THE WESTERN HEIGHTS DOVER, KENT

ISSN 1478-7008

Report No 10: Miscellaneous Military Structures, 1850-1945

SURVEY REPORT

PAUL PATTISON, MORAIG BROWN and ANDREW WILLIAMS

Photography by STEVE COLE & ALUN BULL

ENGLISH HERITAGE

ARCHAEOLOGICAL INVESTIGATION
SERIES 31/2001 (Revision of 2004)

RCHM ENGLAND

ENGLISH HERITAGE

THE WESTERN HEIGHTS, DOVER, KENT

REPORT NO 10

MISCELLANEOUS MILITARY STRUCTURES 1850-1945

ARCHAEOLOGICAL INVESTIGATION REPORT SERIES 31/2001
(REVISION OF 2004)

Report by: Paul Pattison, Moraig Brown & Andrew Williams
Survey by: Paul Pattison, Moraig Brown, & Andrew Williams
Drawings by: Paul Pattison & Moraig Brown
Field photography by: Alun Bull & SteveCole

Cambridge Office: Brooklands, 24 Brooklands Avenue, Cambridge CB2 2BU
Tel: 01223 582700 ***Fax***: 01223 582708

Headquarters: National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon SN2 2GZ
Tel: 01793 414600 ***Fax***: 01793 414606 ***e-mail***: *customers@english-heritage.org.uk*
Internet: http://www.english-heritage.org.uk

CONTENTS

LIST OF FIGURES

ABBREVIATIONS USED IN THE TEXT

AA anti-aircraft

CDMU Coastal Defence Maintenance Unit

BL breech- loader

GHQ General Headquarters

LMG Light machine gun

MT motor transport

RBL rifled breech-loader

RE Royal Engineers

REME Royal Electrical Mechanical Engineers

RML rifled muzzle loader

WD War Department

GLOSSARY

Artillery store (or RA store)
A subsidiary building in a fortification, storing equipment for the operation and maintenance of artillery pieces

Barbette
A protective breastwork or forward edge of an emplacement, over which the guns fire

Breech-loader (BL)
A gun which is loaded from the rear of the barrel

Cartridge store
A chamber used to store powder that was already made up into cartridges

En-barbette
A gun mounted to fire the forward edge of its emplacement

Expense magazine
A small magazine in which ammunition was stored for immediate use in part of a fortification or battery

Glaçis
The external slope of a defensive work, carefully profiled and often massively reinforced with earth and other materials to absorb in-coming shell fire

Lamp recess
An alcove or small tunnel in a wall into which a lamp is placed. In magazines a pane of glass set into a brass frame prevents sparks from entering the chamber

Lamp room
A chamber where lamps were cleaned, refitted and maintained

Magazine
A place for the safe storage of gunpowder. Generally applied to any ammunition storage, the term more particularly refers to the place where gunpowder was kept loose in barrels or cases (often called a main magazine). See also cartridge store and shell store

Pivot
The point about which an artillery piece is traversed

Racer
A curved steel track set into the gunfloor. The wheels of a traversing carriage engaged with the racer to ensure smooth movement of the gun about a pre-determined arc of fire

Rampart
The main defence of a fortification, comprising an often massive and carefully profiled earthwork, on or behind which a large part of the garrison and its weaponry are situated

Rifled muzzle-loader (RML)
A muzzle-loading gun is armed from the front of the barrel and in this case the barrel has grooves cut into the inside of the barrel which causes the shell to spin, thus ensuring greater speed and accuracy.

Shell store
A chamber in which shells are stored

Shifting lobby
A room next to a magazine or cartridge store in which men change into and out of magazine working clothes. This was to prevent metal on their ordinary clothing from sparking and thus igniting the gunpowder. Access to the magazine was generally prevented by a waist-high barrier between it and the shifting lobby

Terreplein
A level surface on a rampart, behind the parapet, providing a platform for guns

Traversing carriage
A carriage supporting a gun which enables the gun to be brought to bear on a target by moving through a fixed arc

1. INTRODUCTION

From April to July 1998 the Royal Commission on the Historical Monuments of England (RCHME) carried out survey and analysis of the earthworks and buildings on the defences of the Western Heights, Dover (Fig 1). The main parts of the fortress are described in reports 1-9; this report concerns smaller structures of various dates, which aslo played important roles. The survey was undertaken at the request of Kent County Council as part of an Interreg II programme relating to historic fortifications in Kent, Nord-Pas de Calais and West Flanders. The programme was co-ordinated for several partners in Kent by Kent County Council and funding for Western Heights was shared between the RCHME and the European Union. The field investigations were the responsibility of staff of the RCHME Field Office in Cambridge.

This report is no 10, the last in the series concerning the Western Heights fortifications, and for best effect, should be read in conjunction with the other nine. The main features described in this report are shown in Figure 2.

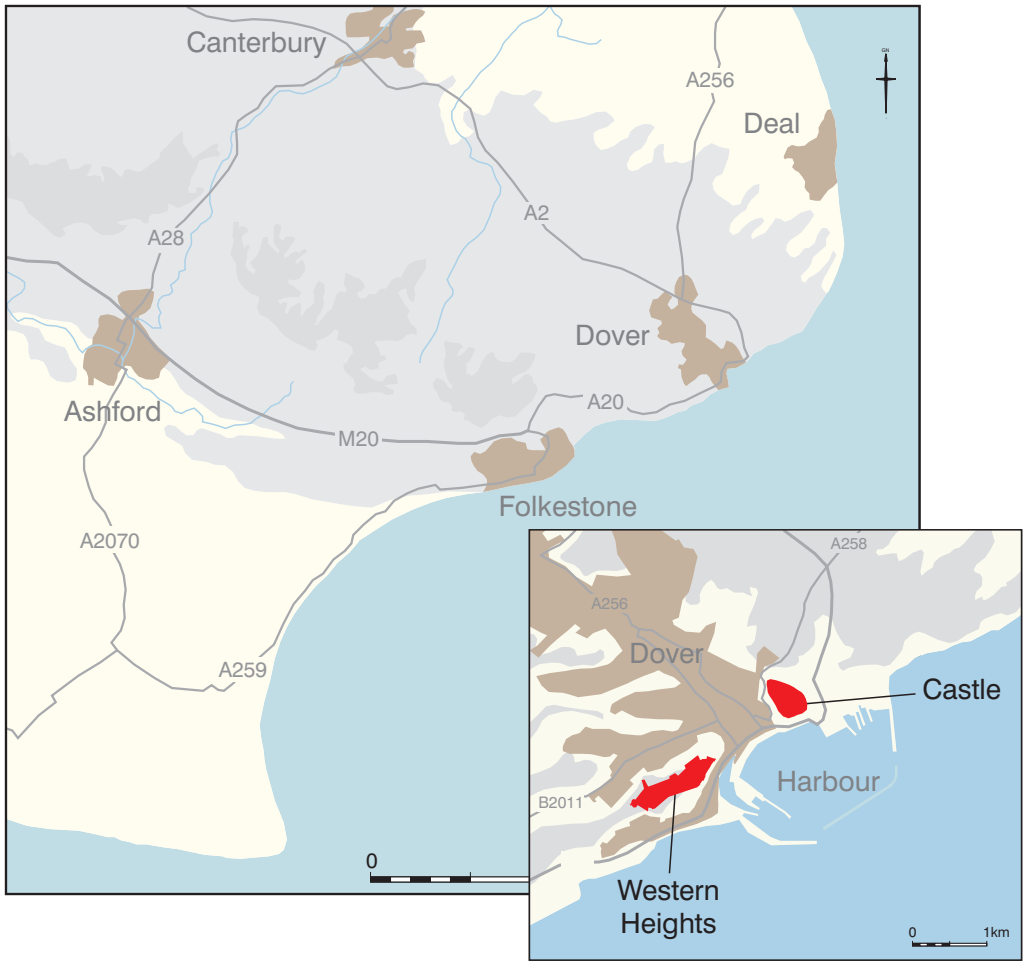

Figure 1
Dover Western Heights, location map (pale yellow = land below 50m OD; light grey = land 50-150m OD; dark grey = land over 150m OD; pale brown = urban areas)

2. DROP BATTERY

Historical Background

Drop Battery originated *c*1853, following a report to the Inspector General of Fortifications concerning the *'sea batteries'* protecting the port and harbour at Dover. The report proposed a new *'Battery on the Cliff in front of Drop Redoubt*' comprising eight 8-inch guns. A note attached to the report proposed the alternative armament of 42-pdrs and estimated the cost of construction at £1000, complete with curbs, racers and pivots for eight guns on Madras traversing carriages (PRO: WO/55/785). In February 1853, the commanding RE officer in Dover wrote to the Inspector General requesting the guns, stores and all paraphernalia for the '*armament of the Batteries now constructing at Dover*' (PRO: WO/55/785). Work must have proceeded shortly afterwards as the battery is shown in outline on a plan of 1858, with a simple curved rampart with gun floor behind it, and a single building to the rear - probably an artillery store (PRO: WORK/43/1598).

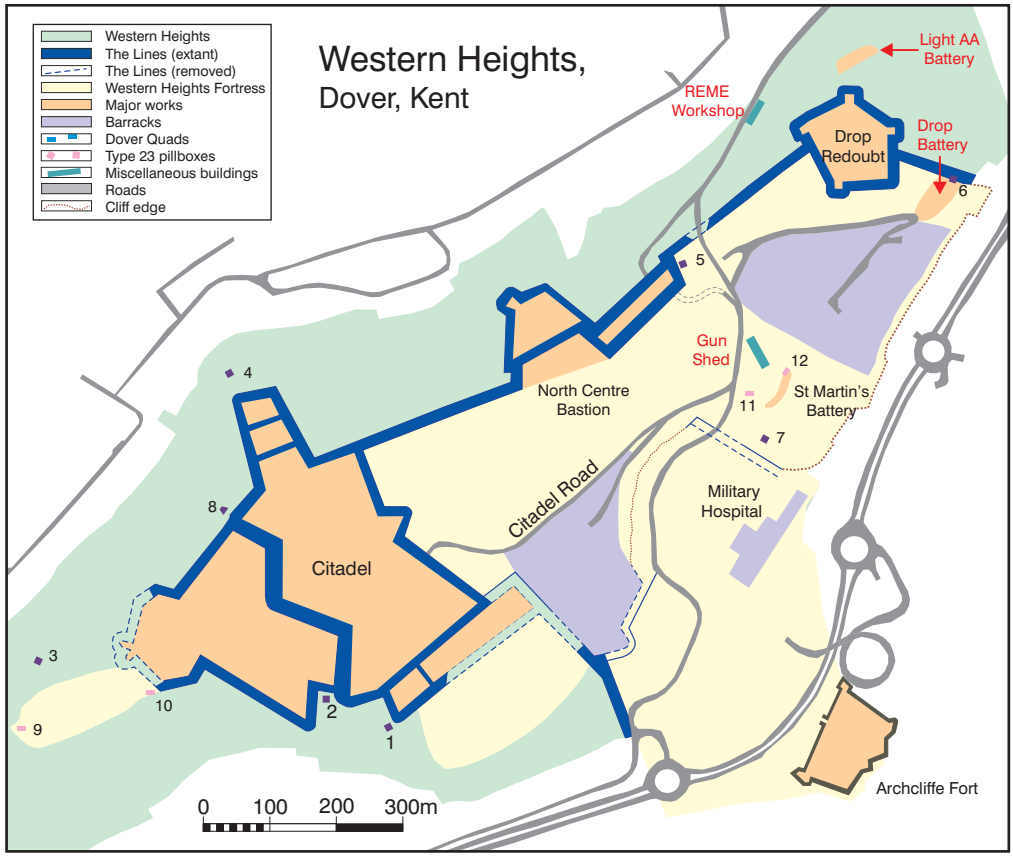

Figure 2
Plan of Dover Western Heights, showing the locations of all structures discussed in the report

