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NORTH WEALD REDOUBT
Essex

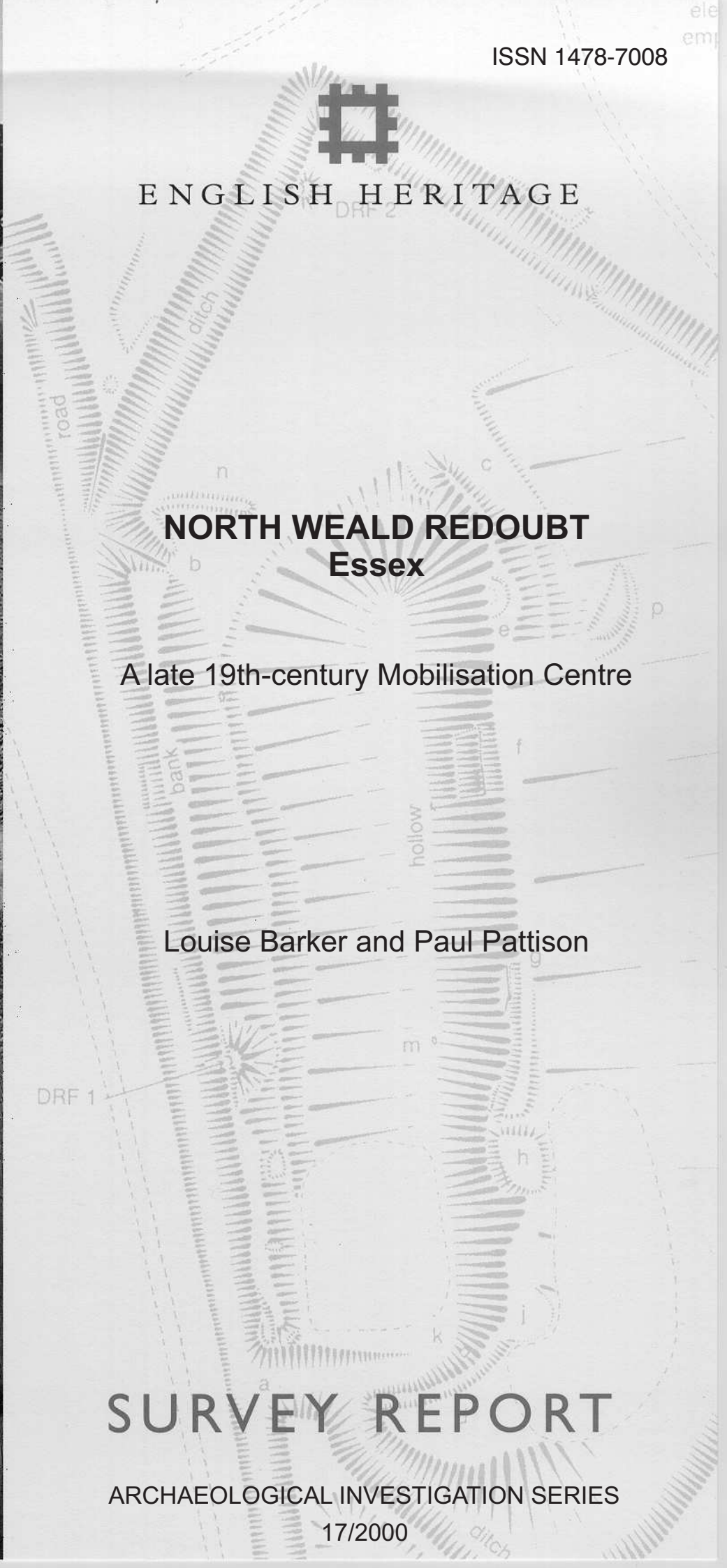
A late 19th-century Mobilisation Centre

Louise Barker and Paul Pattison

SURVEY REPORT

ARCHAEOLOGICAL INVESTIGATION SERIES

17/2000





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**NORTH WEALD REDOUBT,
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A LATE 19TH-CENTURY MOBILISATION CENTRE

ARCHAEOLOGICAL INVESTIGATION REPORT SERIES 17/2000

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1. INTRODUCTION

During March and November 1999 The Royal Commission on the Historic Monuments of England carried out a survey of the structures and earthworks on the site of the North Weald Redoubt, at Ongar Radio Station, Essex (TL 5056 0396). The survey was carried out following a request by Essex County Council who partly funded the work, in light of a local development possibility and as a contribution towards future management of the site.

Since the sale of the site in 1992-3, the condition of the redoubt has deteriorated significantly, due to a lack of routine maintenance and security. Scrub and undergrowth has colonised quickly so that access to large areas is now very difficult, particularly the rampart, ditch and the north-western end of the front casemates. Moreover, drainage has failed and at the time of survey there was severe flooding, particularly in the gorge ditch and gorge casemates, but also in the marshalling yard and front casemates. The concrete in many of the structures is failing and security fences around the site have been breached; vandalism is a problem, with the majority of the buildings stripped of their fittings. As a result, the redoubt is officially designated as threatened (English Heritage 1999, 11). Those buildings formerly associated with the Radio Station had been largely demolished and cleared by the time of the present survey.

The redoubt as a whole was surveyed at a scale of 1:500, while the magazines were planned at 1:100. A narrative photographic record was also made.

North Weald Redoubt is a fine example of a rare type of historic monument, a *mobilisation centre* for the defence of London, built towards the end of the 19th century and now protected as a Scheduled Ancient Monument (no 29424, revised September 1998, previously Essex 155). The site occupies high ground to the east of North Weald Bassett, within an area most recently used as Ongar Radio Station, strategically located at the highest point in the area (106.59m OD) and offering extensive all-round views (Fig 1).

The redoubt is one of the best preserved examples of 13 such centres constructed for the defence of London during the 1890s, and it survives with few modifications from the War Office plans produced in 1892 and 1904. It was an element in the London Defence Scheme, which envisaged the creation of a 72-mile-long entrenched stop line, divided into ten tactical sectors. The actual defensive positions *were not* to be established until an invasion seemed imminent but a series of permanent mobilisation centres *were* to be built along the projected stop line. These were defensible assembly points for a mobile field force where stores and provisions could be kept and collected. North Weald Redoubt, the most northerly

mobilisation centre, was also the first, constructed from 1890 to guard against an attack on London through East Anglia.

Additions and alterations to the redoubt are a result of its later use as part of a radio station, between 1919 and 1982, when the old buildings of 1892 and 1894 were used mainly used for storage. The main part of the Radio Station was a new build outside the ditch on the north-east. During the Second World War, close defence of this installation was augmented by two “Allen Williams” steel turrets, sited at opposite ends of the curving rampart.

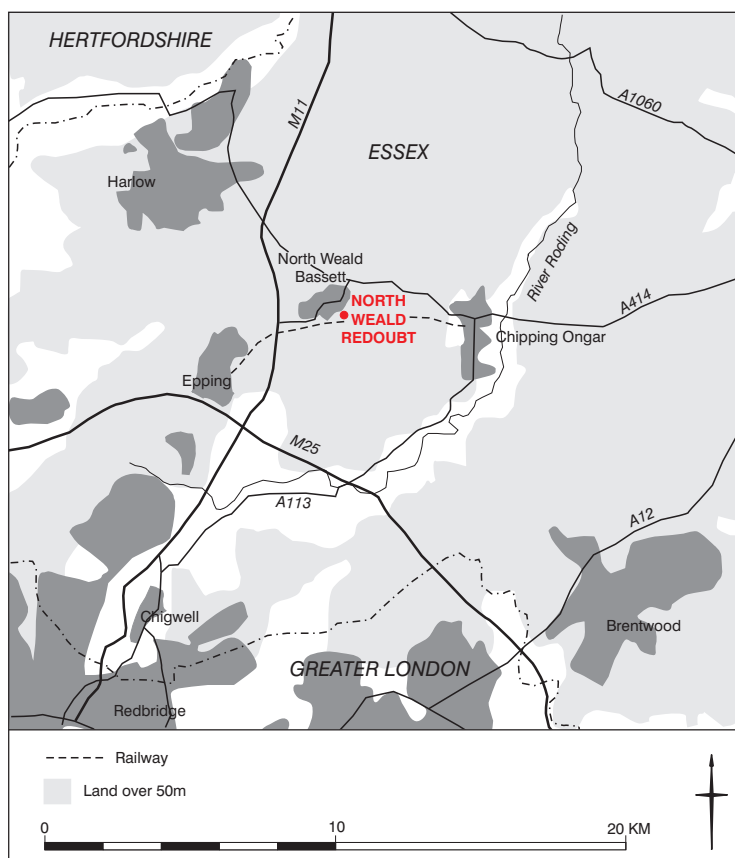


Figure 1
North Weald
Redoubt,
Location Map

2. ARCHAEOLOGICAL BACKGROUND

The area before construction of the redoubt

In 1992-3, the University College London (UCL) field archaeology unit (Archaeology South-East) carried out an evaluation on 200 hectares of land around the disused Ongar Radio Station, in advance of a planning enquiry for development. In addition, a desktop assessment was made and landscape survey, trial trenching and field walking took place over the area (South Eastern Archaeological Services 1993 (SEAS)).

Although there are no remains of previous activity visible at the redoubt, there is evidence for the continuous use of the landscape since prehistoric times: this is particularly the case for the northern part of Ongar Great Wood, within which the redoubt is included (Greig 1993, 200 and 1994, 245-246). Flint concentrations recovered from field walking suggest the presence of prehistoric sites, whilst survey and excavation traced the line of a Roman road, on a north-south course to the east of the redoubt.

Since early Medieval times the area was part of the manor of Ongar Park, originating in a lease made in 1294. Prior to this, the park formed part of the demesne lands of the manor of Stanford Rivers (SEAS 1993, 3). The land later to be taken up by the redoubt lay principally in the parish of High Ongar, though partly in Stanford Rivers.

