walkover survey area, and this joins the east-west Far Middle Sike valley at Thorn Key Wath which is shown on the historic maps. From this junction, the streams in the valleys join to form the Kirk Moor Beck. A public footpath/modern vehicle track crossed the northern part of the survey area.
- 1.5 The walkover survey investigated the area to the north of the detailed measured survey, either side of the Kirk Moor Beck itself, which is set within a prominent and steep-sided valley (see figure 2). The walkover survey was sub-rectangular in plan, measuring c.450m north-south by 200m east-west, running from the north end of the detailed measured survey areas as far as Thorn Key Howes round barrows; within the walkover survey area, the ground surface rises from to c.179m to c.187m AOD from south to north respectively. The eastern part of the walkover survey area had a dense covering of heather, making recognition difficult. However, the western part was rough grass, with features more clearly visible.

Existing Information

- 1.6 The Flyingdales QL decoy site is not thought to have been the subject of any previous detailed survey work, although a brief description, with a photograph and drawn reconstructions of several features, is provided by Harwood and McMillan (2008a, 88-89). The site was also previously noted as part of a LiDAR ground-truthing project (Brightman 2019, 35), and a site visit was undertaken by Ed Dennison of EDAS in December 2021; in both cases, the presence of surviving earthworks was confirmed. However, the site has, to date, attracted little attention, compared to the better known 'Starfish' site to the west.

Fieldwork Methodology

- 1.7 The major part of the survey project was defined by an EDAS method statement, which was agreed with the NYMNP before the start of work (see Appendix 2). The subsequent walkover survey was not, but it followed well-practised procedures.

Documentary Collation

- 1.8 A number of sources were examined to research and collate details of Second World War bombing decoys. There has been a recent upsurge in interest in military sites associated with the Second World War, and this also extends to bombing decoys in general and specific Starfish sites. In addition to the standard works (e.g. Dobinson 1996; 2000), other more local sources were examined (e.g. Harwood & McMillan 2008a). There are a number of published sources relating to specific individual decoy sites or their components (e.g. Thomas 2014; Blood 1992), as well as county-wide or area surveys (e.g. Osborne 2020, 182-184 for Northamptonshire; Haigh, D 2004 & 1993 for Calderdale). Many decoy sites are now described or detailed on the Internet, with photographs, for example those in Arborfield in Berkshire, some in Lancashire, others in Richmond Park, and those in the Cuckmere Valley in East Sussex

(http://www.arborfieldhistory.org.uk/properties_starfish_sites.htm;

<http://www.lancashireatwar.co.uk/decoy-sites/4575224154>;

https://stmargarets.london/archives/2012/05/richmond_park_starfish_bombing_decoy_sf8a.html; https://stmargarets.london/archives/2012/05/richmond_park_starfish_decoy_sf8a_the_fires_burn_o.html; <https://www.blighty-at-war.net/decoy-ql-sites.html>).

However, many of these latter sources tend to concentrate on the surviving above-ground structural elements, typically control bunkers and night shelters, rather than the more ephemeral earthworks making up the decoy sites themselves.

- 1.9 Two very well researched accounts detail one specific Starfish site at Wrington in Somerset, built to protect Bristol, and another describes decoys in the Cuckmere Valley in East Sussex; both include much information on decoys in general (Floyd 2020; <https://www.blighty-atwar.net/decoy-ql-sites.html>). However, few archaeological surveys appear to have been carried out in England, although one Oil QF site in Medway (Kent) has been recorded in detail (Small 2014), as well as parts of the extensive decoy complex on the north bank of the Humber east of Hull (Blood 1992). Unfortunately, very few archaeological surveys have been undertaken of the earthworks of Starfish sites and, as far as can be determined, none have been done of any QF/QL sites, primarily because surviving non-structural elements are so rare.

Detailed Measured Survey

- 1.10 The detailed measured earthwork survey was undertaken in two phases. The first phase was undertaken using EDM total station equipment to produce a basic site plan at 1:250 scale; this detailed scale was necessary due to the slight and small-scale nature of the earthworks. Sufficient information was gathered to allow the survey area to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features. The survey recorded the position at ground level of all structures, earthworks, water courses, leats, paths, stone and rubble scatters, ironwork, fences, walls and other boundary features, and any other features considered to be of archaeological or historic interest. The isolated nature of the survey area meant that it was not possible to tie the survey into any existing Ordnance Survey bench marks or the national grid, but approximate heights AOD were obtained from other sources. Survey points were taken from fixed survey stations on a closed traverse around and through the survey area. The locations, descriptions and values of the control points are stated in the final survey data. The EDM survey was undertaken in early February 2022.
- 1.11 On completion of the total station survey, the field data was plotted and re-checked in the field in a separate operation. Any amendments or additions were surveyed by hand measurement and added to the plan. The resulting site survey was produced at a scale of 1:250 and presented as an interpretative hachure plan(s) using conventions analogous to those used by Historic England (2017, 25-26 & 41-45). The survey work equates to a Level 3 archaeological survey as defined by Historic England (2017, 33-34).
- 1.12 Once the 1:250 site survey was completed, a representative selection of the different individual types of decoy earthwork were surveyed in greater detail, to allow comparison with historic photographs of QL decoy features and historical documentation. A total of nine individual earthworks were surveyed at a scale of 1:50, using traditional tape and offset methods. These were also located and identified on the 1:250 site survey. The detailed measured survey work was undertaken in early March 2022.

Walkover Survey

- 1.13 Once the detailed measured survey was complete, it was decided to extend the survey area to the north, to see if any of the identified earthworks continued into this area. This was achieved by a walkover survey, on both sides of the Kirk Moor Beck, which is set within a prominent and steep-sided valley. The walkover survey was sub-rectangular in plan, measuring c.450m north-south by 200m east-west, running from the north end of the detailed measured survey area as far as Thorn Key Howes round barrows, in the area between the Kirk Moor Beck and the A171. Allowing for the dense heather cover to the eastern part, the walkover survey was inspected in a systematic manner, by two field workers walking in parallel. The detailed survey showed that the decoy features occur in strings or lines, and so when one was located, the area around it was intensively inspected to establish the orientation of the line and the total number of features within. The features were located using a hand-held GPS with an accuracy of +/- 3m, and were plotted on a modern Ordnance Survey base at a scale of 1:2500. The walkover survey was undertaken in late January 2023.

Photographic Survey

- 1.14 General photographic recording of the survey areas, together with close-up photography of significant details and individual monuments, was undertaken using an SLR digital camera with 12 mega-pixel resolution. The guidelines produced by Historic England (2015; 2017, 22-23) were followed and each photograph was provided with a scale where appropriate.
- 1.15 All photographs were taken in colour in jpeg format, and were clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and cross referenced to digital files. A photographic register detailing the location and direction of each shot was completed (see Appendix 1).

Written Accounts

- 1.16 Sufficient notes were taken on site in order for a detailed description of the survey area to be prepared, supported by the drawn and photographic records.

Reporting and Archiving

- 1.17 An EDAS archive archaeological survey report was produced, based on the results of the documentary collation and the information obtained during the fieldwork. This report assembles and summarises the available evidence for the survey area in an ordered form, synthesises the data, comments on the quality and reliability of the evidence, and how it might need to be supplemented by further field work or desk-based research. The report is illustrated by reduced versions of the survey drawings, other historic maps and plans, and a selection of photographs. One hard copy and a pdf version of the final report were supplied, for submission to the NYMNPA Historic Environment Record. Another copy was also included within the site archive. Other pdf copies were distributed to interested parties as appropriate.
- 1.18 An entry was submitted to the OASIS (On-line Access to the Index of Archaeological Investigations) project, including the deposition of a digital copy of the report with the Archaeology Data Service, via the OASIS form, upon completion of the project. A fully indexed and ordered field archive was prepared, following the guidelines produced by the Chartered Institute for Archaeologists (CIfA 2020). The archive comprised primary written documents, plans, sections and photographs, and an index to the archive, and it was deposited with the NYMNPA at the end of the project.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 2.1 There is little evidence for any intensive activity across the survey area prior to the laying out of the Second World War decoy. The 1853 Ordnance Survey 6" to 1 mile map (sheet 46, surveyed 1848-49) shows the survey area as unenclosed moorland, lying close to the southern boundary of Fylingdales Moor, which was common to the parishes of Hawsker-cum-Stainsacre and Fylingdales. As might be expected, there is evidence of prehistoric activity in the area, for example a 'tumulus' lies in the angle of the A171 road and Kirk Moor Beck (NYMNPA HER 3801; HERR 29743; SM 1019892), there is another further to the north (NYMNPA HER 22484) and there are two others next to each other to the north, known as Thorn Key Howes (NMYNPA HER 3799; HERR 29804); the 1853 and 1952 maps mark the latter as a 'tumulus & circle' (see figures 14A and 14C).

- 2.2 A number of trackways are shown in the area, including one that crosses the walkover survey area on the north side of Kirk Moor Beck, apparently following the line of one of the numerous hollow ways still surviving here. It is similarly depicted in 1893 (sheet 46/12, surveyed 1891), by which date the trackway was marked as a bridle road, with a footpath branching off it to the south-west; the same situation exists in 1913 (sheet 46/12, revised 1910) and there is still a modern footpath crossing this part of the moor. There is no indication on the post-war 1952 Ordnance Survey 6" to 1 mile maps (sheets 46SE and 46NE, revised 1950) of any wartime activity in the survey area, although some isolated features are shown further to the west.
- 2.3 Although the decoy is located on Fylingdales Low Moor, it is often referred to in the published material as the Sneaton decoy (e.g. Dobinson 1996; 2000); the identifier Low Moor is used throughout this report.

Bombing Decoys

- 2.4 The Second World War saw the emergence of aerial bombardment as a decisive instrument of warfare and, to counter this threat, the United Kingdom maintained a flexible and diverse mechanism of air defence throughout the war. This included the early warning of approaching aircraft, through radar and visual detection, and the local defence of towns, cities and other vulnerable points using anti-aircraft gunnery and balloon barrages. But less conspicuously, many potential targets were shadowed by decoys, dummy structures, lighting displays and fires, all designed to draw enemy bombs from the intended points of attack.
- 2.5 Britain's decoy programme began in January 1940 and developed into a complex deception strategy, using four main methods: day and night dummy aerodromes ('K' and 'Q' sites); diversionary night-time fires (Quartz Fire 'QF' and Special Fire 'SF' or 'Starfish' sites); simulated urban lighting (Quartz Light 'QL' sites); and dummy factories and buildings (M series). QL sites gave the appearance of a variety of target types displaying permitted and illegal lighting, and poor blackout adherence, QF sites replicated the effects of different types of fires caused by bombing using a variety of inflammable materials such as railway sleepers, coals and timber shavings ignited by electrically fired detonators, and the QF/QL sites utilised a combination of both effects (Thomas 2014, 9-11). In all, some 839 decoys are recorded for England in official records, built on 602 sites (some sites containing decoys of more than one type) (Schofield 2004, 22). This makes up the greater proportion of the c.1000 or so decoys recorded for the United Kingdom. The decoy programme represented a large investment of time and resources - apart from construction costs, several thousand men were employed in operating decoys, the fortunes of which were closely tied to the wartime targets they served. The decoys were often successful, drawing many attacks otherwise destined for towns, cities and aerodromes, and saving many lives (Historic England scheduling description, SM 1019757).
- 2.6 Fires simulating the bombing of urban areas were known as SF (Special Fires or Starfish) decoys, to distinguish them from the smaller QF installations. Numerous towns were protected by a cluster of these Starfish sites, which represent the most technically sophisticated of all the decoy types, with each site replicating the fires an enemy aircrew would expect to see when their target had been successfully set alight. The decoys included variation in fire type, duration of burning, and speed of ignition. In a permanent Starfish site, all fire types were used, set in discrete areas defined by sub-circular firebreak trenches and controlled from a remote shelter. The whole array was linked by a network of metalled access roads. Temporary

Starfish sites, all built in 1942 to counter the threat from the so-called Baedeker raids against historic towns and cities, only had basket fires. Dobinson (1996, 46) states that the 1942 temporary Starfish sites were equipped only with basket fires, but that most other sites employed all four types of fire groups. In all, 228 decoys with a Starfish component are recorded in England, 37 of which were Temporary Starfish, the rest being Permanent. The Permanent sites were located mostly in central England, close to the urban and industrial targets they were intended to protect; temporary sites, like the Baedeker targets they were protecting, were confined to southern and eastern England (Dobinson 1996, 44-45).

- 2.7 QF decoys were first provided for the night protection of RAF airfields, but from August 1941 their role was extended to protect urban centres. Although similar to Starfish sites, they differed in being considerably smaller, using a more limited range of fire types and being sited for the local protection of specific vulnerable points rather than whole cities or conurbations. The new QF sites of 1941-42 fell into four groups, for the protection of urban and industrial targets: a Civilian or 'C' Series located mostly in the west Midlands, the north-west and in the Middlesbrough area, administered by the Home Office; the Royal Navy 'N' Series sites, fewer in number and sited to protect coastal bases; the Army 'A' Series sites, to protect ordnance factories or military installations (these existed in a sparse belt running from central southern England into the west Midlands); and oil installations and tank farms (the 'Oil QF' sites). In all, only about 100 QF sites were operational in England. Very little now survives of any of these decoys, most having been cleared after the war, although some night shelters remain (Historic England scheduling description, SM 1019757; Dobinson 1996, 56-60).
- 2.8 QL decoys first became operational in August 1941, and at the peak in December 1942, some 209 were active. Most of these were civilian or Civil QLs, serving non-military targets, the majority of which lay in the industrial Midlands and north, with other concentrations on the Tyne and Tees, and in the Bristol and Avonmouth areas; many were co-located with the Starfish sites (see figure 3A). Like Starfish, QLs were sited in clusters with a dozen or more decoys protecting the larger towns and cities. In operation, the decoys would usually be illuminated in groups, representing the apparent extent of the target. QL sites relied on diversity to retain realism, and no two were alike. Standard layouts were explicitly avoided and sophisticated light displays varied across areas covering five to 30 acres in extent, the size depending on the target it was intended to replicate. Since many were co-located with Starfish sites, their night shelters and ancillary structures were often also used to serve the QL site. Isolated sites were, however, provided with shelters of their own. Some 230 decoys in England had a QL component; 142 of these were QL sites alone. Once again, very little now survives of any of these decoys, most having been cleared after the war (Historic England scheduling description, SM 1019757; Dobinson 1996, 69-74; Thomas 2014, 9).
- 2.9 Many of the different types of decoys were located close to each other and operated together, to present a co-ordinated deception strategy. For example, the north coast of the Humber estuary, to the south-east of Hull, contained a combination of three Starfish sites, three QL sites and one Oil QF site (Dobinson 2000, 92), while the remains on Blackdown Hill on the Mendip Hills in Somerset incorporate six types of QL, QF and Starfish decoys, all designed to mimic various industrial and transport facilities in Bristol (Schofield, Webster & Anderton 1999).

Starfish (SF) Sites

- 2.10 Nationally, by 23rd January 1941, the number of civil Starfish sites had risen to 43, covering 13 cities including Middlesbrough. By the end of April of the same year, numbers had risen dramatically to 130 sites, covering a total of 42 target towns (Dobinson 2000, 89) (see figure 3B). However, in June 1941, a new type of Starfish was introduced with the aim of protecting general areas rather than specific cities, with the lighting of the decoy coming under the direct control of No. 80 Wing RAF at Radlett (Hertfordshire), rather than a tier of local control (Dobinson 2000, 134-135); No. 80 Wing co-ordinated the sophisticated communications network established to monitor the movements of enemy aircraft and alert the personnel at the relevant site, and their regional headquarters was based on the north-east coast at Marske east of Middlesbrough where a few structures remain (Harwood & McMillan 2008b, 165-174). These new Starfish sites were known as 'Strategic Starfish' sites, being usually somewhat larger than the conventional type and sited with an eye to covering larger areas - in practice, this meant serving a number of cities.
- 2.11 The basic method of operation of a typical Starfish site has been explained in a number of sources (e.g. Dobinson 2000, 96-107). In summary, various types of fire-producing equipment were grouped together in different 'fire groups', and these were ignited electronically through cabling from a control shelter, in order to replicate the effect of incendiaries dropped at the start of a bombing raid. An essential part of the design of the site was to isolate one fire group from another (and also from any nearby fuel reserves) by digging firebreak trenches or bunds around them, usually with a circular or sub-circular plan, to prevent grass fires spreading across the whole complex; there was also generally a looping access road for fuel deliveries, which was often camouflaged later in the war (Dobinson 2000, 104) (see figure 4A).
- 2.12 A combination of four main types of fire group were used at a typical site, to produce a variety of different fire and smoke effects - these were boiler or boiling oil fires, grid fires, basket fires and coal fires (see figure 4A). Boiling oil fires involved feeding diesel or gas oil into metal troughs from a supply tank, which was initially heated and then fired electronically, with the sudden addition of water producing a violent and explosive fire burst (see figure 5A) - each Starfish site typically had 12 to 14 boiling oil fires, and tank capacities of 480 gallons of oil and 200 gallons of water meant that a burn could be maintained for up to four hours. The grid fire system was similar, although it used paraffin to produce a brighter but less ferocious yellow flame (see figure 5B). Basket fires utilised small c.3 feet square crates, raised above ground level on a stand, lined with wire netting and filled with layers of highly flammable and inexpensive materials; flare cans filled with creosote were attached to the sides for greater effect (see figures 5F and 6A). This was the most common and numerous type of fire mechanism, with the baskets usually placed in clusters or rows of 8, 16 or 24 within an individual fire group. The majority were fired from their own electronic igniters, although the proximity of the baskets often meant that fire spread from one to another (see figure 5C). In this instance, burning was limited to about an hour, meaning a sequence of firing episodes was needed to maintain a four hour burn. The final method, using coal fires, consisted of a single or double brazier made from scaffolding supporting a metal tray beneath which were the igniters. It was very similar to the grid fire apparatus - coals were burnt in one or more long thin braziers and a 36ft (c.11m) long feed pipe from a tank dripped diesel oil onto the coals to provide sudden violent explosions against the background burn (see figure 5D). A variant of the coal type was the crib fire, in which coal was held in a large

above-ground wire-mesh container and ignited from flare cans beneath, which in turn were lit from donators linked to the control shelter (see figure 5E) (Dobinson 1996, 49-51; Dobinson 2000, 97-104).

- 2.13 Crucial to the operation of a Starfish site was the control shelter, which should more accurately be termed a night shelter as operation of the decoy was confined to night time. This was a much simpler structure than those present at other Q or QL decoy sites, and it functioned as a home for the igniter switchgear and communications equipment; a generator provided power to the electrical circuits and switches that activated the fire groups, either singly or in rotation. The shelters are almost all above-ground structures, as pre-1941 below-ground types were found to be susceptible to flooding. A design drawing for the shelter (Air Ministry CT 557/41) was produced sometime in 1941, and is believed to be the only type used on wartime Starfish sites (Dobinson 1996, 52-53; Dobinson 2000, 106) (see figure 4B).
- 2.14 Essentially, the control shelter consisted of a brick or concrete walled rectangle (measuring 10ft by 8ft internally and 7ft high - 3.0m by 2.4m by 2.1m high) with a concrete roof, protected by earth banking for blast protection. The walls were to be constructed in 14 inch brickwork or 16 inch precast concrete hollow blocks filled with sand, and the roof was to have steel reinforced fabric. There was a single entrance accessed along a 3ft wide passage between two sloping brick retaining walls, which was protected by an external brick blast wall measuring 7ft 6 inches high, 7ft long and 1ft 2 inches wide (2.28m high, 2.10m long and 0.35m wide). Internally, the shelter was a single space, with various air vents and an emergency exit through the roof which had a hinged opening and was accessed using step irons in the wall below; this exit was also used to view the operation of the decoy from the roof. There was a soakaway channel in the reinforced concrete floor for drainage, and the whole structure was painted with two coats of bitumen paint and surrounded by earth banking; the roof also had a 1ft thick cover of earth. Many of these Starfish shelters still survive nationally, in varying conditions, and also occasionally their associated fuel storage areas; this is largely because, while all other remains were removed or salvaged, the shelters were offered for sale to the local landowners as it was thought that they could serve a useful agricultural purpose (Dobinson 2000, 205-207). A surviving example at the Osmotherley Starfish site has recently been recorded, and this also has a Nissen hut base adjacent to it (Dennison & Richardson 2021).
- 2.15 The basic method of operation was to run cables from the fire groups to the control shelter which housed the telephone (via which orders were received to ignite), and the switchgear which activated the various fire groups in the decoy. The shelters were placed at some distance from the fire groups, for obvious reasons, in some cases more than several hundred yards; that at Osmotherley was located 500m-600m away from the firebreaks. The electrical engineering involved was complex, and become more complex as sites expanded, requiring constant maintenance from two electricians who were included in the staff who operated the site; they would normally travel each day from a parent unit to man the site during the night (Dobinson 2000, 106-107). Staffing levels were initially 24, but numbers were later reduced to 19 and then 17 by October 1941, and permanent accommodation, usually in the form of a small Nissen hut, was erected at a small number of sites (Dobinson 1996, 54).
- 2.16 As the Second World War progressed, Luftwaffe operations against Britain became less effective, and there was a block closure programme of Starfish sites. The sites that were closed first tended to be those in peripheral positions, mostly

serving northern targets. Many of the recorded Starfish sites are last referred to in April 1943 (Dobinson 1996, 149-150).

Quartz Light (QL) Sites

- 2.17 As noted above, QL sites were designed to protect urban populations in larger towns and cities. When in operation, the decoys would usually be illuminated in groups, representing the apparent extent of the target. As noted above, the sites relied on diversity to retain realism, and no two were alike; standard layouts were explicitly avoided to prevent recognition, and the sophisticated light displays could extend up to over 30 acres (12ha), the size depending on the target it was intended to replicate. Although many QL sites were co-located with Starfish sites, they did seem to share night shelters and ancillary structures, and isolated sites were obviously provided with shelters of their own. Some 230 decoys in England had a QL component, and 142 of these were stand-alone QL sites. Dobinson reproduces a schematic plan of QL sites at Swarkestone (Derbyshire) and Nare Point (Cornwall), which are laid out around the firebreaks of Starfish decoys (see figure 7). In this way, the QL lights would draw the bombs, and then as they fell on or around the target, the Starfish would be lit to give the impression of fires having been started, thus attracting more bombs (Dobinson 2000, 143 & 146).
- 2.18 Depending on location and the type of site it was protecting, a typical QL decoy simulated urban lighting, which included dimmed street lighting, lights from open doors and flashes from tram wires, as well as 'permitted' industrial lighting such as furnace glows, factories, docks and railway marshalling yards, all laid out in a similar pattern to what an enemy pilot would be expecting to see over the actual target. The equipment used to achieve the lighting effects comprised a range of simple devices, often deceptively so, most of which were free standing and once cleared away after the war would leave little surface evidence behind.
- 2.19 The QL sites built to replicate urban areas (such as that on Low Moor) were in some ways the most ingenious decoys of the war, and also the most varied. Some of the lighting devices were simply the actual article, for example, shielded railway signal lights placed on poles to mimic a railway marshalling yard, or a set of vehicle headlamps contributing to displays of poorly blacked-out residential or industrial areas. However, many devices were specifically designed or created, and they have the appearance of 'Heath Robinson' constructions (Air Historical Branch und., 222-224; Dobinson 2000, 137-140; Dobinson 1996, 75-76) (see figures 8A to 8C). In decoys protecting industrial complexes, for example, the presence of coking ovens was imitated by 'furnace glows' using a tray of sand or soil a few metres across, with a canopy fitted with red and yellow lights suspended above it, shining down on the sand to create a dim glow. 'Loco glows' worked on a similar principle to replicate the faint glow of an open firebox door of a steam train (see figure 9).
- 2.20 More general lighting suggesting poor blackout conditions ('leaky lighting') in residential areas included 'hurdle lights' or 'reed lights', where screens of wicker were placed over domestic light bulbs, and also 'jinx lights', where a hooded lamp was suspended from a rod swung over a tray of water to create a flickering light (see figure 9). 'Box lights' were used to throw a diffuse light in one direction, illuminating a wall or an earthwork bank. Other constructions, using a wooden frame covered with chicken wire and scrim, mimicked an open door left ajar or a skylight not using correct black-out curtains. The most elaborate examples were the electrical 'tram flashes' for townscape displays and 'rivetting fires' for industrial ones; both of these relied on sudden bursts of light from carbon-arc lamps

controlled by a randomly closing switch. There were usually only a few of these on a typical QL site, and they were widely separated to avoid enemy pilots detecting that flashes were always coming from the same spot (Air Historical Branch und., 222-228; Dobinson 2000, 140-141).

- 2.21 In order to replicate the behaviour of a true target from the air, the wiring at a QL decoy was arranged in primary and residual circuits; the primary circuit could be turned off suddenly on the approach of enemy aircraft while the residual circuit could be left on to simulate poor blackout conditions. Each decoy also used bright lights to attract the enemy from a considerable distance and less bright or dimmed lights which were then only visible on approach (Air Historical Branch und., 224; Dobinson 2000, 144-145). A considerable amount of research was undertaken to assess the effectiveness of the QL night-time decoys, often utilising RAF reconnaissance. It was soon discovered that, from the air, there was significant variation in the apparent strength and visibility of the lighting - often the lights appeared to flicker, i.e. to disappear for short periods as if obstructed or hidden and then re-emerge, and it was realised that this feature needed to be introduced into the lighting displays to make them more convincing to the enemy. Lights of different visibilities and colour, and some of the flickering effects, were also provided. All these factors were taken into account in the design and operation of night display decoys.
- 2.22 Moonlight and weather conditions were also important to the operation of the QL lighting displays. For example, if a display was intended to represent permitted factory lighting, it could not hope to be effective and consequently was not operated at all in bright moonlight, as the enemy would be able to see the decoy sufficiently well to detect the absence of buildings and roads. Similarly, the presence of cloud and mist affected visibility of the ground and the lights, to such an extent that exact regulations and operating instructions could not be laid down. Generally speaking, the strength of lighting was varied according to the prevailing weather conditions, using dimmers. To avoid switching on lights only when they could be seen by the enemy, local controllers gave instructions to operate in different ways over a number of hours each or most nights, as suited to local conditions, although conforming to the general overall operating policy. Therefore, provided that the lighting conditions were suitable, QL displays were often lit for a certain number of hours on most nights to attract the odd raider, even when no obvious attack was imminent.
- 2.23 Thomas (2014, 11-12) and Dobinson (1996, 78) provide some information on the actual operation of a QL or combined QL/QF decoy. It was critical that there was good telephone communication with other sites, local ARP centres and the distant Control centre. If the QL display was not already operating, the generator was started when the order came by telephone to light the display. The switch gear to illuminate whichever part of the display was required by the local controller was then operated - on no account were the QL team permitted to illuminate a light display on their own initiative as the controller would be more aware of the strategic situation in the whole region, and so would be able to take into account other factors such as the illumination of other decoys, any developing attacks, the engagement of enemy aircraft by searchlights and anti-aircraft defences, and the departure or the passing over of enemy aircraft. If the light display was successful in drawing bombs, the operators would still have to wait for permission from the controller before igniting the fire display of the QF decoy or a nearby Starfish site for example. It should also be realised that the controller could chose to have the fire displays ignited if bombers had already attacked a target in the surrounding area, and if another wave of bombers was known to be approaching. However,

the deficiencies in this method of operation were increasingly recognised, and from February 1943 direct operational control of QL displays was placed in the hands of the crew manning the site, who could then manipulate the primary and residential circuits, and make subtle adjustments to a dimmer switch to ensure that their decoy was neither too bright, nor too faint, for the local conditions.

- 2.24 While the operators were responsible for the day-to-day maintenance and the practical operation of the decoy, the supply of fuel and oil for the generator and the repair of the displays were undertaken by skilled or semi-skilled personnel from outside. At night, the two operators on duty would be situated in the night shelter. As with the Starfish shelters, there was a standard design for a QL control shelter (CT 151/41) which has been reproduced by a number of sources (e.g. Dobinson 1996, 77; Dobinson 2000, 142 (see figure 8D). It comprised an upstanding earth-banked building resting on a concrete raft measuring 29ft 8ins (9m) long with a flat reinforced concrete roof. Internally, the building was divided into two rooms. The field control room contained the switch gear, stove and communications equipment, while the engine room housed three generators placed on concrete beds linked to an external system of expansion chambers. There was a central entrance at ground level shielded by an external blast wall, and a roof hatch for escape purposes. Many of the QL shelters also still survive nationally, in varying conditions.
- 2.25 It should be noted that this type of design was not universal, and other QL/QF sites, for example those operated by the Army, had a different form of shelter although still incorporating two rooms and a blast wall at the entrance (Thomas 2014, 25).