Alterations were made to the battery as a result of the construction of the North-east Line between Drop Redoubt and the cliff edge at Drop Battery, between October 1859 and February 1862. A report of October 1868 records the evidence of this construction given by Captain Charles Elwin Harvey RE, who stated that a magazine ('G' magazine, see below) was added at that time but that no alterations were made to the pre-existing expense magazines (John Iverson pers comm). A plan of 1881 reveals how the huge rampart of the Line truncated the north-eastern edge of the old battery, completely blocking its field of fire in that direction. It also depicts seven of the original eight positions for the guns, formed by ground platforms for cannon mounted on garrison carriages firing *en barbette*, a free-standing Store and three magazines. Two original expense magazines (nos 1 and 2) stood to the rear of the gun floor while a third - that referred to in the report of 1868 and later called 'G' magazine - had been added on the flank under the rampart of the Line. To compensate for the truncated field of fire, a new circular emplacement stood on top of the Line above the new magazine. This was for a gun on a traversing carriage with a 360° 'C' pivot, possibly a modern rifled piece.

In 1876, the armament comprised three 42-pdrs and three experimental 7-inch RBLs but it was proposed that these be removed and replaced with five 64pdr RMLs (John Iverson, pers comm). 'G' magazine was operational in 1882 though it had been given a new entrance incorporating access to expense magazine no 1.

In May 1886, it was recommended that the battery should be disarmed by removal of its five 64pdr RMLs, following the construction of the new St Martins Battery nearby, with its three heavy RMLs (PRO: WD/2411a; John Iverson, pers comm).

A miniature rifle range had been constructed on the site of the gun floor by 1925 (WD/b).

Description and Interpretation (Figs 3 and 4)

The site of Drop Battery is accessible from Drop Redoubt Road, close to the cliff edge overlooking the western docks. It was constructed by cutting back severely into the hillside and depositing the spoil to form a roughly rectangular terrace (the *terreplein*) with a *glaçis* on the seaward side. The guns were arranged along the south-east edge of the *terreplein* in a gently-curving line facing the sea, on open stone platforms fronted by a low brick parapet. The *terreplein* is accessible but only a few features can be seen; at the north-eastern edge, a low brick wall may be part of the parapet and a concrete floor at the south-western end is associated with the rifle range; there is, however, no surface trace of

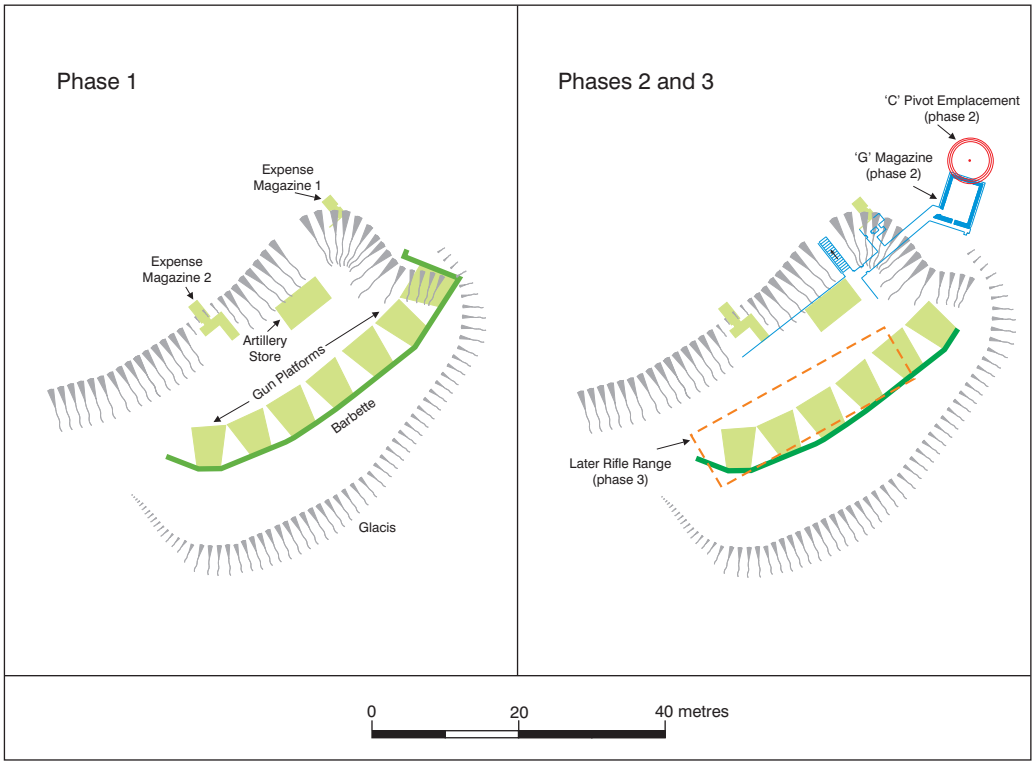

Figure 3
Drop Battery; general plans of the site development

the original Store building. The *glaçis* and rear scarp are covered by thick impenetrable scrub but appear to be intact; both are steep, well-defined and at least 3.0m (9ft 10in) high, though access could not be gained for accurate measurement. In the rear scarp, the original entrance to expense magazine no 1 is buried but no 2 expense magazine survives as originally built. On the north-east flank, 'G' magazine lies under the rampart of the North-east Line, reached through its secondary entrance which also leads into magazine no 1; the original entrances to both are buried.

Expense magazine no 2

This is a small building in yellow stock brick, approached along an L-shaped passage in the rear scarp of the battery. The outer arm of the L is ramped down to the profile of the rear scarp, reaching a maximum height of 3.5m (11ft 6in), while the inner arm forms a tiny forecourt to the magazine. The doorway to the magazine is 1.98m (6ft 6in) high and 0.87m (2ft 10in) wide, with a shallow segmental arch of two header courses and rebated internally for double, inward-opening wooden doors. The area on both sides of the doorway, some 1.87m (6ft 1½in) to the east and 1.0m (3ft 3½in) to the west, is covered with a thick layer of asphalt waterproofing which extends above the arch and probably seals the vault. There is a small rendered repair above the doorway and, one each flank, a small hole, 0.2m (8in) square, giving onto a ventilation cavity around the magazine.

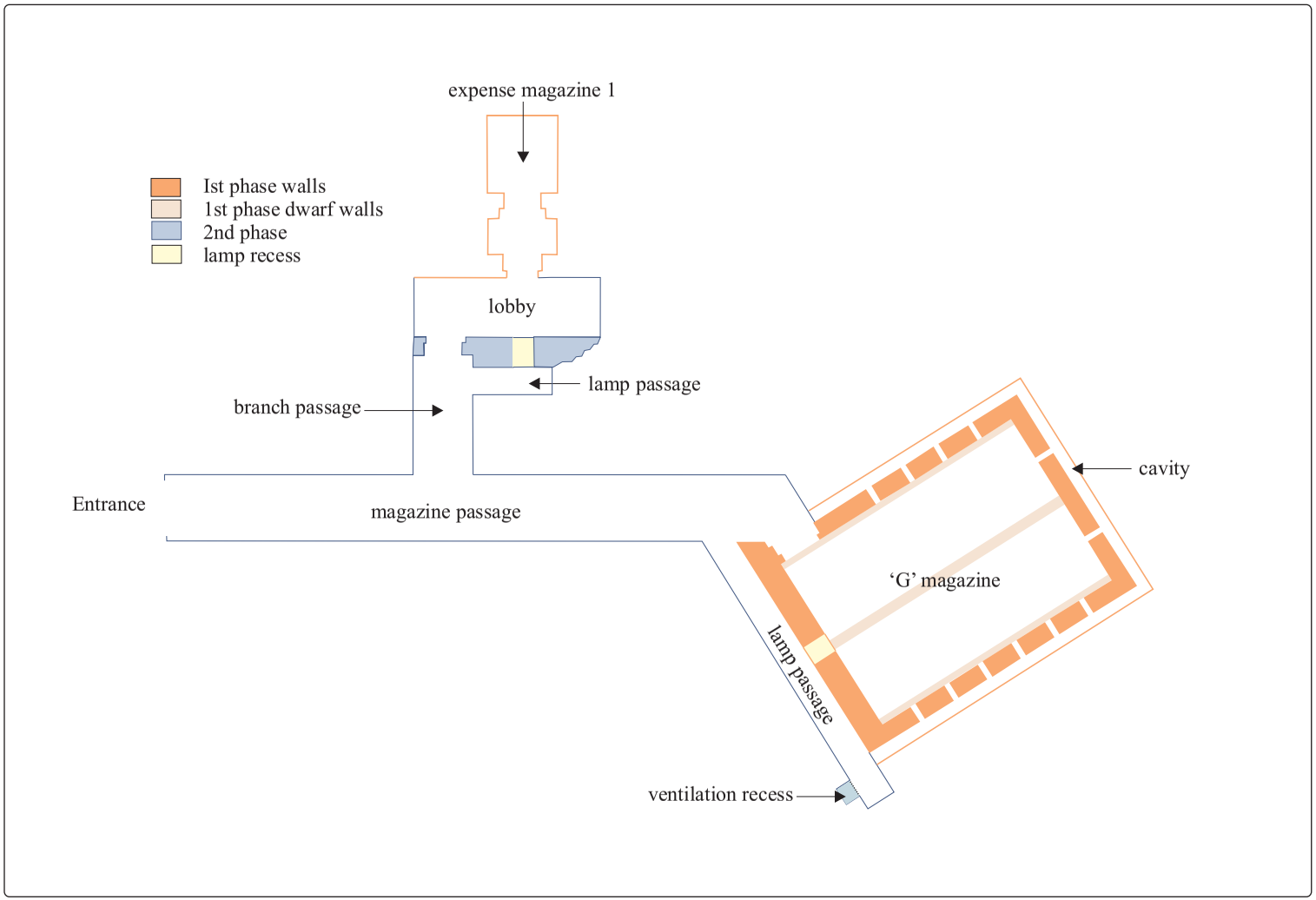

Figure 4
Drop Battery; RCHME plan of 'G' magazine and expense magazine no 1

The rectangular magazine, 2.8m (9ft 2in) long and 1.45m (4ft 9in) wide, has an axial semi-circular vault, 2.2m (7ft 2½in) high, coursed entirely with stretchers. The floor has gone but comprised timber boards laid axially on the surviving cross-axial dwarf walls, to allow ventilation under. The north-west end wall has six header-sized gaps in the brickwork, arranged in pairs at head, waist and floor height, which formerly held timbers for the magazine racking.