The fields directly to the south of the redoubt are recorded on a map of *c* 1800 as *Great Plasto* and *Little Plasto*. These unusual names are thought to derive from the Old English word *pleg-stow*, which may be translated as ‘a sport place, a place where people gathered for play’ (SEAS 1993, 4). Given also that a field directly east of the redoubt is recorded on a map of *c* 1800 as *Coney Heath* - suggesting a rabbit warren - a longer tradition of sport and hunting might perhaps be inferred (SEAS 1993, 3). In 1843, the area was enclosed farming land, a situation that continued with only minor changes into the present century.

3. HISTORICAL BACKGROUND TO THE REDOUBT

The London Defence Scheme of the 1890s has been rigorously researched in recent years, resulting in two papers that provide historical, strategic and typological contexts for the defences (Smith 1975; 1985). The following text is based heavily upon those papers and also on Saunders (1989).

Changing defensive policy 1860-80

In the middle of the 19th century, it was believed that the main military threat to Britain still came from France, although there had been peace between the two nations since 1815. By the middle of the century, the territorial ambitions of Napoleon III and the rapid pace of technological development in warfare, stimulated the setting up, in 1859, of the Royal Commission on the Defence of the United Kingdom. This resulted in a massive programme of fortress building in the 1860s and the division of home defence into seven commands. This defence scheme was, in effect, a major change in emphasis towards the importance of the army, whose supporters felt that no amount of expenditure spent on the navy - traditionally favoured as the first and most important line of defence - could guarantee immunity from invasion. If Britain lost naval supremacy, the country needed a substantial field force backed up by adequate fixed defences to protect vital points, though it was still felt unnecessary and too expensive to provide London with permanent fortifications. During this period, fortifications were primarily coastal, protecting dockyards and naval anchorages, against sea-borne bombardment and assault. Such fortifications held fixed guns either in prominent casemates or in open batteries.

By the 1870s, a new threat was perceived: a united Germany. At the same time, despite the on-going construction of the Royal Commission forts, opinion was changing as to the form and function of fixed defences. The failure of established defences and the damage caused by the increasing power and accuracy of artillery, as demonstrated for instance in the Franco-Prussian War, caused a reassessment in Britain. There was a growing awareness that forts needed to rely, not on the concentration of artillery in massive casemated batteries with heavily armoured fronts, but more on concealment, with disappearing guns in pits on the vulnerable front faces of fortresses, as well as casemated guns and shielded open emplacements on the less exposed flanks.

This need for fortifications to respond to the changing nature of warfare saw its first practical applications in the defences of several forts built to protect Chatham dockyard, and culminated in the construction of the London Defences. When work began in 1875 on updating the Chatham defences, it was in the massive style of the 1860s but after a break in work at the end of the 1870s, new features and modified designs were applied when work

resumed in the 1880s. By this time, artillery was capable of accurate high angle fire at a range of 3000 yards, employing shells with improved propellants, bursting charges and enormous penetrative power. By way of response, the Chatham forts were completed to accommodate moveable armament as well as fixed guns, they lacked the now vulnerable *caponiers* and, for the first time, were built with extensive use of concrete. Accommodation casemates and stores were located on a gorge rampart, where howitzers were deployed: prominence of the gorge was avoided and most of the structures were bomb-proofed under thick layers of chalk rubble, earth and turf, to appear from the front as grassy hillocks. As was the case in most coastal defences since the 1860s, guns were supplied with ammunition from serving rooms set in traverses in the ramparts, connected via lifts to the magazines below. A solid-earth front rampart was also constructed to absorb incoming fire.

An important development, first used at Chatham and which was to have a direct bearing on the London Defences, followed observation of the Turkish defence of Plevna in Bulgaria and Gorni-Doubniak in the Balkans, against a Russian army in 1878 (Welch, 1879). Here infantry entrenchments and relatively slight low-profiled redoubts had absorbed a sustained artillery bombardment: the Turks, well-protected in their dugouts, suffered only light casualties so that the ensuing Russian infantry assault was decimated by the defenders using the recently developed magazine rifle. The efficiency of entrenchments and rifles had long been known but the combination of the new rifle and barbed wire, the latter invented in 1876, was cruelly effective. The result of these engagements was a questioning of the need for permanent defence works and whether semi-permanent field works might be more effective. A Major Walker wrote in 1885 concerning semi-permanent infantry redoubts:

'The profile is arranged so to get rid of all the dead spaces in the ditch, to bring the material obstacle to assault under direct fire from the parapet, while effectively covering it from the enemies artillery fire... This is done by projecting the superior slope of one sixth to the front (in the form of a glacis) until it reaches a depth of about 10ft below ground and by placing in the ditch thus formed an Iron Palisade. Inside the work there is good shelter behind the front parapet. The parados which is the same height as the crest and has a gentle slope in front, affords cover to the bombproofs, which are protected from high angle fire, with iron rails, 2 feet of concrete and about 5 feet of earth'

(1885, 208).

Sir Andrew Clarke, Inspector General of Fortifications, applied these new principles in the eastern sector of Chatham, on two infantry redoubts. The first, Grange Redoubt at Twydall, was built in 1886 while the second, Woodland Redoubt at Fort Darland, followed in 1889 (PRO/WO/78/4156). The design of these redoubts included a device that became known as the Twydall Profile, comprising an earthen front parapet as a firing position for infantry, with open-baked concrete casemated shelters behind (Fig 2). The glacis sloped gently down

to an unclimbable iron Dacoit fence set within a shallow ditch, that was not revetted and lacked any flank defences, cutting at an angle of about 45°. Beyond, a counterscarp glacis sloped down to meet the natural ground surface. The rear and sides of the redoubts were similarly protected. Artillery defence was provided in a self-contained sunken battery between the two redoubts.

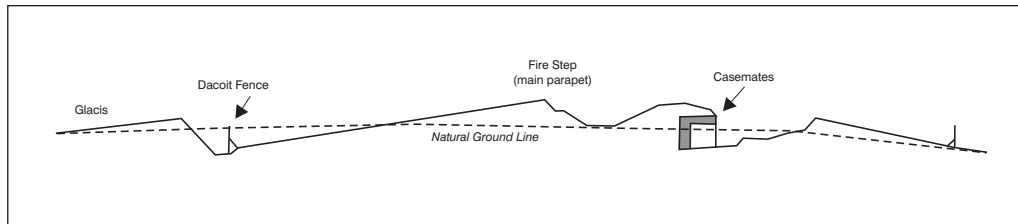


Figure 2
Twydall Profile,
idealised section
(after Thuillier,
1902)

The new works were so well blended into the landscape as to be practically invisible from a few hundred metres. Grange Redoubt was experimental and constructed by contract labour working night and day to find out the shortest possible completion time; it took only 31 days (Gulvin and Hughes 1978, 77-85). The cost of such a redoubt was only £6,000 as opposed to a minimum of £45,000 for a fort of the old type and it was noted that:

'it will be ere long universally recognized that it is only on these principles that the defence of London is practicable'

(PRO/WO/33/46).

Almost immediately, the Twydall Profile was adopted in a number of coastal batteries in England and in British possessions abroad eg East Tilbury Battery, Beacon Hill Battery at Harwich (Brown and Pattison 1997) and Wolseley Battery, Malta.

The emergence of a London Defence Scheme

The Chatham forts were experimental, employing moveable armaments, concealed batteries and dispersed infantry positions. Opinion proved favourable and in 1889, the Salisbury government authorised a scheme for the defence of London using these new tactical arrangements. The works were designed and built with an eye to political expediency and secrecy, being described as *mobilisation centres* rather than fortifications, perhaps to minimise the chance of opposition to expenditure in parliament (*Hansard*, 11th March 1889). The idea of defences for London had been debated in the past, notably in 1860 when the Royal Commission advised against it, with the exception of protection for the Woolwich arsenal. The debate continued, and as late as 1888, Lt Col E Mitchell recommended a full and expensive ring fortress of twelve works, some ten miles out from London. The real objection to such a fortress was based on the high expenditure required

and the attractiveness of the scheme which eventually emerged was its cost effectiveness: it was estimated that a defence employing the new principles would cost £480,000 against the £5-£16 million for a ring fortress (PRO/WO/33/48).

The London Defence Scheme was based on moveable armaments deployed in field positions for which plans would be prepared in peacetime but not implemented until an invasion seemed imminent. There were, however, to be thirteen permanent *elementary works*, as a secret memo described them (PRO/WO/33/48), publicly referred to as *mobilisation centres*. These formed the foci of the defence line, acting as defensible supply bases, and were built in the 1890s on a front 72 miles long, along the escarpment of the North Downs from Guilford to Halstead and then up the west bank of the Darent valley to terminate on the bank of the Thames at Dartford; it then resumed at Vange on the north bank and ran along the low hills of Essex to Epping (Fig 3).