The Low Moor Decoys

- 2.26 The primary purpose of the Low Moor decoys was to divert enemy bombers from the important chemical and steel-making centre at Middlesbrough, some 45km to the north-west. It is believed that German bombers approached Middlesbrough in a forked attack formation, one group heading north along the coastline and then inland from the Tees estuary, and the other flying north guided by the western scarp of the North York Moors above Osmotherley. Often, a breakaway flight path was used, flying first at Leeming or Goose Pastures, two important airfields, and then across the North York Moors (Dennison & Richardson 2021, 7).
- 2.27 As noted above, many Starfish and other types of decoys occupied the same site or were closely adjacent; where they were physically separate, both sites would be independently controlled although they would often operate in tandem. On Low Moor, there was a Starfish (SF) site and a QL site which occupied adjacent sites; there is no evidence to suggest that the QL site was contained within the confines of the Starfish complex.
- 2.28 Both the Low Moor SF and QL sites were included within the extensive area of Fylingdales Moor initially owned and later leased by the War Department, which is highlighted on various maps dating to 1949 and 1955 (NYCRO ZW(M) 1/27 & ZW(M) 1/32) (see figures 10 and 11). Although the precise details and meanings on these maps are not fully understood, they relate to War Department ownership and restricted access areas, over which live firing took place.

Low Moor (Sneaton) Starfish Site (SF10e)

- 2.29 The first three Strategic Starfish sites to open nationally appear to have been those in the Middlesbrough system, located at Osmotherley, Guisborough (Kildale Moor) and Low Moor, and others were later built at Middleton (north-west of Stokesley), Kirkleatham and Newton Bewley (see figure 3B); the Civil site at Low Moor was designated SF10(e) (Dobinson 2000, 134-135). The Middlesbrough scheme was said to be complete by January 1941 (Dobinson 2000, 135), although the first known reference to most of the sites in the group occurs on 1st August 1941 - Historic England note that the Low Moor decoy is first referenced on 15th October 1941 whereas Dobinson and the HERR suggests it is 1st March 1942 (Historic England scheduling description, SM 1019757; Dobinson 1996, 149; HERR 1345990).
- 2.30 The Scheduling description for the Low Moor Starfish site notes that the last known reference to the site was 8th December 1943, although Dobinson differs again, stating that all of the other Starfish sites in the Middlesbrough system are not referred to after 8th April 1943 (Dobinson 1996, 149); it is assumed that additional research has been undertaken or found since Dobinson published his information. The site was decommissioned in late 1944-early 1945 and the area was then used for military training in the build up to the D-Day landings; tank tracks from the latter activity extend north-south across the east side of the site and over the surrounding moorland for over 1.5km. Contemporary aerial photographs dated to September 1943 show the tank tracks, suggesting that the decoy had been abandoned by then (see below).
- 2.31 Starfish sites were generally positioned to the south and south-east of the centre which they were meant to protect, and within c.10 miles of the urban limit (Dobinson 1996, 44). The Low Moor example corresponds with the southern positioning, but it is set c.27.5 miles away from the approximate wartime urban limit of Middlesbrough.
- 2.32 The semi-circular firebreaks, some nine in all and some with internal divisions, are shown on historic and recent aerial photographs, with the former positions of individual fire baskets seen within some of the groups, as well as the access road which follows a curving alignment from New May Beck farm and enters the site in its south-west corner (see figure 12A); this route branches south off the B1416 road at Red Gate. It was previously reported that the firebreaks varied from 100-200 yards in diameter, and that the earth banks were evident on the ground, originally being c.15ft wide and 6ft deep (5m by 2m), but in 2008 they were only c.2ft deep (Harwood & McMillan 2008a, 89). The same source notes that coal was found in the centre of the firebreaks, indicating that all the four types of fire-producing equipment were used, namely boiler, grid, baskets and coal fire (Harwood & McMillan 2008a, 87). The SM description notes that the firebreaks form shallow ditches up to 1.5m wide and 0.75m deep, forming seven enclosures ranging in size from 40m to 100m in diameter, and all take up an area of c.400m by c.300m (Historic England scheduling description, SM 1019757). Unfortunately, the fact that the site was significantly disturbed by tanks after it went out of use means that the firebreaks are now very difficult to locate in the heather ground cover. Dobinson (2000, 222) includes a 1992 aerial photograph of the site, and the more recent Google Earth 2009 imagery clearly shows the tank tracks (see figure 12B).
- 2.33 The control shelter is said to have been located to the north-west of the Starfish site itself, on the east side of the access track to New May Beck on Sneaton Low Moor opposite a wooded area adjacent to a modern caravan park, but that it was

demolished before 2003; the remains of its concrete foundations and brick rubble were found (Harwood & McMillan 2008a, 88-89) (see figure 12C). Harwood and McMillan note the site as being at NZ 89550 03950, but this places it further to the north and away from the road, and not in the position as shown on their sketch plan. The day-to-day operation of the complex was maintained by RAF No. 80 Wing at Radlett (Hertfordshire) and the parent RAF Station at Middleton-St-George, near Darlington (Harwood & McMillan 2008a, 87). One source suggests that the personnel staffing the site were housed in tents and Nissen huts in woodland 1.5km to the north-west (Historic England scheduling description, SM 1019757), presumably near the shelter, although elsewhere it is noted that personnel were billeted in local pubs and farms (the Wilson Arms, the Old Rectory and Manor House Farm in Sneaton), and that the manpower comprised 19 airman, a sergeant and an electrician (Harwood & McMillan 2008a, 87). It is also suggested that the site was bombed at least once, as a string of bomb craters can be seen running from north-east to south-west across the site (Harwood & McMillan 2008a, 88).

- 2.34 An aerial photograph taken on 23rd September 1943 (Historic England archives RAF/AC577 v 5076) clearly shows the northern firebreak enclosures of the Starfish site, with arrangements of fire generating equipment (mostly basket fires) inside them, although one or two of the firebreaks might also contain grid or coal fire apparatus (see figure 13); the similar Starfish site at Osmotherley was also only equipped with basket fires (Dennison & Richardson 2021, 7). Interestingly, the largest north-easterly enclosure is crossed by numerous tank tracks, with a lesser number crossing some of the others, suggesting that the decoy had gone out of use by this date, although the basket fires are still in position. Unfortunately, the resolution is not clear enough to see any other details, although numerous bomb craters aligned roughly east-west are shown either side of the B1416 road to the north. Other aerial photographs, taken on 27th August 1946 (Historic England archives RAF/106g/UK/1700 rp3438 & v5440) show that the fire baskets have been removed.
- 2.35 Other photographs taken on 23rd September 1943 (Historic England archives RAF/AC577 v 5077) and 27th August 1946 (Historic England archives RAF/106g/UK/1700 rp3437), show an isolated structure and also a Nissen hut, interpreted as being the Starfish control shelter, in the position sketched by Harwood and McMillan on the east side of the track to New May Beck (NGR NZ 89525 03869). However, this would place the shelter some 1.2km away from the Starfish site, and there is higher ground between the two which means that there is no visible interconnection; the control shelter at the Osmotherley Starfish site was located only 500m-600m away from the firebreaks. No structures are shown in this position on the 1952 Ordnance Survey 6" map (sheet 46NE, revised 1950).

Low (Sneaton) Moor QL Site (QL96b)

- 2.36 The QL decoy appears to have primarily simulated urban lighting, such as street lighting, lights from open doors, and flashes from tram wires, and also perhaps industrial lighting such as furnace glows, dock and railway lights. There does not seem to have been a QF component, this instead being provided by the nearby Starfish decoy. Although the full extent of the QL site has not yet been established (see below), it covers at least c.5.2 acres (although the majority is concentrated within a much smaller area) and so falls within the smaller range of QL sites.
- 2.37 There is little detailed published information available about the Civil Sneaton QL decoy. Interestingly, Dobinson (2000, 286) notes that it formed part of the Civil 'C'

series and was designated as site C96b, whose parent was the 'North-East Coast'; the other QL decoy in this group was located at Aldbrough, on the Holderness coast of East Yorkshire, which was operated in conjunction with a Starfish site (SF31d) protecting Hull. This distinction might suggest why the Starfish and QL site on Low Moor were physically separate. The other Q-type sites in the Middlesbrough system were located at Grangetown (QF/QL), Bran Sands (QF/QL), Seal Sands (QF/QL), Greenabella (QF), Cowpen Bewley (QF/QL), Newton Bewley (QL, operating with the Starfish here), Wolviston (QF/QL), Elton (QF), Middleton (QF) and Kirkleatham (QF, operating with the Starfish here) (Dobinson 2000, 276) (see figure 3A).

- 2.38 The HERR record suggests that the Low Moor QL site operated between 2nd October 1942 and 1st May 1943 (HERR 1345990). The QL decoy is therefore likely to have had a maximum operational life of only some eight months. The surveyed site is suggested to have contained 'open door' and 'roof/skylight' types of simulated lighting, and in 1975 a Forest Enterprise Ranger found evidence of lights and wiring in an open door simulation trench (Harwood & McMillan 2008a, 87 & 89). It is suggested that there were at least seven such features within the decoy, and a photograph accompanying an earlier brief description shows the remnants of a wooden and corrugated sheeting structure at one of them (see figure 14D). The description also includes a reconstruction of the 'open door' and 'roof light' features that were present (see figure 14B); the latter differs from the other reconstructions consulted for this report, in that the feature is largely formed by a sunken trench rather than a wooden frame erected above ground. Earthwork evidence suggests that military vehicles were driven across the decoy after it had fallen out of use, either deliberately to disguise its form or incidentally as part of the same pre-D Day training which disrupted the remains of the Starfish to the west.
- 2.39 Dobinson (2000, 142) states that, in many cases, the lights and wiring on QL sites were controlled from a separate shelter, although the Scheduling description suggests that at Low Moor, both the Starfish and the QL decoy were operated from a now demolished concrete shelter thought to have been located 1.3km to the north-west of the Starfish site, visible on a September 1943 aerial photograph (see above). However, this control shelter is actually 2.3km to the north-west of the QL site, which seems a very long distance across which to lay wires and cables to operate the various devices.
- 2.40 Unfortunately, the QL remains, being relatively small-scale, are not really visible on the wartime aerial photographs (e.g. RAF/106g/UK/1700 rp3438 & v5440 taken 27th August 1946), although a series of white dots, some arranged in north-south lines, are shown on earlier photographs of September 1943 (Historic England archives RAF/AC577 v5076). It is not clear whether these dots actually represent the remains of the decoy. The site of the possible QL control shelter, identified during the walkover survey (see below), is depicted as an unnamed structure on the 1952 Ordnance Survey 6" map (sheet 46SE, revised 1950) (see figure 14C); on the earlier 1949 War Department map it is named as a 'shooting box', presumably reflecting its post-war use (see figure 10B).
- 2.41 The majority of the QL site is covered by recent LiDAR imagery, and this shows a number of the small earthworks in the detailed survey area (see figure 14A) (see below). Only a few other features are visible in the walkover survey area to the north of the Kirk Moor Beck, and the most prominent are the Thorn Key Howes barrows and another circular 'tumulus'. However, the tank tracks crossing this part of the moor and the QL site in particular show up very well (NYMNP A HER).

- 2.42 Harwood and McMillan's sketch of the site (2008a, 88) also shows a second QL site to the south-east of New May Beck Farm (see figure 2). This could not be investigated in the field as part of this current project, and part of the site is now covered with a plantation. However, perhaps this QL site was operated from the now demolished night shelter further to the north, rather than it being the control point for the main Starfish site?

3 DESCRIPTION OF DETAILED MEASURED SURVEY AREA

Introduction

- 3.1 Before reading the description of the detailed survey area, a number of important points need to be considered. Firstly, the earthworks appear to represent two phases relating to the QL decoy. The earlier is the ground disturbance involved in constructing and setting out the decoy, and the later being what remains of the decoy after all above-ground structures had been removed, augmented by deliberate or incidental vehicle damage. Reconstructions of the kinds of features that would likely have been present at a typical QL site (for example, Dobinson 2000, 140-141; see figures 8A, 8C and 9) show a partially buried frame holding them in place and, in at least one example within the survey area, rabbit burrowing has exposed what may be the remains of such a frame made from angle-iron (see below). Contemporary photographs also appear to show angle-iron elements to the corners of some of the features erected at QL decoys, although other devices such as the 'reed light' and 'jinx light' would leave minimal or no surface features (Air Historical Branch und., 224-226; see figure 9). Secondly, as far as the authors are aware, there are no other earthwork surveys depicting what a QL decoy looked like after the features had been removed, as opposed to reconstructions of what they may have looked like during operation and the various disposition of devices within a site (see figure 7). There is therefore virtually no comparative information against which to assess the identified remains within the detailed survey area.
- 3.2 Therefore, in the following description, the identified earthworks have been divided into a number of different types, based on their form and appearance at the time of the survey (see figure 15). A possible interpretation of these types and what they might indicate about the form and layout of the decoy is offered in the Discussion and Conclusions below. The types are as follows:

Type A - zigzag trenches with a pit at either end

- 3.3 A trench with a 'W' or 'M' plan form, with an average length of between 6m and 8m. The outer ends comprise rectangular pits, measuring on average 2.0m by 1.5m, connected by a narrower angled section with an average width of 0.60m. The sides of the trench are steeply scarped, and up to a maximum of 0.60m deep. There is often a low bank of spoil, generally to the eastern, downslope, side, which has been thrown up by the excavation. In one example, there is a parallel bank of spoil to the upslope side with the same plan form. There are at least nine examples of this type within the detailed survey area, mostly concentrated in the southern part, but with two outliers at the northern end; two examples were subject to more detailed surveys. Harwood & McMillan (2008a, 87 & 89) refer to these types as an 'open door V trench simulation' and suggests that a V-shaped slip trench, containing a single light bulb, could be made to simulate the opening and closing of a door - their reconstruction shows a 'W' or 'M' plan trench with a flat corrugated iron roof supported on timbers over one end (see figure 14B). In another context, these trenches could be considered to be slit trenches or

weapons pits, but one would normally expect these to be straight rather than having an angled alignment.

Type B - rectangular pit with arm extension

- 3.4 A rectangular pit, measuring on average 1.2m by 2.0m, with a short arm up to 1.4m long set at an approximate right angle to one corner. The main pit is up to 0.40m deep, and the arm somewhat shallower. There is often a low bank of spoil to one side, which has been thrown up by the excavation. There are at least two examples of this type within the detailed survey area, both on the east side of the southern part.

Type C - larger rectangular pit with arm extension

- 3.5 A rectangular pit, similar to Type B above, but slightly larger in size, being on average 2.0m by 1.5m, with a right-angled arm, up to 2.0m long, running off the centre of one of the short sides. Both the pit and the arm have steeply scarped sides and are up to 0.40m deep. There is a low bank of spoil surrounding, thrown up from the excavation. There are at least two examples of this type within the detailed survey area, both within the southern part.

Type D - sub-rectangular or sub-oval pit with angled arm extension

- 3.6 A sub-rectangular or sub-oval pit, measuring up to 3.0m square but generally 2m square, with an angled arm up to 4.0m long running off one corner. In most examples, the arm angles away from the pit in two sections, although in at least one case the arm resembles the central section of the Type A trench described above; it may be that some of these types are in fact Type A trenches where one outer pit has been infilled or damaged. Both the pit and the arm are up to 0.40m deep, and this type appears to be particularly prone to rabbit burrowing; in one example, the burrowing may have revealed part of a below ground angle-iron frame. There is often a low bank of spoil to the eastern, downslope side, which has been thrown up by the excavation. There are at least seven examples of this type within the detailed survey area, mostly concentrated in the southern part, but with one outlier at the north end.

Type E - shallow, sub-rectangular or oval depression

- 3.7 A shallow, sub-rectangular or oval depression, generally measuring no more than 2.0m across and 0.20m deep, and with only a very shallow spoil bank or collar (or indeed none at all). There are at least 15 examples of this type within the detailed survey area, generally forming north-south lines across the central and northern parts.

Type F - well-defined sub-circular depression

- 3.8 A well-defined sub-circular depression, up to 2.5m across and 0.60m deep, surrounded by a relatively prominent collar of spoil. The type resembles a small bomb or mortar crater, but is neatly constructed. There are at least two examples (and perhaps as many as five), all situated along the southern edge of the detailed survey area, along the top of the north slope of the tributary of the Kirk Moor Beck.

Type G - low U-shaped mound of spoil, surrounding a central depression

- 3.9 A low, U-shaped mound of spoil, surrounding a central depression, measuring up to 4.50m across but generally smaller. The U-shaped mound is open to one side, but there is no clear pattern to the direction of the opening. There are at least six examples of this type across the central and southern parts of the detailed survey area.

Other Earthworks

- 3.10 In addition to the types defined above, there are numerous other earthworks within the detailed survey area which may have formed part of the decoy but which are too poorly defined or preserved to categorise. There are also a small number of larger features which do not fit easily into the above categories, and which are described separately below.

The Survey Area

- 3.11 As noted above in Chapter 1 above, the detailed survey area measured c.175m north-south by 120m east-west, and was set on the north side of a tributary of the Kirk Moor Beck (which originates in Mires Slack to the west), to the immediate west of the A171 Whitby to Scarborough Road (see figure 2). This tributary is set in a deep valley which actually forms part of the boundary of Fylingdales Moor. The core of the decoy (as examined by the detailed survey) occupies an area of relatively level ground covering the eastern half of the survey area, set at an elevation of c.168m AOD, and spread out across a sub-rectangular area measuring c.100m north-south by 65m east-west; it is noticeable that this area is largely devoid of heather vegetation but is instead closely cropped grass [1/759, 1/760, 1/772] (see plate 1).
- 3.12 The digital photographic record taken as part of the survey work is referenced in the text below using italics, the numbers before the stroke representing the date on which the photograph was taken and the number after indicating the individual shot (e.g. [1/001]); a number of the photographs are also reproduced below as plates.

Identified Earthworks (see figure 16)

- 3.13 Within the core area of the detailed survey, the earthworks appear to be laid out in four approximate lines or rows, running almost north-south, set between c.16m and c.25m apart. There are also further potential alignments to the south and west of this core area.

Alignment 1: East

- 3.14 The east alignment has a Type D sub-rectangular or sub-oval pit with an angled arm extension at the south end [1/700, 1/701, 1/773] (see plate 2), with a pair of shallow sub-circular depressions, c.1.0m in diameter, to the immediate north. There is then a Type B rectangular pit with an arm extension, with the arm pointing to the south [1/703-1/705] (see plate 3 and figure 15), and to the north of this, a second Type B feature with the arm pointing to the north [1/706]. Beyond this, there may be a faint, sub-rectangular area of ground disturbance measuring c.5m by 2m.
- 3.15 The main features within the alignment are spaced at c.10m-11m centres and, when viewed from a distance, they appear to be linked by an almost continuous

line of disturbance/spoil on their east sides [1/702]. As surveyed, the alignment runs for c.35m. It might have been expected to have continued beyond the post and wire fence here and into an area of dense bracken/heather cover to the north. However, probing with ranging rods revealed no obvious features within the bracken, and the LiDAR coverage shows no obvious features here either.

Alignment 2: Centre East

- 3.16 The central east alignment has a Type G low U-shaped mound surrounding a central depression at the south end, open to the south-east and positioned close to the top of the scarp sloping down to the Kirk Moor Beck tributary [1/710] (see plate 4). Just to the west of this, there is a Type A zigzag trench, aligned north-east/south-west [1/711, 1/712]. Moving north within the general alignment, there is then a Type D sub-rectangular or sub-oval pit with an angled arm extension running off to the north [1/709] (see plate 5 and figure 15, D1); this earthwork is crossed by north-east/south-west aligned vehicle tracks with a width of 2.50m [1/707]. At the apparent end of the row, there is a second Type A zigzag trench, aligned north-west/south-east [1/708] (see plate 6). This example is unusual in that it has a linear spoil bank to the west, running parallel to the trench. There also appears to be a faint sub-circular earthwork, c.2.50m in diameter, attached to the south pit, with other faint depressions resembling small Type E depressions to the north and west. The main features within this alignment are spaced at c.15m centres and, as surveyed, it appears to extend for c.40m.

Alignment 3: Centre West

- 3.17 The central west alignment has a Type D sub-rectangular or sub-oval pit with an angled arm extension at the south end [1/715] (see plate 7). This has been extensively burrowed by rabbits, revealing a buried piece of horizontal angle-iron, possibly a remnant of the below-ground frame of the structure once positioned here [1/717, 1/720] (see plate 8). The short arm associated with this earthwork runs off to the north in a curving rather than in a zig-zag fashion.
- 3.18 Moving north, there is a Type G U-shaped mound surrounding a central depression 4.0m in diameter and open to the south-east, and then a Type D sub-rectangular or sub-oval pit [1/737-1/739] (see plate 9 and figure 15, D2). It is possible that this earthwork has been modified by several later phases of activity. The deeper parts of the feature resemble the Type D earthworks seen elsewhere, but the pit may have been subsequently enlarged on the south side to create a depression that is now c.4m square in plan (although of varying depth); there is a low but wide area of spoil extending around three sides of the pit. Additionally, the arm which angles away to the west from the pit has a second, short arm running off its south side. This could however be a short rut caused by a vehicle tyre or track digging into soft ground, as it is aligned on a vehicle track approaching from one of the hollow ways to the south. To the immediate west of the above Type D earthwork, there is low crescent-shaped bank measuring c.8m across, enclosing a smaller bank of a similar plan form within [1/736].
- 3.19 Continuing the main alignment, to the north of the aforementioned Type D earthwork, there is what may be a Type C earthwork, with the arm pointing to the south-east, and then three small widely spaced Type E depressions. These extend almost as far north as a modern vehicle track which crosses the north part of the survey area, but they do not continue beyond it. The main features within the row are spaced at centres varying between c.12m and 20m, and the whole

alignment runs for a distance of c.820m. The Type D and C earthworks are quite prominent on the LiDAR imagery (see figure 14A).

Alignment 4: West

- 3.20 The west alignment has what appears to be a denuded or damaged Type A zigzag trench at the south end, aligned north-south and placed within one of the hollow ways here [1/725-1/727] (see plate 10). There is then a gap of c.15m, before another denuded Type A earthwork is apparent, aligned east-west. This has a well preserved Type C rectangular pit with an arm extension to the east, with the arm leaving the south side of the pit and then turning through a right angle to the east [1/735] (see plate 11). Moving north, there is a well preserved Type A zigzag trench, aligned north-south [1/742, 1/743], and then a second Type C earthwork, with the arm leaving the east side of the pit and then turning through a right angle to the north [1/740, 1/741] (see plate 12 and figure 15).
- 3.21 Immediately beyond this, there are two further well-preserved Type A zigzag trenches [1/744, 1/746-1/749] (see plate 13 and figure 15, A1), both aligned north-south, and flanked by Type E depressions to the east and west. Finally, there is a Type D sub-rectangular or sub-oval pit with an angled arm extension to the north, suffering from rabbit activity [1/750, 1/751] (see plate 14), with at least four widely spaced Type E depressions to the north again [1/752, 1/753] (see figure 15). These continue just beyond the modern east-west vehicle track. At the north end of the row is a denuded earthwork which might represent a Type D feature. The main features in the southern half of the row are more closely spaced than in the other alignments, and this line is also the most badly affected by the north-south aligned vehicle tracks crossing the decoy area; these have an average width of 2.50m (see also plate 14). Nevertheless, the Type A trenches are quite prominent on the LiDAR imagery (see figure 14A).

Alignment 5: West of Core Area

- 3.22 There may be a further north-south alignment of earthworks to the west of the core area described above, set at the base of a natural south-east facing scarp. At the south end, some of these are no more than shallow sub-circular mounds. The alignment may extend to the south, across a shallow marshy gully [1/728, 1/732] which runs south-eastwards to join the tributary of the beck, where there is a well preserved Type G mound, open to the south [1/729, 1/730] (see plate 15), together with other poorly defined earthworks in the vicinity. Close to the south side of the east-west vehicle track crossing the northern part of the survey area, there is a pair of Type G mounds, open to the east and north-east respectively (see figure 15). The alignment continues to the north of the modern vehicle track, with two Type E depressions set at the base of the scarp. Overall, this alignment extends over some 135m.

Alignment 6: South end of Core Area

- 3.23 On the south side of decoy's core area, there are numerous other earthworks, some of which appear to be grouped. A number of Type F well defined sub-circular depressions are all apparently located at the southern end of the detailed survey area, often on or close to the edge of the scarp sloping down to the Kirk Moor Beck tributary, on the east and west sides of the hollow ways here [1/714] (see plate 16); one on the west side of the hollow ways is particularly well defined [1/731] (see figure 15). It is possible that these earthworks form a curving

alignment along the top of the natural slope here, which extends for some 85m roughly east-west.

Alignment 7: North-west of Core Area

- 3.24 On the top of the same scarp, at an elevation of c.172m, there is a short line or row of features set on a north-east/south-west alignment, either side of the modern vehicle track. At the south end, there is a Type D sub-rectangular or sub-oval pit with an angled arm extension running to the north, and to the centre there a well-preserved Type A zigzag trench [1/754-1/757] (see plate 17 and figure 15, A2); this latter earthwork is visible on the LiDAR imagery at the south-west end of a hollow way (see figure 14A). To the north end of the row, there is what may be a Type D earthwork, or possible a Type A feature which has been truncated [1/758]. This alignment was seen to continue to the north during the walkover survey, where further Type A zigzag trenches were identified (see Sites 5 to 8 below).

Isolated Earthwork

- 3.25 Finally, at the north-east corner of the detailed survey area, there is another possible Type A zigzag trench, apparently isolated between a series of hollow ways [1/766-1/769] (see plate 18). Again, this alignment was seen to continue to the north where further Type A trenches were identified during the walkover survey (see Sites 2 and 3 below).

Hollow Ways and Vehicle Tracks

- 3.26 The detailed survey area is crossed by numerous hollow ways and vehicle tracks. At the south end of the survey area, there are four short hollow ways which climb the north side of the valley of the Kirk Moor Beck tributary [1/721-1/724] (see plate 19). The hollow ways are all aligned broadly north-south, with an average length of c.18m and an average width across the top of c.3m to 4m. They have steeply scarped sides and are up to 1m deep. It seems likely that these hollow ways pre-date the decoy, as one has a denuded Type A zigzag trench cut into the base (see above). However, some were subsequently re-used as vehicle and tank tracks. Limited sections of vehicle tracks also survive to the south of the marshy gully running into the Kirk Moor Beck tributary, but they are much clearer to the north of the hollow ways [1/733, 1/734] (see plates 14 and 20). There are at least three parallel lines of tracks following a curvilinear route for c.120m across the decoy's core area and beyond; more are visible on the LiDAR imagery (see figure 14A). The tracks have an average width of 2.40m. At least one vehicle track of a similar width ran north-east/south-west across the core area. Google Earth images from 2009 and 2021 suggest that this can be followed for 220m to the south-west of the detailed survey area, where it joins with other trackways to form part of a longer distance route.
- 3.27 At the north end of the detailed survey area, there are a series of parallel, sinuous, north-east/south-west vehicle trackways that can be followed for c.110m. They are on average 2.40m wide, and in one case have formed a curvilinear depression, c.3m wide and 0.80m deep [1/762]; it is possible that the latter is actually an earlier hollow way, forming part of the trackway shown crossing the survey area in 1853. Again, Google Earth photographs from 2009 and 2021 and the LiDAR imagery suggest that these features form part of a longer distance route than can be followed for at least 500m, and that at their south-west end they may have a common origin with the north-east/south-west trackway described above crossing the core decoy area.

- 3.28 Finally, the trackway shown in 1853 appears to have left the line of the modern A171 along the route of one of the well-preserved and prominent parallel hollow ways here. These hollow ways gradually become shallower as they approach the survey area and, where they enter the north-east corner, the two most prominent are c.3m wide and 1m deep [1/764, 1/770, 1/771] (see plate 21). They continue to fade as they move north-west, and perhaps to cut a number of even fainter, poorly defined linear depressions that may also represent former trackways [1/761, 1/763].

4 DESCRIPTION OF WALKOVER SURVEY AREA

Introduction

- 4.1 Once the detailed survey was complete, it was later decided to extend the survey area, to see if any of the identified earthworks or alignments continued to the north. This was achieved by a walkover survey.
- 4.2 The walkover survey area is described below, in a logical order. The same plan form typology as was used for the detailed survey area has been used, so comparisons between the two sets of earthworks can be made. As before, the digital photographs are referenced in bold type and square brackets, the numbers before the stroke representing the date on which the photograph was taken and the number after indicating the individual shot (e.g. [1/001]); a number of the photographs are also reproduced below as plates.