'G' Magazine

This was a main magazine, designated Western Heights 'G' in 1882. The magazine and its various passages are constructed of yellow stock brick laid to English bond, usually with semi-circular vaults of stretchers.

The magazine lies under the rampart of the North-east Line and is approached via a vertical entrance façade cut into the base of the rampart, flanked by brick side walls ramped to the earthwork profile (Fig 5). Left of the entrance, the base of a flight of steps can just be seen, formerly lead up to the 'C' pivot gun position on the rampart crown. The façade is 3.3m (10ft 10in) high and 2.33m (7ft 8in) wide, containing a recessed doorway 2.2m (7ft 2½in) high with shallow segmental relieving arch of two header courses.

The doorway gives onto the semicircular-vaulted magazine passage, leading north-eastward for some 12.5m (41ft), and 1.35m (4ft 5in) wide. It proceeds straight to the magazine but has a side passage to the north, leading to expense magazine no 1.

The magazine passage has two pairs of sockets for waist high barriers, before and after the side passage. At the end of the passage there are adjacent openings in the south-east wall, the first giving onto a lamp passage and the second into the magazine (Fig 6). Both magazine and lamp passage are set at a curious angle to the magazine passage, resulting from closure of the original entrance passage, which was perpendicular to the south wall of the magazine. The magazine passage has therefore been broken into the west corner of the magazine and the repaired brickwork and a secondary stone lintel are visible on the inside. The lamp passage, also secondary, is 5.65m (18ft 6in) long and only 0.36m (1ft 2in) wide; it has a half vault, the lower side to the south. Its north wall contains a central lamp recess serving the magazine, with a ceramic airbrick overhead, and, at the east end, the exit of the cavity to the magazine walls, capped by a stone lintel. The south wall has a small recess, with twin ceramic airbricks, leading to circular ceramic vent pipes which exit to the exterior.

Figure 5
Drop Battery; the entrance to 'G' magazine,photo from the south (NMR: AA008578 © Crown Copyright 1998)

The magazine is a rectangular chamber 5.47m (17ft 11in) by 3.82m (12ft 6½in) with an axial semi-circular vault (Fig 7). The doorway is flat-headed with a stone lintel, rebated externally for double outward-opening wooden doors The floor was timber boarded on low sill walls; the boards have gone but the sills remain. The south end wall contains the lamp recess capped by a stone sill and lintel. The north, east and west walls are vented into a cavity through narrow vertical slots 0.11m (4½in) wide extending to a height of 1.24m (4ft 1in) above the sill wall; these slots also extended under the board floor. Each

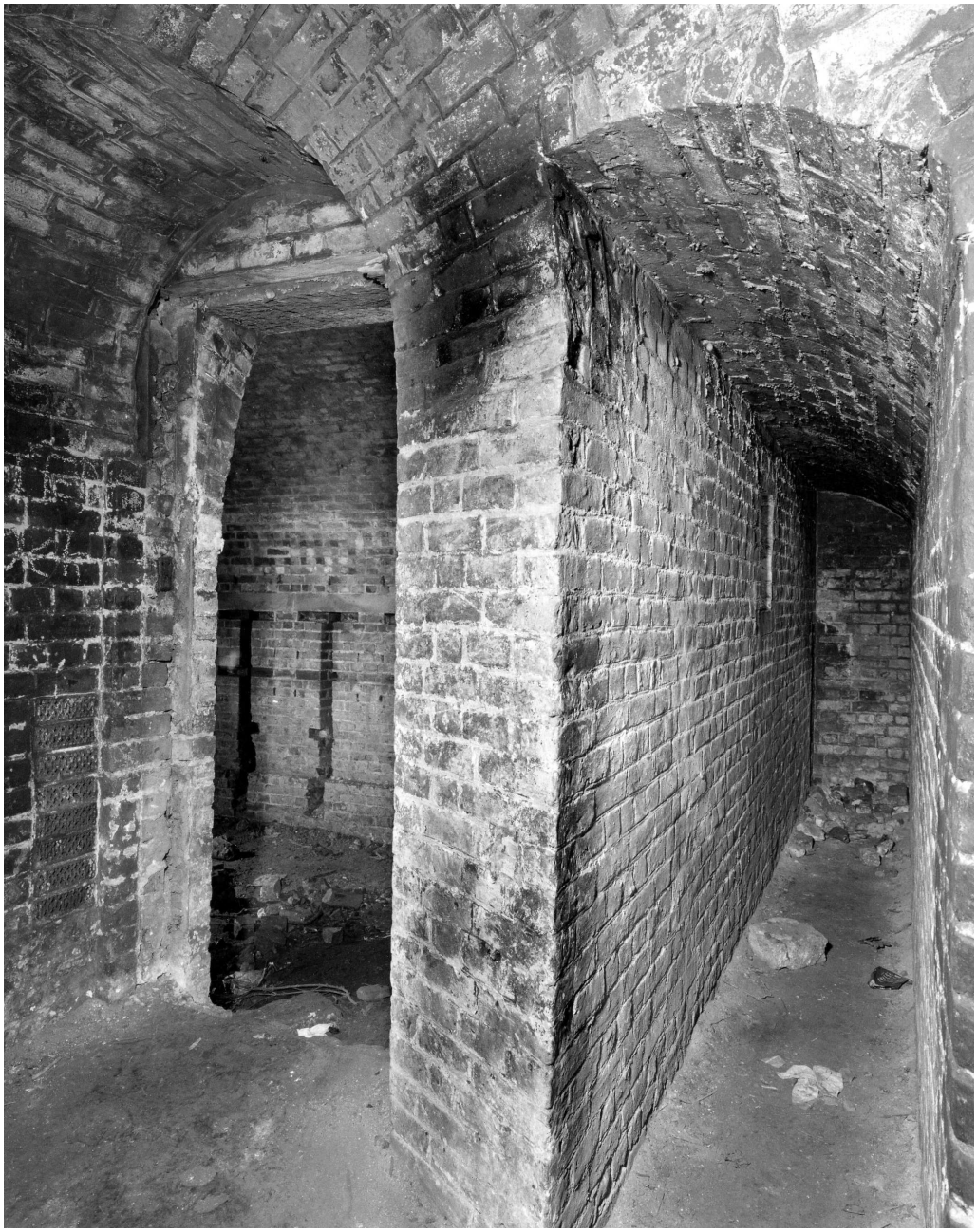

Figure 6
Drop Battery, 'G' magazine; photo of the adjacent entrances to the magazine (at left) and its lamp passage (NMR: AA008581 © Crown Copyright 1998)

slot has three horizontal timber stretchers built across it into the wall, for the attachment of a timber lining and for timber racking for the powder barrels.

Expense magazine no 1

Expense magazine no 1 is approached along a branch passage from the north-west wall of the magazine passage of 'G' magazine. The passage has the usual semi-circular vault,

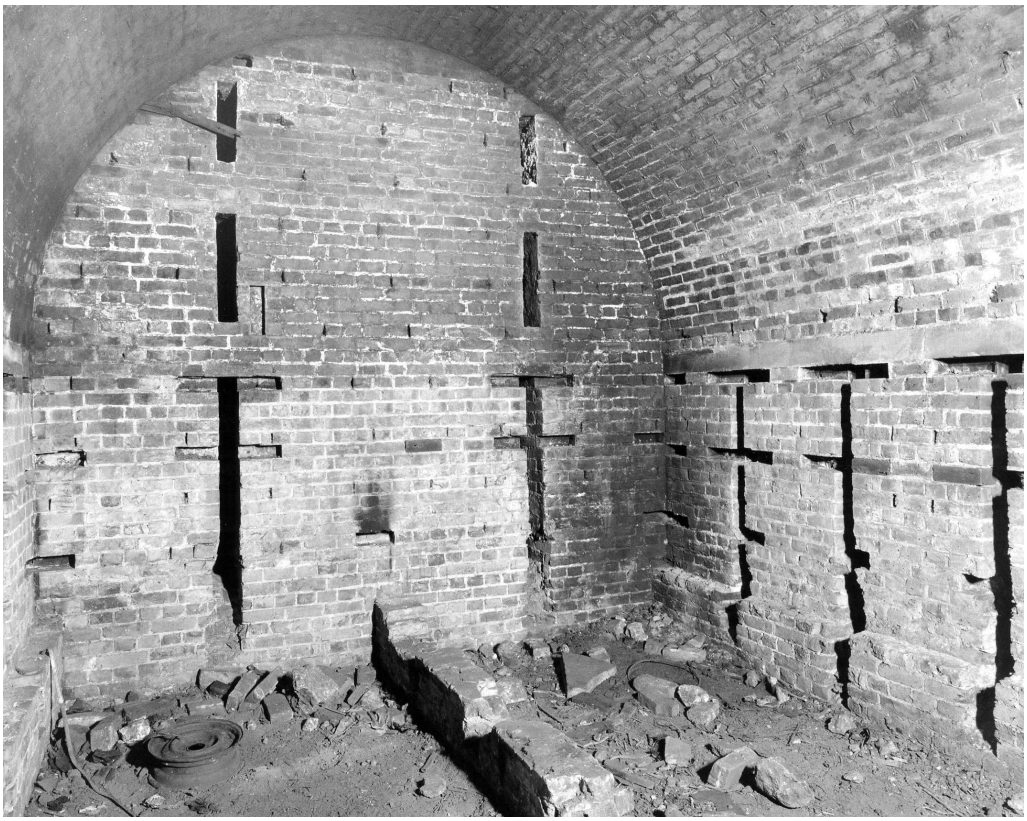

Figure 7
Drop Battery; 'G' magazine; photo of the magazine interior, from the south, showing ventilation slots and dwarf walls for a suspended board floor (NMR: AA008579 © Crown Copyright 1998)

neatly vaulted into the magazine passage, while its floor is ramped downwards towards a narrow doorway. A short lamp passage leads off perpendicular from its north-east wall, for some 1.60m (5ft 3in) to its blind end; it is 0.55m (1ft 9½in) wide, with a semi-circular vault, a fllor very slightly higher than the branch passage and a lamp recess in its north-west wall. The recess is 0.55m (1ft 9½in) high and 0.42m (1ft 4½in) wide, with a sandstone sill and lintel, the latter vented to an adjacent ceramic airbrick.