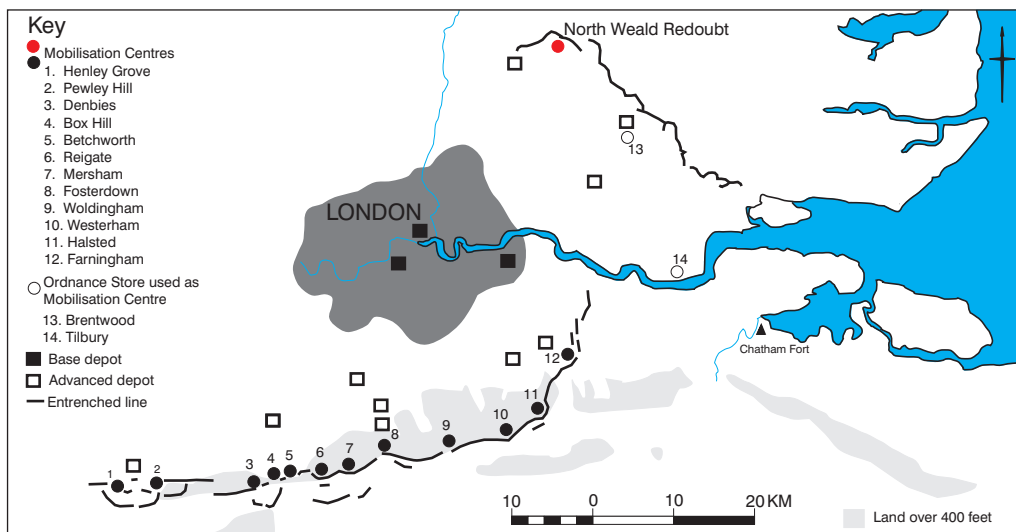


Figure 3
Map of the London
Defences (after Smith
1985, 127)

The scheme may have been adopted as a result of proposals by a Major Esdale (1886), who proposed that an effective defensive system was possible by devising contingency plans for the rapid formation of field works around London in the event of war, but providing magazines in peace at five-mile intervals along the defensive perimeter, so that all ammunition and stores would be available immediately when and where they were wanted during an invasion emergency. He proposed a defensive armament comprising 180 4.7-inch BL guns (Fig 4). A similar scheme was put forward by General Sir E Hamley, MP for Birkenhead. Whether influenced by these ideas or independently based, in 1888 Colonel J C Ardagh, the Assistant Adjutant General, prepared analogous proposals in two War Office papers that produced the same blend of contingency planning with a core of fortified permanent works with a storage facility (PRO/WO/33/48/A116 & A117). The latter were to be built along the defence line, particularly at or near strategic gaps in the North Downs

through which road and rail communications to London passed. In the event of an invasion threat, these works would be rapidly improved and supplemented by temporary batteries, redoubts and entrenchments along the line. The essence of the scheme was that it was not entirely dependant on the permanent works; although they were the foci of the line, the real defence lay in the temporary works to be established in wartime and manned by a mobile field army of three corps, to be disposed between London and the coast, supplemented with seven volunteer divisions within the London defences.

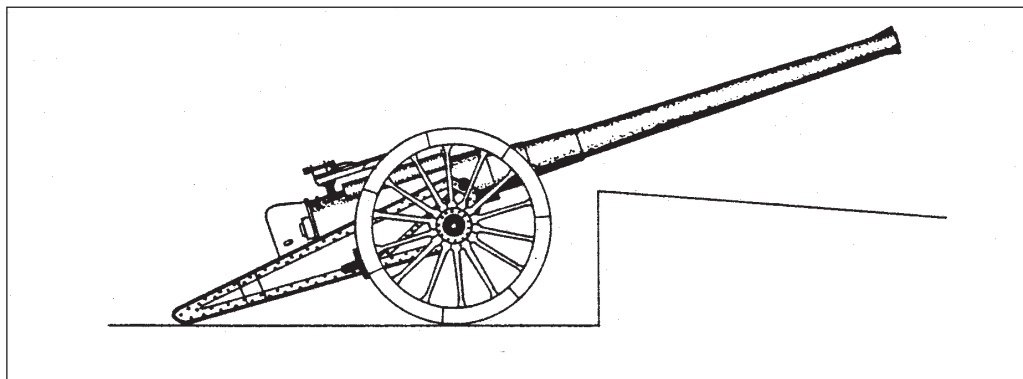


Figure 4
4.7-inch BL gun (after
Smith 1975, 139)

This basic idea was accepted, although Ardagh's recommendation for 30 permanent works was reduced to 13 by the War Office. These were at Pewley Hill, Henley Grove, Denbies, Box Hill, Betchworth, Reigate, West Merstham, Fosterdown, Woldingham, Betsoms Hill, Halstead, Farningham and North Weald. Two existing sites, Tilbury Fort and Brentwood, were to remain as ordnance stores. Although the individual works were all built to include magazines, there were two basic types; one for infantry alone, the other deploying artillery. Those at North Weald, Halstead, Pewley Hill and Reigate were for artillery.

A committee of three officers was appointed to produce the first designs for the permanent works and to draw up a scheme for the occupation of the defence line. Their work was complete by 1892 (Sinclair 1926, 170-173). Funds allocated during 1889-90 and 1895-96 came from Army Estimates and then from Military Works and Imperial Defence Loans, with initial expenditure on the purchase of land. By 1891 most of the sites were in government ownership, with the land for North Weald Redoubt acquired on the 22nd May 1890 (PRO/WO/78/2262). However, by the end of 1891, only North Weald had been substantially completed (Appendix A in 'Home Defence' PRO/WO/33/51). North Weald may have been intended as a prototype for the other mobilisation centres but insufficient funds delayed their construction until the end of the decade, by which time new ideas led to considerable variation in design and positioning. Nevertheless, the construction of North Weald caused much curiosity in the locality:

'Large gates painted red were erected to bar public access near to the junction of the road leading to the Village Hall with High Road. Rumour had it that ammunition was originally stored in the fort but was moved out before the outbreak of World War I'

(Newens 1985, 125).

The structure of the London Defence Scheme

The London Defence Scheme translated recognition of the prime importance of London in the event of invasion into a large and thoroughly conceived contingency plan: total expenditure on the scheme was £160, 671. The structure and proposed operation of the scheme is contained in an officers '*Handbook for the London Defensive Positions*' (War Office, 1903). The main defence comprised the entrenched line with its field batteries and redoubts, to be established during war time, both in front of and between the mobilisation centres. To the rear of the line, making use of the radial rail system of London, ten railway stations were designated as advanced depots to replenish supplies in the mobilisation centres, drawing upon base depots at Woolwich, Bishopsgate and Nine Elms railway stations. Some 300m south of the redoubt at North Weald, the Loughton, Epping and Ongar branch of the Great Eastern Railway was intended as a supply line.

It was hoped to have seven days warning of an invasion, sufficient for a combined military and civilian labour force to be martialled into constructing the field defences and for the troops to rendezvous at the mobilisation centres and establish themselves in the line. A very detailed mechanism was developed to ensure that this would happen, covering the transport of labour, tools and plant supplies, and the housing and feeding of the labour force (PRO/WO/33/51; WO/33/188/A672; WO/32/6374). The civilian contractors were to bring their own picks and shovels but a reserve of 10% and a full supply of all other tools and equipment were to be stored in the mobilisation centres. These included a million sandbags, 176,000 yards of barbed wire, barrows, saws and dozens of other items. Royal Engineers were to mark out the works, prepare houses and villages for defence, carry out preventative demolitions, construct wire entanglements and undertake other details. All other work fell to civilian contractors, comprising a force of 35-45,000 men, intended to construct the works in about four days.

Some 200,000 troops were allocated to the London Defence positions, comprising four cavalry brigades, eight imperial yeomanry brigades, five army corps, ten volunteer divisions and three yeomanry cavalry divisions: a large proportion were infantry volunteers. Artillery to be deployed in the scheme was of a moveable nature, the principal components being 30 batteries of 4.7-inch BL guns and 70 batteries of 15-pdr BLs, supplemented by batteries of obsolete 40-pdr, 20-pdr and 16-pdr RMLs - making a total of over 400 guns. For the main

batteries, the ammunition stored in each mobilisation centre comprised 300 4.7-inch rounds and 352 15-pdr rounds per gun.

The general commanding this field army would operate with the security of the London Defences and supply bases at his back, with the facility to withdraw to the line if necessary. So far as can be judged the general strategy was not to confront the enemy on the beaches but as he advanced inland. The extent of troop training to meet the requirements of the scheme is unclear, as is whether the handbook was actually issued to units, but in 1896 it was claimed that the volunteer infantry were not prepared (Spencer Wilkinson, 1896). In 1900, during large-scale manoeuvres to test the effectiveness of the home defence army, it was found that volunteer officers were unable to retain control of large bodies of troops.

The abandonment of the London Defence Scheme and defence policy after 1906

By the turn of the 20th century, there was a rough uniformity in the tactics of defence in the four important systems of London, Chatham, Portsmouth and Plymouth. It was accepted that a line of permanent artillery forts no longer constituted a fortress, the latter now seen as the whole defensive organisation. Long-range engagement using small arms now enjoyed a prominent place in a defensive policy that provided for concentrated firepower with a balance of artillery, machine-guns and rifles, deployed largely in carefully-concealed temporary positions.

However, the ascendancy of the army following the 1860 Royal Commission report was short-lived. In the 1880s the balance tipped once more to the Royal Navy, with the Defence Act of 1888 providing for a massive expansion of the fleet. At the turn of the century, it was widely believed that the Royal Navy could repulse any attempt at invasion of England and Ireland. The election of a liberal government in 1905 led to formalisation of this naval-based policy and the London Defence Scheme was among the first casualties. The committee of Imperial Defence noted

'In view of the conclusion that a serious invasion of the United Kingdom is impossible, so long as our naval supremacy is maintained, the London defences should be abolished'

(PRO/CAB/38/11/11)

Nevertheless, the Navy did not have all their own way and by 1911, the perception of the threat from Germany was such that the War Office began to make new land-based plans, involving a shift in strategy for the army as envisaged in the London Defence Scheme. Local forces were now to engage an invasion force as early as possible - on or near the beaches -

and the old land fortresses of Portsmouth, Plymouth, Dover and Chatham were revived with new defensive plans in which the permanent forts resumed a role as focal points. They were, however, only for infantry, while the main defences comprised entrenched positions and artillery batteries in concealed sites outside the forts, armed mainly with 4.7-inch and 15-pdr guns - the same weapons that had been envisaged for the London Defence Scheme.

Throughout the First World War, the Cabinet maintained the conviction that London would be the prime objective of a German invasion and appropriate measures were taken. The full extent of these defences remains unclear but sufficient is known to indicate the existence of successive *stop lines* of trench groups between the capital and the coast. Oral testimony and some documentary evidence suggests that the innermost stop line was resurrected from the London Defence Scheme which had been discontinued in 1906. North Weald Redoubt is thought to have served as an arsenal during the First World War.