Identified Earthworks

- 4.3 Starting at the south end of the walkover survey area, the southernmost earthwork was the possible Type A zigzag trench (NGR NZ 91513 02900) (Site 1) lying at the north-eastern limit of the detailed measured survey area. Rather than being an isolated example, as had previously been thought, this was found to form part of an angled alignment with two other Type A trenches, spaced at approximate 20m centres; the row is aligned north-west/south-east, although the individual features tend to be placed more to east-west, and they are set at an average height of 172m AOD. Both the central example (Site 2 - NGR NZ 91510 02919) [2/049] (see plate 22) and northern trench (Site 3 - NGR NZ 91489 02935) [2/050] are well preserved, and each is between 5.5m to 6.0m long.
- 4.4 To the west, at the top of natural east-facing scarp forming the western limit of the detailed measured survey, the northernmost Type D sub-rectangular or sub-oval pit feature or possibly a truncated Type A feature (Site 4 - NGR NZ 91450 02870) was previously recorded as part of Alignment 7 as the detailed measured survey (see above). To the north-west of this, after a gap of c.30m, there is an alignment of four Type A zigzag earthworks, set at the top of the same scarp and spaced at c.18m to 20m centres. All are aligned broadly north-west/south-east, and are set at an average height of 177m AOD. The two southernmost examples (Site 5 - NGR NZ 91436 02891 and Site 6 - NGR NZ 91435 02909) are poorly preserved, measuring c.6.0m in length. However, the third feature (Site 7 - NGR NZ 91432 02920) is well defined and measures c.7.0m long and up to 0.5m deep [2/051, 2/052] (see plate 23). The northernmost feature (Site 8 - NGR NZ 91427 02940) is denuded, with only the central section being clearly visible. It is possible that these four features represent a northern continuation of Alignment 7 seen in the detailed survey area.

- 4.5 Moving to the north side of the steep-sided narrow valley housing the Kirk Moor Beck, there is a row or string of four possible bomb craters (Sites 9, 10, 11 and 13). They are set on a slightly curvilinear north-west/south-east alignment, at centres of between c.22m to 35m, and at height of between 166m and 170m AOD. They are clustered along a natural linear depression resulting from water erosion (and several were indeed filled with water at the time of the walkover survey), and it is possible that some, if not all, are not caused by bomb damage. The southernmost example (Site 9 - NGR NZ 91535 02978) has a sub-rectangular plan, measuring c.7m by 3m and with a maximum depth of c.0.5m. The next example (Site 10 - NGR NZ 91520 03005) is similar, but the third feature in the string (Site 11 - NGR NZ 91503 03020) comprises a sub-circular depression, c.5m wide and 0.6m deep. The northernmost feature (Site 13 - NGR NZ 91471 03042) is slightly out of alignment with the other three, but it is very similar to the others, measuring c.8m by 3m. A number of depressions are shown in this area on the LiDAR imagery (see figure 14A).
- 4.6 Some 25m to the west of the possible bomb craters, there is an earthwork (Site 12 - NGR NZ 91480 03025) that is possibly a former observation trench [2/053] (see plate 24). It is aligned north-south, c.10m long and 0.5m deep, and appears to comprise two parts. The larger part resembles a slightly angled narrow trench, while the smaller part to the south is a sub-rectangular pit. It therefore might be a Type D feature. However, there may be other pits in the same area, all set out in a broadly sub-circular arrangement. The earthworks may have formed a small observation post, and it may be significant that it is positioned just south of a historic crossing point of the steep sided valley of the Kirk Moor Beck named as Thorn Key Wath, where a number of trackways converging on it from the east and west (see figure 14C). Some of these survive as earthworks, including one within the walkover survey area (Site 14 - NGR NZ 91466 03052 to NZ 91518 03051). This follows a slightly sinuous, east-west line for c.100m, and comprises a linear depression, 0.5m deep, with a spread bank running parallel to the southern side; together, the depression and bank have a combined width of 3.5m, and it is very visible on the LiDAR imagery (see figure 14A). In sections, the earthwork more closely resembles a leat than a trackway, although there is no known evidence for artificial water movement across the walkover area.
- 4.7 However, more relevant to the possible trench and associated earthworks noted above (Sites 12 and 14), is the presence of another crossing point of the beck just to the south of Thorn Key Wath, which shows signs of significant military activity, as evidenced by the mass of vehicle tracks which approach it from both sides. From the west, on the 2009 and 2021 Google Earth imagery, and the LiDAR imagery (see figure 14A), the tracks are visible approaching the crossing point as a band at least 100m long and 50m wide. They narrow as they descend to the crossing point but then fan out again as they climb the slope to the north-east, eventually reaching a total width of over 200m. The tracks can be followed for at least 650m north-east of the crossing point, as far as the A171 road. It may be that the possible trench and associated features formed an observation point or even a firing point for exercises with military vehicles crossing a natural obstacle.
- 4.8 There is another similar earthwork (Site 15 - NGR NZ 91581 03046) in an isolated position in the eastern part of the survey area. It comprises a sinuous linear depression, aligned north-south, c.8.0m long and 0.5m deep. There is a very narrow linear depression running into the main depression from the south-east, which could be interpreted as a cable trench. The earthwork could be a denuded example of a Type A decoy zigzag trench, but this is considered unlikely as throughout the rest of both survey areas they occur in rows rather than in isolation.

However, c.75m to the north, just to the east of the limit of the vehicle tracks, there are two sub-circular depressions (Site 16 - NGR NZ 91570 03116 and NGR NZ 91562 03123) set c.10m apart. Each is formed by a well-defined sub-circular depression, up to 3.0m in diameter and 0.8m deep; there may be a third, denuded example to the south-east. These may represent Type F decoy features, but their relatively isolated position away from other earthworks might, on balance, suggest they are bomb craters.

- 4.9 To the immediate west of the vehicle tracks, close to where they emerge from the steep-sided valley, there are two further bomb craters (Site 17 - NGR NZ 91457 03115 and NGR NZ 91460 03105) set c.10m apart, each being sub-rectangular in plan, c.6.0m long and 1m deep [2/055] (see plate 25). A short distance to the north, there is a possible denuded Type A zigzag trench (at NGR NZ 91455 03128) although again, its isolation from any other decoy features and positioning at the base of a natural scarp makes this unlikely and it could be another bomb crater. It is noticeable that these three craters are on the same alignment as others further to the south-east (Sites 9 to 11).
- 4.10 There is a cluster of more definite decoy features within the central part of the walkover survey area, all placed at an elevation of c.179m AOD on the east side of the Kirk Moor Beck. The east part of the cluster is formed by an alignment of three Type A zigzag trenches, running north-south but with individual features aligned north-east/south-west and set at c.20m centres. The two end examples (Site 18 - NGR NZ 91489 03166 and Site 20 - NZ 91488 03202) are denuded, but the central example (Site 19 - NGR NZ 91491 03182) is better preserved [2/054]. All three lie within the spread of vehicle tracks in this area.
- 4.11 At a right angle to the south end of this line, there is another line of two Type D sub-rectangular pits with angled arm extensions, running off to the west (Site 21 - NGR NZ 91476 03165 and Site 22 - NGR NZ 91462 03169), again set at 20m centres and aligned east-west. There is a third Type D feature (Site 23 - NGR NZ 91455 03185), aligned north-south, set c.20m to the north of the alignment. In addition to these earthworks, there are several others in close proximity that may be associated. A denuded earthwork (Site 24 - NGR NZ 91464 03185) could be an example of a Type C rectangular pit with an arm extension, while a c.20m long line of shallow scrapes (Site 25 - NGR NZ 91452 03175), running north-west/south-east along the top of a natural break of slope could represent a number of Type E depressions.
- 4.12 There appear to be very few potential decoy earthworks or indeed other features visible beyond this cluster, although the ground is so heavily disturbed by vehicle/tank tracks that they would be very difficult to identify amongst the ruts and linear depressions. There is a possible example of a sub-rectangular pit (which might be a Type B pit but without the arm extension), c.5.0m long by c.2.0m wide and 0.5m deep, c.60m to the south of Thorn Key Howes (Site 26 - NGR NZ 91504 03283), although its isolated position might suggest another probable military function.
- 4.13 More convincingly, a feature has been dug into the east side of the south barrow at Thorn Key Howes (Site 27 - NGR NZ 91493 03336) at an elevation of c.189m AOD; this site is a Scheduled Monument (NHLE 1019794). The feature is aligned north-south and is T-shaped in plan, with a short linear depression, perhaps an entrance point, leading into a c.8.0m long linear depression resembling a second trench possibly with pits set at either end. The feature might again have a non-decoy function, for example to observe or fire up the vehicles passing to the east,

although it is noticeable that there is good view from here towards the QL decoy and also towards the Starfish decoy to the west. The Scheduled Monument description does note that the barrow has been disturbed by previous excavation, implying an 'archaeological' investigation rather than wartime activity (Historic England scheduling description, SM 1019794), and it is possible that the linear depression results from this, although it is equally possible that a previous excavation was utilised in the Second World War.

Night Shelter Base

- 4.14 Some c.300m to the west of Thorn Key Wath, overlooking the north side of the watercourse forming the valley of Far Middle Syke, there are the remains of an apparent Second World War shelter (at NGR NZ 91150 03157). The footings were exposed by heather burning several years ago by the tenant farmer (Philip Turford of Keith Rigg Farm). They are now partly covered with heather re-growth which obscures some of the detail. The isolated structure is shown on the Ordnance Survey 1952 6" map (sheet 46SE, revised 1950) (see figure 14C). The site is recorded on the NYMNP HER (site 8687) as a 'hunting lodge', presumably referring to its label of a 'shooting box' on the 1949 War Department map (see figure 10B).
- 4.15 The structure measures 9.00m by 3.00m externally, with the long axis aligned north-west/south-east, defined by banks 0.30m high and 0.50m wide [2/191, 2/192] (see plate 26). The base is formed by an exposed concrete pad on which the bricks of the walls were laid; only one course of brickwork now survives, and this to the corners of the building only [2/194, 2/195] (see plate 27). The bricks are red, apparently handmade (average dimensions 230mm x 110mm x 70mm), although there is at least one *ex situ* machine-made moulded brick evident [2/197]. It is possible that the bricks were re-used from elsewhere, with the moulded brick being contemporary with the date of construction. The density of the heather meant that it was not possible to determine any internal features or even an entrance, although the east corner is offset, perhaps suggesting an entrance here although this would not conform to the specific design [2/193]. However, there is no evidence for any external blast wall here, or along any of the long walls, which might be expected at any entrance.
- 4.16 It is unclear what the structure was used for. Views to the main part of the QL site to the south-east are generally obscured [2/196] (see plate 28), but there are extensive views to the Starfish site to the west across the shallow valley of Far Middle Sike [2/198-2/201] (see plate 29). However, the structure is of the correct dimensions to have served as the night shelter for the QL site (see figure 8D) although there does not appear to be an entrance in any of the long sides of the building, and no evidence for any external blast wall or expansion chambers; however, they could have been demolished to ground level and are now not visible beneath the heather re-growth. This structure is located c.500m to the north-west of the core of the QL site, and it was quite common for there to be no direct line of sight between the shelter and the decoy. There was no necessity for a visual link as the lights were directly controlled from within the shelter and there could have been an intermediate observation post if needed, and views could often be had by standing on the roof of the shelter if required, accessed via the internal escape hatch (Roger Thomas, *pers. comm.*). If not the control shelter for the QL decoy, it could have been used as an observation post from which to observe the operation of the Starfish site further to the west. Of course, it is also possible that it could have performed both functions as both types of decoys were frequently operated together, the QL decoy used to initially attract bombers and then the Starfish decoy

was lit to encourage them to drop more bombs. However, in these instances, two shelters were constructed adjacent to each other.

5 DISCUSSIONS AND CONCLUSIONS

Date of Operation

- 5.1 The actual operating dates for both the Starfish and the QL decoy sites on Low Moor are not known, with limited published documentary references often only providing broad outlines. For example, the Middlesbrough Starfish scheme, which included that on Low Moor, was said to be complete by January 1941, although the first known reference to most of the sites in the group occurs on 1st August 1941 (Dobinson 2000, 135). Historic England note that the Starfish decoy is first referenced on 15th October 1941 whereas Dobinson and the HERR suggests it is 1st March 1942 (Historic England scheduling description, SM 1019757; Dobinson 1996, 149; HERR 1345990).
- 5.2 Similarly, there is no definite date for its closure or abandonment - the Scheduling description notes that the last known reference was 8th December 1943, while Dobinson says it was 8th April 1943. Either way, aerial photographs dating to September 1943 show the tank tracks across several of the decoy firebreaks (despite the fire-making apparatus still present), suggesting that the site had been abandoned by then. This would imply the Starfish decoy had an operating period of less than two years. Despite this, the Middlesborough system was seen to be one of the most effective of the Starfish groups during the war (HERR 1345990; Dobinson 2000, 213). The QL site is believed to have operated between October 1942 and May 1943, only some seven or eight months (HERR 1345990).
- 5.3 The day-to-day operation of the Starfish decoy was maintained by RAF No. 80 Wing Radlett and the parent RAF Station at Middleton-St-George, near Darlington (Harwood & McMillan 2008a, 87). It is presumed, although not confirmed, that this was also the situation with the QL site.

Siting of the QL Decoy

- 5.4 The siting of the QL decoy is not like those shown by Dobinson (2000, 143 & 144) in that it is not positioned between the firebreaks of a Starfish site, rather it is physically separate and c.1km to the east of it (see figure 2). This is not unusual - some 230 Starfish decoys in England had a QL component, whereas there were 142 'stand-alone' QL sites. Where they were co-located, it was usual for both types of decoy to have their own shelters, although they could be placed next to each other.
- 5.5 Harwood and McMillan (2008a, 88-89) and Historic England (scheduling description, SM 1019757) suggest that there was one single control shelter for both decoys on Low Moor, located on the east side of the access road leading from the B1416 at Red Gate to New May Beck Farm. A shelter with an adjacent Nissen hut is shown on September 1943 aerial photographs (at NGR NZ 89525 03869), but there is no indication of any other tented accommodation in the adjacent wood as noted by the SM description. Instead it is thought that personnel were billeted in local pubs and farms (the Wilson Arms, the Old Rectory and Manor House Farm in Sneaton), and that the complement comprised 19 airmen, a sergeant and an electrician (Harwood & McMillan 2008a, 87). However, this location for the shelter lies some 1.2km away from the Starfish site, and 2.3km to the north-west of the QL site, which would mean cables and other wires having to

span a considerable distance (see figure 2); a similar control shelter at the Osmotherley Starfish site was located only 500m-600m away from the firebreaks. Harwood and McMillan also suggest that there was another QL site just to the south-east of New May Beck Farm, and so perhaps this roadside shelter was associated with this site. If so, this would mean that the position of the Starfish control shelter is unknown; it may be somewhere along the curving access track to the Starfish site, perhaps in the area of the former Wilson's shooting hut where the track crosses the Fylingdales Moor boundary.

- 5.6 The concrete base of the control night shelter for the surveyed QL site, located either side of the Kirk Moor Beck on the east side of the A171 road, was identified during the current phase of fieldwork. It lies some c.300m to the west of Thorn Key Wath, overlooking the north side of the watercourse forming the valley of Far Middle Syke (at NGR NZ 91150 03157) (see figure 2). The dimensions of the base matches that for a typical QL shelter (see figure 8D), but no other upstanding remains survive and heather re-growth on the base means that no internal features (e.g. room divisions, generator beds etc) are visible, and there is no above-ground evidence for any external blast wall protecting the entrance or the expansion chambers for the generators. This shelter lies c.500m to the north-west of the core of the QL decoy.

Form and Layout of the QL Decoy

- 5.7 It is difficult to produce any proper discussion or conclusions regarding the earthworks of the QL decoy as recorded by the detailed and walkover surveys, as there seem to be no other surveyed examples against which to make comparisons. In addition, the sites relied on diversity to retain realism, and no two were alike; standard layouts were explicitly avoided to prevent recognition, and the sophisticated light displays could extend over areas of up to 30 acres in extent, the size of any decoy depending on the target it was intended to replicate.
- 5.8 The core of the QL decoy appears to lie within the detailed survey area, and it seems to comprise five main alignments or rows, laid out broadly parallel and on a north-south orientation on a relatively level shelf of ground, although the precise alignment and lengths of the rows varies (Alignments 1 to 5). Further to the west, there appears to be another line of features on the same orientation but set at a slightly higher level (Alignment 7), and which extends into the walkover survey area, and then a row of features aligned more east-west, positioned slightly back from the edge of a natural scarp (Alignment 6). These alignments all contain a mixture of the seven different types of earthworks identified by the survey (see figure 18). Alignment 4 contains a high percentage of Type A earthworks (zigzag trenches with a pit at either end), while Alignment 3 contains several Type D earthworks (pits with angled arm extensions), a Type C earthwork (a pit with arm extension), a Type G earthwork (U-shaped mound around a depression) and several Type E earthworks (depressions). Alignment 7, on the higher ground in the north-west corner of the detailed survey area, contains two Type D earthworks and a Type A earthwork, while to the north on a similar line are four further Type A zigzag earthworks. There appears to be a preponderance of Type F earthworks (sub-circular depressions) at the southern end of the detailed survey area, overlooking a tributary of the Kirk Moor Beck.
- 5.9 Within the walkover survey area, in addition to the extension of Alignment 7 noted above, there was a north-west/south-east aligned row of three Type A zigzag earthworks. There also appears to have been a cluster of features located c.350m

north of the core of the decoy, comprising a combination of Type A, C and D earthworks out in an approximate right-angled formation.

- 5.10 The lack of other comparable sites, and surveyed QL features generally, means that any interpretation of the seven types of earthworks recorded by the survey is very difficult. Many of the features illustrated or photographed show that there would be relatively minimal ground disturbance associated with their installation, with only the bases or legs of the various devices dug into the ground (see figures 8 and 9); the swinging or hooded 'jinx light', where a light was suspended only by a wooden pole or stick inserted into the ground to illuminate a patch of sand (see figure 9H), would be almost impossible to identify in the field. However, the illustrations provided by Harwood and McMillan (2008a, 89), which are presumably based on local knowledge and first-hand recollections, show two devices dug into the ground which would have left earthworks of the type recorded by the current survey (see figure 14).
- 5.11 It would appear that the earthworks recorded at the Low Moor QL decoy represent the remains of various 'leaky lighting' devices, designed to simulate poorly blacked-out urban streets rather than an industrial complex, maybe several rows of terraced houses with some outlying buildings to the north-west and the north-east. The zigzag Type A trenches correspond to the example illustrated by Harwood and McMillan (2008a, 89), while their buried structure could be represented by Type C and/or Type F. The rectangular pits seen in Types A, B, C and D could be the sites of semi-sunken 'box lights', 'reed lights', 'skylights' or 'open door' devices. But this is only supposition and the detail is missing. For example, do the pits at either end of the Type A zigzags indicate that there were two lights, and what is the purpose of the arm extensions coming off the Type B, C and D features - do they indicate where the wiring comes in, do they in part cause shadows from a box light located in the pit, or are they simply a means to access the lights and wiring for maintenance purposes? The Type D features seem to be particularly prone to rabbit burrowing - one example still contained a buried cast-iron frame, so does this indicate that either a more substantial below-ground frame has been removed and infilled, leaving softer soil, or were they were filled with a softer material like sand and so could actually be examples of the furnace/loco glow devices? The Type F and G earthworks might in some cases merely be better preserved or more denuded examples of the same thing. The Type E shallow depressions do appear to represent *something*, rather than being natural depressions such as tree pulls (as trees are generally absent) and they do lie within the general alignments. Perhaps the depressions result from the removal of a concrete block for a post from which a hooded light was supported, so simulate street lighting? It might also be expected that there would have been cable runs or wiring trenches running to, from and between the various devices, connecting them to the control shelter some 500m away to the north-west. Given that no cable trenches etc were identified by the survey, as has been seen on other sites (e.g. Dennison & Richardson forthcoming), it is assumed that the wires were simply laid on the ground surface and removed when the site was decommissioned (although it is accepted the some trenches could be obscured by existing vegetation).
- 5.12 It is generally accepted that the primary purpose of the Low Moor decoys (both the Starfish and QL sites) was to divert enemy bombers from the important chemical and steel-making centre at Middlesbrough, some 45km to the north-west. However, even this relatively simple explanation is confused as Dobinson (2000, 286) notes that the QL decoy was designated as site C96b, whose parent was the 'North-East Coast'. The decoy does only lie 4.5m to the west of the coast, but it is unclear what it might have been protecting in the Robin Hood's

Bay/Ravenscar/Sandsend/Whitby area; there was a Chain Home radar complex at Ravenscar (Dennison & Richardson 2014), but this is unlikely to have been worthy of a specific QL decoy. An answer might be that it is believed that one approach for German bombers targeting Middlesbrough was to head north along the coast and then inland via Redcar and the Tees estuary (Dennison & Richardson 2021, 7). Perhaps the QL decoy was designed to confuse the enemy by making them think they had reached Redcar earlier than they had.

- 5.13 Nevertheless, the QL decoy does appear to be replicating an urban environment, and the Starfish site lies c.1km to the west. This would appear to correlate with the arrangement seen on the ground at war-time Middlesbrough. There was a high concentration of industrial facilities on the south side of the prominent bend of the River Tees, in the 'Iron Masters' district, where several iron works and steel foundries were located (Harwood & McMillan 2008c, 22). This area might have been decoyed by the Starfish site, in which case the QL site, being located c.1km to the east, could represent part of the dense approximately aligned north-east/south-west residential terraces in the St Hilda's part of the town, centred on Lloyd Street, Snowdon Street and Stockton Street (for example) on the north side of the present A66; many of the residential terraces have now been replaced by industrial units.
- 5.14 Between them, the two decoys appear to have attracted some enemy attention, as at least two possible strings of bomb craters were noted in the QL site adjacent to the Kirk Moor Beck, and Harwood and McMillan (2008a, 88) note another longer string crossing the Starfish site and running towards the QL site. Numerous others can be seen on the 1946 aerial photographs, especially either side of the B1416 road to the north (see figure 13). These might be evidence that the decoys were successful during their operation, but it is equally possible that at least some of the craters, especially the more isolated examples, might not be decoy-related, might be post-decoy activity, or might not even be wartime activity at all.

Post-Decoy Activity

- 5.15 The presence of vehicle and tank tracks over parts of both decoy sites, shown as being present on the September 1943 aerial photographs and clearly evident on the current LiDAR imagery (see figure 13 and 14A), suggests that the decoys were abandoned by that date (see above). Parts of the North York Moors were used for intensive tank training, it is said in preparation for D-Day, but in fact this was taking place at least two years before this. It is understood that the 51st and 56th Army Training Unit were involved, but little specific detail is known about where and when this training took place. The Imperial War Museum contains several paintings showing tank activity on the Moors and from these it is possible to gain an impression of what was involved, although actual locations, other than the generic 'North York Moors' are not given (<https://www.iwm.org.uk/collections/search?filters%5BplaceString%5D%5BNorth%20York%20Moors%2C%20North%20Yorkshire%2C%20England%2C%20United%20Kingdom%5D=on>). A previous archaeological survey at Cawthorn Woods revealed numerous earthworks relating to Second World War activity, including bren gun carrier tracks, small structures, craters, foxholes and slit trenches (Dennison 2005). Across Low Moor, the tracks are on average 2.50m wide, implying the use of larger military vehicles such as tanks, and there are pronounced 'pinch-points' where the Kirk Moor Beck and deep valleys are crossed (see figure 14A).

- 5.16 It is quite possible that some of the features identified in the QL complex could reflect this post-decoy use. For example, some of the Type F earthworks (sub-circular depressions) are more sharply defined than many of the other earthworks, and there is a concentration of them overlooking the tributary valley of the Kirk Moor Beck on the southern edge of the detailed survey area. There are a number of probable tank tracks crossing this area - could the earthworks result from mortar shells or hand grenades being aimed at the tanks? In another context, it might be suggested that the Type A zigzag trenches are actually slit trenches or weapons pits, again from where tanks could be fired on, but these would normally be straight and the zigzag shape conforms to the Q site illustration shown by Harwood and McMillan (see figure 14B). One of the Imperial War Museum paintings does show a long straight trench over which bren guns are being fired at tanks (<https://www.iwm.org.uk/collections/item/object/11398>). At least one of the earthworks in the walkover survey area, near the crossing point of the beck to the south of Thorn Key Wath (Site 12), was thought to represent an observation post from which to monitor tank movements, while other features to the north (Sites 26 and 27) might have a similar function. It is also possible that the Type D pits which have two extending arms might have been modified for military training purposes, to become a firing position.
- 5.17 It is clear from the Google Earth imagery that Second World War vehicle movements covered large parts of Fylingdales Low Moor. It would be worth undertaking further research into this activity, as it could have a bearing on other remains scattered across the moor. Where were all these tanks or vehicles based, and what sort of numbers were present at any one time?