The end of the branch passage contains a narrow doorway, formerly closed by twin wooden doors, leading into a lobby which may be the original entrance passage. It runs perpendicular to the branch passage. The entrance has a shallow segmental arch of two header corses over a rebate for inward-opening doors; there is a flat stone lintel on the inside. The lobby is half-vaulted, with the lower part of the vault on the south-east wall, while the north-west wall is rendered. Towards its north-west end is the flat-headed doorway to the magazine. This comprises two tiny chambers. The first is only 1.43m(4ft 8in) by 0.72m (2ft 4½in), closed originally by inward-opening doors, the second 1.43m (4ft 8in) by 1.57m (5ft 2in), rebated for an outward-opening door capped by a shallow segmental arched head seg head. Like expense magazine no 2, the end wall of the second chamber has three pairs of missing headers forming sockets for timber racking.

3. A GUN SHED

This building, still in use as B.C.B Garage, is located on the top of the ridge with access from the eastern side of Centre Road. Its structural form and its absence from plans until 1861 hint at a construction date in the late 1850s; a record plan of 1867 identifies it as a Gun Shed, and another of 1892 specifically as the Ordnance Store Department Gun Shed ((NMR: WD/ 2506; WD/2411; PRO: WO/78/2426/20). However, by 1904 it had been converted as a Cart Shed for the nearby Royal Engineers Store (NMR: WD/LXVIII.14.12). Finally, a plan of 1937 reveals the proposal to convert the building for the repair and storage of motor vehicles (NMR: WD/2438).

It is a single-storey, twelve by three bay building of pier and panel construction with the piers in English Bond and the panels in Flemish bond. It has a hipped Welsh-slate roof with red clay ridge tiles and cast-iron guttering. The western elevation originally had an open front, divided into twelve bays by ten timber posts with deep chamfers and stops. A wall plate, formed from six scarf-jointed pieces of timber of heavy scantling and with a deep chamfer on the inside face, runs the entire length of this elevation. King-post trusses with iron strapping and square bolts rest on this plate, while angle ties with tusk-tenons are placed at each corner of the building.

As originally built and shown on the 1867 plan, the long open frontage provided 'parking bays' for artillery pieces on wheeled carriages (Fig 8). The central location of the building, at a junction of main roads, suggests that its purpose was to accommodate a mobile reserve of artillery for rapid deployment across the Western Heights, perhaps in connection with the tactics proposed for the new Armstrong rifled field-gun (Coad and Lewis 179). In 1859, a special committee recommended that the lighter Armstrong field guns should cover both the flanks and the ground between bastions in order to prevent an enemy force using this ground to position their own rifled artillery for the bombardment of the fixed defences.

By the 1890s, the role of the Western Heights defences had changed to a Mobilisation Centre - a large defensible supply centre from which a field army operating against an invading force in the surrounding region could be supplied with troops and equipment. In this context, the Gun Shed may have continued to house mobile artillery equipment until the turn of the century. However, by 1903, three new stores had been built for mobilisation equipment and a year later the Gun Shed was being used as a Cart Shed by

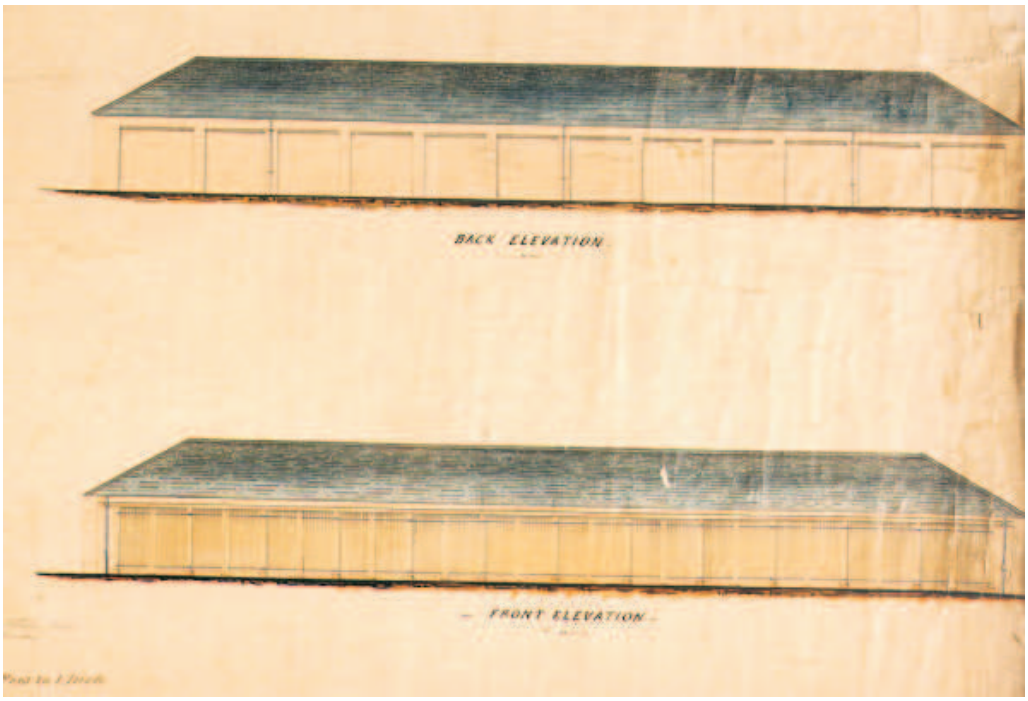

Figure 8
The Gun Shed, as drawn in 1867 (extract of NMR: WD/2411 © English Heritage 2001)

the Royal Engineers. The 'Washing Platform' of granite sets in front of the four middle bays of the shed, shown as an undated alteration in red ink on the 1867 plan, probably dates from this period (NMR: WD/2411).

Plans of 1937 reveals the proposal to convert the building for the repair and storage of motor vehicles, comprising three instructional lorries, nine two-seater cars, seventeen General Service lorries and one four-seater car (NMR: WD/2438; WD/2442). The provision of instructional lorries suggests that the remodelling may have been connected with the conversion of the Army from horse-drawn transport to motor vehicles, which took place in the 1930s. The simple design of the original building made conversion to a garage relatively straightforward, with the lintels of the central four doorways being raised for lorries and new garage doors, made from steel, replacing the originals. The rear of the shed was partitioned to form 'M.T stores' for vehicle spares at the south end and offices at the north. Roller shutter doors for the stores and a doorway and windows for the office were inserted in the rear wall beneath concrete lintels. Both garage and stores were lit by inserted skylights and heated by a small flat-roofed boiler house added to the north wall. The large inspection pit which survives at the south end of the garage, lined with glazed white brick, appears to be a later addition as it is not shown on the 1937 plans.

In the revetment wall south of the Gun Shed, two vent pipes indicate the position of the 2000-gallon petrol tank installed at this time but the small oil store next to it has been demolished, leaving no obvious traces (NMR: WD/2438).

At the same date, an additional garage was proposed north of the converted Gun Shed: this was built and also survives. It is a small single-storey building, in red brick laid to stretcher bond with a pitched slate roof, called a 'standard garage'. It accommodated three vehicles and had roof trusses of 'L' section steel angle. The present garage doors may be the 'Éclair Balanced Doors' specified on the 1937 plan (NMR: WD/2443; WD/2438).

4. PILLBOXES

Historical Background

Pillboxes were a common form of anti-invasion defence from the First World War, though their heyday was at the beginning of the Second World War; at least 18,000 were built in 1940 alone (Lowry 1995, 79). They were used in a variety of situations, often forming important links in linear defences such as the GHQ Stop Line, an anti-tank barrier which ran from south-west England, through London, then up to Wales and Scotland. On a more local scale, they were used for defence of coast batteries, airfields and other military installations.

In the Second World War, a ring of pillboxes was established around the Western Heights, both to provide blanket cover to the approaches, and also to defend particular installations (Fig 9). Many have been removed since the end of the war, but twelve were recorded during the RCHME survey. There are two basic forms of pillbox on the Heights; type 23 for combined land and air defence and the so-called 'Dover Quads'.

Description and Interpretation (for pillbox nos given below see fig 10)

Dover Quads

In 1993, a rapid survey and assessment was undertaken of the Dover pillboxes, focussing on the Dover Quads (Burridge 1993; 1994). This revealed that there had been fifteen of this type on the Western Heights, with another fifteen along the western approaches to Dover (Fig 9). Moreover, with the possible exception of two candidates in west Wales, this type of pillbox appears to be confined to the Dover area (Roger Thomas, pers comm).

The Quads were scattered to cover the approaches to the Heights and each was generally inter-visible with one or more others. Of the fifteen originals identified by Burridge on the Heights, only eight survive and although their structure is essentially the same, there are four minor variations:

Type A - square in plan. Four survive, two each on the north and south flanks of the Citadel.

Type B - square with chamfered external corners set at a 45° angle to the main structure.

Type C - similar to type B but considerably altered, thickened and strengthened.

Type D- trapezoidal.