The Radio Station 1919-82

In 1919 the site of North Weald Redoubt was sold at auction to the Marconi Wireless Telegraph Company who established a radio station directly to the north of the site and used the redoubt for storage (OS 6-inch, 1923). Several additional buildings were erected (the remaining original radio masts were taken down in 1982). In 1929, the Imperial and International Communication Company took over the site and continued operations under the new name *Cable and Wireless*. Two wireless masts stood in 1947 (OS 1:2500, 1947). During the Second World War the site came under direct government control and may have served in the communication system for the Southern Fighter Command during the Battle of Britain, in which the nearby airfield of North Weald played a notable part. A large number of concrete anchor blocks in the fields around the redoubt are from wartime radio installations. The redoubt itself was provided with two gun emplacements for local defence, in the form of Allen-Williams turrets.

In the period after the Second World War, as a result of the Commonwealth Telegram Act of 1949 where *Cable and Wireless* and *UK Radio Services* at the Post Office merged, the radio station was owned by the Post Office (Newens 1985, 139). It was maintained by them and later by British Telecom until 1992/93, when the site was decommissioned and sold. The most recent sale of the site has resulted in the wholesale clearance of all radio installations.

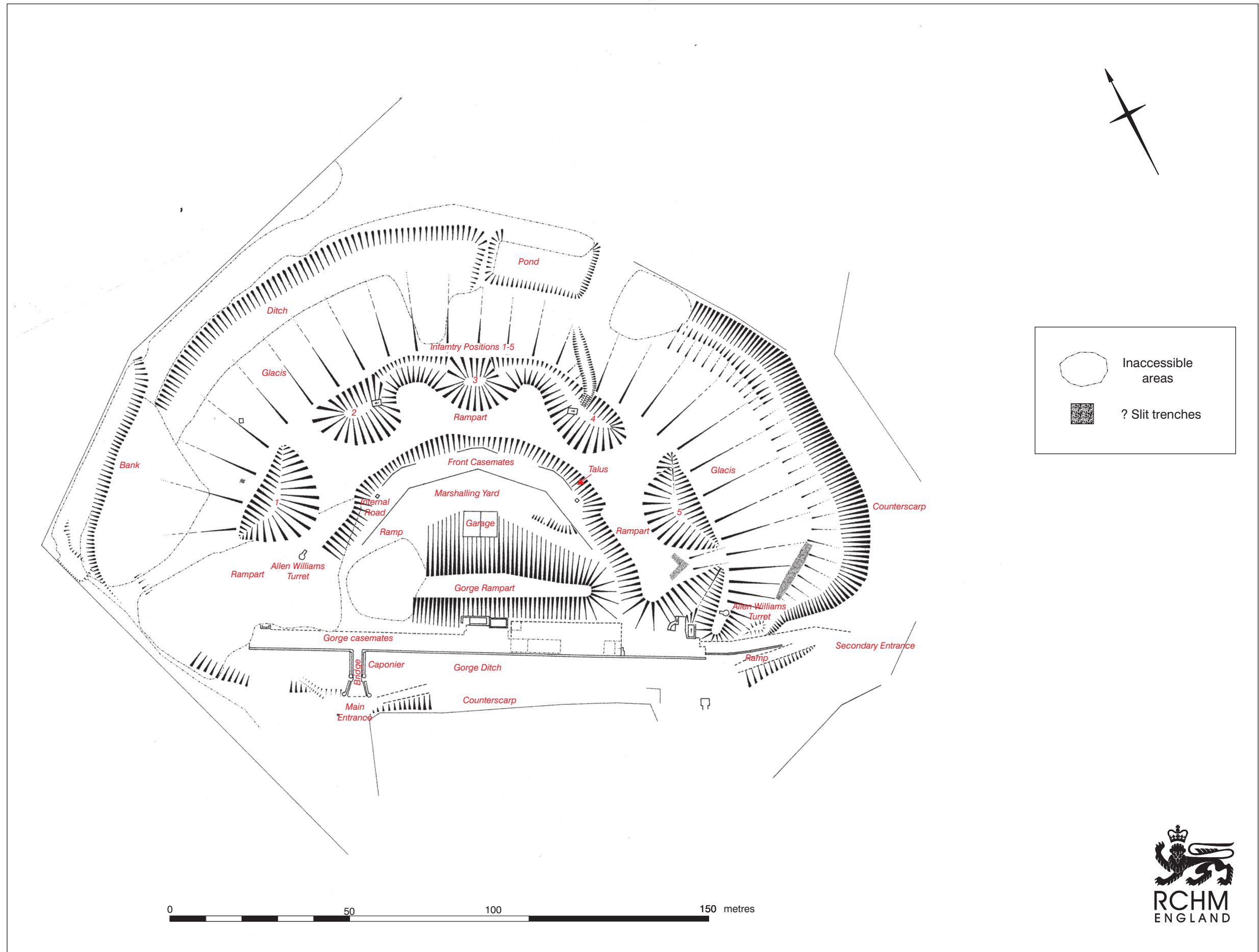


Figure 5 RCHME survey plan of North Weald Redoubt, reduced from original 1:500 scale

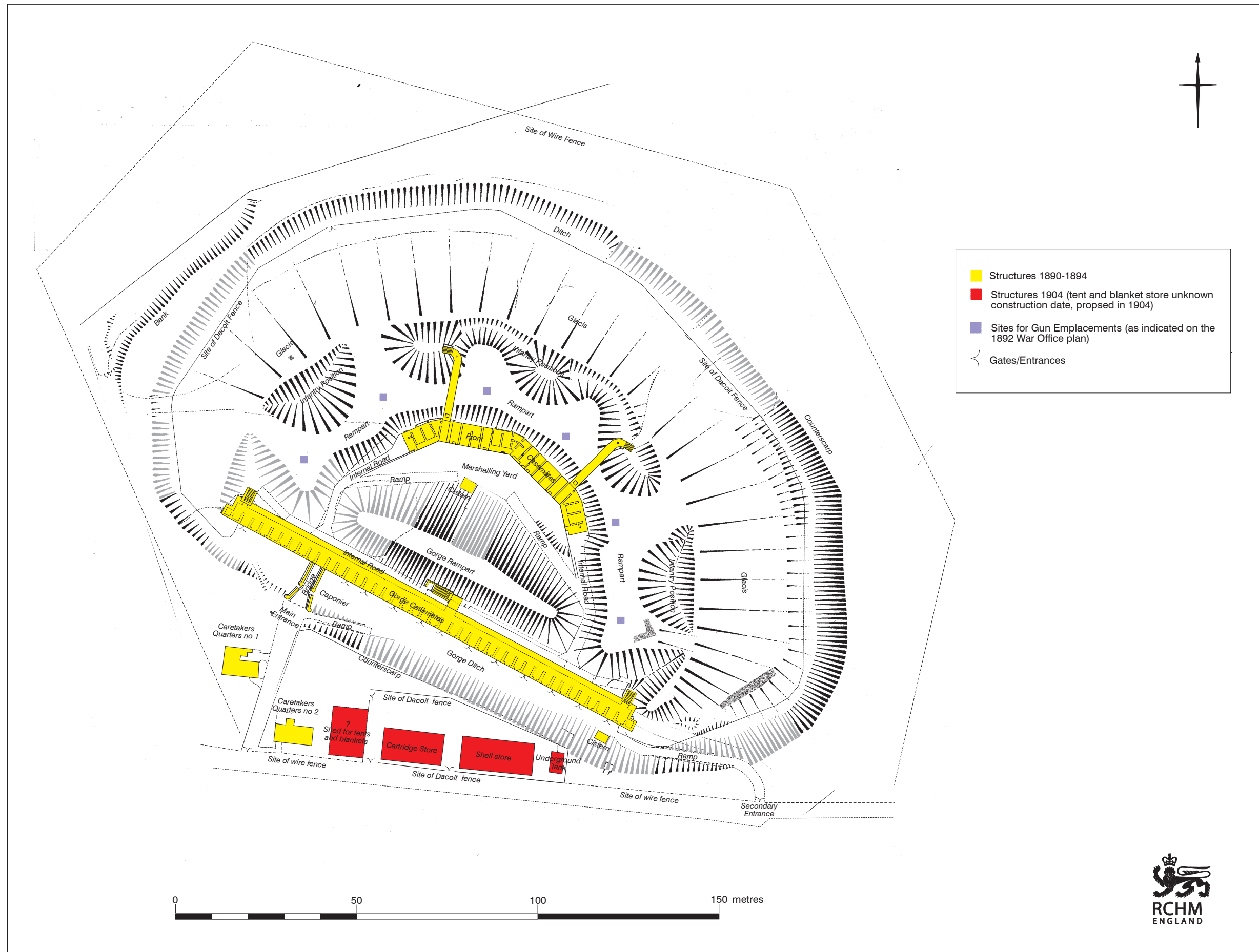


Figure 6 RCHME schematic plan showing the late 19th and early 20th century structures associated with the mobilisation centre

4. SITE DESCRIPTION AND INTERPRETATION

For words and letters that appear in **bold** in the following text, see the figure indicated at the beginning of that section. Other figure references appear in the body text.

A) Summary (Figs 5 and 6)

The redoubt has a D-shaped trace of very low profile, covering about 2.5 hectares (6.2 acres). It comprises a **rampart** with **glacis** and outer **ditch**, which, around the curved front, is shaped into a Tywdall Profile, originally with a Dacoit fence (unclimbable) at the base of the glacis, then the **counterscarp** of the ditch and lastly a slighter outer glacis which sloped gradually onto the natural ground surface. The rear of the trace, or **gorge**, is closed by a massive rampart with an outer ditch, the latter revetted vertically in concrete. A strained wire fence surrounded the whole site.