6 BIBLIOGRAPHY

NYCRO = North Yorkshire County Record Office

Primary Sources

- 1853 Ordnance Survey 6" to 1 mile map Yorkshire sheet 46 (surveyed 1848-49)
- 1893 Ordnance Survey 25" to 1 mile map sheet 46/12 (surveyed 1891)
- 1913 Ordnance Survey 25" to 1 mile map sheet 46/12 (revised 1910)
- 1949 Fylingdales Moor and Howdale Moor (War Department Property) NYCRO ZW(M) 1/27 (MIC 1293)
- 1952 Ordnance Survey 6" to 1 mile map Yorkshire sheet 46SE (revised 1950)
- 1952 Ordnance Survey 6" to 1 mile map Yorkshire sheet 46NE (revised 1950)
- 1959 Fylingdales - War Department restrictions NYCRO ZW(M) 1/32 (MIC 1293)

Secondary Sources

Air Historical Branch (1) Air Ministry (undated) *Decoy and Deception*. RAF Monograph (first draft)

Blood, K 1992 *Bombing Decoy at The Outstray, Humberside (TA 22 SW11): Archaeological Survey Report* (Royal Commission on Historical Monuments for England mss)

Brightman, J 2019 *North York Moors National Park LiDAR Ground Truthing: Archaeological Landscape Survey* (unpublished Solstice Heritage LLP archive report (project SOL1819-118) for the NYMNP)

CIfA (Chartered Institute for Archaeologists) 2020 *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*

Dennison, E 2005 *Archaeological Survey of Cawthorn Woods, East Moor, Cawthorn, North Yorkshire* (unpublished EDAS report 2003/187.R01)

Dennison, E & Richardson, S (forthcoming) *Flamborough Heavy Anti-Aircraft Diver Site, Flamborough Head, East Yorkshire: Archaeological Survey* (unpublished EDAS report 2022/666.R01)

Dennison, E & Richardson, S 2021 *'Starfish' Bombing Decoy Control Shelter, High Lane, Osmotherley, North Yorkshire: Archaeological Survey* (unpublished EDAS report 2019/600.R01)

Dennison, E & Richardson, S 2014 *Bent Rigg Radar Station, South-East of Ravenscar, Stainton Dale, North Yorkshire: Archaeological Survey* (unpublished EDAS report 2011/410.R01)

Dobinson, C 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*

Dobinson, C 1996 *Twentieth Century Fortifications in England vol 3: Bombing Decoys of WWII* (unpublished mss for CBA/English Heritage)

Floyd, R 2020 *The Wrington Warren Starfish* (available at <http://www.farvis.co.uk/wringtonstarfish/Wrington%20Warren%20Starfish.htm>)

Haigh, D 2004 'Local History from World War II: Starfish Decoys and Targets in Calderdale and West Yorkshire'. *Transactions of the Halifax Antiquarian Society*, new series vol 12, 149-156

Haigh, D 1993 'Local History from World War II: the 'Starfish' sites at Cragg Vale and Clifton'. *Transactions of the Halifax Antiquarian Society*, new series vol 1, 121-135

Harwood, J M & McMillan, S 2008c *Defence of the UK: North Yorkshire and Cleveland: Middlesbrough vol 3* (North Yorkshire and Cleveland 20th Century Defence Study Group)

Harwood, J M & McMillan, S 2008b *Defence of the UK: North Yorkshire and Cleveland: Cleveland vol 4 part 2* (North Yorkshire and Cleveland 20th Century Defence Study Group)

Harwood, J M & McMillan, S 2008a *Defence of the UK: North Yorkshire and Cleveland: Whitby vol 2* (North Yorkshire and Cleveland 20th Century Defence Study Group)

Historic England 2017 *Understanding the Archaeology of Landscapes: a Guide to Good Recording Practice (Second Edition)*

Historic England 2015 *Digital Image Capture and File Storage: Guidelines for Best Practice*

Osborne, M 2020 *Defending Northamptonshire: the Military Landscape from Pre-history to the Present*

Schofield, J 2004 *Modern Military Matters - Studying and Managing the 20th century Defence Heritage in Britain: a Discussion Document*

Schofield, A J, Webster, C J & Anderton, M J 1999 'Second World War Remains on Black Down: a Reinterpretation'. *Proceedings of the Somerset Archaeological and Natural History Society* vol 142, 271-286

Small, F 2014 *Second World War Oil QF Bombing Decoy, Allhallows, Medway, Kent* (English Heritage Research Report Series 8-2014)

Thomas, R 2014 *Coed-y-Paen QF/QL Bombing Decoy 'A' Army (Series) Night Shelter* (Conflict Archaeology Investigation Report)

Electronic Sources

https://stmargarets.london/archives/2012/05/richmond_park_starfish_bombing_decoy_sf8a.html = Richmond Park: Starfish Bombing Decoy SF8A

http://www.arborfieldhistory.org.uk/properties_starfish_sites.htm = Arborfield Local History Society: WWII 'Starfish Sites'

<https://www.blighty-at-war.net/decoy-ql-sites.html> = Blighty at War: The QL Decoy Sites: Cuckmere Valley, East Sussex

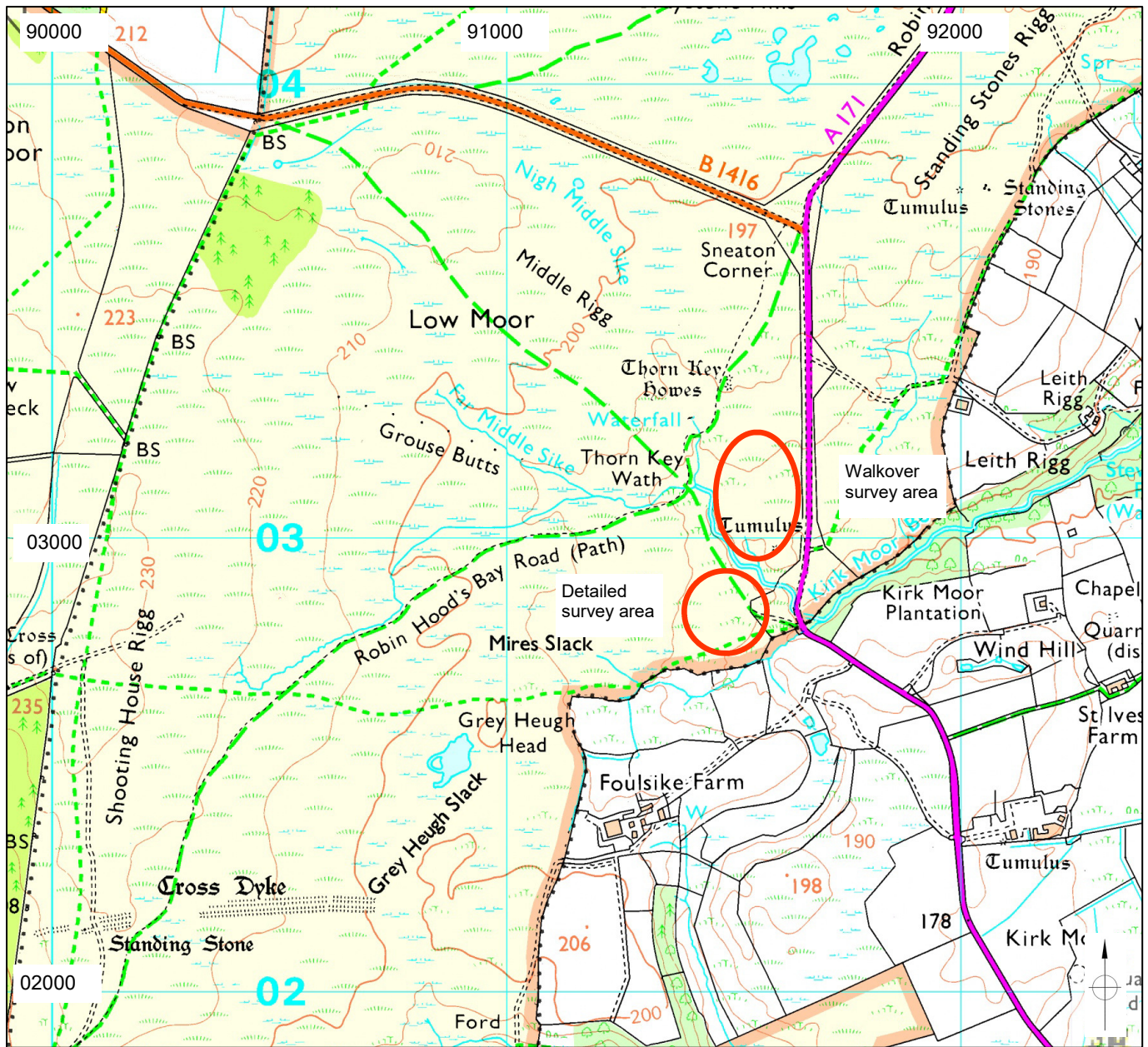
<http://www.lancashireatwar.co.uk/decoy-sites/4575224154> = Lancashire at War: Exploring the Hidden History of War Sites in Lancashire: Decoy Sites

<https://www.iwm.org.uk/collections/>

7 ACKNOWLEDGEMENTS

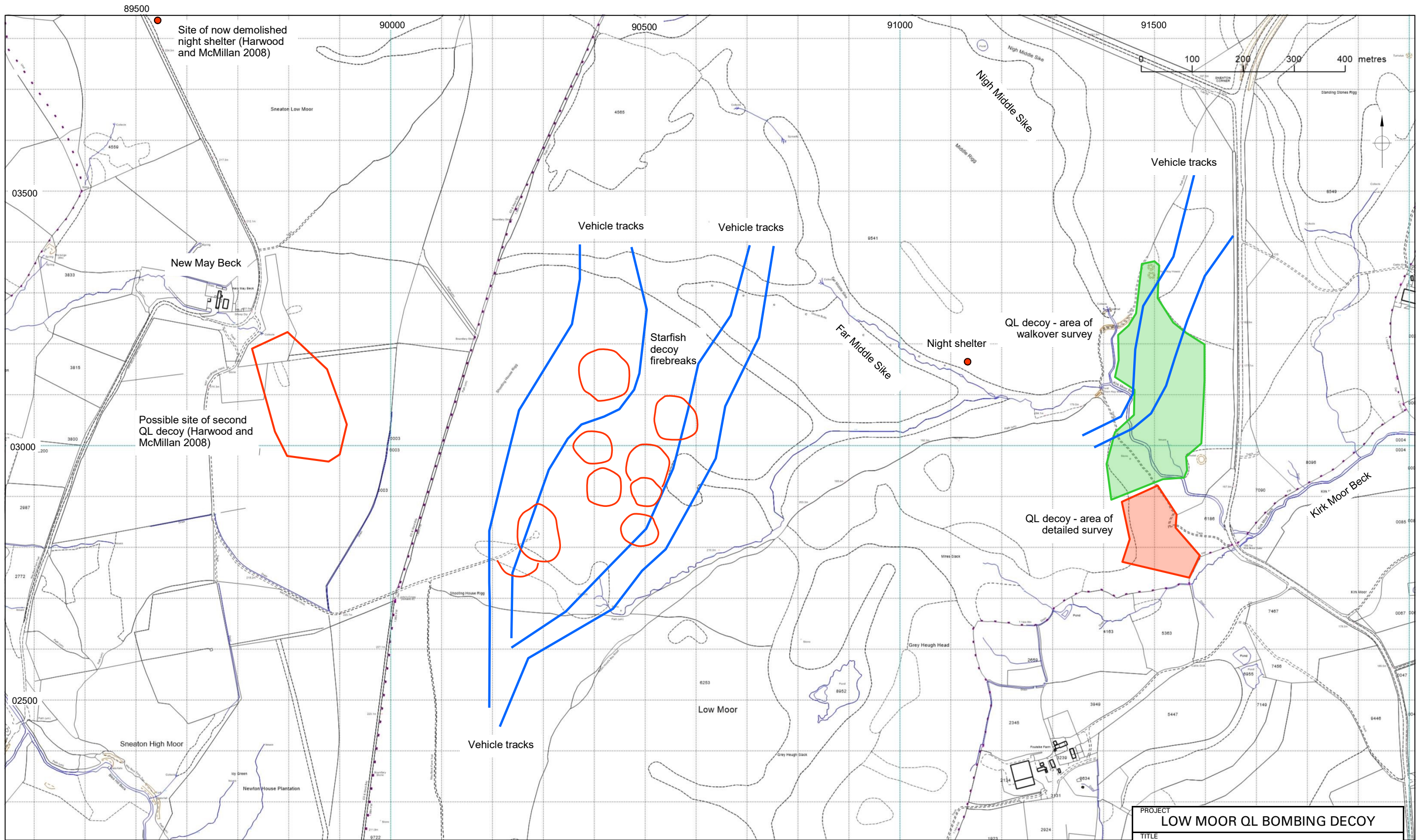
7.1 The archaeological survey of the QL decoy site was commissioned and funded by the North York Moors National Park Authority, and thanks are due to Mr Miles Johnson, Head of Historic Environment and Nick Mason (Archaeological Officer) for their help and assistance during the project. Thanks are also due to Lol Hodgson (Bailiff to Fylingdales Court Leet) and Philip Turford of Leith Rigg Farm for allowing access into the survey areas, and to Roger Thomas (Conflict Archaeologist) for advice and the supply of relevant information.

7.2 The detailed archaeological earthwork survey was carried out by Shaun Richardson of EDAS, in conjunction with Dave Kempley of Benchmark Land Surveys of Leeds, and assisted by Richard Lamb. Shaun Richardson and Ed Dennison undertook the walkover survey. Shaun Richardson produced the fieldwork records, took the survey photographs, and compiled a draft report. Ed Dennison (EDAS) produced the final report and drawings, with whom the responsibility for any errors or inconsistencies remains.



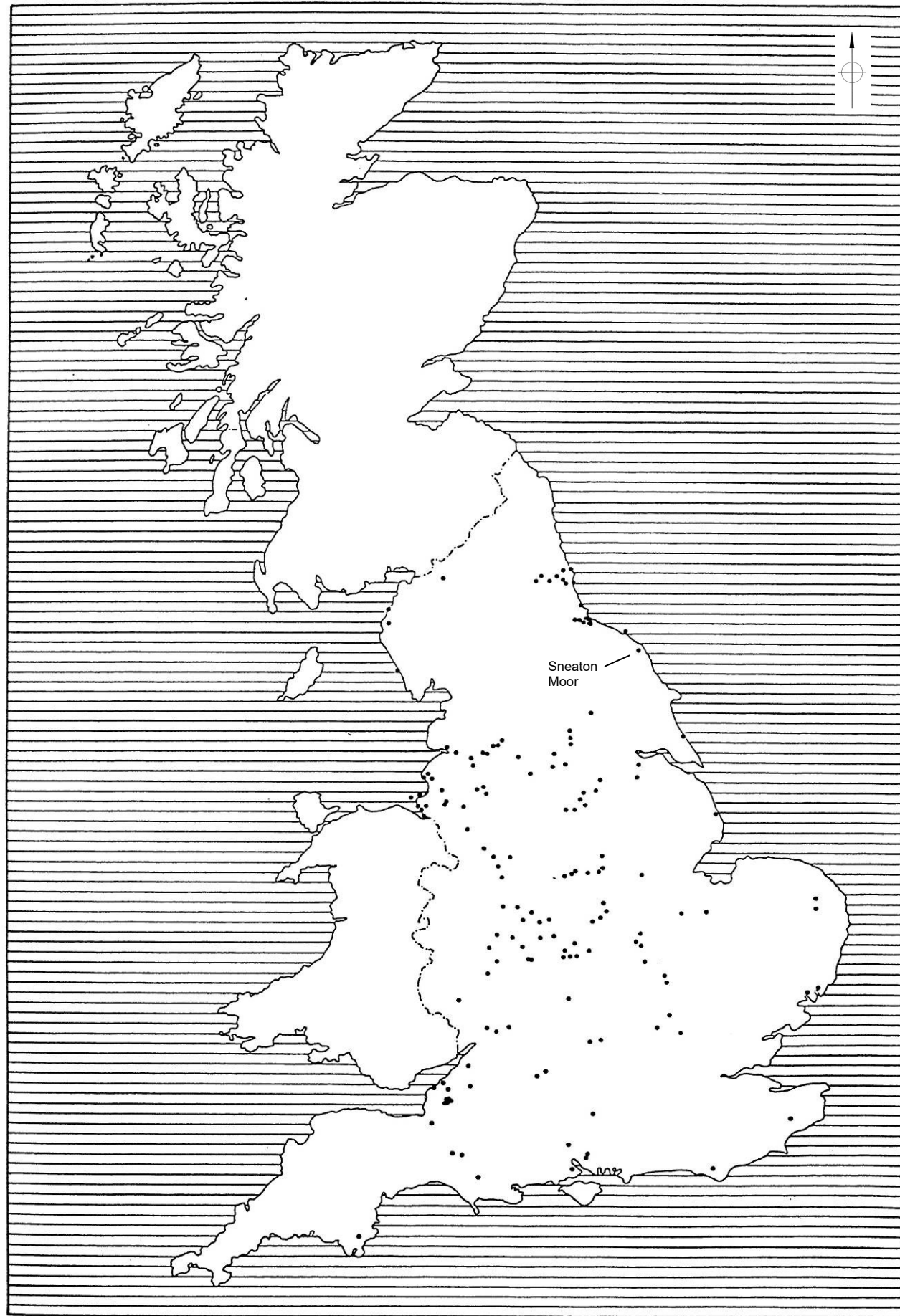
© Crown copyright and Database rights
 Ordnance Survey Licence 100013825 (2023).

| | | | |
|---------|------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | GENERAL LOCATION | |
| SCALE | DATE | AS SHOWN | JUNE 2023 |
| EDAS | | FIGURE | 1 |



© Crown copyright and Database rights
 Ordnance Survey Licence 100013825 (2023).

| | | | |
|---------|----------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | AREAS OF SURVEY | |
| SCALE | AS SHOWN | DATE | JUNE 2023 |
| EDAS | | FIGURE | 2 |

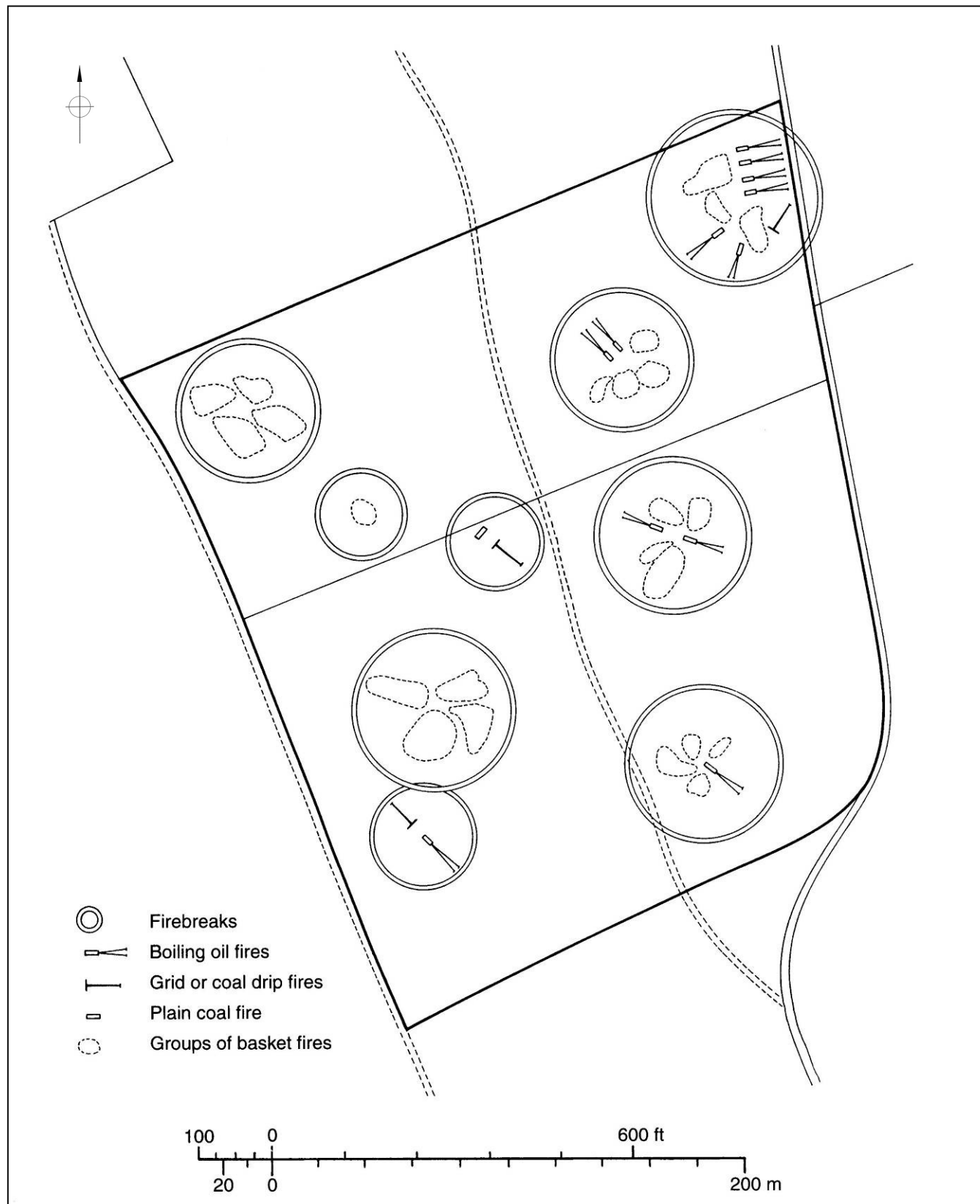


A: Distribution of civil QL series (source: Dobinson 1996 *Twentieth Century Fortifications in England vol 3: Bombing Decoys of WWII* p.71, figure 31). There is a small cluster of sites around Middlesbrough, that on Sneaton Moor (96b) being highlighted.

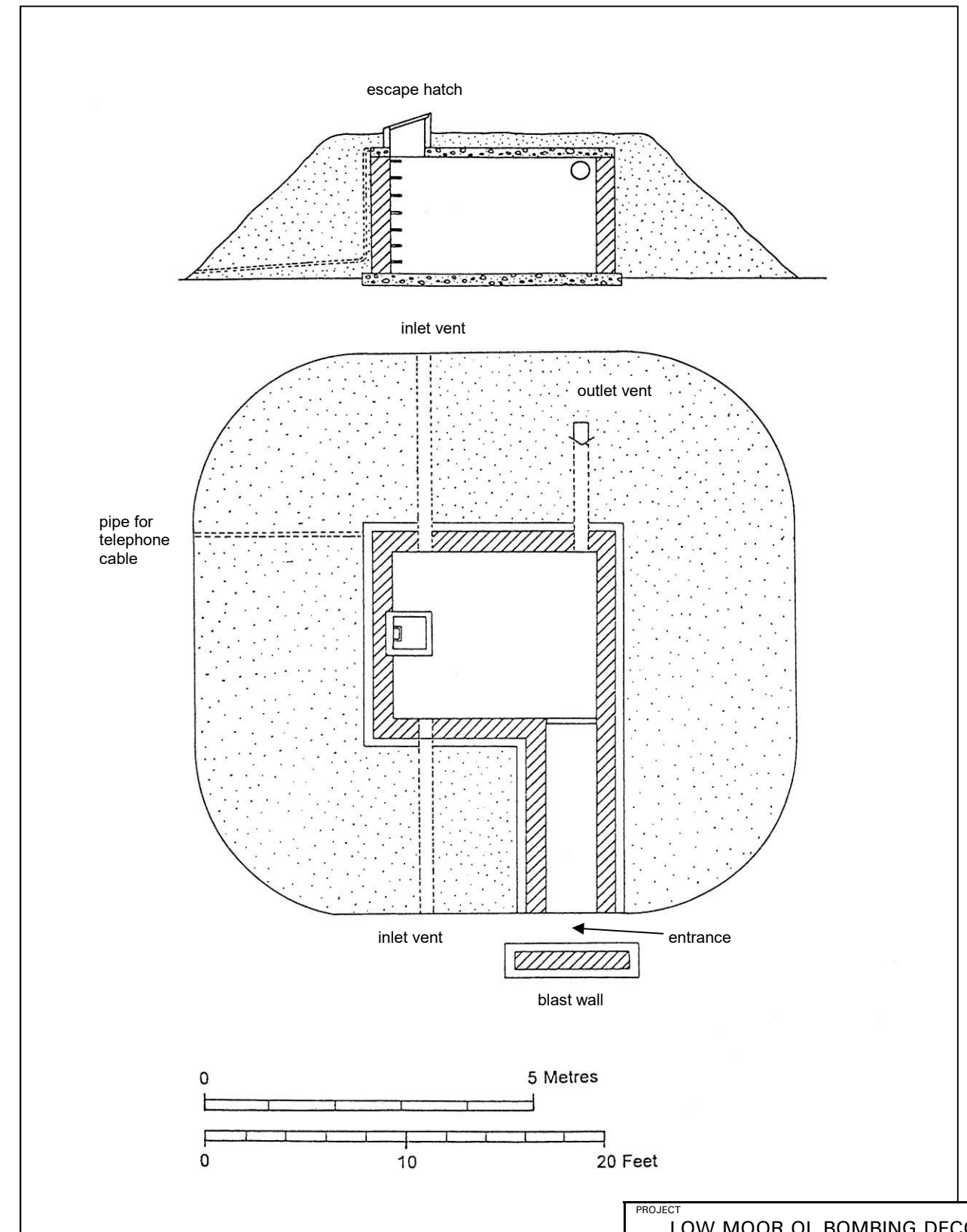


B: Distribution of permanent Starfish sites in England (source: Dobinson 1996 *Twentieth Century Fortifications in England vol 3: Bombing Decoys of WWII*, p.43, figure 13). There is a cluster of sites around Middlesbrough, the Sneaton Moor site (10e) being highlighted.

| | | |
|---------|---------------------------|-------------------|
| PROJECT | LOW MOOR QL BOMBING DECOY | |
| TITLE | DISTRIBUTION OF SITES | |
| SCALE | NTS | DATE JUNE 2023 |
| EDAS | FIGURE 3 | |

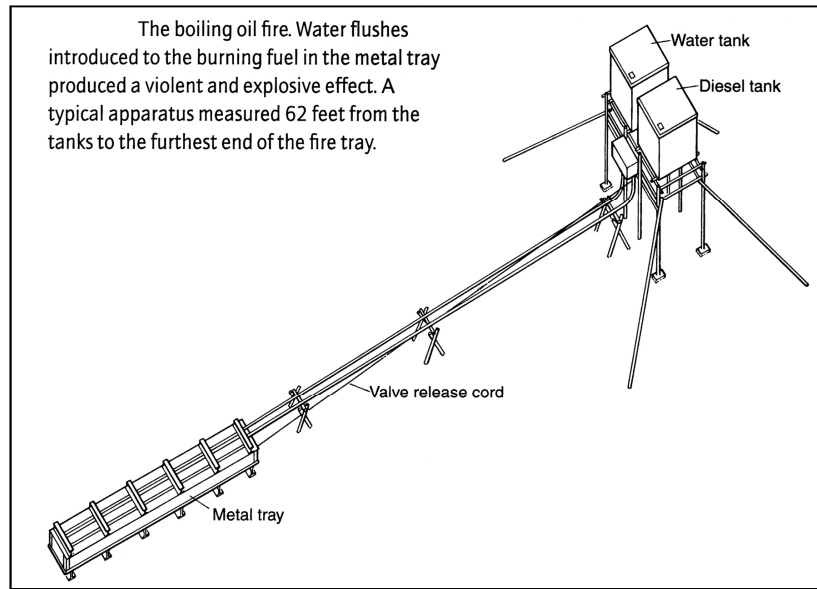


A: Schematic layout of a typical Starfish site, showing the arrangement of fire groups and the fire types within them (source: Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, p.105, figure 18).

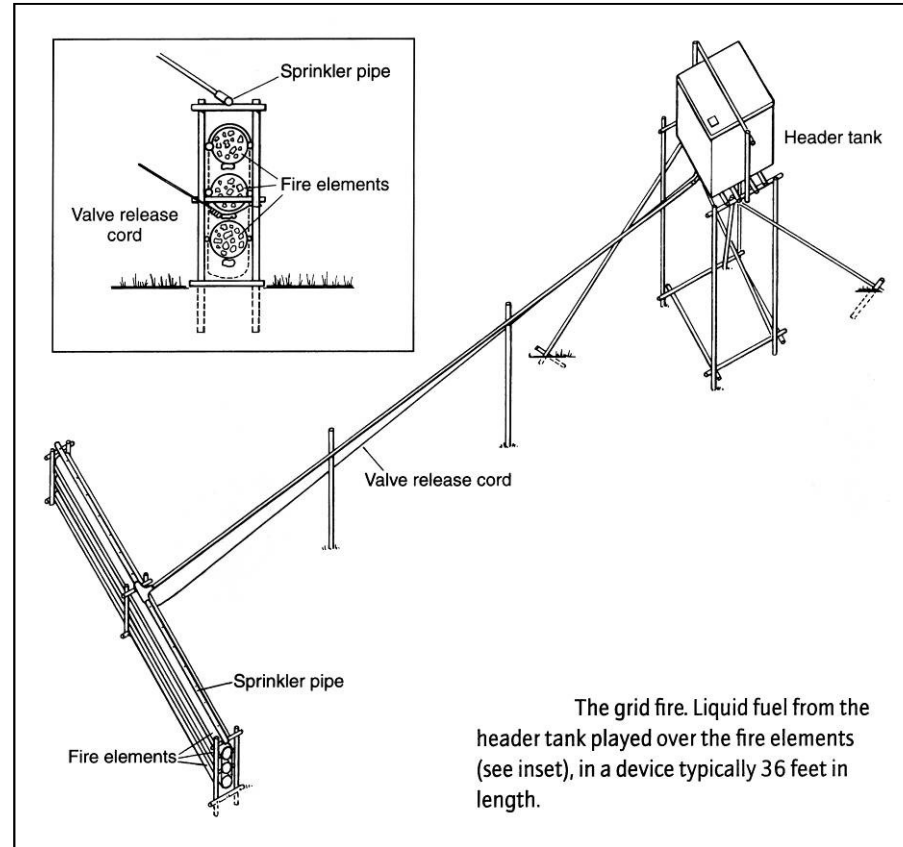


B: Typical Starfish control shelter design (Air Ministry drawing CT 557/41) (source: Dobinson 1996 *Twentieth Century Fortifications in England vol 3: Bombing Decoys of WWII*, p.55, figure 23).