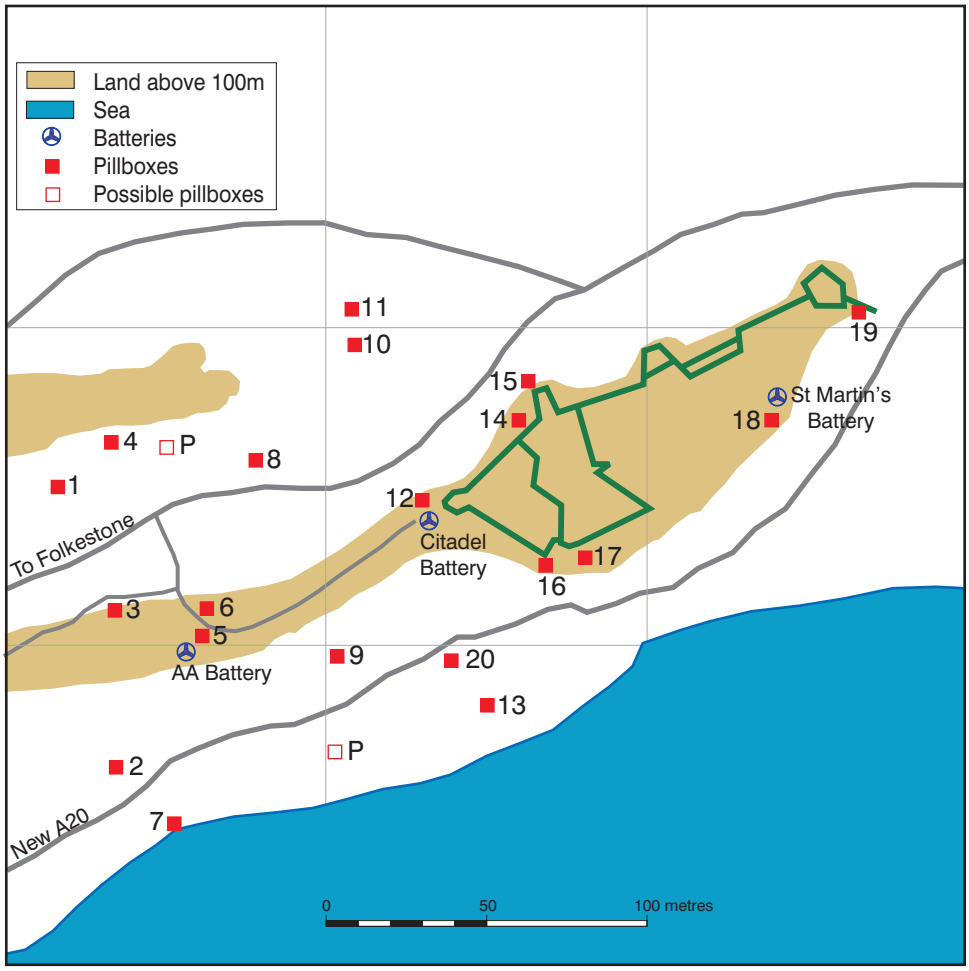

Figure 9
Plan showing the distribution of Dover Quad type pillboxes in the Dover area (after Burridge)

All are constructed in concrete with brick facings inside and out, concrete floors and flat overhanging reinforced concrete roofs. Each pillbox has one narrow door-less opening in the rear wall, often approached along a narrow slit trench or system of trenches.

Wide, outward-splaying embrasures covered the ground on all sides, and there is generally a small embrasure for close defence of the doorway. The embrasures were protected on their downward-sloping faces by concrete ricochet steps which would have helped to prevent the entry of enemy bullets. Each pair of embrasures share a long concrete lintel. Inside, all eight have several small recesses for storage of arms and ammunition, though there is no remaining evidence that these had doors. The recesses are generally slightly deeper than the width of the pillbox walls, so their rear walls abut the main structure. The recesses usually have concrete lintels.

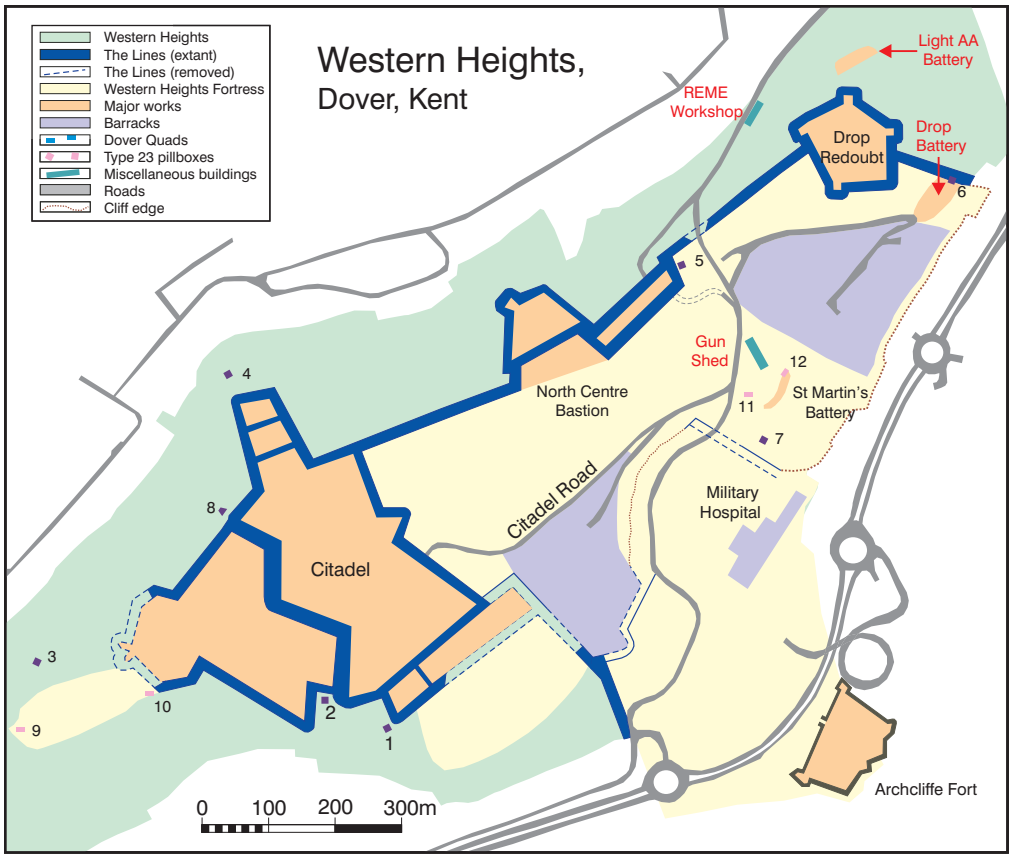

Figure 10
Plan of the Western Heights showing the location of pillboxes, numbered 1 to 11

Pillbox 1 (TR 3089 4029; NMR: TR 34 SW 423; Fig 11)

A type A Quad, situated south of the Citadel. It measures 2.73m (8ft 11½in)on each internal face and 1.76m (5ft 9in) high to the present ground level; the walls are 0.6m (2ft) thick. The doorway in the west wall is 0.7m (2ft 3½in) wide. Embrasures in the south, north and east walls are 0.90m (3ft) wide by 0.16m (6in) high, and are situated 1.30m (4ft 3in) from the present ground level; all splay

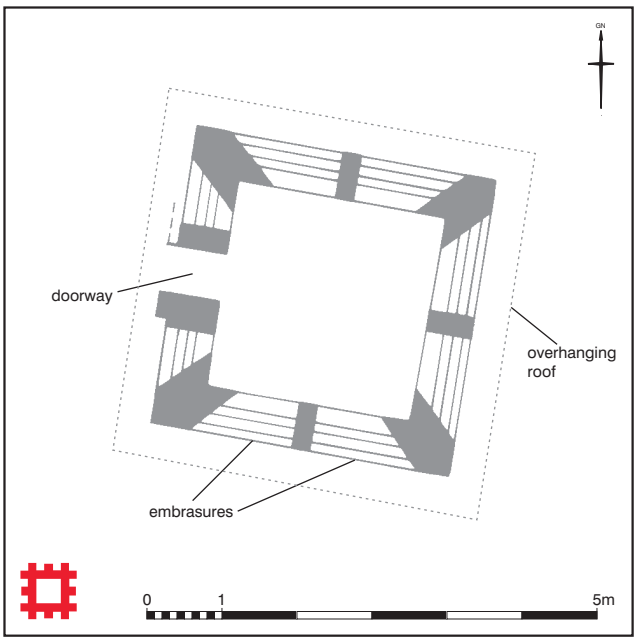

Figure 11
RCHME plan of pillbox 1

externally towards the corners of the pillbox. The west wall has wo smaller embrasures flanking a central doorway, each of which, at 0.25m (10in) wide by 0.16m (6in) high, has an outer face which splays to the corner and an inner face perpendicular to the wall. All splay down to the exterior, with concrete ricochet stepping.

There are five storage recesses inside the pillbox: four are identical at 0.62m wide (2ft), 0.65m (2ft 1½in)deep and 0.40m (1ft 3½in) high, while the fifth, 0.80m (2ft 7½in) wide, 0.78m (2ft 7in) deep and 0.80m (2ft 7½in) high, has a stone lintel.

Pillbox 2 (TR 3080 4032; NMR: TR 34 SW 422)

A type A Quad situated south of the Citadel. It is similar to no 1 except there are two embrasures in each of the east, west and south walls, while a narrow embrasure in the centre of the north wall is flanked by a wider one to the east and a doorway to the west. There are at least two internal recesses but most of the interior is obscured by a build up of earth and could not be surveyed. Chicken wire on top of the roof may have been for camouflage.

Pillbox 3 (TR 3038 4034; NMR: TR 34 SW 419)

Situated on the north side of Citadel Battery, this is a two-phase structure comprising a brick building with a standard type A Quad attached to its north side.

The earlier structure is a rectilinear brick building measuring 2.41m (8ft 11in) by 1.84m (7ft) set within a concrete cavity. It has a flat concrete roof and is entered through a doorway, 0.72m (2ft 4in) wide in the east side, and there are two windows in the north wall (originally 0.19m (7½in) wide by 0.38m high (1ft 3in), though one is now broken). A doorway has been inserted into the north wall to provide access to the pillbox.

The Quad has embrasures in the east, north and west walls and there are three recesses, two in the east and one in the west walls.

Pillbox 4 (TR 3065 4080; NMR: TR 34 SW 421; Figs 12-14)

A type A Quad, north of the Citadel North Bastion. The interior, largely filled with earth, measures 2.76m (9ft ½in) by 2.73m (8ft 11½in) and is entered through a doorway, 0.52m (1ft 8½in) wide, in the south-east side. The north-east, north-west and south-west walls each contain two embrasures, 0.87m (2ft 10in) wide by 0.15m (6in) high, which splay out

Figure 12
Photo of pillbox 4, from the west (NMR © Crown Copyright 1998)

Figure 13
Photo of pillbox 4, from the east (NMR © Crown Copyright 1998)

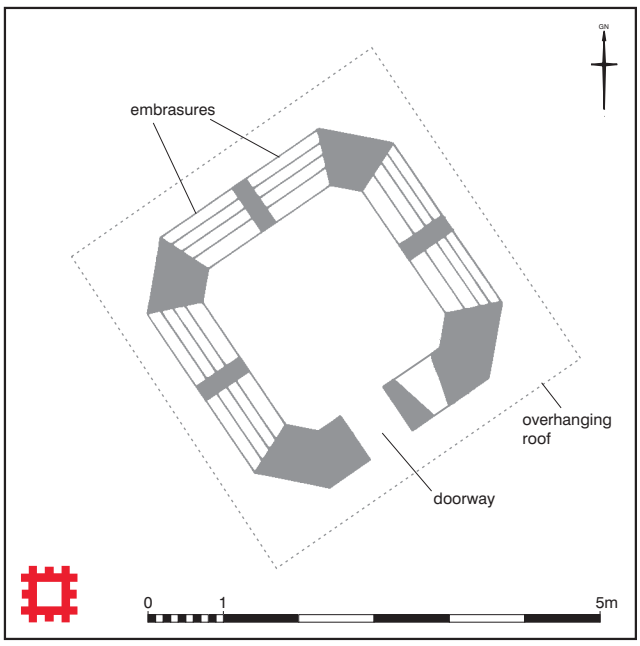

Figure 14
RCHME plan of pillbox 4

towards the corners of the pillbox. The doorway in the south-east wall is flanked on the east by an embrasure, 0.58m (1ft 11in) wide by 0.30m (1ft) high, and on the west by a small square-sided opening, 0.26m (10in) wide by 0.47m (1ft 6½in) high. All of the openings splay downwards to the exterior with concrete ricochet steps.