The southern or **counterscarp** side of the gorge ditch is initially an earthwork cut at an angle of 45°, falling to a vertical concrete face that is matched on the northern side. This northern face forms the elevation for a range of reinforced concrete casemates - the **gorge casemates** - intended for stores and accommodation. Protection for the gorge ditch and its casemates was provided by a **caponier**, which is surmounted by the **bridge** crossing the ditch to allow access to the interior of the redoubt. Inside, the rampart encloses a sunken **marshalling yard** and a second range of casemates – the **front casemates** - that housed magazines for the storage of shells, cartridges and artillery spares.

The main entrance to the site was from the south along a short branch of the road from North Weald Bassett, through a gate and passing by a **Caretaker's Quarters** in the angle of the road junction. On this approach, there was an option to cross the bridge onto the flat roofs of the gorge casemates, or to descend a ramp into the gorge ditch for access to the casemates themselves. There was a second gated entrance to the redoubt, also off the North Weald Bassett road but further to the east, where another ramp led obliquely down the counterscarp to the eastern end of the gorge casemates. Access out of the gorge onto the glacis was blocked by the Dacoit fence, which terminated at either end of the gorge casemates.

From the main entrance, having crossed the bridge onto the roof of the gorge casemates, there were two options. Firstly, access could be gained to the gorge casemates themselves via three flights of steps, two at the ends of the range and one in the centre. Alternatively, entry was possible to the interior of the redoubt through two cuttings situated at each end of the gorge rampart. The road from each cutting then bifurcated, one branch forming a level loop across the roof of the front casemates, the other ramped down to the marshalling yard and the entrances to the front casemates themselves.

The record plan of November 1892 clearly shows an infantry firing step built along the full length of the curving rampart, incorporating recesses to enable enfilading and cross fires to be established (Fig 7). Also, on the upper part of the glacis, there were five carefully excavated and profiled pits forming additional **infantry positions**, an interesting variation of the standard Twydall arrangements. Two of these were linked back to the marshalling yard and front casemates by substantial concrete galleries passing underneath the rampart.

By late 1892, the redoubt was largely finished but the record plan shows, on the rampart, six *sites for Gun Emplacements to be formed hereafter*. Although these were not made, further work did take place after 1892, with an additional Caretaker's Quarters by December 1893 and, by March 1904, free-standing **Cartridge** and **Shell Stores** were added outside the redoubt on the south, extending eastward in series from the original Caretaker's Quarters (Figs 12 and 21).

B) The defences (Figs 5 and 6)

The main ditch of the redoubt is unrevetted, its **counterscarp** cut at an angle of 45° to a depth of 4.6m (15ft) (Fig 8). Much of it is badly disturbed, for instance on the northern side by a pond, with the best sections situated on the east and north-west. Due to thick undergrowth it is difficult to trace the ditch on the western side but in places it would seem to have disappeared. There is evidence here of a bank, which may possibly be the result of upcast from the ditch, the whole disturbance possibly resulting from the use of the site as part of the radio station.



Figure 8
Section of
ditch on the
east side of
the redoubt
(AA00/1073)

There is virtually no trace of the **unclimbable fence** in the base of the ditch but its termination, closing off the eastern end of the gorge from the glacis, is marked a small slot, 0.30m in width, let into the concrete of the gorge casemates for securing the end of the fence. The fence originally contained two small gateways to allow infantry movements and patrols.

The glacis has a shallow even slope that generally survives well, although very overgrown, as do the five **infantry positions** cut into it. Each position is a D-shaped pit, with the straight

face outward, and sloping sides falling to a flat base. They measure *c* 25m (82ft) by 18m (59ft), with the base some 3.0m (10ft) below the glacis to provide adequate cover for infantry detachments defending the ditch. Troops and ammunition from the interior of the redoubt could pass under the rampart via the two galleries, emerging up short flight of steps in the base of pits 2 and 4, flanking the central pit, 3, which is linked to 2 and 4 by trenches to facilitate deployment. Curiously there are no such trenches linking to nos 1 and 5, which could only be reached by traversing the glacis from pit 2 and 4 or directly over the rampart from the firing step, thereby exposing the defenders to the enemy: this suggests, perhaps, that they are unfinished. Pit 5 also has steps leading up and onto the lower glacis, where there is a slightly worn path running for *c* 10m (33ft), a later feature connecting the Radio Station with its stores in the front casemates. Also of late date are small circular concrete bases on the northern and western glacis, perhaps supports for a fence, and the remains of a radio mast (Fig 24).

The top of the rampart is flat and lacks clear features, while the *talus* falls unbroken to the flat roof of the front casemates. The firing step is not apparent and may not have been formed as shown on the 1892 plan: the foot of the *talus* is revetted only in three short stretches, with low concrete walls adjacent to the ammunition hatches in the casemate roof. However, it is possible that alterations have removed the firing step because the *talus* retains traces of the recesses shown on the 1892 plan, which would have enabled enfilading and cross fires. The three circular hatches, through which ammunition would have been lifted from the casemates below, are intact with their original wooden hatches (Fig 9).



Figure 9
Ammunition
lift hatch on
the roof of the
Front
Casemates
(AA008522)

The **gorge rampart** is a massive but simple earth construction, with a shorter outer slope rising from the gorge casemates and a longer slope down into the marshalling yard, the whole forming a flattened triangular plan. It does not incorporate any particular defensive positions, its principal function being to absorb enemy artillery fire and prevent damage to the interior of the work. However, from its summit, infantry could command the southern approaches to the redoubt.

The **gorge ditch** doubled as a sunken roadway allowing access to the gorge casemates. It is some 130m (426ft) long and 9m (30ft) wide and was originally 3-4m (10-13ft) deep, its vertical sides are revetted in concrete, with a counterscarp beyond the southern face cutting at an angle of about 45°. Only four short sections of the counterscarp were surveyed, the remainder being inaccessible for reasons of safety due to severe flooding.

An original **cistern** is located in the southern face of the gorge and was later linked to a second cistern, constructed in 1904, to the east of the additional Shell Store (see below).

The **gorge casemates** could only be inspected from a distance because of flooding (Fig 10). According to War Office specifications of 1893, they were built to accommodate 72 men (English Heritage, AA43268/1). Construction is in concrete throughout, including the roofs which are thickened to resist bombardment. Access could be gained from the gorge ditch



Figure 10
The gorge casemates
(AA001081)

through several doors or down three flights of steps from the roof, as in the slightly later Fort Darland at Chatham. All three flights survive, one in the centre and two at either end of the range (Fig 11).

The interior was half-partitioned into small rooms, with a continuous corridor along the northern side.

Each room had either an entrance or a window to the gorge ditch: there were 12 entrances, each one protected by double doors of ½-inch steel, and 28 small rectangular windows protected by vertical steel



Figure 11
Eastern
entrance to the
gorge
casemates
(AA00/1071)

bars. A ventilation pipe was provided in each room, capped on the roof by a stoneware ventilator with slate cover, none of which survive (Fig 12). Additional vents were located above each external door.

The roof of the casemates has probably been re-asphalted and is presently coated in a silver paint. The

ventilators have all been removed and a post-and-wire fence installed along the edge of the range. The concrete foundation of a secondary structure survives on the roof, part of a rectangular building of *c* 30m (98ft 5in) by 9m (29ft 6in), lying *c* 6m (19ft 6in) to the east of the central stair. This was a timber-built rigging workshop belonging to the radio station. Two other associated structures stood on the roof immediately to the west: all had been removed by 1974 (OS 6-inch 1923; OS 1:10,000, 1974).

The original secondary entrance at the south-eastern end of the redoubt has been modified by the addition of a branch road leading directly onto the roof of the gorge casemates. This incorporates a small bridge across the end of the ditch, the whole construction probably associated with the Radio Station.

The main **bridge** carried the principle access road across the gorge ditch and onto the roof of the gorge casemates, in a similar style to the slightly later Fort Darland at Chatham. The approach is flanked by splaying concrete walls that formerly ended in double, outward-opening gates at the entrance to the bridge. The massive cylindrical concrete gate piers are extant but the gates themselves have been removed, although they were constructed in unclimbable fencing (Figs 12 and 13). The flanking walls are continued across the bridge as a parapet.

The *caponier* under the bridge is a rare example for this date, the only one constructed in any of the mobilisation centres and perhaps due to the fact that North Weald was the first to be constructed: the presence of *caponiers* in forts had been criticised several years earlier



Figure 13
The bridge,
from the
exterior
(AA00/1083)

because of their projecting, vulnerable positions (Smith 1985, 113). The North Weald example is a strongly built concrete passageway reached through the gorge casemates. It is pierced by eight small loopholes on each face to allow enfilade fire by rifles along the length of the gorge ditch (Figs 12 and 14). A note on a record plan of 1893 reveals that the loopholes were glazed, presumably

to prevent draughts in peacetime, and would have been broken out in the event of an attack. Ditches ran along each face of the *caponier*, spanning the width of the gorge ditch, and are referred to as *drop ditches* on the record plan; these were designed to prevent a close attack on the loopholes and deny flanking access to the bridge (PRO/WO/78/2606/4). The interior of the *caponier* could not be examined because of flooding.