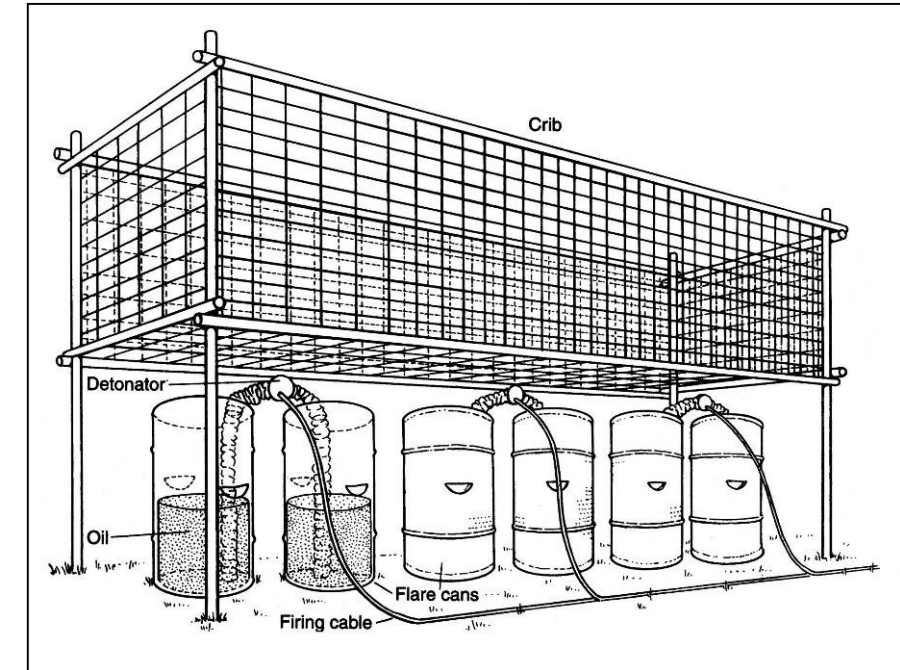
| | | | |
|---------|------|-----------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | STARFISH LAYOUT AND SHELTER | |
| SCALE | DATE | AS SHOWN | JUNE 2023 |
| EDAS | | FIGURE | 4 |



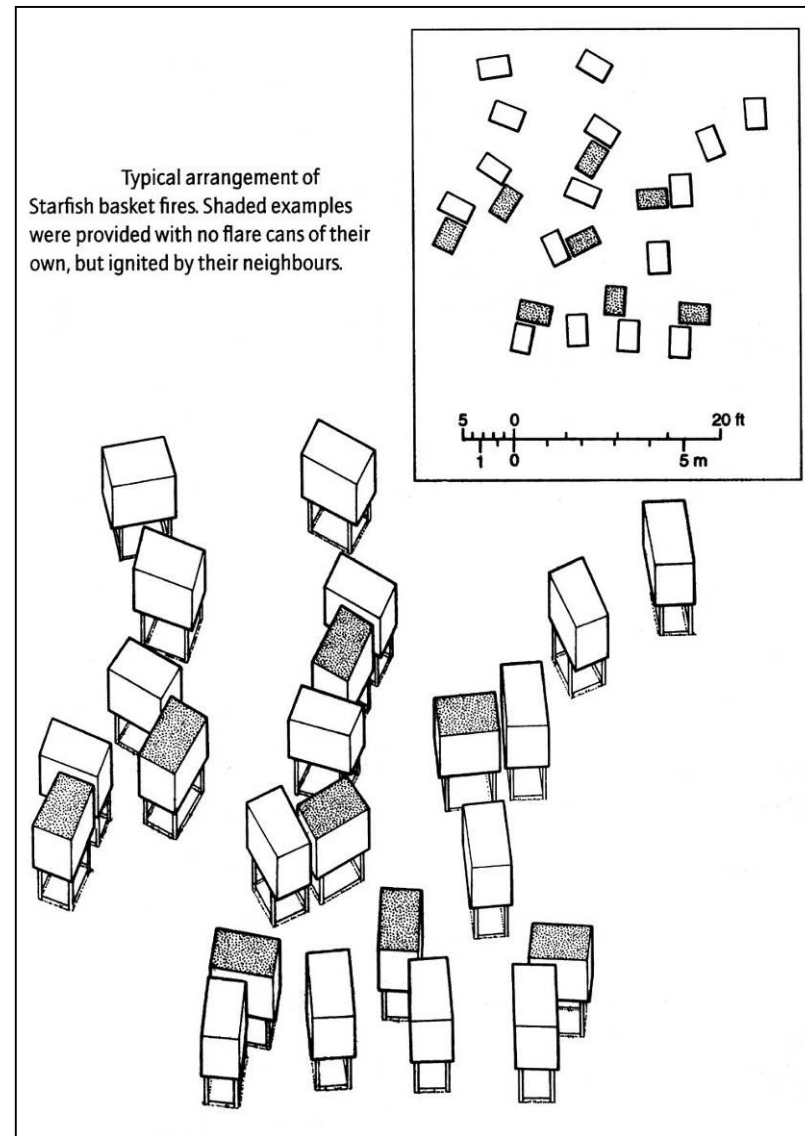
A: Boiling oil fire apparatus.



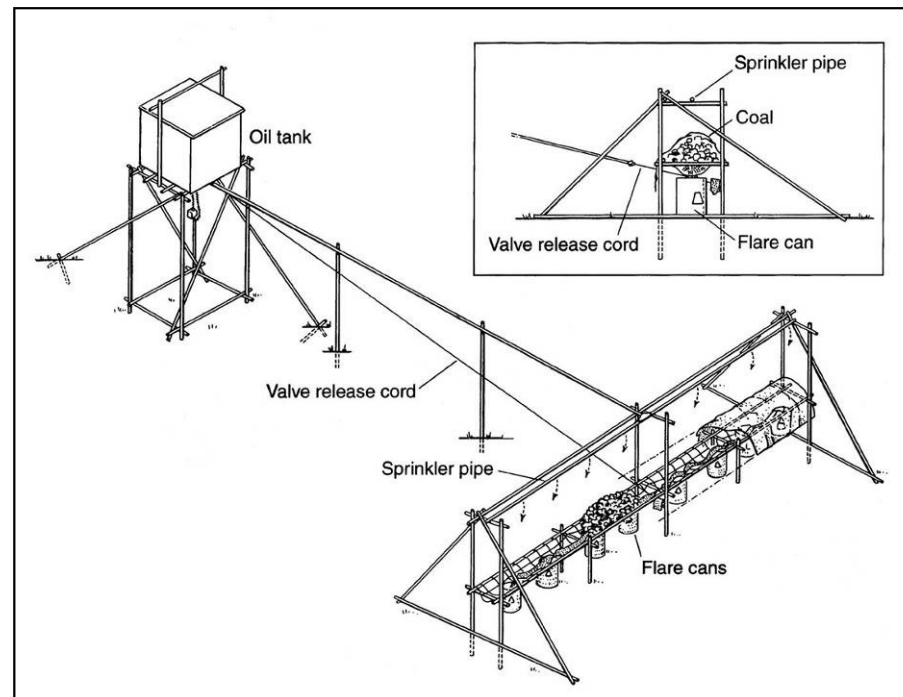
B: Grid fire apparatus.



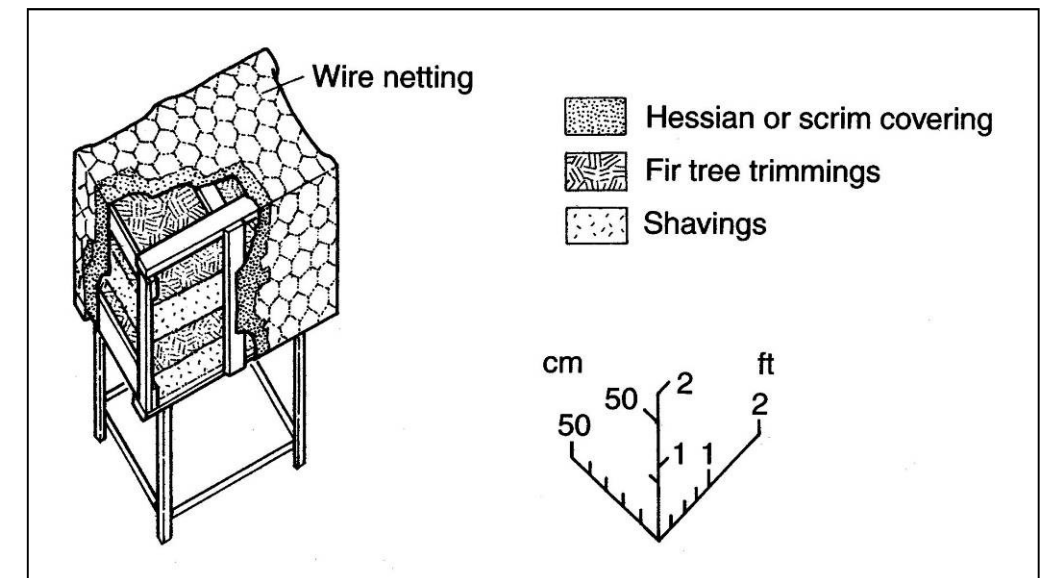
E: Crib fire apparatus.



C: Typical arrangement of basket fires; shaded examples had no flare cans but were ignited by their neighbours.



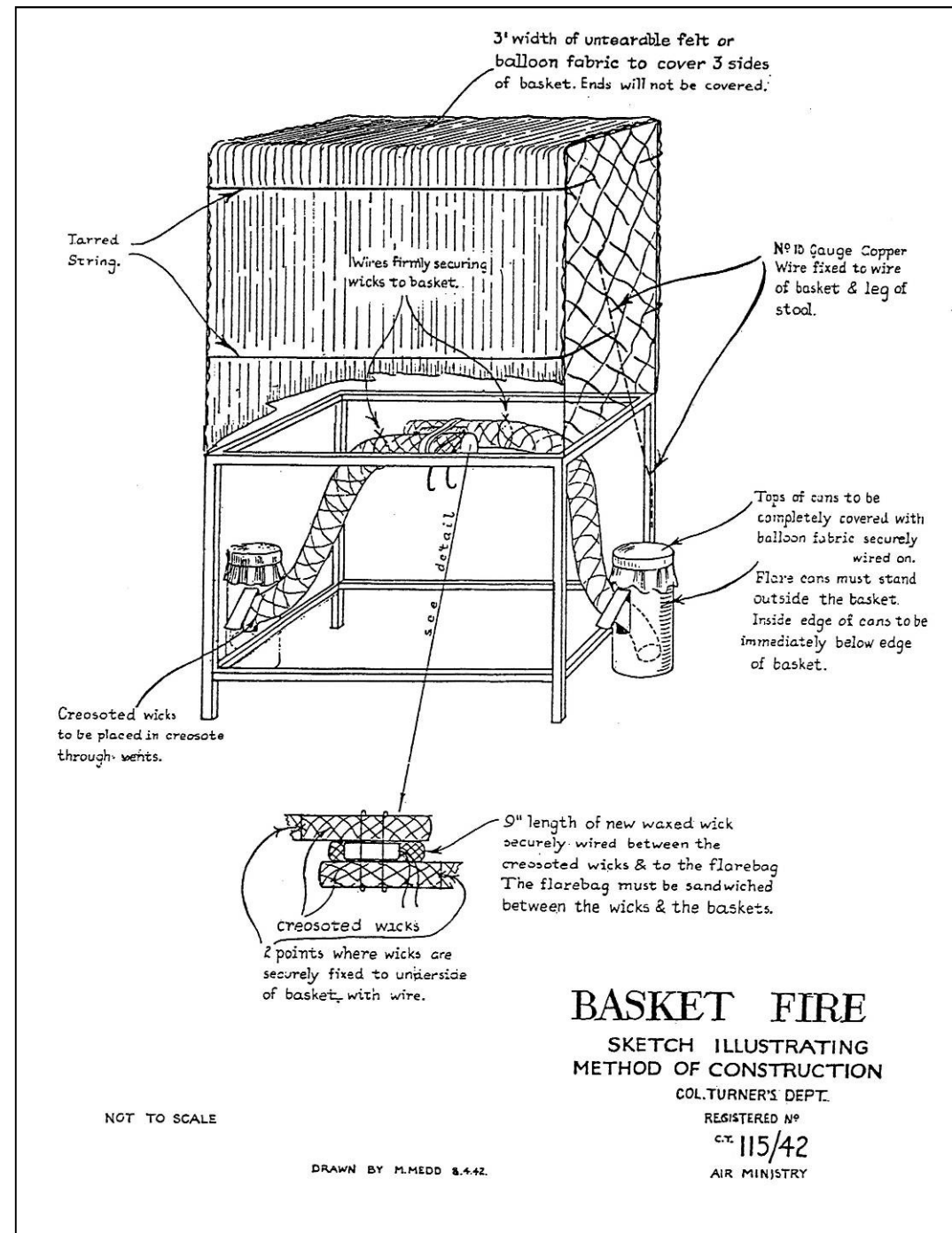
D: Coal drip fire apparatus.



F: Typical Starfish basket fire.

All drawings sourced from Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, figures 9 & 13 to 17).

| | |
|---------------------------|-----------|
| PROJECT | |
| LOW MOOR QL BOMBING DECOY | |
| TITLE | |
| STARFISH FIRE APPARATUS | |
| SCALE | DATE |
| AS SHOWN/NTS | JUNE 2023 |
| EDAS | FIGURE |
| | 5 |



A: Design for Starfish basket fire, 1942 (Air Ministry drawing CT 115/42) (source: Dobinson 1996 *Twentieth Century Fortifications in England vol 3: Bombing Decoys of WWII*, p.50, figure 18).

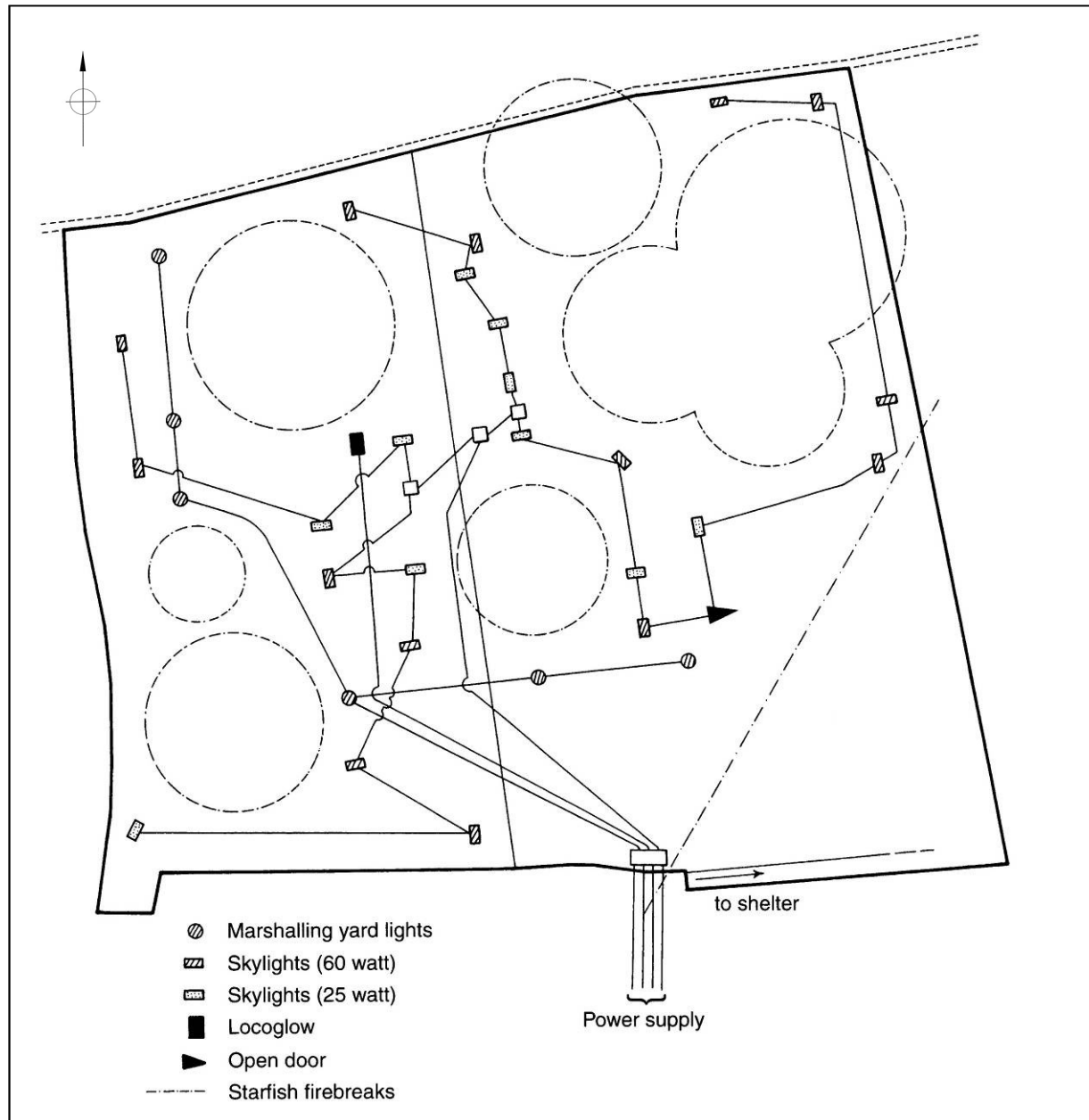


General view of basket fires and boiling fire apparatus at an unidentified Starfish site (source: Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, p.104, plate 10).

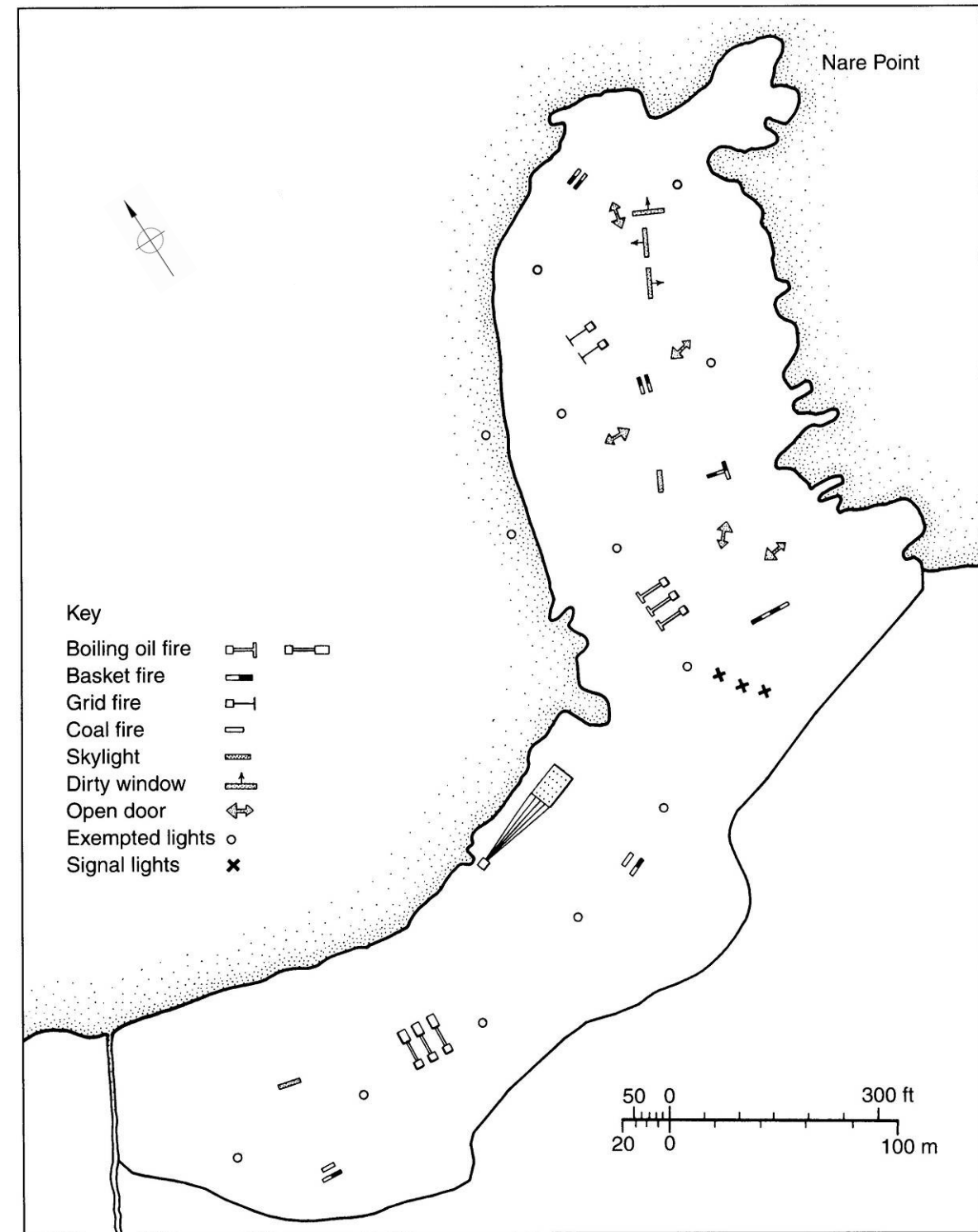


Starfish basket fires in operation (source: Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, p.101, plate 9).

| | |
|--------------------------------------|-------------------|
| PROJECT LOW MOOR QL BOMBING DECOY | |
| TITLE STARFISH FIRES | |
| SCALE AS SHOWN/NTS | DATE JUNE 2023 |
| EDAS | FIGURE 6 |

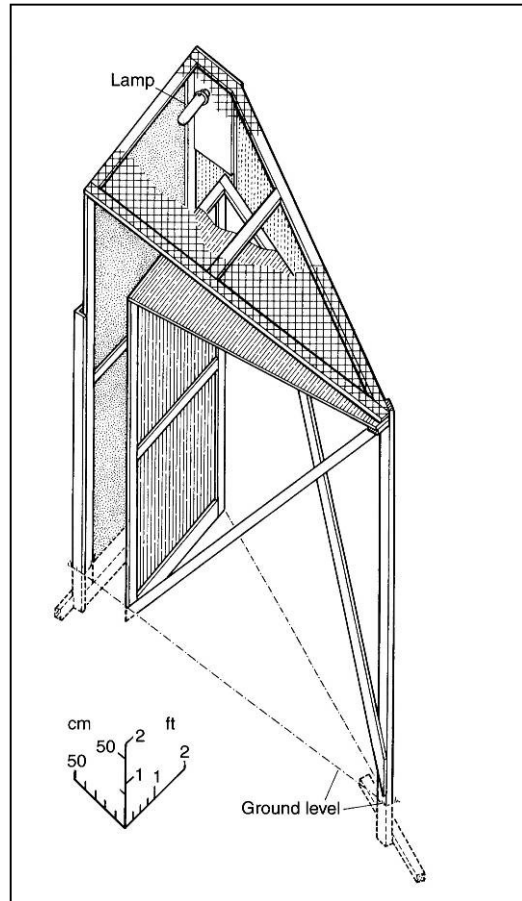


A: Partly schematic layout of a QL and Starfish decoy, at Swarkstone (for Derby), showing the arrangement of marshalling yard lights, loco glows, skylights and open door mechanisms (source: Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, p.143, figure 31).

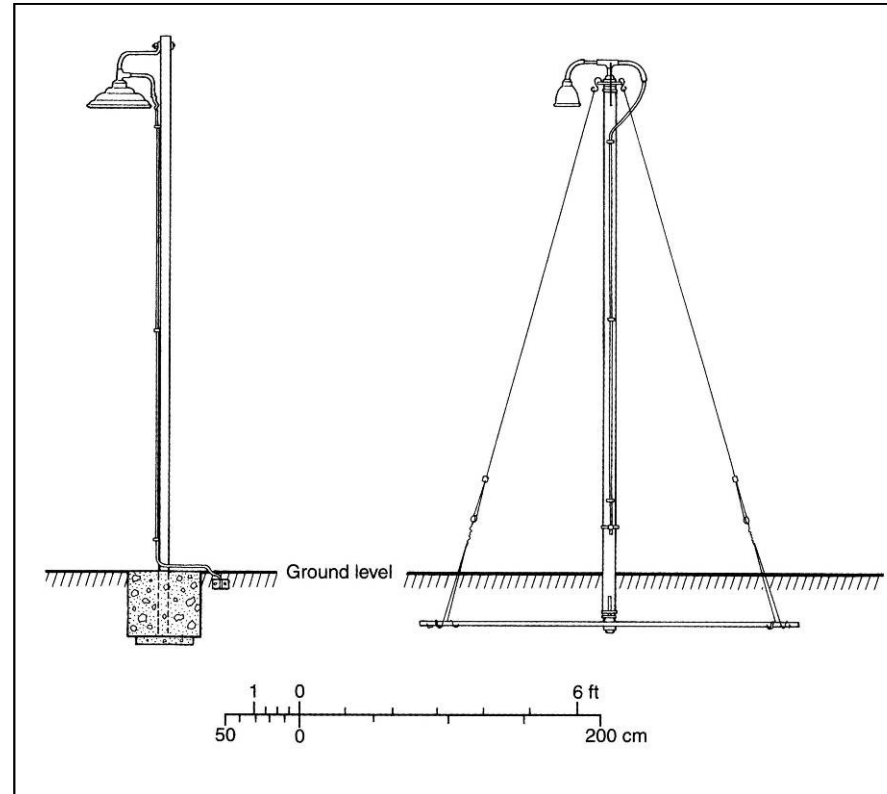


B: Partly schematic layout of a QL and Starfish decoy, at Nare Point (for Falmouth), showing the arrangement of fire and lighting mechanisms (source: Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, p.144, figure 32).

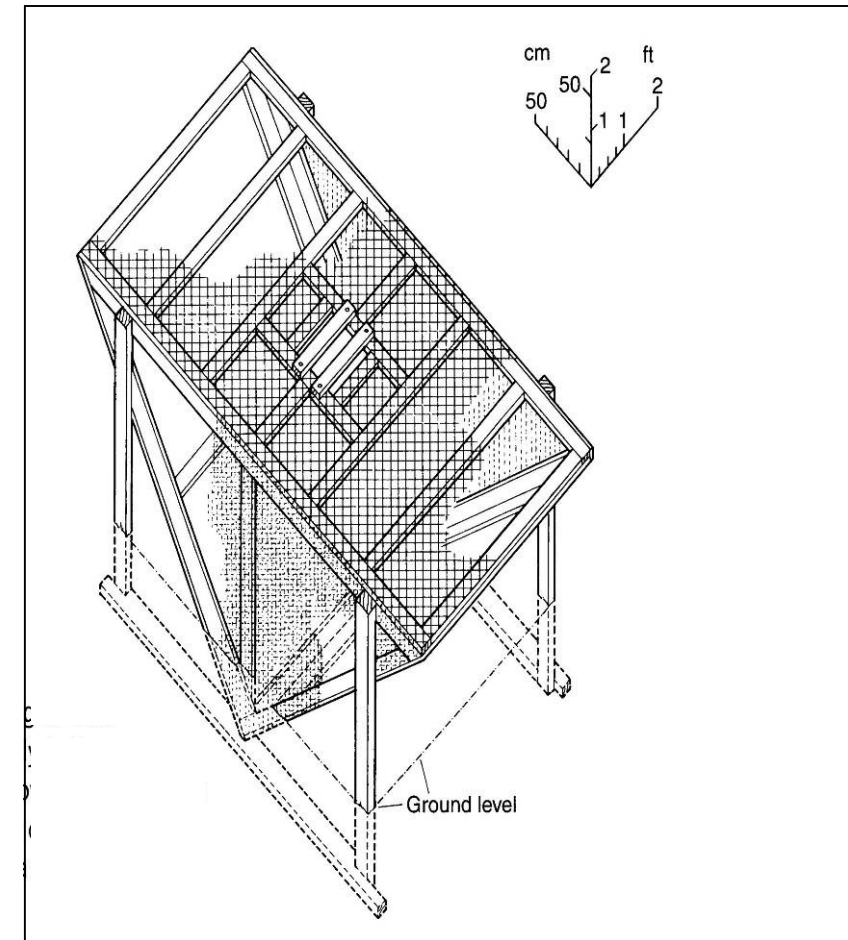
| | |
|---------------------------|-----------|
| PROJECT | |
| LOW MOOR QL BOMBING DECOY | |
| TITLE | |
| TYPICAL QL LAYOUTS | |
| SCALE | DATE |
| AS SHOWN | JUNE 2023 |
| EDAS | FIGURE |
| | 7 |



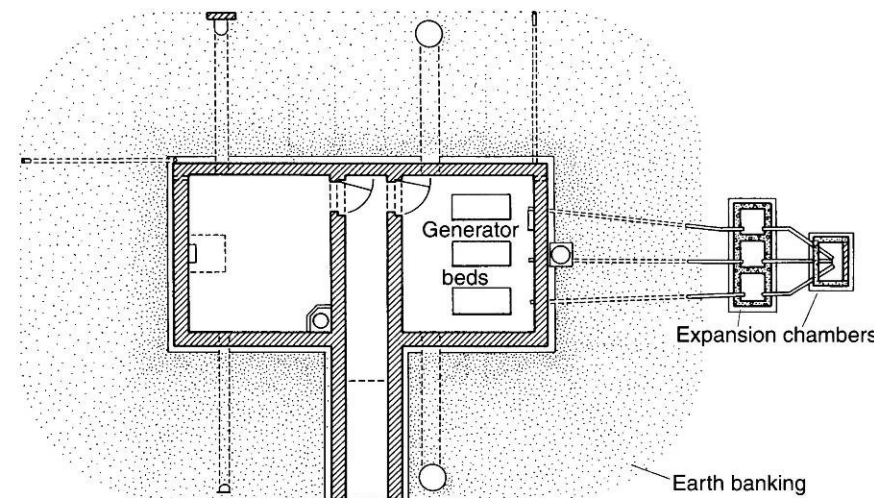
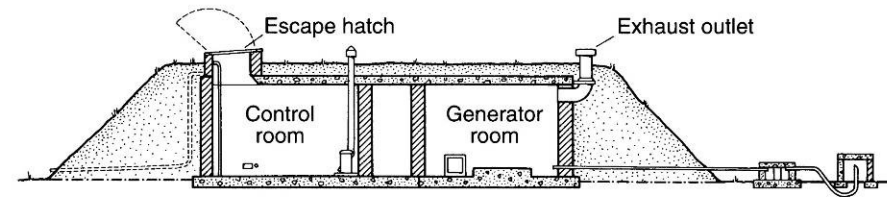
A: 'Open door' timber frame and hessian and plaster-covered device to allow light through the frontal aperture, suggesting a door left ajar.