There are five internal recesses: two each in the north-east and south-west and one in the south-east walls. Measurement was impeded by earth, but those in the north-east and south-west walls are 0.61m (2ft) wide by 0.61 deep; the recess in the south-east wall is larger, measuring 0.73m (2ft 4½in) wide by 0.75m (2ft 5½in) deep.

Pillbox 5 (TR 3131 4096; NMR: TR 34 SW 494)

A type B Quad, overlooking North Entrance. It measures 2.58m (8ft 7½in) on each internal side. The north-west and south-west walls each contain two embrasures which splay to the exterior, including downwards concrete ricochet stepping. The north-east wall contains one identical embrasure as well as a second, 0.32m (1ft ½in) high, which has a smooth downward slope to the exterior.

There are five internal recesses: four are 0.60m (1ft 11½in) wide by 0.62m (2ft ½in) deep by 0.64m (2ft 1in) high, while the fifth is 0.75m (2ft 5½in) wide, 0.77m (2ft 6in) deep and 1.03m (3ft 4½in) high.

Pillbox 6 (TR 3170 4108; NMR: TR 34 SW 425)

A type B Quad situated to the south of the Drop Redoubt, on the rampart of the North-east Line adjacent to the cliff edge. It was originally approached from the Grand Shaft Barracks but the area is now heavily overgrown and access is difficult.

It is similar to no 5, its brick walls sitting slightly eccentrically on a concrete plinth, with each internal face 2.60m (8ft 8in) long. There are six embrasures, two in the east, south and west walls, each measuring 0.70m (2ft 3½in) wide by 0.30m (1ft) high with external splays downwards and towards the corners of the structure. One embrasures has been modified to create a large, rendered alcove measuring 1.25m (4ft 1in) wide, 0.38m (1ft 3in) deep and 0.6m (2ft) high. The other five embrasures have wooden frames, presumably to support internal wooden shutters. The doorway in the north wall is 0.70m (3ft 3½in) wide and is flanked by a smaller embrasure, 0.60m (2ft) wide by 0.45m (1ft 6in) high internally, narrowing to an external aperture of 0.25m (10in) wide by 0.45m (1ft 6in) high. Externally, a secondary brick blast wall, 0.47m thick (!ft 6½in), covers the entrance and extends the full height of the pillbox; it contains a small eye-level opening, 0.32m (1ft ½in) wide by 0.34m (9in) high towards its west end.

Behind the pillbox to the north, built into the rampart of the North-east Line, is a small recess, 1.5m wide (4ft 11in), 0.95m deep (3ft 1½in) and 0.88m (2ft 10½in) high. It is of cavity wall construction, in pebbly concrete lined with yellow stock brick, with an overhanging flat concrete roof.

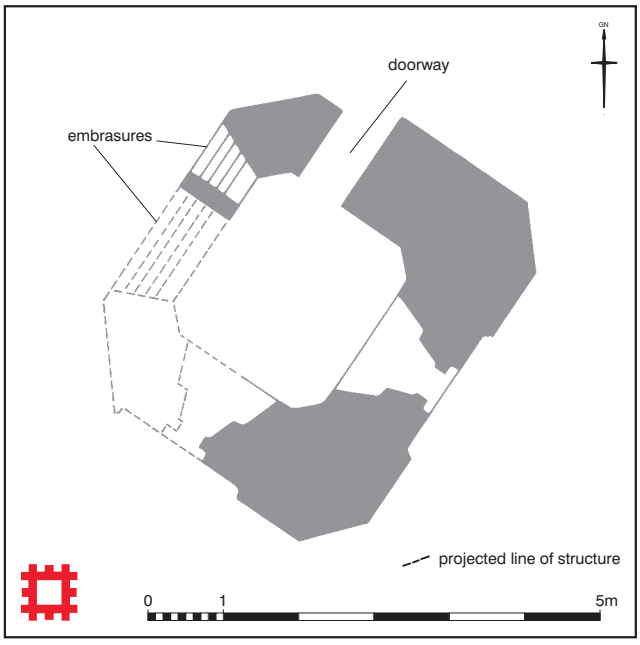

Figure 15
RCHME plan of pillbox 7

Pillbox 7 (TR 3143 4070; NMR:TR 34 SW 424; Fig 15)

A type C Quad situated on St Martin's Flank. It is essentially the same shape as no 5 but it has been substantially damaged at the west corner, perhaps by enemy action.

There is a doorway, 0.71m (2ft 4in) wide, in the north-east wall, flanked by a blocked embrasure, 0.61m (2ft) wide by 0.46m (1ft 6in). The south-east and south-west walls each have the remains of a single large embrasure of a type seen only in this pillbox; there is an internal splay from a narrow external aperture. The north-west wall has the remains of two embrasures of the usual externally-splayed type seen in the

other Quads. These, however, face directly into an earth bank outside and could have performed no useful function.

Because of the damaged condition of the structure, phasing is unclear, but the concrete lintels suggest that the splayed embrasures replaced earlier ones

The blocking of the small embrasure adjacent to the doorway is not visible externally because the north-east, south-west and south-east walls were at some time thickened by at least 0.37m (1ft 2½in). It seems likely that a standard Dover Quad was constructed and subsequently strengthened by thickening the side and front walls, blocking the small door-side embrasure and altering the south-east and south-west walls, to create two large and well-protected embrasures. These may have been to accommodate and protect a larger calibre weapon.

There are internal recesses in all four walls: a large one in the north- east wall, 0.76m (2ft 6in) wide, 0.76m deep and 0.90m (2ft 11½in) high, and four of standard-size 0.60m (2ft) wide, 0.62m (2ft ½in) deep and 0.52m (1ft 8½in) high in the south-east, south-west (2) and north-west walls. Two close to the west corner are partially destroyed. All have slate lintels, while the large embrasure has a concrete lintel above the slate one.

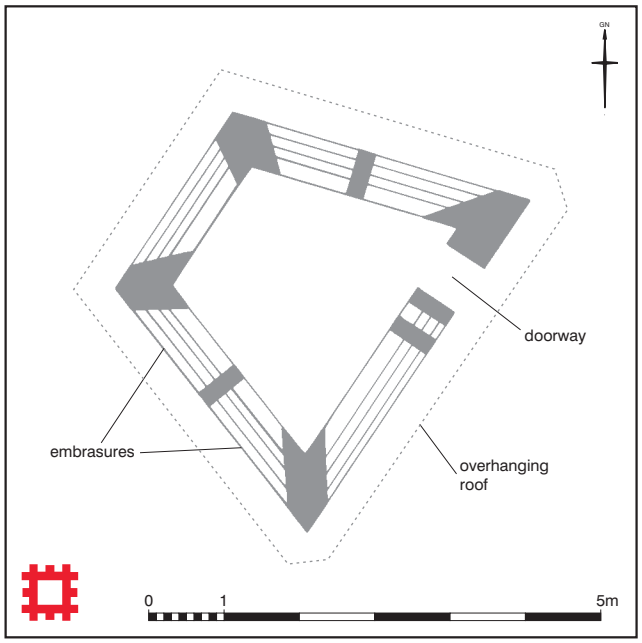

Figure 16
RCHME plan of pillbox 8

Pillbox 8 (TR 3064 4060; NMR: TR 34 SW 420; Fig 16)

A type D trapezoidal Quad facing north-west near the junction of the Citadel and the Western Outworks. There is an entrance, 0.69m (2ft 3in) wide, in the south-east wall close to the east corner. The south-west and north-east walls each contain two embrasures, 1.60m (5ft 3in) wide, which splay externally towards the corners of the pillbox but have perpendicular inner faces; a

fifth one in the south-east wall is identical, while a single embrasure in the north-west wall splays towards both corners. Between the doorway and the embrasure in the south-east wall is a small square-sided opening, 0.23m (9in) wide, for observation of the approach to the entrance. All of the embrasures also slope downwards externally with concrete ricochet steps.

There are four internal recesses: two in the south-west wall and one in the north-east wall measure 0.62m (2ft ½in) wide, 0.61m (2ft) deep and 0.52m (1ft 8½in) high, while one in the south-east wall is 0.68m (2ft 3in) wide, 0.78m (2ft 7in) deep and 0.79m (2ft 7in) high.

Type 23 pillboxes

There are four of this type on the Western Heights, built to provide close defence against ground and air attacks for both Citadel and St Martin's Batteries. The Type 23 is a standard form found throughout Britain and those on the Western Heights are typical, though each one exhibits minor variations.

The type is rectangular in plan, constructed entirely in concrete with walls generally 0.38m (1ft 3in) thick. There are two distinct parts, comprising a roofed pillbox for ground defence with rifles and LMGs and an open-topped pit for a light anti-aircraft gun. Access to the pillbox is through the AA pit, which was itself entered either through a narrow doorway or over the top of the wall by a metal ladder or rungs. The AA pit has no more than one embrasure for ground defence, the main feature being a concrete pillar holding an iron pintle for the light AA gun.

A short flight of steps leads down from the AA pit into the pillbox, which has a short anti-ricochet wall partially dividing it and three or four embrasures, all of which have a smooth inwardly-splaying face to create an angle of fire, while the outer face exhibits a splayed and stepped profile to prevent enemy bullets from entering the structure. Below some of the embrasures are the remains of wooden frames for folding shelves.

Pillbox 9 (TR 3035 4028; NMR: TR 34 SW 495**)**

This pillbox is situated close to the western flank of Citadel Battery, on the lip of the slope to the sea. The AA pit measures 2.35m (7ft 8½in) by 1.84m (6ft ½in) with walls 1.65m (5ft 5in) high. There is no doorway into the pit so that the walls must be scaled to gain access. The pit has a single embrasure in the north wall, 0.74m (2ft 5in) wide by 0.31m

(1ft) high internally, narrowing to an external aperture of 0.25m (10in) wide by 0.30m (1ft) high. A square concrete pillar supporting an iron pintle for a light AA gun is in the centre of the pit. Steps in the south wall lead down to the pillbox, through a doorway 0.46m (1ft 6in) wide and 1.17m (3ft 10in) high.