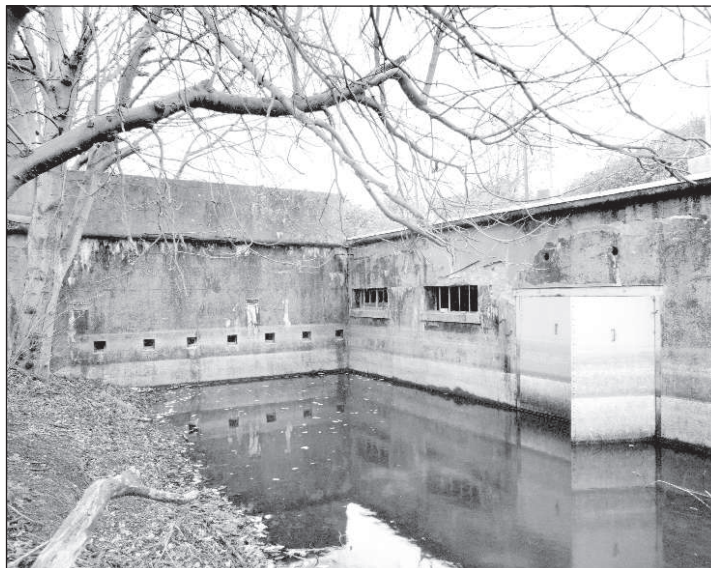


Figure 14
The caponier,
from the south
east
(AA00/1080)

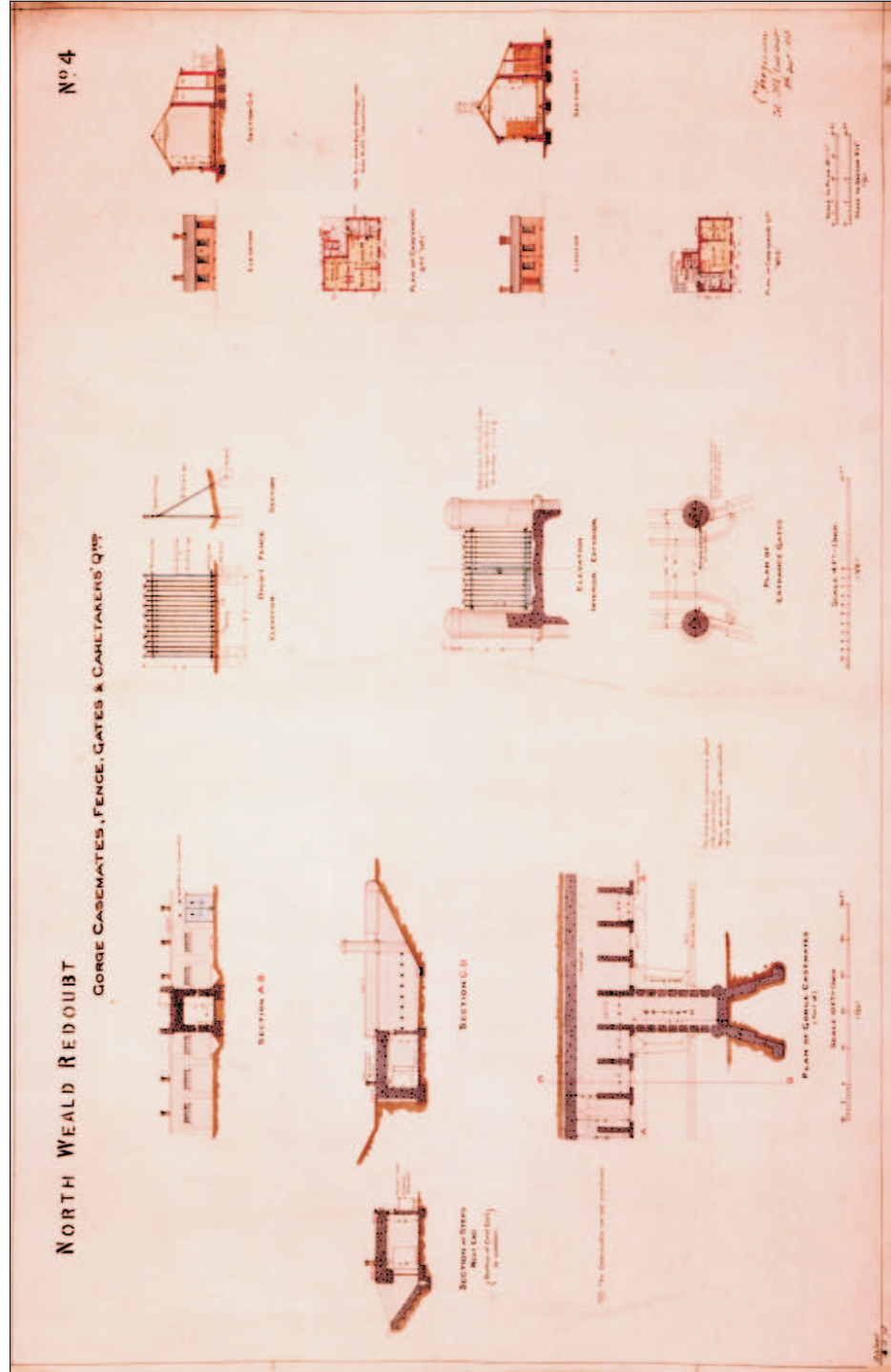


Figure 12 North Weald Redoubt - 1893 plans and sections of the Gorge Casemates, Fence, Gates and Caretakers Quarters (PRO WO/78/260(4))

C) The marshalling yard (Fig 5 and 6)

The original ramped roads into the marshalling yard survive, although obscured by vegetation in places. The **marshalling yard** itself, at the very centre of the redoubt, is relatively clear of vegetation. It forms a small crescentic standing with maximum dimensions of *c* 60m (197ft 7in) by 12m (38ft 4in). At the back of the yard, let into the base of the gorge rampart, are two adjacent concrete water tanks, not as shown on the 1892 plan - when there was only one - but a slightly later adaptation - there were two by December 1893 (PRO/WO/78/2404/2; WO/78/2606/3). A garage of late date has been constructed against the western side of the tanks, cut into the base of the gorge rampart, and there is a small room built behind the tanks, reached via a revetted cutting along their eastern side.

The marshalling yard afforded direct access to the front casemates and to the east and west galleries that led under the rampart to the glacis.

D) The front casemates (Fig 15)

These casemates rise from the northern side of the marshalling yard and functioned as magazines for the storage of artillery, ammunition and essential spares. They are of the same



Figure 16
The front casemates and marshalling yard from the south east (AA00/8517)

thickened concrete construction to those in the gorge, with a flat roof coated with asphalt, the cartridge stores receiving the greatest protection. Internally the roofs slope slightly upward to the rear. In plan the whole range is formed from four contiguous straight sections (referred to here as sections **A**, **B C** and **D**), with changes in angle between the sections to follow the curve of the rampart (Fig 16). The end sections, **A** and **D**,

have mirror-image plans and performed identical functions as self-contained magazine units, with four rooms each comprising a shell store, two cartridge stores and a shifting lobby. They are separated from the central sections **B** and **C** by the east and west galleries. A third magazine unit is located centrally to the range and is divided between sections **B** and **C**, with five rooms to include a lamp store: on each side of this magazine are four rooms in

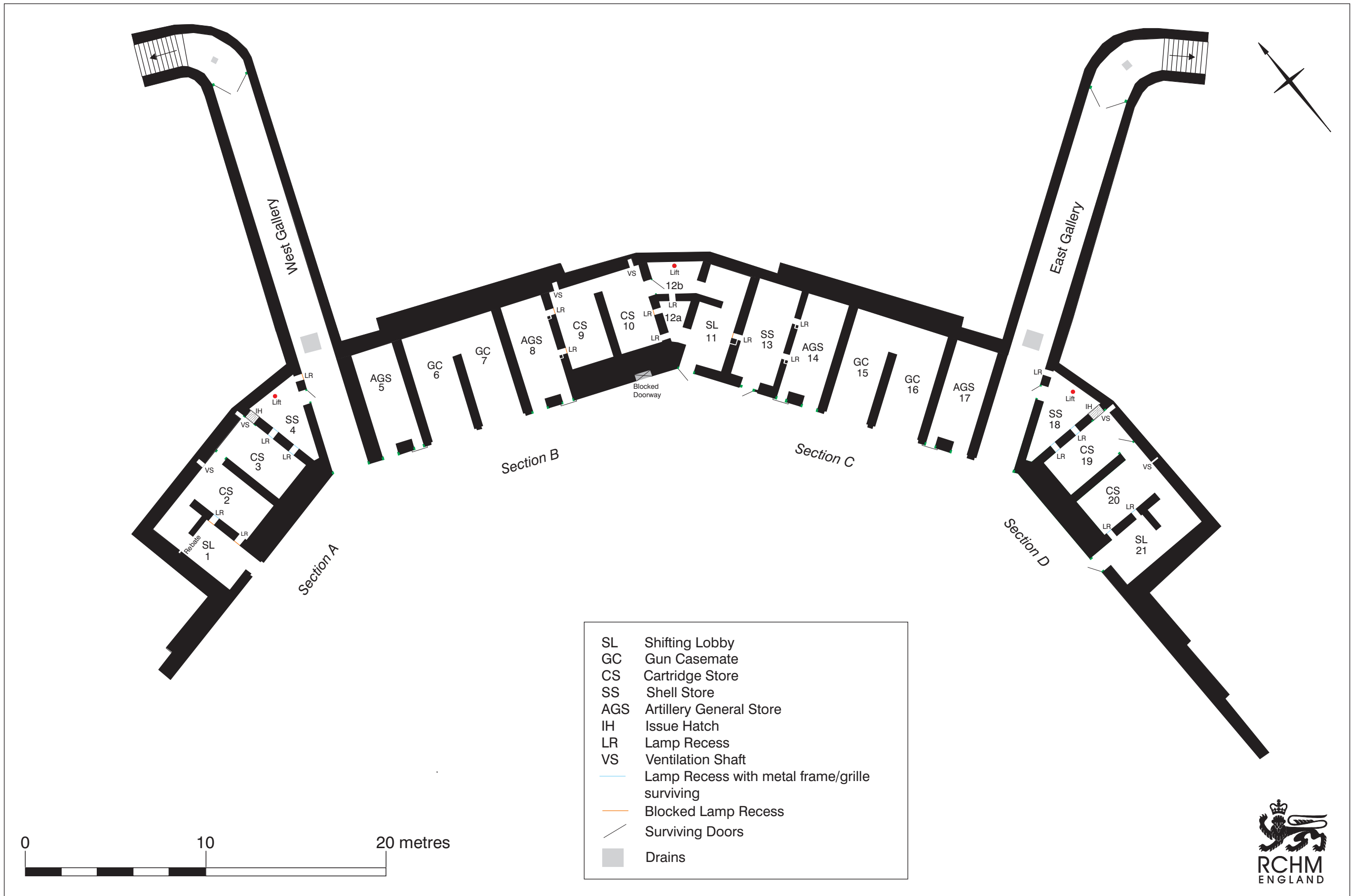


Figure 15 RCHME Survey Plan of the Front Casemates. Reduced from the original 1:100 scale survey.
For 1893 plan of the casemates see figure 17. Casemate and section numbers relate to descriptions within the survey report

sections B and C comprising a pair of gun casemates flanked by artillery general stores, once again arranged in a mirror image. The gun casemates were for the storage of mobile artillery pieces and their limbers, while the general artillery stores held important spares for the guns.