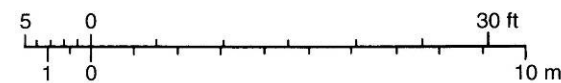
B: Marshalling light devices.



C: 'Skylight' timber frame and hessian and plaster-covered device to allow light through a narrow opening in the top, suggesting a skylight with no blackout curtain.



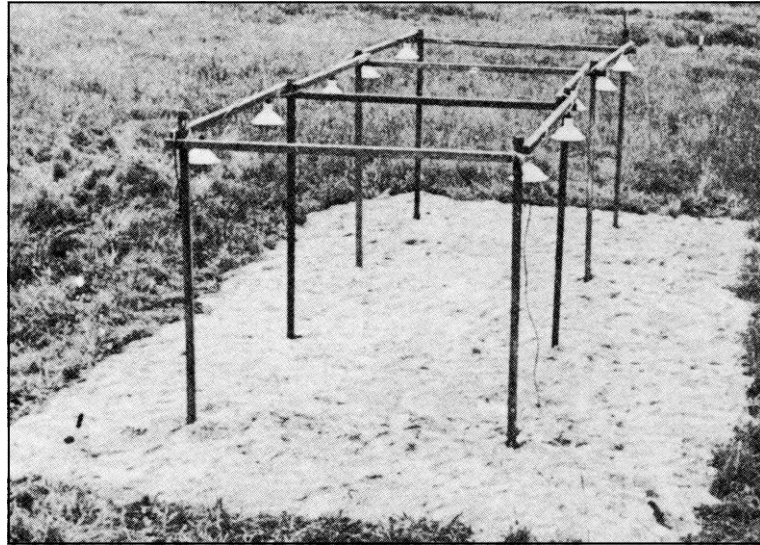
Blast wall



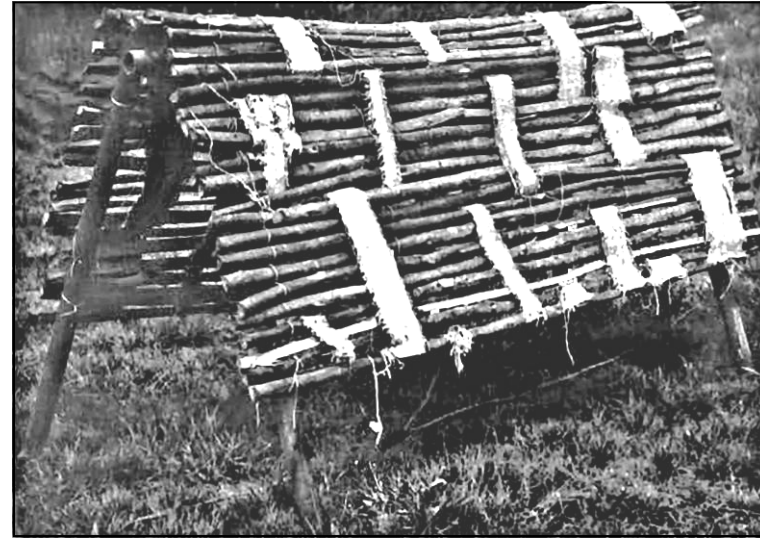
D: Typical QL control shelter design (Air Ministry drawing CTD 151/41).

All sourced from Dobinson 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*, figures 27 to 30.

| | |
|--------------------------------------|-------------------|
| PROJECT LOW MOOR QL BOMBING DECOY | |
| TITLE QL SITE DETAILS | |
| SCALE AS SHOWN | DATE JUNE 2023 |
| EDAS | FIGURE 8 |



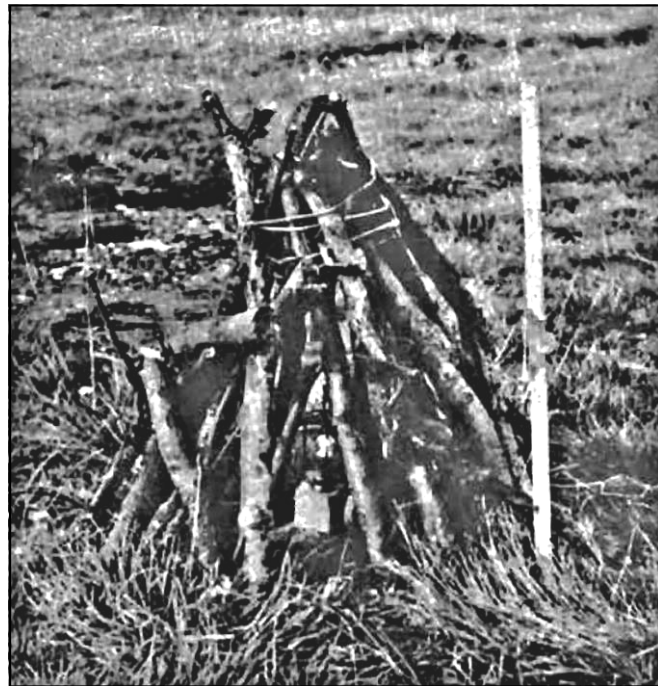
A: 'Furnace glow' - red and amber lights illuminating a patch of sand.



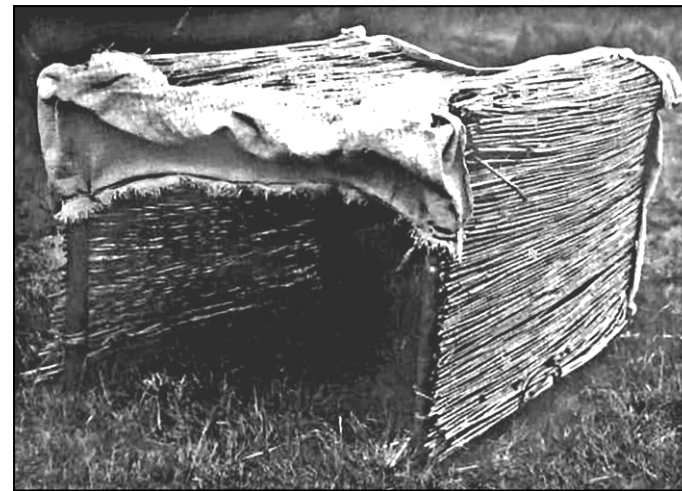
B: 'Hurdle light' - partial screening to present a flickering light (source: Air Historical Branch monograph).



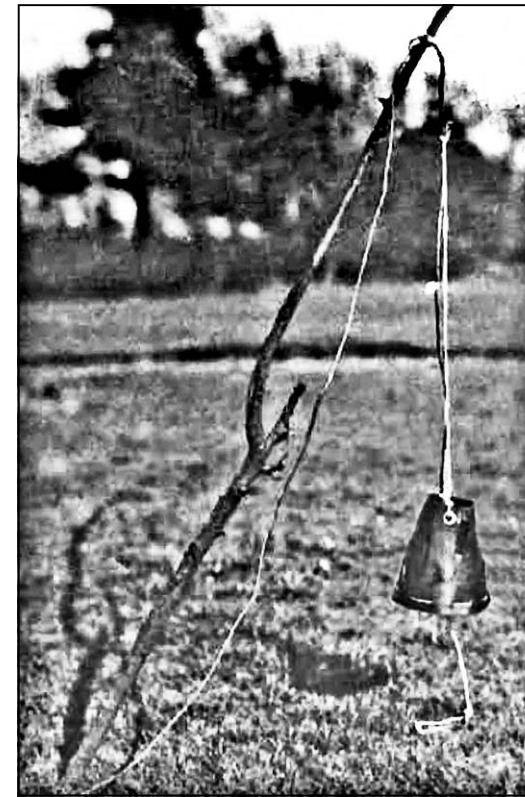
C: 'Box light' device (Assault QL site).



D: Improved 'hurdle light' device (Assault QL site).



E: 'Reed light' - partial screening to present a flickering light.



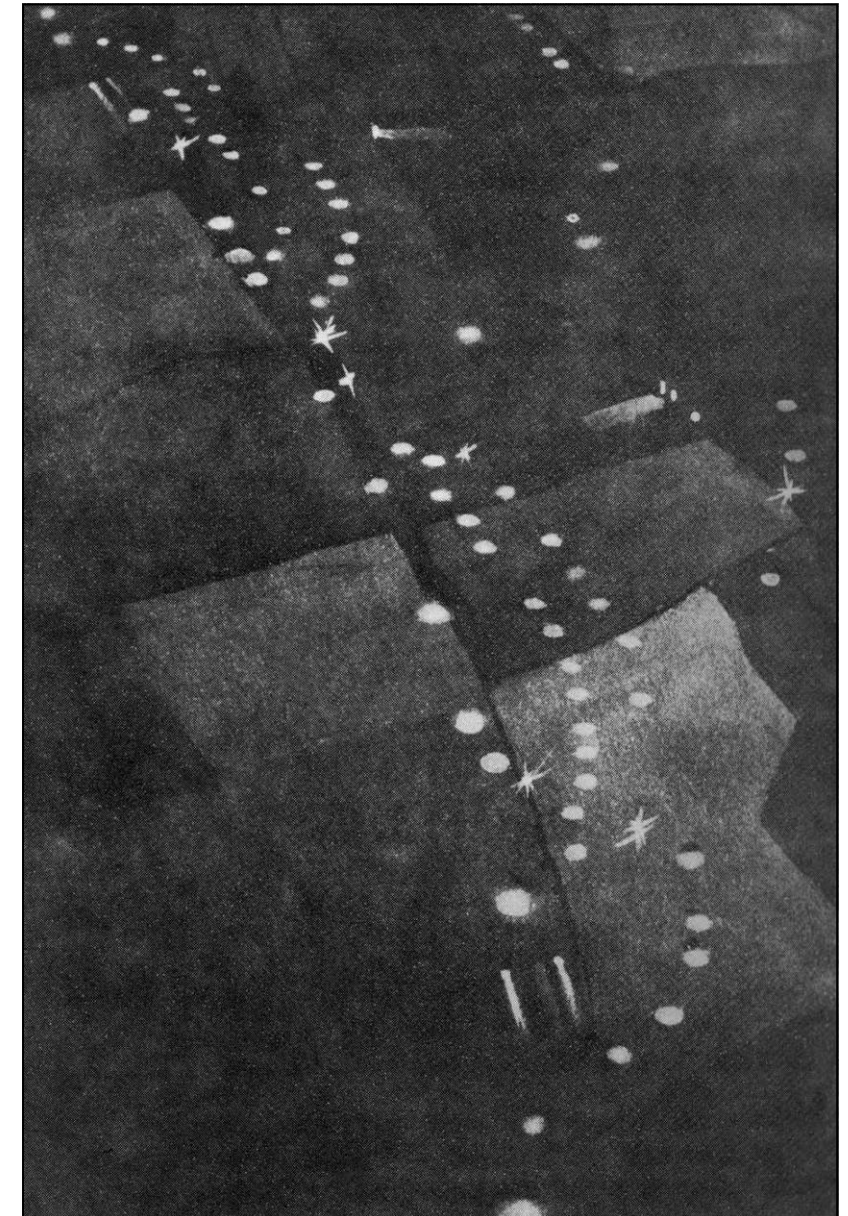
H: Hooded 'jinx light' - to simulate swinging lights.



F: 'Skylight' device.



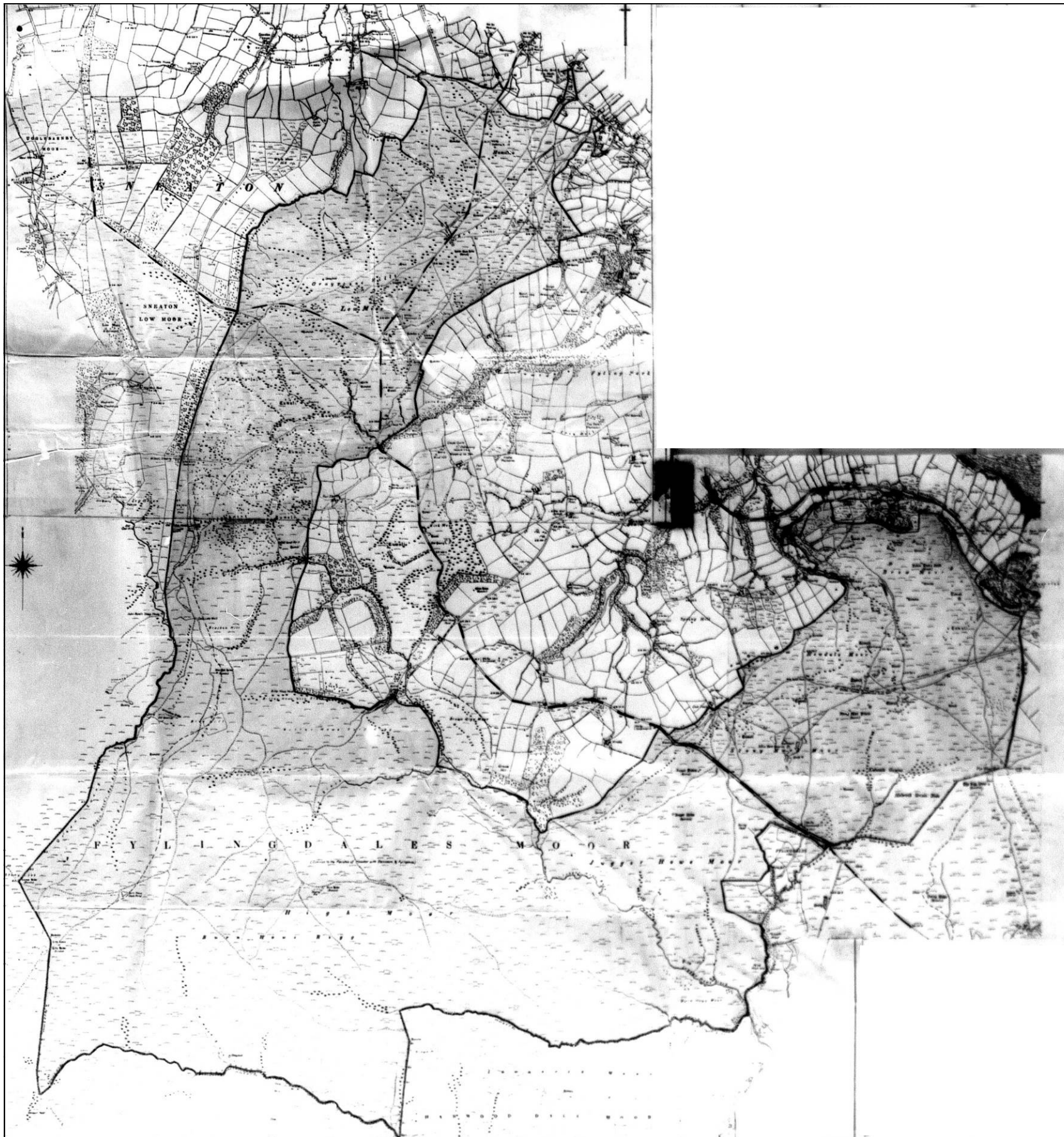
G: 'Box light' - for throwing diffused light onto walls, hedged, banks etc.



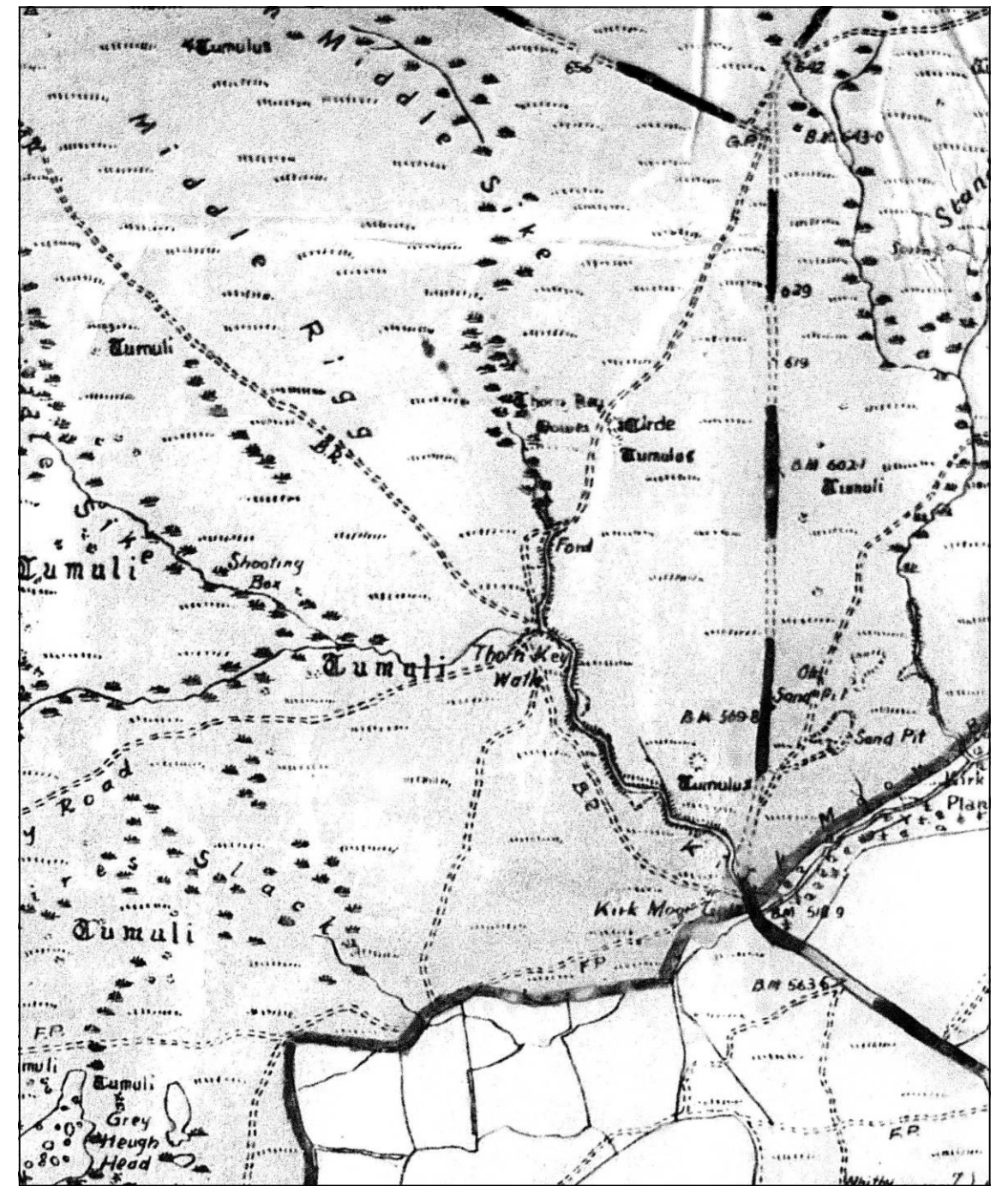
I: Typical marshalling yard QL decoy, with permitted lighting represented by hooded lights.

All sourced from Air Historical Branch monograph (undated) *Decoy and Deception*.

| | | | |
|---------|------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | TYPICAL QL DEVICES | |
| SCALE | DATE | NTS | JUNE 2023 |
| EDAS | | FIGURE 9 | |

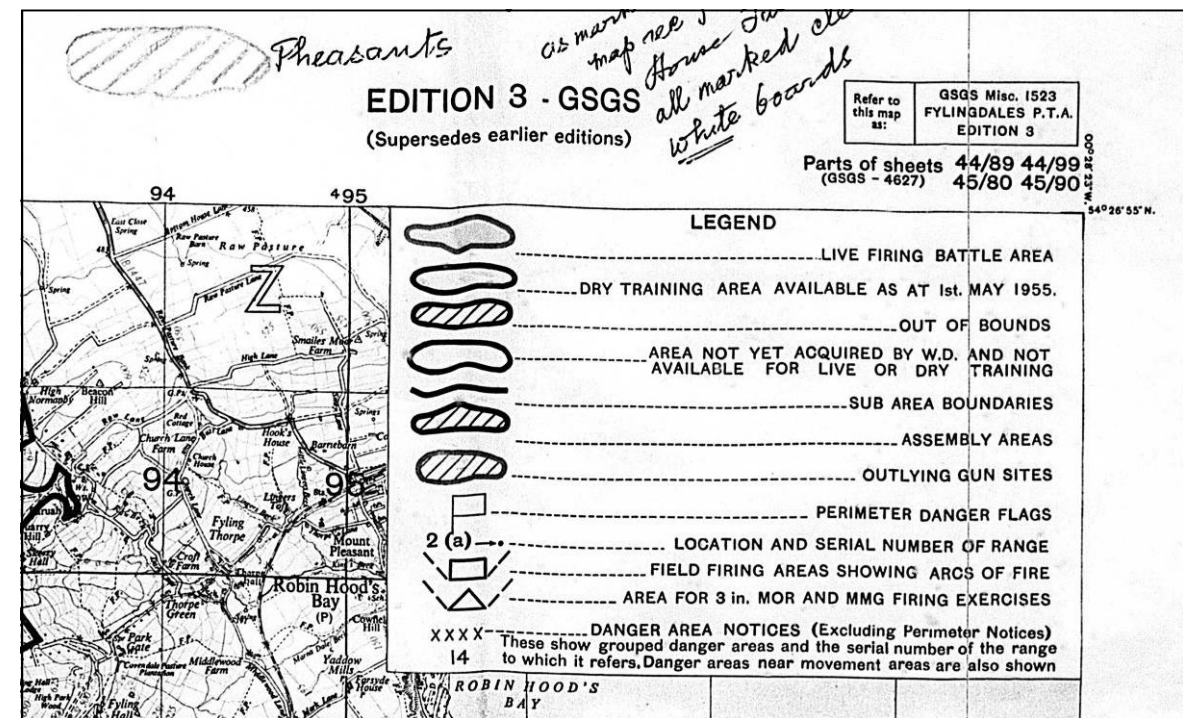
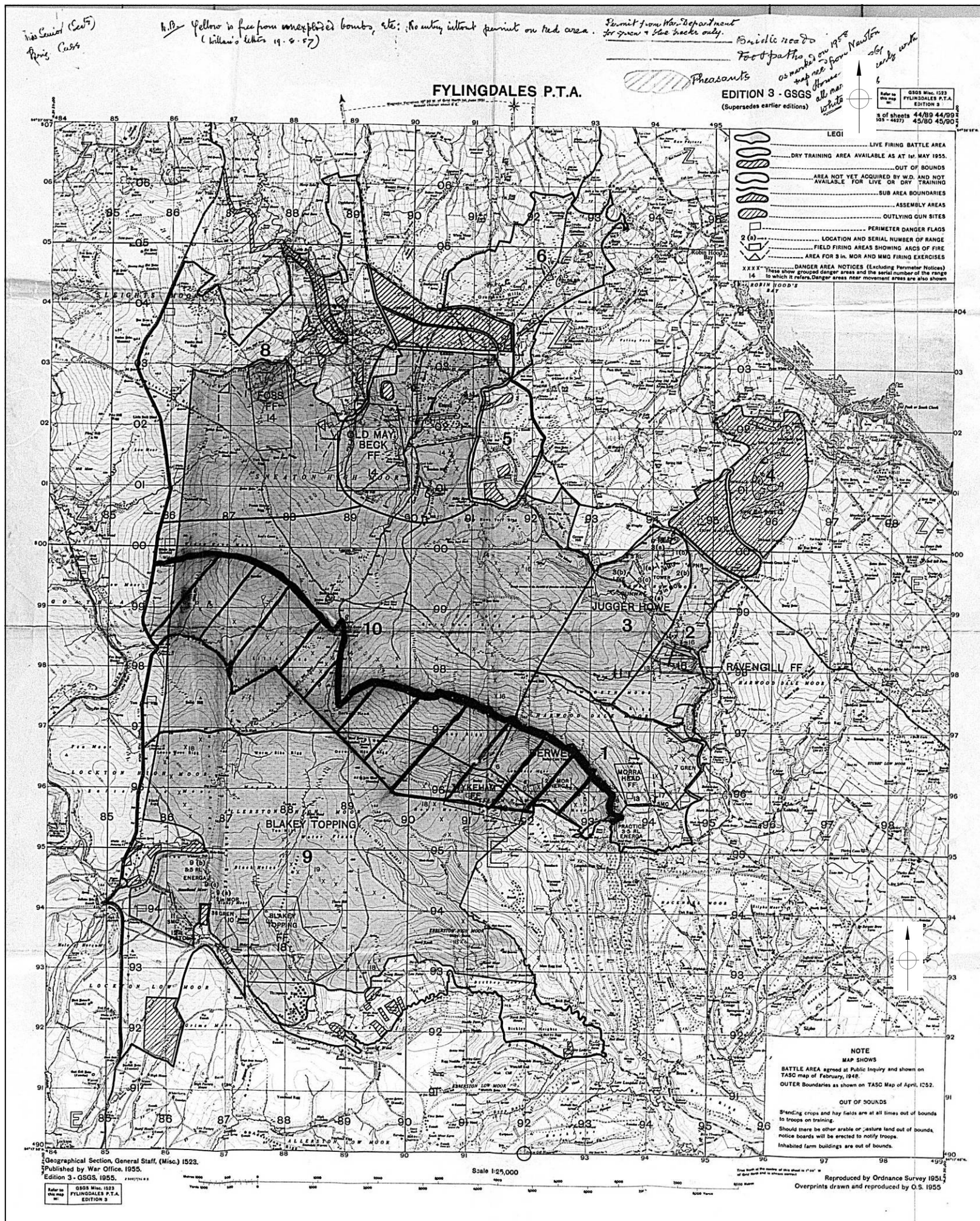


A: 1949 Fylingdales Moor and Howdale Moor (War Department Property) (source: NYCRO ZW(M) 1/27) (reproduced with permission).