The pillbox, 2.30m (7ft 6½in) square intrnally, is entered through a doorway 0.49m (1ft 7in) wide by 1.61m (5ft 3½in) high; it has a flat concrete roof. Immediately inside, a concrete ricochet wall, 1.35m (4ft 5in) long by 0.23m (9in) wide, partially divides the pillbox. There are embrasures in the south, west and north (2) walls, identical to that in the AA pit but with lower surfaces that slope down to the exterior; some of the recesses below the embrasures have timber strips *in situ.*which formerly supported shelves.

Pillbox 10 (TR 3054 4033; NMR: TR 34 SW 496)

This pillbox is situated on the eastern flank of Citadel Battery, on the lip of the slope to the sea. It is similar to no 9 except that a short flight of steps leads up to the embrasure in the AA pit, providing access to the interior. Small metal rings on top of the walls of the AA pit were for holding down camouflage nets.

Pillbox 11 (TR 3141 4077; NMR: TR 34 SW 497)

This pillbox is situated to the rear and overlooking St Martin's Battery, reached via a long flight of steps from the covered way behind the battery.

The rectilinear AA pit measures 2.35m (7ft 8½in) by 1.84m (6ft ½in), with walls 1.65m (5ft 5in) high. Access is through a doorway in the south-east wall, 0.57m (1ft 10 ½in) wide. An embrasure in the north-west wall of the AA pit measures 0.74m (2ft 5in) wide by 0.31m (1ft) high internally, narrowing to an aperture 0.25m (10in) wide by 0.30m (1ft) high. Parallel horizontal rebates below the embrasure are probably sockets for shelf supports. The concrete pillar and iron pintle for a light AA gun, the whole 2.35m (7ft 8½in) high, survive in the centre of the pit. The height of this mounting means that the gunner must have stood on a temporary platform while handling the gun. The interior and tops of the walls are painted black. A small recess for a wooden batten (13cm (5in) by 8cm (3in) by 3cm (1in) deep in thesouth- west wall is of unknown function.

A flight of three steps in the south-west wall of the AA pit descends 0.40m (1ft 4in) into the pillbox through a doorway 0.49m (1ft 7in) wide by 1.61m (5ft 3½in) high. The

interior is 2.30m (7ft 6½in) square, with a flat concrete roof. A concrete ricochet wall, 1.35m (4ft 5in) long by 0.23m (9in) wide partially divides the interior. There are four embrasures, in the north-west (2), south-west and, south-east walls. These are identical to that in the AA pit with the exception that they are not open-topped; some of the rebates below the embrasures have timber battens for shelves *in situ*. A small drain emits from the south-east wall at ground level.

The pillbox and the AA gun pit are on slightly different alignments, indicating that they were built in two (close) episodes.

Pillbox 12 (TR 3146 4080; NMR: TR 34 SW 498; Figs 17-19)

This pillbox is situated on the eastern flank of St Martin's Battery, overlooking Grand Shaft Barracks. It is identical to no 11 except that; the door to the AA pit is in the north wall; there is no embrasure in the AA pit; the concrete pillar for the light AA gun is circular within a metal casing.

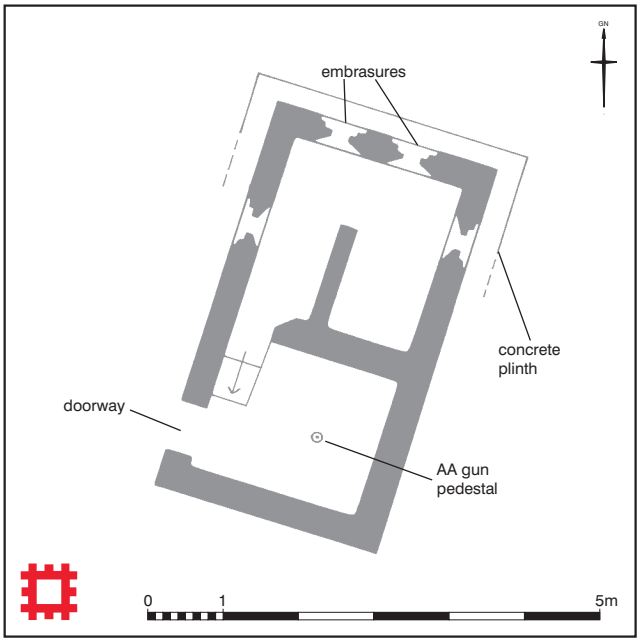

Figure 17
RCHME plan of pillbox 12

The pillbox part has four embrasures, one in each of the north and south walls and two in the east wall. Below each embrasure are short vertical battens, part of the shelf supports. Small metal rods on the roof may have been used to hold down camouflage netting. There are four flat-bottomed circular holes in the roof, each 0.30m (1ft) in diameter and 0.18m (7in) deep: these exhibit no obvious pattern, and they do not extend down into the interior of the pillbox.

Figure 18
Photo of pillbox 12, from the north-west (NMR: AA99/09723 © Crown Copyright 1998)

Figure 19
Photo of pillbox 12, showing a detail of the AA pit, from the north (NMR: AA99/09725 © Crown Copyright 1998)

5. REME WORKSHOP

Historical Background

On the north face of the Heights, some 500m north-east of the North Entrance on the south side of the North Military Road, is a reinforced-concrete walled compound let into the hillside. The compound contains a pair of reinforced-concrete buildings used during the Second World War by the 7th Coastal Defence Maintenance Unit (7 CDMU) of the Royal Electrical and Mechanical Engineers (REME). An unpublished typescript identifies the buildings as an instrument workshop and separate living accommodation, used by 7 CDMU around 1943. The unit personnel, based mainly at the nearby Ordnance Store on St John's Road, were concerned with the maintenance of the optical instruments used for aiming and calibrating the coast artillery weapons emplaced around Dover. The construction of the workshop in a detached location was for two reasons. Firstly, it removed the sensitive instruments from the dirty environment of the Ordnance Store, which is adjacent to Priory Station and secondly, it provided a greater degree of protection against enemy bombardment for these vital components of the coast artillery (unpublished typescript).

The buildings, however, are visible on aerial photographs of 1941 and 1942 and were clearly used by another unit, perhaps for another purpose, before 7 CDMU. The compound and buildings are most clearly captured on aerial photographs taken in 1945 (NMR: HLA/373/932-3; HLA/574/64-5; 106G/UK610/6295-6)

Description and Interpretation

The main building, at the eastern end of the compound, was an instrument workshop, while a smaller structure to the west provided overnight accommodation for night duty staff (Fig 20). The compound is now a vehicle workshop used by B.M.S Garages *'The BMW specialists of Dover'* and apart from resurfacing of the instrument workshop floor (obscuring the bases for original lathes etc) and provision of some new internal doorways, the site is relatively unaltered.

Instrument Workshop

This is a six-bay concrete structure with a flat concrete roof, higher in the central three bays. In the centre of the front elevation a pair of substantial sliding steel doors, suspended on an external steel runner, originally closed the entrance. The increased height of the doorway and the flanking bays both allowed lorries to back into the

Figure 20
Photo of the REME workshop, from the north-west (NMR © Crown Copyright 1998)

workshop and also provided room for a travelling gantry crane (*in situ*) which extended from inside the workshop to a pillar on the compound wall at the kerb of the North Military Road. This equipment was probably provided to handle heavy optical instruments used with large-calibre coast artillery. A single steel-door hung on pintle hinges is provided in the eastern end of the workshop to allow access to a separate emergency generator room inside the building.

Windows were provided only in the front elevation to minimise the effects of bomb blasts; the other walls are approximately 0.6m (2ft) from the compound wall in order to absorb the shock from any such blast. The windows, which are blocked but retain their steel casement frames, are wide to allow as large an amount of light as possible into this part of the building. A smaller and higher-set window at the eastern end of the front wall originally lit a small office.

The blast-proof roof is constructed of ribbed steel sections bolted together and covered with a thick layer of poured concrete. This construction technique is similar to that employed in coast artillery magazines of this era and points to the high degree of protection afforded to the workshop.

The interior of the building is divided into three unequally sized rooms by 0.30m (1ft) thick reinforced-concrete partition walls, aligned north to south. These sections contained a workshop in the taller three middle bays, boiler, generator, air cleaner and office in the two bays at the eastern end and stores and toilets in the single bay at the western end (unpublished typescript). Apart from the gantry crane, the only other evidence of the workshop's function are two 1.37m (4ft 6in) high stone or concrete pillars set in its north-west corner. Each pillar has a small holdfast, about 0.30m (1ft) in diameter, containing three bronze bolts, set in its top. These are granite collimating pillars used to set the scales and leveling bubbles on sensitive optical instruments (unpublished typescript). To avoid vibration and movement the columns are apparently eight feet long with five feet of the column set into the ground. The only remaining evidence for the boiler, air cleaning plant and emergency generator are steel-grilled vents set high in the front and east walls. A similar vent in the west wall was probably for the toilets.

Living Accommodation

This comprises a five by one bay flat-roofed, single storey building of similar construction to the instrument workshop. This is identified in the 7 CDMU unit history as living accommodation for a permanent storeman/guard and two REME tradesmen who were on stand-by in case of an emergency during the night. The building has two doorways closed by steel doors similar to that leading to the emergency generator room. The eastern doorway leads into the REME accommodation, a simple room lit by two windows with steel casement frames. The west door leads to the Storeman's room; it has a single window. Both rooms have stove flue pipes leading through the rear wall and independent chimneys rising through the concrete-slab roof. A toilet was provided in a small reinforced concrete outshot at the western end.

Observation Post?

Behind and above the compound, recessed into the hillside, is a small reinforced-concrete shelter with wing walls. It provides an excellent view across the valley to the north of the Heights and may be an observation post connected with the light AA emplacements on the north side of the Drop Redoubt (see below). Slot in the floor were probably for telephone cables.

6. LIGHT ANTI-AIRCRAFT BATTERY

Historical Background

This site is visible on aerial photographs taken in 1941, 1942 and 1945 (NMR: HLA/373/932-3; HLA/574/64-5; 106G/UK610/6295-6). It is clearly visible on those of 1945, approached along a blind-ended terraced track from the North Military Road. Six structures can be seen inside a defended perimeter (probably of barbed wire) which together bear the hallmarks of a light AA battery, probably for a Bofors gun. These were, from the west, a sentry post, a small building (? office), two Nissen huts, an open concrete pit and a gun emplacement. Its position on the north slope of the Heights meant that it would not see aircraft approaching from the sea so it may have been intended to target enemy aircraft flying east or west over the town, or returning from a sortie further inland.