The majority of the casemates were ventilated, usually via ceramic pipes in the roof but those in the cartridge stores are built into the rear walls: all were capped by square brick and stone outlets on the roof - only one of which remains. The artillery general stores have doors and windows facing into the marshalling yard while the shifting lobbies have only doors, as does the central shell store. The cartridge and shell stores have brick party walls pierced by lamp recesses to minimise the risk of explosion, the lamps sitting in the recesses that were sealed by glass doors reinforced with external metal latticed grills and only accessible from the outer faces of the walls. The gun casemates were to be provided with double gates, though these had not been installed by late 1893 when *there were no gates to the gun casemates, but hinge hooks and pivots are fixed* (PRO/WO/78/2606/3). The walls of the cartridge stores that face into the marshalling yard are thickened.

Vandalism to the whole range has resulted in the removal of most doors and windows, though the wooden frames often survive. Concrete and render to the exterior elevation is flaking and falling away. The preservation of interior detail is better, with survival of some of the original fittings, including complete issue hatches, lamp recesses, some doors and painted signs that closely match details given on the 1893 record plan (Fig 17). Fuller details of each casemate are given in Section 6.



Figure 18
View along east
gallery with
entrance to shell
store (room 18) on
the right
(AA00/8520)

The **east and west galleries** are placed symmetrically in the redoubt, leading originally through strong double doors from the marshalling yard through the front casemates and under the rampart to the glacis. Both galleries also have direct access to shell stores. The galleries are 2.2m (7ft 2in) in width and run straight for some 23m (75ft 5in) to stout double wooden doors



Figure 19
Stairway leading to
the infantry positions
on the gallery from
the east gallery
(AA00/8519)

(painted green and brown), although in each case only one door survives (Fig 18). Beyond the doors, each passage curves into the open to a short stair leading up into the infantry positions; there are drains between the doors and the stairs and the eastern passageway has a metal handrail in the middle of the stairway (Fig 19).

Large drains are also located in the galleries: in the eastern passage this lies partially exposed with its concrete cover removed. The galleries are flat-roofed and the walls retain piping and brackets for shelves.

E) The external buildings (Figs 5 and 6)

There are several buildings outside the redoubt which were part of the mobilisation scheme. Although these were not examined in detail during the present survey, the following summaries provide a general context.



Figure 20
The Caretakers
Quarters and
structure associated
with the ? tent and
blanket store
(AA00/1093)

The mobilisation centres were not to be manned in peacetime and so were provided with caretakers, for whom small cottages were built. At North Weald, they are outside the redoubt but inside the perimeter fence, immediately south of the bridge. **Caretaker's Quarters no 2** is an

original building of 1892, **Caretaker's Quarters no 1** added to the west in 1893: perhaps accommodating a senior official and an assistant. Both are cottages of a standard type, brick built, single storied with pitched slate roofs. They provided similar facilities comprising a bedroom (two in the 1893 cottage), living room, scullery, yard, coal house, toilet and ash bin (Figs 12 and 20; PRO/WO/78/2606/4).

Both cottages survive, though in a very dilapidated state. The interiors have been stripped, the windows broken, partitions kicked in and the roof slates robbed or smashed. Cottage no 2 has been gutted by fire. Internal timberwork is now exposed to an increased rate of deterioration through water penetration.

Three more buildings were added subsequently, in a line running east from Caretakers Quarters no 2. The function of the first is unknown, although it occupies the site of a *shed for*

tents and blankets

proposed on a record plan of 1904 (Fig 21; PRO/WO/78/2606/5). It is a small square building of similar construction to the cottages and has certainly been used as a boiler room at some stage (English Heritage, AA43268/1). The remaining two buildings

were a **Cartridge Store** and **Shell Store** respectively, built between 1903 and 1904 to accommodate supplies of

additional shells and cartridges for 4.7-inch artillery - each store to hold 7200 rounds (1200 boxes of cartridges, 3600 boxes of shells) (Fig 21; PRO/WO/78/2606/5). These stores were originally secured and surrounded by an additional Dacoit fence.



Figure 22
Exterior of the
radio station
workshop
incorporating the
1903/04 Shell and
Cartridge Stores
(note the original
large round headed
window in the
gable)
(AA00/1085)

Both of these stores were originally brick-built rectangular halls with rivetted iron trusses supporting slate roofs. They survive, amalgamated to form one building and heavily altered for the Radio Station, complete with original roof trusses and much brickwork (Figs 22 and 23). The Cartridge Store was the smaller structure, at 16.6m (54ft 4in) by 5.9m (19ft 4in), with two small rectangular windows in the south elevation, single large round-headed windows in the gables and two separate doors in the north elevation. The eastern window

Figure 23
Interior of the
radio station
workshop
incorporating the
earlier 1903/1904
Shell and
Cartridge stores
(note the original
steel roof
structure)
(AA00/1086)



was protected on the outside by a wire screen. The Shell Store was slightly larger, at 19.9m (65ft 4in) by 5.9m (19ft 4in), of similar design but with three windows in the south elevation and an extra window between the doors in the north elevation. In both stores the ammunition was stored in boxes on the asphalt floor, in six areas with passages left for access and ventilation.

F) Significant later additions to the redoubt (Fig 24)

There are two **Allen Williams turrets**, a rare type of gun emplacement installed during the Second World War for close defence of the Radio Station, located prominently at each terminal of the main rampart. Only a small number of these turrets were produced in 1939-40 by a company specialising in pre-fabricated building components. The south-western turret is concealed in very thick vegetation but the south-eastern example is visible and consists of a rotating steel dome, 1.5m (5ft) in diameter, set over a concrete lined



Figure 25
Allen Williams
Turret
(AA00/1070)

pit with an entrance passage to the west (Fig 25). The dome contains space for two men, one to rotate the upper section, the other to operate the armament, which could include a Bren or Lewis LMG or a Boys anti-tank rifle. The machine guns could be mounted through the square aperture in the side of the turret or the circular opening above, allowing engagement of



both ground and aerial targets.

There are other structures directly associated with the Radio Station but these are not considered in detail here. They include a timber-built rigging workshop overlying the eastern end of the gorge casemates, of which only the foundation remains, and a brick workshop most recently used as an engine generator test centre, attached to the southern side of the 1904 Cartridge Store. There are also more recent annexes on the eastern end of this store, a garage in the marshalling yard directly to the east of the water cistern, oil tanks with brick supports, vehicle inspection ramps, fences, fence posts and bases.

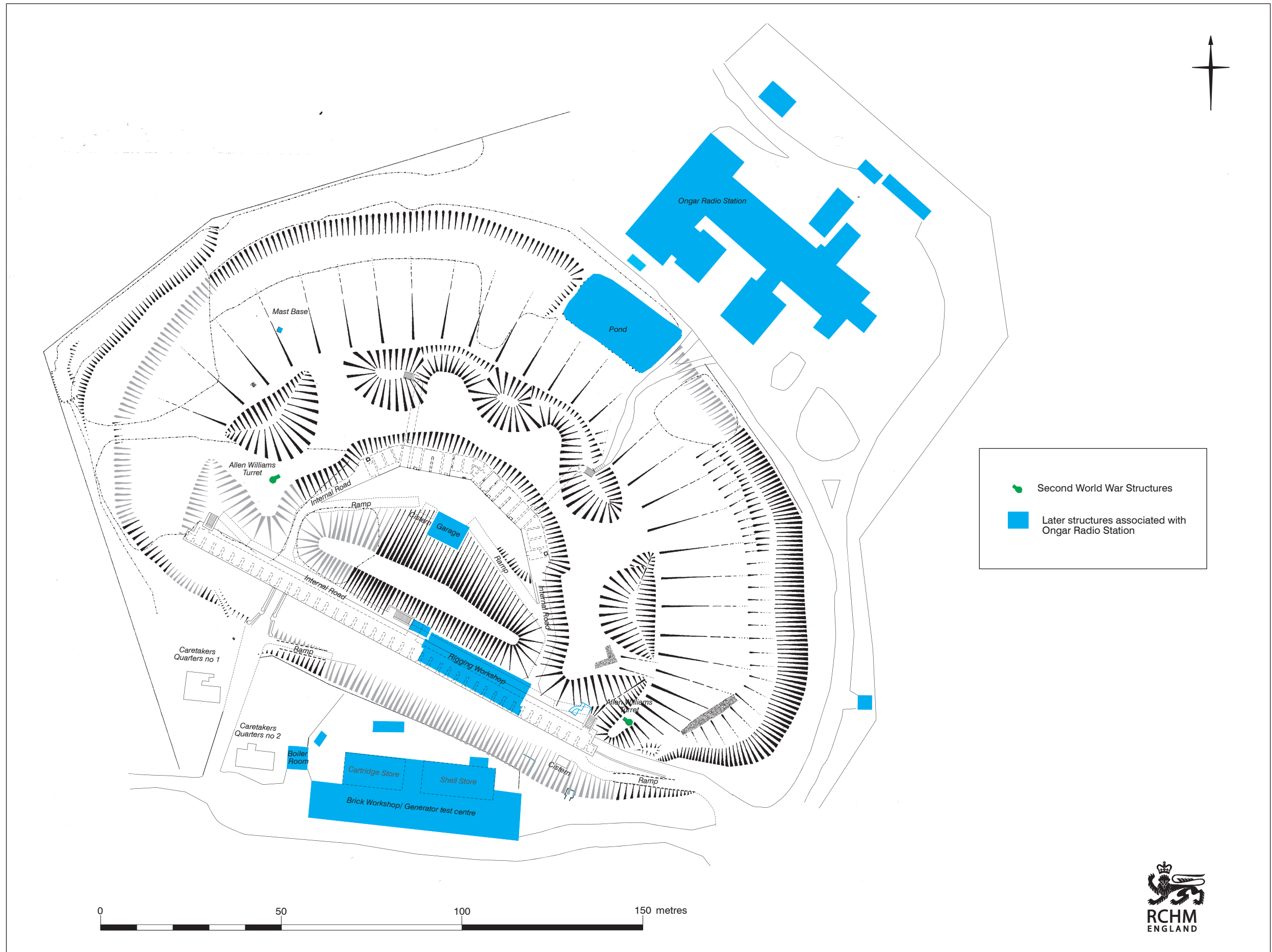


Figure 24 RCHME schematic plan showing modifications to the redoubt for Ongar Radio Station, including Second World War defences