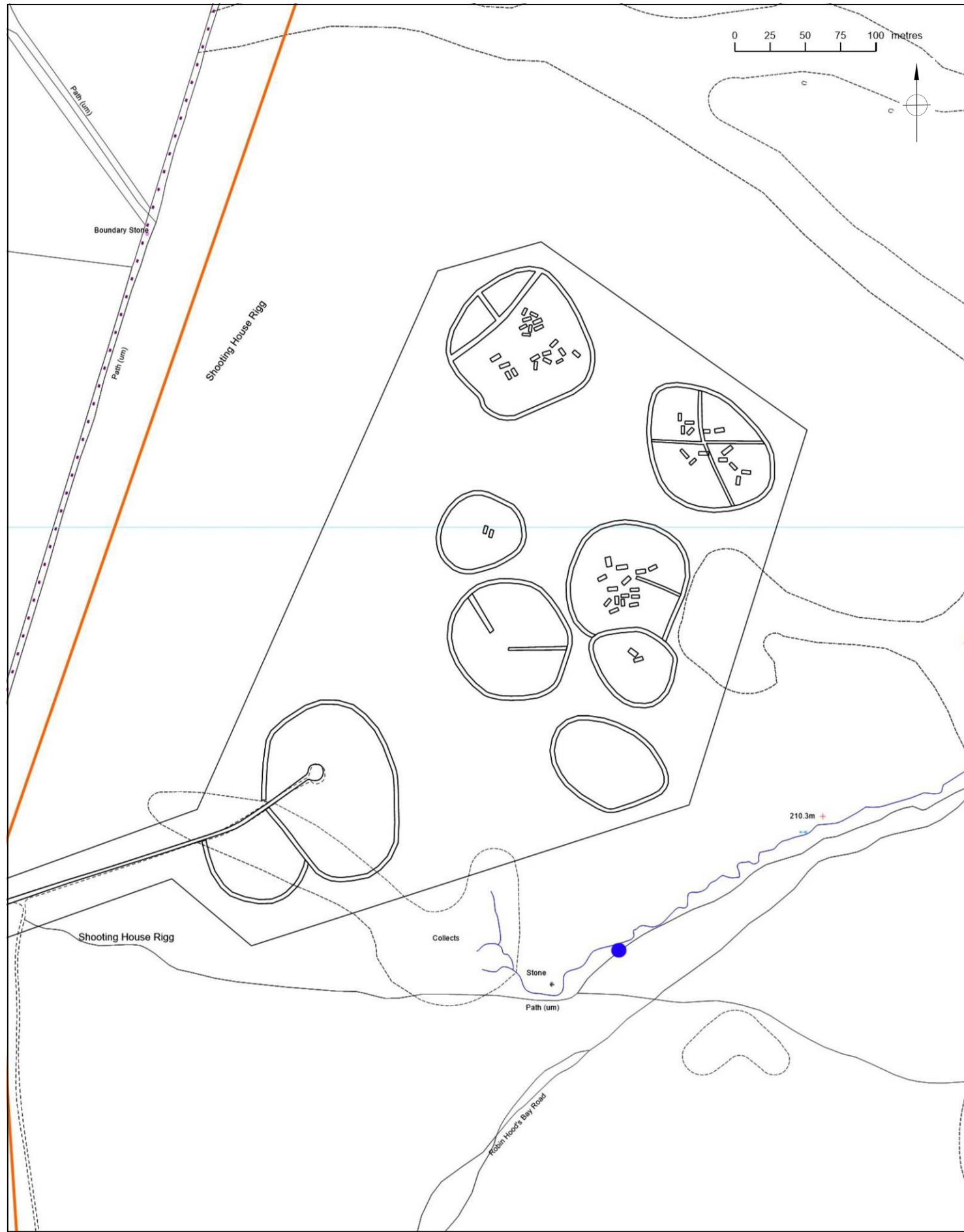
B: Detail of 1949 map, showing 'Shooting Box'.

| | | | |
|---------|-----------|---------------------------|----|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | 1949 WAR DEPARTMENT MAP | |
| SCALE | DATE | | |
| NTS | JUNE 2023 | | |
| EDAS | | FIGURE | 10 |

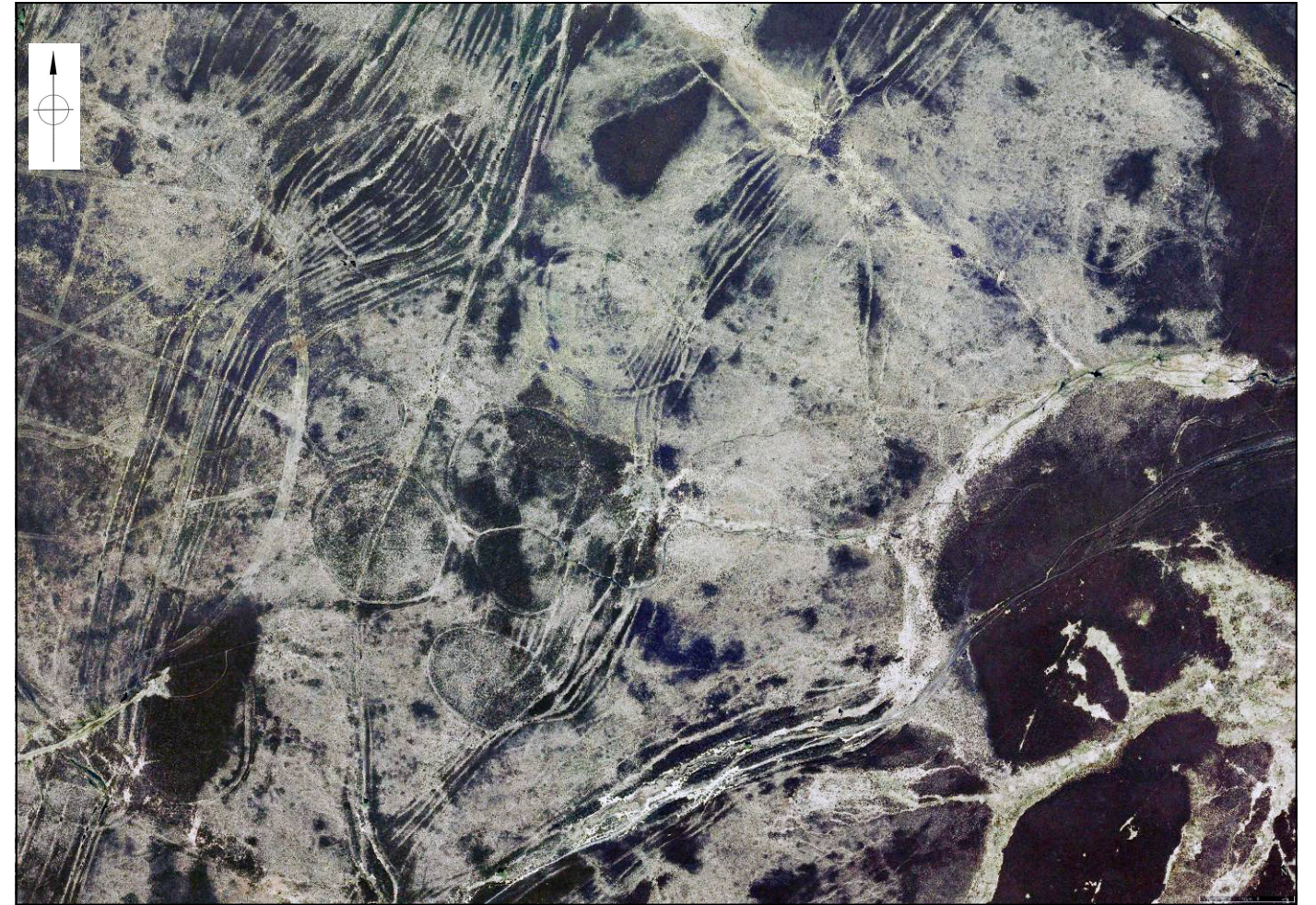


1955 Map of Fylingdales Moor (War Department Property)
(source: NYCRO ZW(M) 1/32) (reproduced with permission).

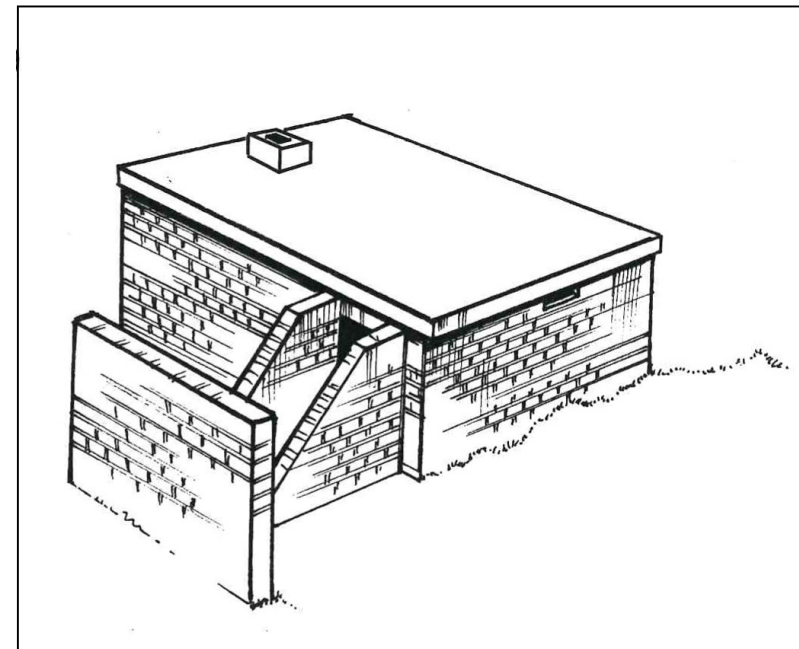
| | | | |
|---------|--------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | 1955 WAR DEPARTMENT MAP | |
| SCALE | DATE | NTS | JUNE 2023 |
| EDAS | FIGURE | | 11 |



A: Sneaton Moor Starfish complex, as mapped by NYMNPA HER (reproduced with permission).

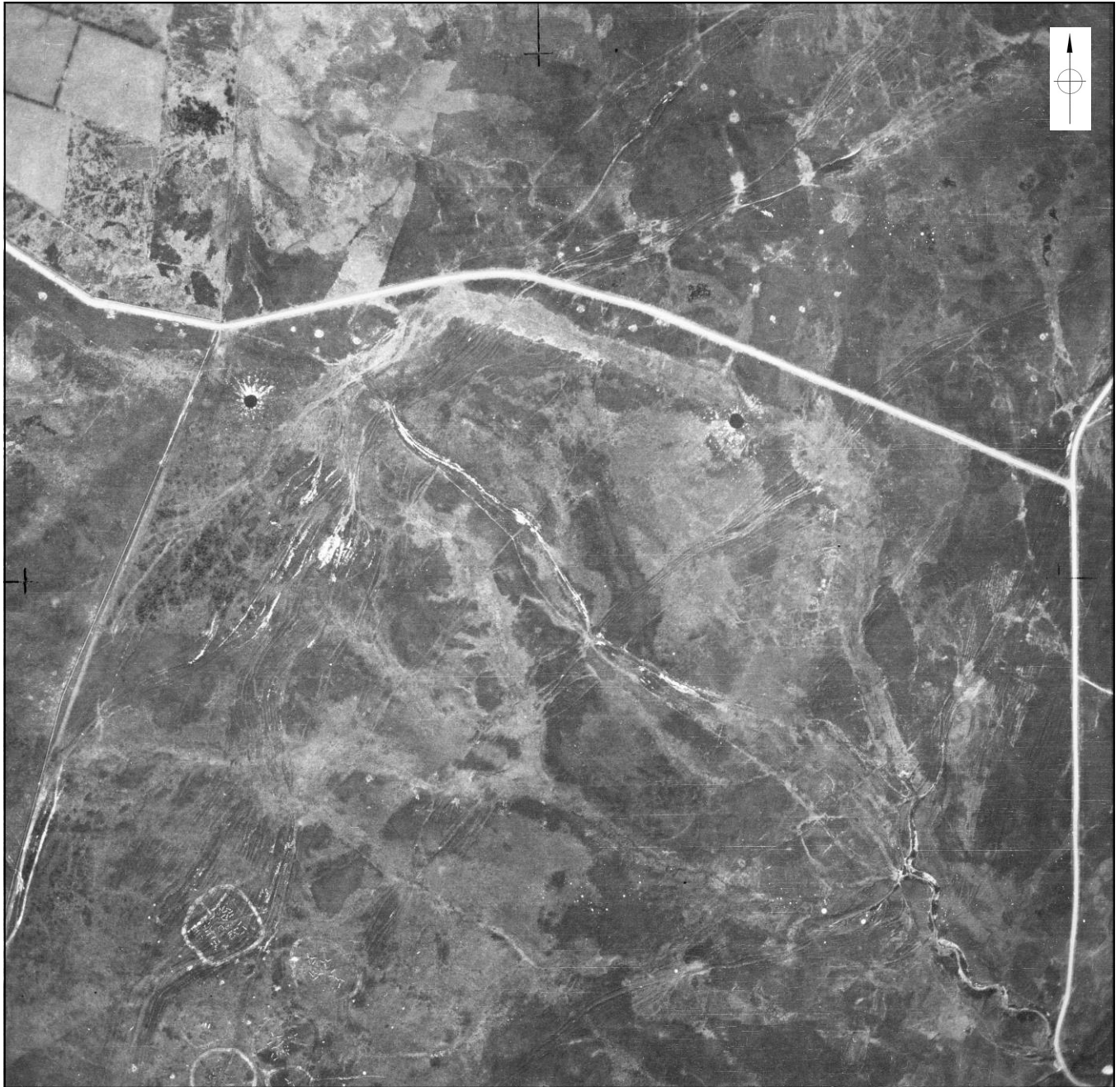


B) Aerial view of Sneaton Moor Starfish complex (source: Google Earth 2009 photography).



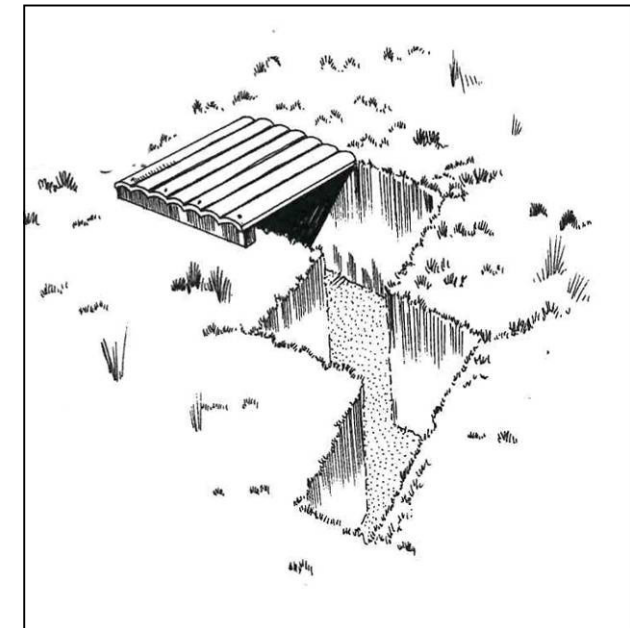
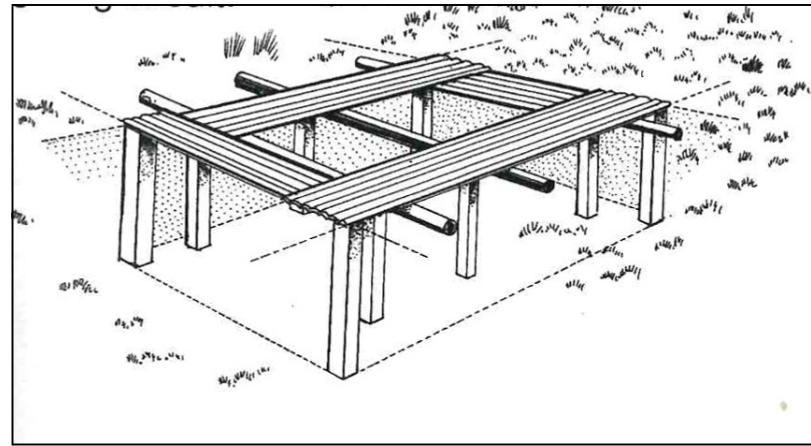
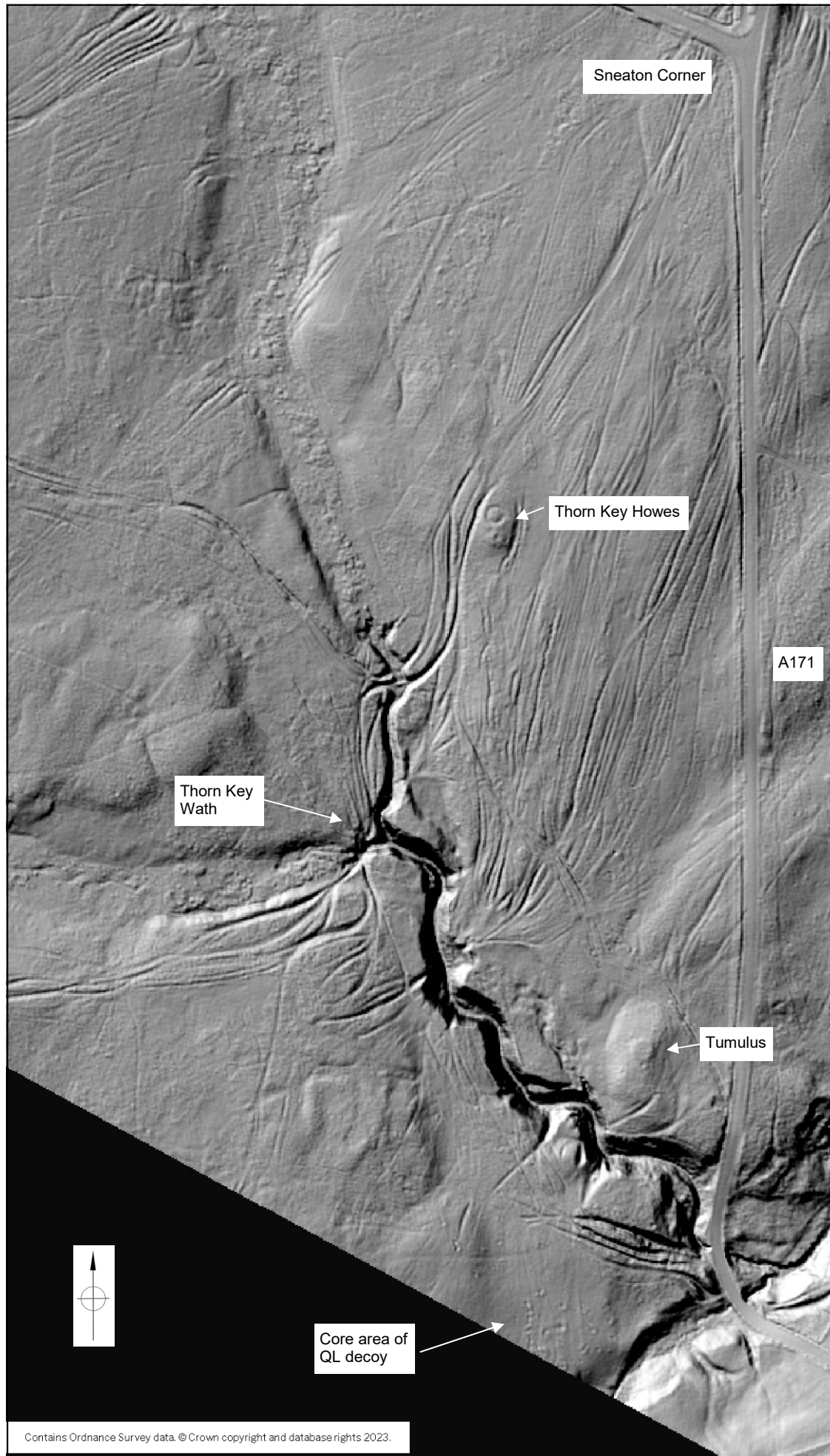
C) Illustration of the probable design of the Starfish control bunker, now demolished (source: Harwood & McMillan 2008a *Defence of the UK: North Yorkshire and Cleveland: Whitby vol 2, p.89*).

| | |
|---------------------------|-----------|
| PROJECT | |
| LOW MOOR QL BOMBING DECOY | |
| TITLE | |
| STARFISH SITE | |
| SCALE | DATE |
| AS SHOWN/NTS | JUNE 2023 |
| EDAS | FIGURE 12 |



Source: Historic England Archives aerial photograph
RAF AC577 V 5076 taken 23rd September 1943.
© Historic England Archives, reproduced with
permission

| | |
|---------------------------|-----------|
| PROJECT | |
| LOW MOOR QL BOMBING DECOY | |
| TITLE | |
| 1943 AERIAL PHOTOGRAPH | |
| SCALE | DATE |
| NTS | JUNE 2023 |
| EDAS | FIGURE |
| | 13 |



B) Illustrations of some of the Q site light simulations (source: Harwood & McMillan 2008a *Defence of the UK: North Yorkshire and Cleveland: Whitby vol 2*, p.89).



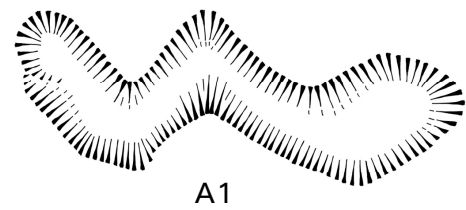
C) 1952 Ordnance Survey 6" to 1 mile map Yorkshire sheet 46SE (revised 1950), showing position of night shelter (red circle).



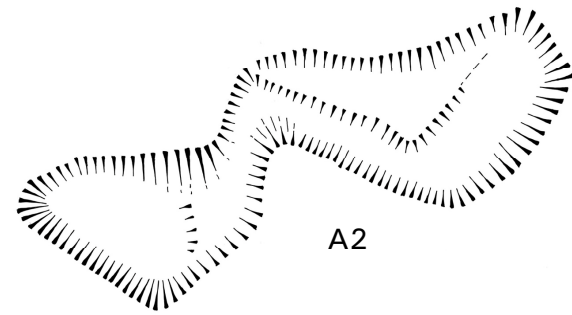
D) Remains of one of the 'open door simulations' (source: Harwood & McMillan 2008a *Defence of the UK: North Yorkshire and Cleveland: Whitby vol 2*, p.89).

| | | | |
|---------|-----|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | QL COMPLEX | |
| SCALE | NTS | DATE | JUNE 2023 |
| EDAS | | FIGURE | 14 |

A: LiDAR image of QL site (supplied by NYMNP HER and reproduced with permission).

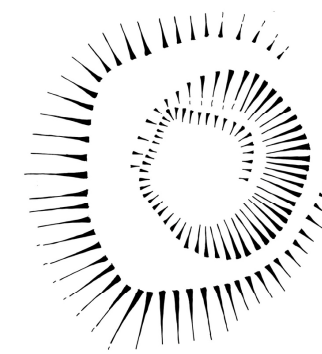


A1

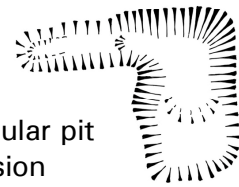


A2

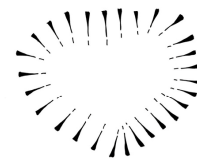
Type A: zigzag trenches with a pit at either end



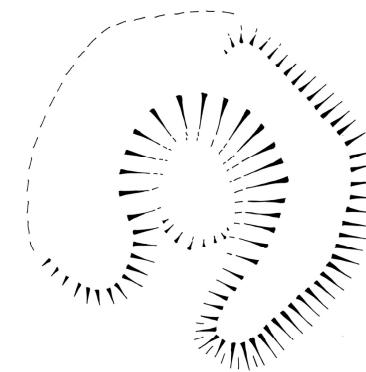
Type F: well-defined sub-circular depression



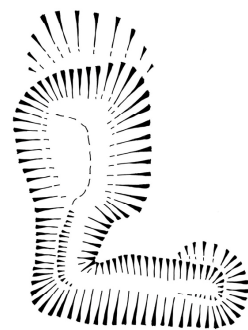
Type B: rectangular pit with arm extension



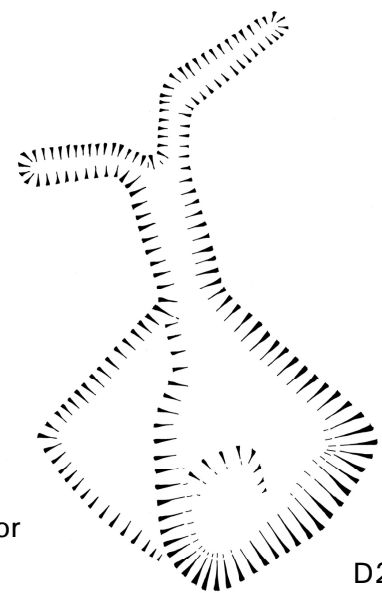
Type E: shallow, sub-rectangular or oval depression



Type G: low U-shaped mound of spoil, surrounding a central depression

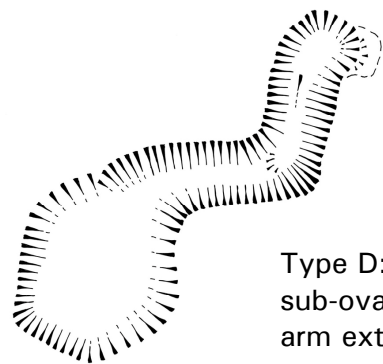


Type C: larger rectangular pit with arm extension

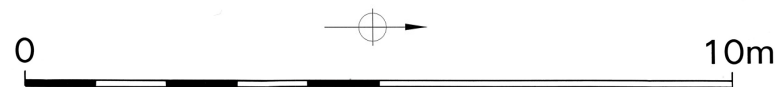


D2

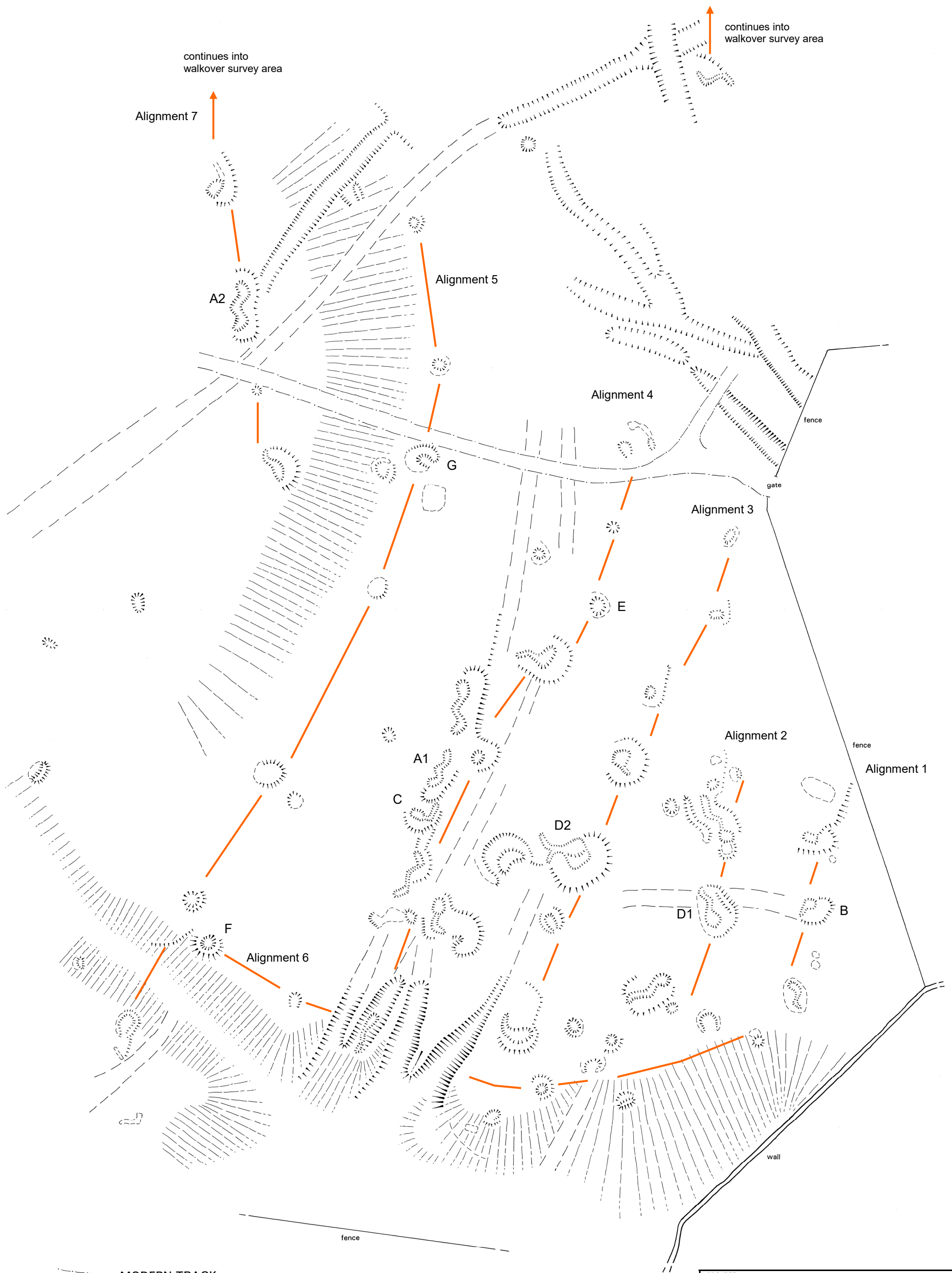
Type D: sub-rectangular or sub-oval pit with angled arm extension


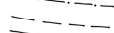


D1



| | | | |
|---------|----------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | QL EARTHWORK TYPES | |
| SCALE | AS SHOWN | DATE | JUNE 2023 |
| EDAS | | FIGURE | 15 |