Description (Fig 21)

Today, the remains of the site can be approached along the original terraced track, which runs along the base of the *glaçis* below and north of the Drop Redoubt. The end of the track opens onto a terrace, its south side formed by the *glaçis* and its north side by a substantial scarp created by depositing material on the steep natural slope. The defended perimeter of the battery ran along the crest of the *glaçis* and the base of the down slope; the former has three slit trenches or weapons pits cut into it for local ground defence.

On the terrace, only those structures in the eastern half have identifiable surface remains. The most obvious is a rectangular depression, **a**, 14.0m (46ft) long, up to 8.0m (26ft 3in) wide and 1.0m (3ft 4in) deep; the site of one of the Nissen huts. Remains of brick walls can be seen at both ends, 0.22m (8½in) thick and surviving up to 0.8m (2ft 7½in) high, both have entrances 0.9m (3ft) wide. Although its function is unknown, the hut might have been a magazine, its sunken position providing some protection against blast and bombardment. There is no surface trace of the second Nissen hut, though its site is at **b**.

To the west, a small rectangular area, **c**, is defined by a low bank 0.4m (1ft 4in) high, on the inner face of which are the remains of a concrete block wall; this defines the gun emplacement. On its north-east and south faces are three concrete boxes, **c**, each one 0.91m (3ft) wide, 0.72m (2ft 4in) deep and 0.55m (1ft 8½in) high, forming ammunition lockers for ready-use. They have internal concrete shelves or rebates for them. The southern two lockers abut a small rectangular structure, constructed of single-thickness concrete blocks, with a flat roof pierced by a central iron pipe, and a sunken floor reached

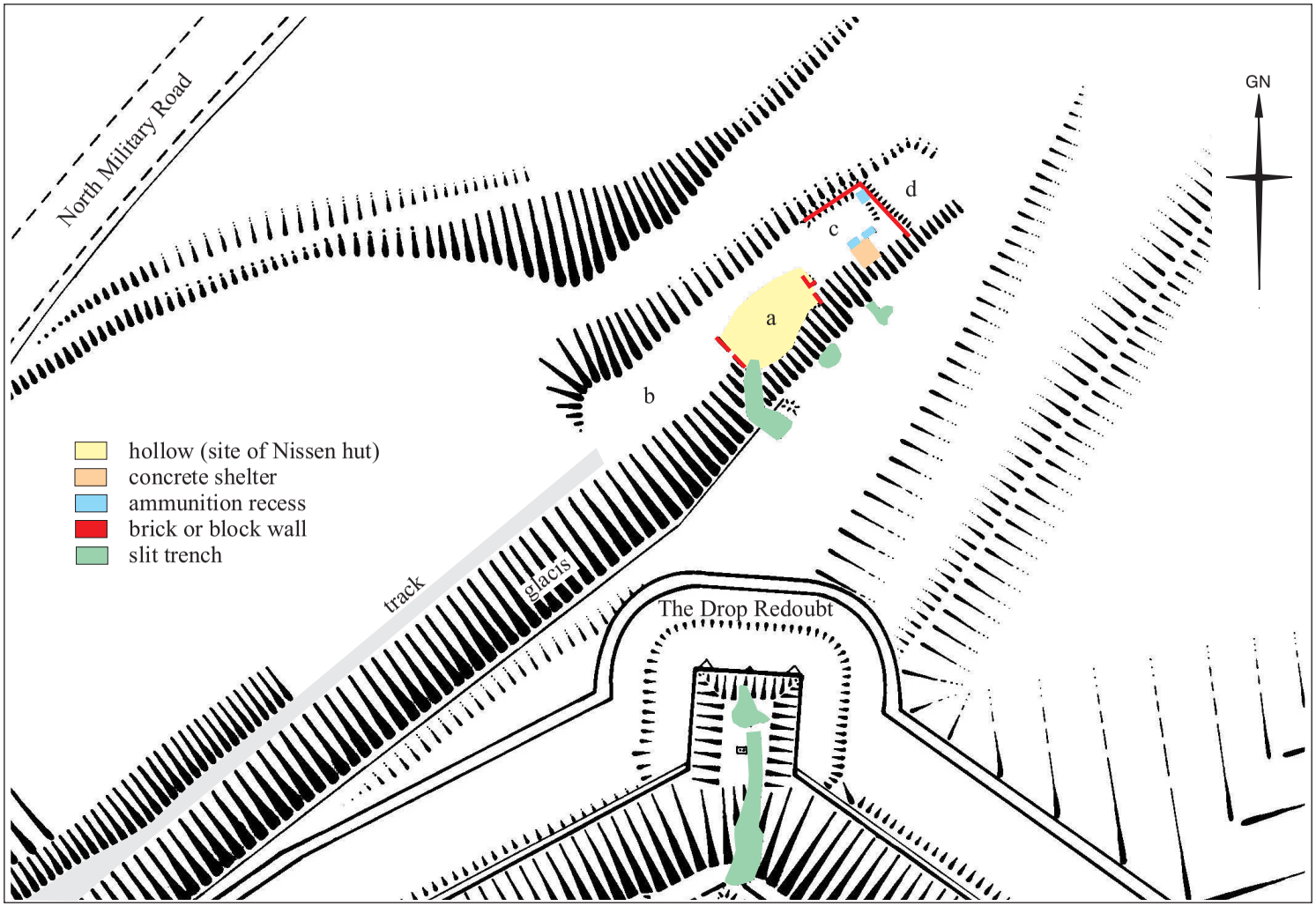

Figure 21: RCHME plan showing the site of the light AA battery

through a doorway in the west wall, 1.15m (3ft 7in) wide. This structure was probably a shelter for the gun crew. Immediately west of the shelter there was an open concrete pit, visible only on the 1945 photographs, which probably housed a predictor To the south, cut into the *glaçis*, is a small Anderson-type shelter, with its corrugated roof intact. Finally, east of the emplacement on its own small platform **d**, is a small circular concrete pad with several fixing bolts: this would seem to be another gun holdfast, possibly from an earlier phase arrangement.

7. SURVEY AND RESEARCH METHODS

The archaeological survey was carried out by Paul Pattison, Moraig Brown and Duncan Garrow, and the architectural investigation was by Andrew Williams. Control points and some hard detail were supplied using a Wild TC1610 Electronic Theodolite with integral EDM. Data was captured on a Wild GRM 10 Rec Module and plotted via computer using Key Terra-Firma software on a Designjet 750C plotter. Further details were surveyed on site using measuring tapes and conventional graphical methods.

All photography is by Steven Cole and Alun Bull.

The report was researched and written by Moraig Brown and Andrew Williams; finished drawings are the work of Moraig Brown.

The site archive and a copy of this report have been deposited in the archive of English Heritage at the National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ .

8. ACKNOWLEDGEMENTS

The author wishes to thank the following for their help in this project:

John Iverson and the staff of Dover Museum

Paul Johnson of the Public Record Office

9. BIBLIOGRAPHY AND SOURCES

PUBLISHED WORKS

Burridge D, 1991 The Western Heights Defences, Dover *Fortress* **9**, 35-45

Burridge D, 1993 Unfinished pillboxes, the Corps Line and other wonders *Loopholes* **3**, 8-15

Burridge D, 1993 Variations on a theme: Part 1 *Loopholes* **6**, 29-33

Burridge D, 1994 Variations on a theme: Part 2 *Loopholes* **7**, 2-9

Coad JG & Lewis PN, 1982 The later fortifications of *Dover Post-Medieval Archaeology* **16**, 141-200

Lowry B (ed), 1995 *20th Century Defence in Britain: An introductory guide* (Council for British Archaeology)

Wills H, 1985 *Pillboxes: A Study of UK Defences 1940* (Leo Cooper in association with Secker & Warburg)

UNPUBLISHED SOURCES

A) National Monuments Record Centre (NMRC), Swindon

Aerial photographs

HLA/373/932-3, 11th December 1941

HLA/574/64-5, 3rd June 1942

106G/UK610/6295-6, 5th August 1945

Historic maps and plans

WD/b *Dover Western Heights; Grand Shaft Barracks and Drop Redoubt, Ground Floor Plan*, 1:500 scale, dated 1925

WD/2411 *Dover Defences, Western Heights, Plans and Elevations of Gun Shed*, dated 1867

WD/2411a *Dover, Western Heights, Plans and Elevations of Magazines and Cartridge Stores*, dated 1882

WD/2438 *Dover Grand Shaft Barracks, Proposed Accommodation for Mechanised Transport*, dated 1937

WD/2442 *Dover Grand Shaft Barracks, Proposed Accommodation for Mechanised Vehicle Transport*, dated 1937

WD/2443 *Dover Grand Shaft Barracks, Proposed Garage*, dated 1937

WD/2506 *Dover, General Plan of the Western Heights Barracks*, dated 1861

WD/LXVIII 14.12 War Department 1:2500 OS sheet LXVIII.14.12

B) The Public Record Office (PRO), Kew

WO/55/785 Box of Engineer papers, including a letter of 14/2/1853 regarding the construction of Drop Battery

WO/78/2426/20 *Grand Shaft Barracks, Dover. Index to the Plans Shewing Present Appropriation*, dated 1896

WORK/43/1598 *Plan of the Western Heights, Dover*, dated 1858

C) Miscellaneous

Typescript report regarding the history of the 7th Coastal Defence Maintenance Unit of the Royal Electrical Mechanical Engineers

10. LIST OF PHOTOGRAPHS TAKEN DURING THE SURVEY

AA008578 Drop Battery: entrance to "G" magazine from the south (B&W)

AA008579 Drop Battery: interior of "G" magazine, showing ventilated north and east walls and supports for a raised floor (B&W)

AA008580 Drop Battery: interior of "G" magazine showing the south wall with a lamp recess (B&W)

AA008581 Drop Battery: interior of "G" magazine showing the lamp passage (on right) and magazine (far left) (B&W)

AA008582 Drop Battery: interior of expense magazine 1(B&W)

AA9909725 Photo of pillbox 12, showing a detail of the AA pit, from the north (B&W)

AA9909723 Photo of pillbox 12, from the north-west (B&W)

Photo of pillbox 4, from the west (B&W)

Photo of pillbox 4, from the east (B&W)

Photo of the REME workshop, from the north-west (B&W)

NATIONAL
MONUMENTS
RECORD

The National Monuments Record contains all the information in this report - and more: original photographs, plans old and new, the results of all English Heritage and RCHME field surveys, indexes of archaeological sites and historical buildings, and complete coverage of England in air photographs.

ROYAL COMMISSION ON THE HISTORICAL MONUMENTS OF ENGLAND

ENGLISH HERITAGE

The Royal Commission on the Historical Monuments of England (now part of English Heritage) gathers information on England's heritage and provides it through the National Monuments Record

World Wide Web: http://www.english-heritage.org.uk
National Monuments Record enquiries: telephone 01793 414600
National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon SN2 2GZ