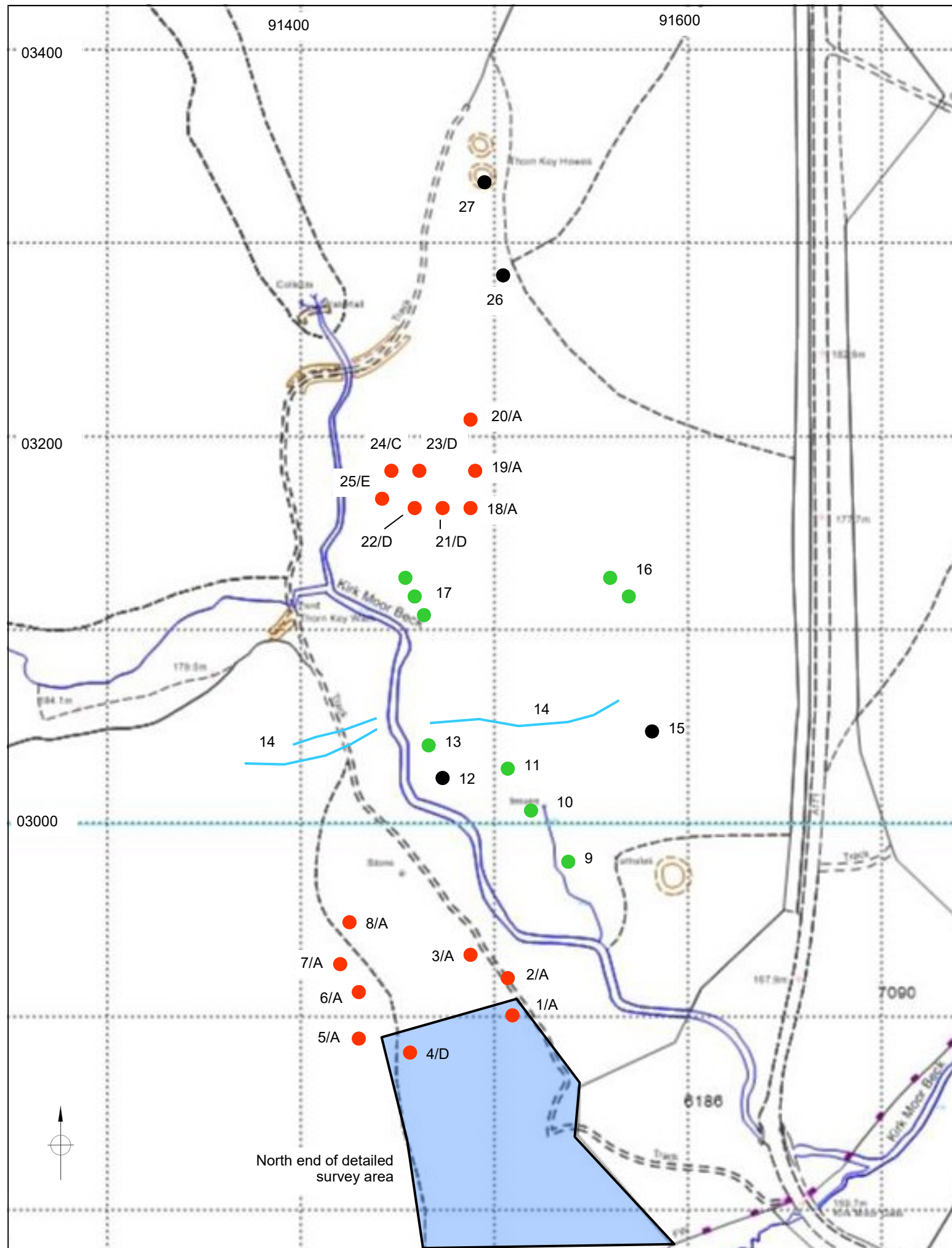


 MODERN TRACK
 ASSUMED WW2 TRACK

A1, A2 etc = surveyed in detail



| | | | |
|---------|----------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | DETAILED SURVEY RESULTS | |
| SCALE | AS SHOWN | DATE | JUNE 2023 |
| EDAS | | FIGURE | 16 |

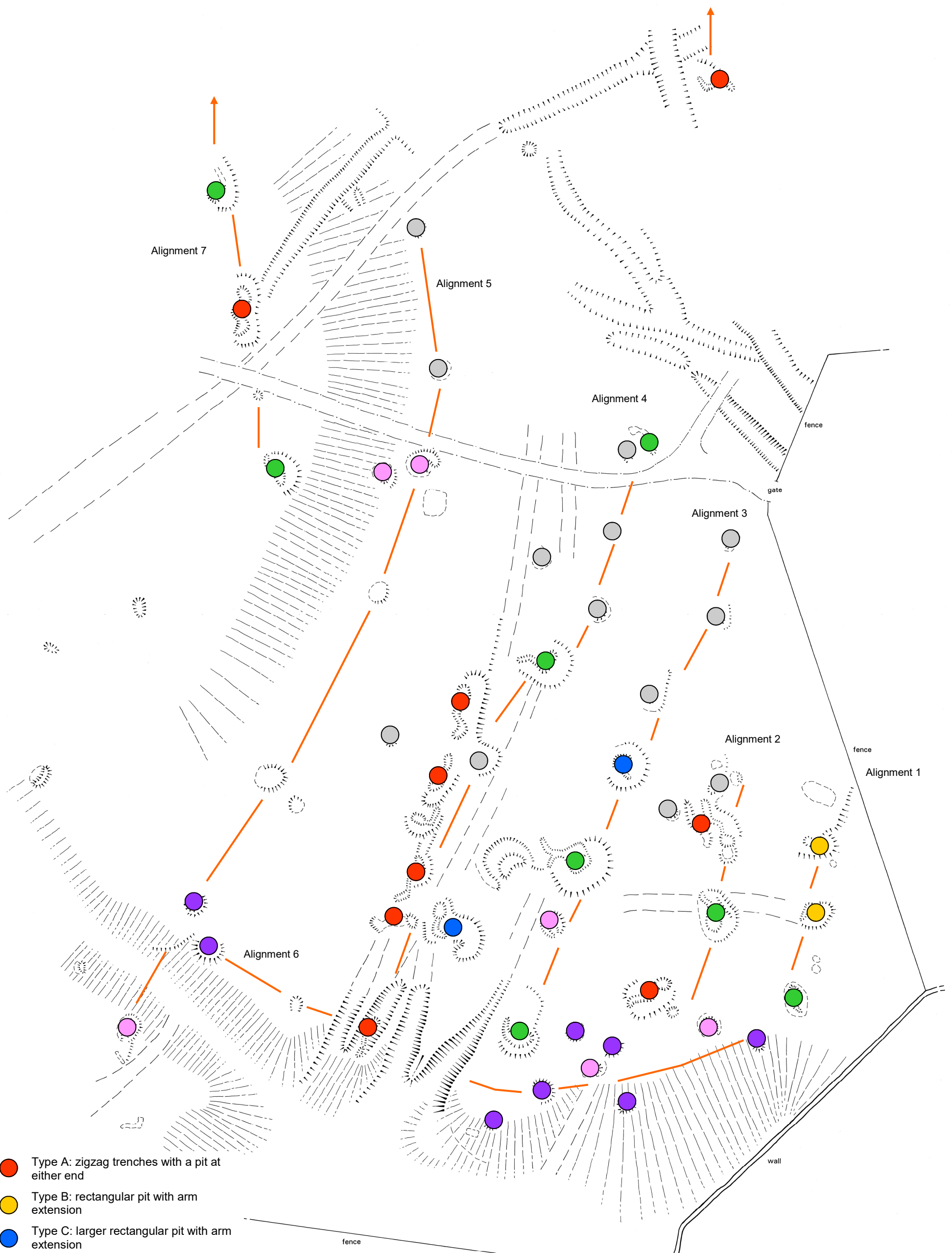


- QL earthwork with type
- Bomb crater
- Hollow way
- Other

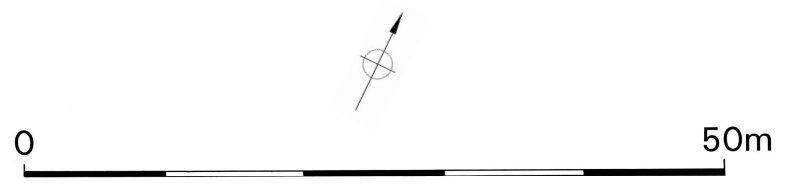


© Crown copyright and Database rights
Ordnance Survey Licence 100013825 (2023).

| | | | |
|---------|----------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | WALKOVER SURVEY RESULTS | |
| SCALE | AS SHOWN | DATE | JUNE 2023 |
| EDAS | | FIGURE | 17 |



- Type A: zigzag trenches with a pit at either end
- Type B: rectangular pit with arm extension
- Type C: larger rectangular pit with arm extension
- Type D: sub-rectangular or sub-oval pit with angled arm extension
- Type E: shallow, sub-rectangular or oval depression
- Type F: well-defined sub-circular depression
- Type G: low U-shaped mound of spoil, surrounding a central depression



| | | | |
|---------|----------|---------------------------|-----------|
| PROJECT | | LOW MOOR QL BOMBING DECOY | |
| TITLE | | DISTRIBUTION OF TYPES | |
| SCALE | AS SHOWN | DATE | JUNE 2023 |
| EDAS | | FIGURE | 18 |



Plate 1: General view over survey area, looking S (photo 1/760).



Plate 2: Alignment 1, Type D earthwork, south end of row, looking SW (photo 1/701).



Plate 3: Alignment 1, Type B earthwork, looking SW (photo 1/705).



Plate 4: Alignment 2, Type G earthwork, south end of row, looking SW (photo 1/710).



Plate 5: Alignment 2, Type D earthwork, looking NW (surveyed example D1) (photo 1/709).



Plate 6: Alignment 2, Type A earthwork, north end of row, looking SW (photo 1/708).



Plate 7: Alignment 3, Type D earthwork, south end of row, looking NW (photo 1/715).



Plate 8: Alignment 3, Type D earthwork, south end of row, angle-iron exposed in rabbit burrow, looking N (photo 1/717).



Plate 9: Alignment 3, Type D earthwork, looking N (photo 1/739).



Plate 10: Alignment 4, Type A earthwork in hollow way, south end of row, looking S (photo 1/727).



Plate 11: Alignment 4, Type C earthwork, south end of row, looking N (photo 1/735).



Plate 12: Alignment 4, Type C earthwork, looking SW (photo 1/741).



Plate 13: Alignment 4, central Type A earthwork, looking S (photo 1/746).



Plate 14: Alignment 4, Type D earthwork, with vehicle tracks, looking S (photo 1/751).



Plate 15: Alignment 5, Type G earthwork, south end of row, looking W (photo 1/729).



Plate 16: Alignment 6, Type F earthwork, east side of hollow ways, looking NW (photo 1/714).



Plate 17: Alignment 7, Type A earthwork, looking S (photo 1/755).



Plate 18: Isolated possible Type A earthwork, north-east part of survey area, looking W (photo 1/766).



Plate 19: Hollow ways, south end of site, looking N (photo 1/724).



Plate 20: Vehicle tracks heading from hollow ways, south end of Alignment 4, looking S (photo 1/734).



Plate 21: Hollow way, north part of survey area, looking SE (photo 1/771).



Plate 22: Walkover survey, Site 2, Type A earthwork, looking S (photo 2/049).



Plate 23: Walkover survey, Site 7, Type A earthwork, looking SW (photo 2/052).



Plate 24: Walkover survey, Site 12, possible observation trench, looking N (photo 2/053).



Plate 25: Walkover survey, Site 17, bomb craters, looking S (photo 2/055).



Plate 26: QL night shelter base, looking NW (photo 2/191).



Plate 27: QL night shelter base, north-west corner, looking E (photo 2/194).



Plate 28: QL night shelter base, view towards QL decoy, looking SE (photo 2/196).



Plate 29: QL night shelter base, view towards Starfish site, looking W (photo 2/198).

APPENDIX 1
EDAS PHOTOGRAPHIC CATALOGUE

LOW MOOR (SNEATON) QL DECOY - PHOTOGRAPHIC CATALOGUE

Film 1: Colour digital photographs taken 10th March 2022

Film 2: Colour digital photographs taken 25th January 2023

* = black and white shot

| <i>Film</i> | <i>Frame</i> | <i>Subject</i> | <i>Scale</i> |
|-------------|--------------|---|--------------|
| 1 | 700 | Alignment 1, Type D earthwork, south end of row, looking NW | 1m, 0.5m |
| 1 | 701 | Alignment 1, Type D earthwork, south end of row, looking SW | 1m, 0.5m |
| 1 | 702 | Alignment 1, showing line of ground disturbance/scarping to east side, looking N | 1m, 0.5m |
| 1 | 703 | Alignment 1, Type B earthwork, looking W (surveyed example) | 1m, 0.5m |
| 1 | 704 | Alignment 1, Type B earthwork, looking N (surveyed example) | 1m, 0.5m |
| 1 | 705 | Alignment 1, Type B earthwork, looking SW (surveyed example) | 1m, 0.5m |
| 1 | 706 | Alignment 1, Type B earthwork, north end of row, looking NW | 1m, 0.5m |
| 1 | 707 | Alignment 2, vehicle tracks heading for Type D earthwork, looking SW | 1m |
| 1 | 708 | Alignment 2, Type A earthwork, north end of row, looking SW | 1m, 0.5m |
| 1 | 709 | Alignment 2, Type D earthwork, looking NW (surveyed example D1) | 1m, 0.5m |
| 1 | 710 | Alignment 2, Type G earthwork, south end of row, looking SW | 1m |
| 1 | 711 | Alignment 2, Type A earthwork, looking S | 1m, 0.5m |
| 1 | 712 | Alignment 2, Type A earthwork, looking S | 1m, 0.5m |
| 1 | 714 | Alignment 6, Type F earthwork, east side of hollow ways, looking NW | 1m, 0.5m |
| 1 | 715 | Alignment 3, Type D earthwork, south end of row, looking NW | 1m, 0.5m |
| 1 | 717 | Alignment 3, Type D earthwork, south end of row, angle-iron exposed in rabbit burrow, looking N | - |
| 1 | 720 | Alignment 3, Type D earthwork, south end of row, angle-iron exposed in rabbit burrow, looking N | - |
| 1 | 721 | Hollow ways, south end of site, looking NW | 1m |
| 1 | 722 | Hollow ways, south end of site, looking N | 1m |
| 1 | 723 | Hollow ways, south end of site, looking N | 1m |
| 1 | 724 | Hollow ways, south end of site, looking N | 1m |
| 1 | 725 | Alignment 4, Type A earthwork in hollow way, south end of row, looking NW | 1m, 0.5m |
| 1 | 726 | Alignment 4, Type A earthwork in hollow way, south end of row, looking N | 1m, 0.5m |
| 1 | 727 | Alignment 4, Type A earthwork in hollow way, south end of row, looking S | 1m, 0.5m |
| 1 | 728 | Small marshy gully leading into Kirk Moor Beck tributary, looking W | - |
| 1 | 729 | Alignment 5, Type G earthwork, south end of row, looking W | 1m, 0.5m |
| 1 | 730 | Alignment 5, Type G earthwork, south end of row, looking E | 1m, 0.5m |
| 1 | 731 | Alignment 6, Type F earthwork, west end of row, looking NW (surveyed example) | 1m, 0.5m |
| 1 | 732 | Valley of tributary to Kirk Moor Beck, looking SE | - |
| 1 | 733 | Vehicle tracks heading from hollow ways, south end of Alignment 4, looking N | 1m |
| 1 | 734 | Vehicle tracks heading from hollow ways, south end of Alignment 4, looking S | 1m |
| 1 | 735 | Alignment 4, Type C earthwork, south end of row, looking N | 1m, 0.5m |
| 1 | 736 | Alignment 3, crescentric earthwork, looking W | 1m, 0.5m |
| 1 | 737 | Alignment 3, Type D earthwork, looking E (surveyed example D2) | 1m, 0.5m |
| 1 | 738 | Alignment 3, Type D earthwork, looking N (surveyed example D2) | 1m, 0.5m |
| 1 | 739 | Alignment 3, Type D earthwork, looking N (surveyed example D2) | 1m, 0.5m |
| 1 | 740 | Alignment 4, Type C earthwork, looking W (surveyed example) | 1m, 0.5m |
| 1 | 741 | Alignment 4, Type C earthwork, looking SW (surveyed example) | 1m, 0.5m |
| 1 | 742 | Alignment 4, southern Type A earthwork, looking E | 1m, 0.5m |
| 1 | 743 | Alignment 4, southern Type A earthwork, looking N | 1m, 0.5m |
| 1 | 744 | Alignment 4, central Type A earthwork, looking N (surveyed example A1) | 1m, 0.5m |
| 1 | 746 | Alignment 4, central Type A earthwork, looking S (surveyed example A1) | 1m, 0.5m |
| 1 | 747 | Alignment 4, northern Type A earthwork, looking S | 1m, 0.5m |
| 1 | 748 | Alignment 4, northern Type A earthwork, looking S | 1m, 0.5m |
| 1 | 749 | Alignment 4, northern Type A earthwork, looking S | 1m, 0.5m |
| 1 | 750 | Alignment 4, Type D earthwork, looking S | 1m, 0.5m |
| 1 | 751 | Alignment 4, Type D earthwork, with vehicle tracks, looking S | 1m, 0.5m |
| 1 | 752 | Alignment 4, Type E earthwork, looking NW (surveyed example) | 1m, 0.5m |
| 1 | 753 | Alignment 4, Type E earthwork, looking S (surveyed example) | 1m, 0.5m |
| 1 | 754 | Alignment 7, Type A earthwork, looking S (surveyed example A2) | 1m, 0.5m |
| 1 | 755 | Alignment 7, Type A earthwork, looking S (surveyed example A2) | 1m, 0.5m |

| | | | |
|---|-------|--|----------|
| 1 | 756 | Alignment 7, Type A earthwork, looking S (surveyed example A2) | 1m, 0.5m |
| 1 | 757 | Alignment 7, Type A earthwork, looking S (surveyed example A2) | 1m, 0.5m |
| 1 | 758 | Alignment 7, possible Type D earthwork, N end of row, looking S | 1m, 0.5m |
| 1 | 759 | General view over survey area, looking S | - |
| 1 | 760 | General view over survey area, looking S | - |
| 1 | 761 | General view over north part of survey area, looking E | - |
| 1 | 762 | Vehicle tracks, north part of survey area, looking N | 1m |
| 1 | 763 | Hollow way, north part of survey area, looking SE | 1m |
| 1 | 764 | Hollow way, north part of survey area, looking SE | 1m |
| 1 | 766 | Isolated possible Type A earthwork, north-east part of survey area, looking W | 1m, 0.5m |
| 1 | 767 | Isolated possible Type A earthwork, north-east part of survey area, looking SW | 1m, 0.5m |
| 1 | 768 * | Isolated possible Type A earthwork, north-east part of survey area, looking SW | 1m, 0.5m |
| 1 | 769 * | Isolated possible Type A earthwork, north-east part of survey area, looking SW | 1m, 0.5m |
| 1 | 770 | Hollow ways, north part of survey area, looking SE | 1m |
| 1 | 771 | Hollow way, north part of survey area, looking SE | 1m |
| 1 | 772 | General view over south part of survey area, looking NW | - |
| 1 | 773 | Alignment 1, Type D earthwork, south end of row, looking NW | - |
| | | | |
| 2 | 049 | Walkover survey, Site 2, Type A earthwork, looking S | 1m |
| 2 | 050 | Walkover survey, Site 3, Type A earthwork, looking S | 1m |
| 2 | 051 | Walkover survey, Site 7, Type A earthwork, looking NE | 1m |
| 2 | 052 | Walkover survey, Site 7, Type A earthwork, looking SW | 1m |
| 2 | 053 | Walkover survey, Site 12, possible observation trench, looking N | 1m |
| 2 | 054 | Walkover survey, Site 19, Type A earthwork, looking NE | 1m |
| 2 | 055 | Walkover survey, Site 17, bomb craters, looking S | 2 x 1m |
| 2 | 191 | QL night shelter base, looking NW | 1m |
| 2 | 192 | QL night shelter base, south-west corner, looking N | 1m |
| 2 | 193 | QL night shelter base, south-east corner showing possible entrance, looking W | 1m |
| 2 | 194 | QL night shelter base, north-west corner, looking E | 1m |
| 2 | 195 | QL night shelter base, north-west corner, looking E | 1m |
| 2 | 196 | QL night shelter base, view towards QL decoy, looking SE | 1m |
| 2 | 197 | QL night shelter base, north-east corner showing ex-situ shaped brick, looking S | 1m |
| 2 | 198 | QL night shelter base, view towards Starfish site, looking W | 1m |
| 2 | 199 | QL night shelter base, view towards Starfish site, looking W | 1m |
| 2 | 200 | QL night shelter base, looking NW | 1m |
| 2 | 201 | QL night shelter base, looking NW | 1m |

APPENDIX 2
EDAS SURVEY PROPOSALS

REMAINS OF SNEATON QL DECOY SYSTEM, WEST OF KIRK MOOR GATE, SOUTH OF SNEATON, NORTH YORKSHIRE

EDAS ARCHAEOLOGICAL SURVEY PROPOSAL

Introduction

This proposal sets out a programme of detailed measured earthwork survey to be carried out within an area of landscape to the west of Kirk Moor Gate, c.500m to the north-east of Foulisike Farm on the west side of the A171 Scarborough to Whitby road, 3km south of Sneaton village in North Yorkshire (NGR NZ 9154 0278 centred). The site is not subject to any statutory protection, although it may be considered to be an outlier of the 2WW bombing decoy on Low Moor (SM 34409; NHLE 1019757); it also lies within the North York Moors National Park. This survey proposal has been produced by Ed Dennison Archaeological Services Ltd (EDAS), at the request of Mr Miles Johnson, Head of Historic Environment at the North York Moors National Park Authority (NYMNP).

Discussions with NYMNP have determined that the programme of detailed measured earthwork survey will comprise a single phase of works, designed to complement and augment the site, which was previously identified from a LiDAR image and subsequent ground-truthing report (Brightman 2019). On completion of the site survey work, a short archive report and archive collating all elements of the project will be produced.

A site visit was made by Ed Dennison on 10th December 2021.

Background Information

The earthworks to the west of Kirk Moor Gate, on the north side of Kirk Moor Beck to the west of the A171 road, were identified as part of a LiDAR Ground Truthing survey carried out across a much wider area (Brightman 2019). The remains were described as follows:

“The majority of features recorded across the Fylingdales Moor survey area definitely or probably date to the use of the North York Moor uplands during the Second World War. The most coherent site was recorded at the southeast extent of Low Moor, above Kirk Moor Beck, comprising the earthwork remains of a bombing decoy known as a QL site (036). Bombing decoy sites were conceived of and implemented early in World War II as a way of confusing enemy bomber raids and drawing them away from cities, airfields and other high priority targets. K sites were intended as daytime decoys and Q sites were intended as night-time decoys, divided into QL sites - set with lights - and QF sites - set with fires to resemble targets already hit by bombing (Sullivan 2019). In form, the site now comprises a regular arrangement of shallow earthwork pits of differing sizes, though no trace of any control point or bunker could be located” (Brightman 2019, 35).

It was recommended that the earthworks of the identified features (site 036) were subject to detailed earthwork survey, which may be a useful way of providing a more detailed assessment and understanding of the form of this type of site (Brightman 2019, 85). The site was classified as being of medium to high significance.

The earthworks are recorded on the NYMNP HER as site 18074. The earthworks are survive well in an area of pasture, and comprise a series of five or six short stepped trenches, typically 7m long and 0.7m wide, together with numerous other depressions and circular features.

Proposed Works

EDAS have extensive experience of undertaking detailed measured earthwork survey of multi-period sites and landscapes, including those within the North York Moors National Park. The proposed survey work at Kirk Moor Gate will essentially comprise a total station EDM survey, subsequently enhanced by hand, and the production of an illustrated archive report.

The remains represent very rare survivals of a 'QL' bombing decoy, associated with the larger 'SF' (Starfish) complex to the north-west on Low Moor. These remains are typically short-lived and very ephemeral, and rarely survive post-war clearance and subsequent agricultural activity. The earthworks are likely to represent small-scale leaking blackout simulations of urban lighting, such as open doors, dirty windows, roof skylights and individual street lighting features, together with others not yet fully understandable. Many of these types of site are small, haphazard and experimental, and frequently follow no set pattern, unlike the larger QL decoy elements such as lights simulating whole streets, railway stations and dummy airfields, which were subject to detailed designs and operation (e.g. Dobinson 2000, 137-144).

Collation of Existing Documentary and Reference Material

No original documentary research will be carried out as part of the project. However, EDAS will collect and collate existing material relating to the history and development of the site (including the LiDAR images), and of other QL sites and their operation, to inform the subsequent recording work.

Topographical Survey

The topographical survey will concentrate on the core survey area, which measures approximately 100m north-south by 100m east-west, but adjacent earthworks outside of this area may be recorded if they can be positively identified. The site is currently in pasture. Parking adjacent to the site is difficult, but it might be possible to park at the adjacent Foulisike Farm, and use an existing public footpath to enter the area.

The survey work will be undertaken at a scale of 1:100, with more detailed survey of specific elements at 1:20 or 1:50, using EDM total station equipment. Sufficient information will be gathered to allow the survey area to be readily located through the use of surviving structures, fences, walls, water courses, trackways and other topographical features. The survey will record the position at ground level of all structures, wall remnants and revetments, earthworks, water courses, leats, paths, stone and rubble scatters, ironwork, fences, walls and other boundary features, and any other features considered to be of archaeological or historic interest. The survey will also record any differences in the exposed surface detritus, such as sorted stone and/or rubble scatters, as well as differences in coarse vegetation, which may aid the functional differentiation and interpretation of the site. The detailed site survey will pay particular attention to any structural remains, and also record areas of erosion (both natural, animal and man-made) or other damage.

The site survey will be integrated into the Ordnance Survey national grid by resection to points of known co-ordinates, using the LiDAR survey information (provided by NYMNP) and a hand-held GPS. The site survey will not be tied into any existing Ordnance Survey bench marks, but one of the survey stations will be given a nominal height (obtained from the GPS and LiDAR data) and then heights plotted across the survey area in relation to this. Survey points will be taken from fixed survey stations on a closed traverse around and through the site. The locations, descriptions and values of the control points will be stated in the final survey data.

On completion of the total station survey, the field data will be plotted and re-checked on site in a separate operation. Any amendments or additions will be surveyed by hand measurement. The resulting site survey will be produced at a scale of 1:100/1:50/1:20 and presented as an interpretative hachure plan(s) using conventions analogous to those used by Historic England. The survey work will equate to a Level 3 archaeological survey as defined by Historic England (English Heritage 2007, 23-24).

Photographic Survey

General photographic recording of the survey area, together with close-up photography of significant details, will be undertaken using an SLR digital camera with 12 mega-pixel resolution. The photographic guidelines produced by Historic England (2015) will be followed and each photograph will normally be provided with a scale where appropriate.

All photographs will be in colour, and clearly numbered and labelled with the subject, orientation, date taken and photographer's name, and cross referenced to film and frame numbers. A photographic register detailing (as a minimum) the location and direction of each shot will be completed. Digital copies of the photographs will be provided in high resolution jpeg format.

Written Accounts

Sufficient notes will be taken on site in order for a detailed description of the survey area to be prepared, in combination with the drawn and photographic records.

Reporting and Archiving

An EDAS archive archaeological survey report will be produced, based on the results of the documentary collation and the information obtained during the fieldwork. This report will assemble and summarise the available evidence for the survey area in an ordered form, synthesise the data, comment on the quality and reliability of the evidence, and how it might need to be supplemented by further field work or desk-based research. The report will also be illustrated by reduced versions of the field plots, historic maps and plans, and a selection of photographic plates. The report will also contain various appendices, including photographic registers and catalogues. One hard copy and a pdf version of the final report will be supplied, for distribution to the NYMNPA Historic Environment Record. Another copy will also be included within the site archive. Other pdf copies will be distributed to other interested parties, as directed by the NYMNPA.

An appropriate entry will be submitted to the OASIS (On-line Access to the Index of Archaeological Investigations) project, including the deposition of a digital copy of the report with the Archaeology Data Service, via the OASIS form, upon completion of the project.

A fully indexed and ordered field archive will be prepared, following the guidelines produced by the Chartered Institute for Archaeologists (CIfA 2020). The archive will comprise primary written documents, plans, sections and photographs, and an index to the archive. Subject to the agreement of the landowner, the site archive will be deposited with the NYMNPA.

REFERENCES

Secondary Sources

Brightman, J 2019 *North York Moors National Park LiDAR Ground Truthing: Archaeological Landscape Survey* (unpublished Solstice Heritage LLP archive report (project SOL1819-118) for the NYMNPA)

ClfA (Chartered Institute for Archaeologists) 2020 *Standard and guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*

Dobinson, C 2000 *Fields of Deception: Britain's Bombing Decoys of World War II*

English Heritage 2007 *Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice*

Historic England 2015 *Digital Image Capture and File Storage: Guidelines for Best Practice*

Ed Dennison, EDAS
15th December 2021