5. CONCLUDING REMARKS AND RECOMMENDATIONS

Summary and importance of North Weald Redoubt

North Weald Redoubt is an important example of a rare and short-lived type of fortification, built at a time of uncertainty in the effectiveness of fixed defences and indeed towards the end of their long history and development in the British Isles. As such it is worthy of the statutory protection as a Scheduled Ancient Monument. It was also the first of its kind - a mobilisation centre - and to that extent it is experimental, though in the design of its defensive perimeter the immediate antecedents are the Chatham redoubts of 1886 and 1889. It is also more-or-less contemporary with Beacon Hill Fort at Harwich, where a Twydall Profile was utilised to defend a coast artillery battery on a promontory (Brown and Pattison 1997).

Nevertheless, it is clear from the record plan of 1892 that the design of North Weald was at that time not entirely settled: although it was clearly an infantry work, there was the intention to add gun emplacements *to be formed hereafter* (Fig 7; PRO/WO/78/2404/2). This is either a reflection of the fluid nature of the design of these centres, or a part of the whole deployment concept. It is unlikely that there ever was an intention to site fixed artillery in the redoubt for its own defence: there are certainly no traces of any fixed emplacements, nor any true *terreplein*. However, it is possible that the 4.7-inch field guns were to be deployed on the rampart in temporary emplacements *to be formed hereafter* ie in the event of an emergency in much the same way as the entire entrenched line. These could be made quickly in the earthen rampart, while the broad ramped access ways and flat roofed casemates made for easy limbering, movement and firing of moveable artillery. This idea is supported by the three circular hatches in the roof of the front casemates, enabling ammunition for infantry or artillery to be lifted by temporary hoists. Once more, this was a simple and economic measure suited to the purpose, negating the need for the substantial and permanent hoists found in contemporary coast batteries.

The main purpose of the redoubt, therefore, was to protect, in an economical fashion, the emergency supplies of guns, ammunition and other stores for a mobile field force operating to the north and east in front of an entrenched stop line. The guns and ammunition were to be kept in the front casemates, while accommodation for infantry and a supply detachment, and perhaps less vulnerable stores, were formed in the gorge casemates. Both these ranges have thickened concrete walls and roofs as a measure of protection against bombardment but interestingly, have no absorbing earth layer above them. The perimeter was defensible by infantry with magazine rifles and possibly machine guns, with the corps positioned on a firing step behind a parapet - a feature that was recessed and shaped to enable crossfires to be established across the glacis and ditch. This line was supplemented by five sunken positions on the glacis itself, two of which are linked back to the centre of the redoubt by galleries

under the rampart, to enable covered deployment and perhaps to flank an enemy that had penetrated one part of the unclimbable fence. These are unusual features and although apparently unfinished, they represent a significant variation of the Twydall Profile. The galleries themselves are effectively bomb-proofed and may have been intended as temporary shelters for infantry waiting to deploy to the glacis, rather like the purpose-built example at Beacon Hill Fort (Brown and Pattison 1997, 21-3).

Relatively few defensive measures occur at the gorge. The broad approach to the bridge is defended only by its Dacoit gates, for which there is no flanking defence, a factor which emphasises the importance of the entrenched line to be established in an emergency: once the redoubt was outflanked, the approach from the rear was a relatively easy one.

Recommendations

Despite its protected status, the redoubt and its attendant buildings are in a very poor state of repair and face continuing depredations. Urgent work is needed to at least slow down that process, including:

- Control and management of vegetation growth to prevent the form of the site being totally obscured and further damaged.
- Re-establishment and maintenance of drainage on the site to prevent flooding. This is a serious problem that is rapidly causing irreparable damage, particularly to the gorge casemates and *caponier*.
- Clearance and drying out of the site would enable completion of survey on the Twydall Profile, gorge casemates and *caponier*.
- The present survey brief did not include the detailed survey of buildings outside the site to the south (Caretaker's Quarters, Shell Store, Cartridge Store etc). These structures should be recorded to complete survey and analysis of the site.

6. DETAILS OF THE FRONT CASEMATES

The front casemates, room descriptions:

The function of each casemate is taken from the 1892 and 1893 record plans, while the section letters and room numbers are assigned for the purposes of this report. Internally, all casemates with external entrances measured 5.5m (18ft) by 2.5m (8ft 2in) with partition walls 0.50m (1ft 7in) thick. The cartridge stores were shorter at 4.5m (14ft 9in) due to the thickening of the walls on the marshalling yard side to 1.5m (4ft 11in). Two triangular-shaped shell stores had maximum dimensions of 4.5m (14ft 9in) by 3.0m (9ft 9in).

Most internal concrete surfaces are plastered and whitewashed - brick surfaces usually whitewashed - and the relatively good condition of rooms 18-20 suggests that they were refurbished late in their history. There is evidence for secondary electric lighting, probably in connection with the Radio Station, and some remains of shelves may also date from this period.

Section A

1) Shifting lobby: entered through a door from the marshalling yard and allowing access to the cartridge stores (2 and 3). The room is partially divided by a cross-axial brick partition wall, the remaining gap formerly taken up by a lifting wooden barrier: the rebate for the upright support is still extant on the western wall. The smaller room contains a ceramic

ventilator in the roof while the larger room contains holes in the wall for shelving as well as the two lamp recesses in the party wall to cartridge store (2): these are blocked with brickwork but adjacent are small square holes, each 0.13m by 0.13m, which ventilated the lamp recesses. The western wall has a painted sign for First Aid (Fig 26).

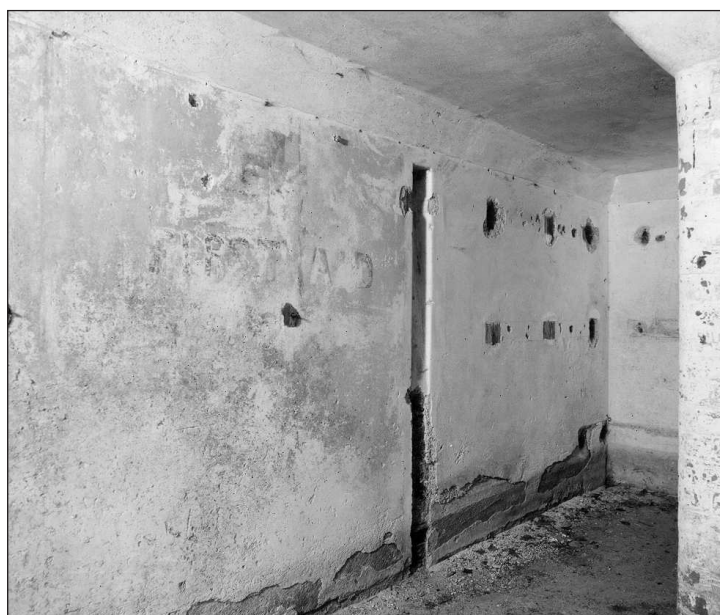


Figure 26
*Interior of shifting
lobby (room 1)
showing the barrier
rebate and first aid
sign
(AA00/8505)*

2) Cartridge store: the walls support several metal hooks that are probably secondary. The north wall contains a recessed ventilation shaft, now covered by a sheet of metal. There are two lamp recesses in the west wall, with the metal frame on the northern recess extant.



Figure 27
Issue Hatch of
Cartridge Store
(room 3)
(AA00/8514)

3) Cartridge store: entry from the adjacent cartridge store (2) was guarded by a wooden door of which only the frame survives. There is a recessed ventilation shaft in the eastern corner of the north wall. Some shelving brackets remain on the western wall, together with loose wiring. The eastern wall contains two lamp recesses, both retaining their original metal frames, the northern one also with part of the grille cover – and an issue hatch, complete with wooden frame and sliding door, to the adjacent shell store (4) (Fig 27).

4) Shell store no 3: small triangular room reached through a door from the west passage. The dark green wooden door retains its painted sign ‘No 3 Shell Store’. The room is whitewashed and has a wooden rail just below ceiling level on all but the eastern wall. As



Figure 28
Grilled lamp
recess and
issue hatch of
shell store
(room 4)
(AA00/8504)

well as two lamp recesses to the adjacent cartridge store, a third recess is let into the eastern wall to the north of the door: it is bricked up on the passage side. The other recesses retain their metal frames and protective grilles in working condition and all three lamp recess ventilators have their original metal grilles. The issue hatch to

casemate 3 has its painted sign and a circular shaft in the roof was originally for lifting ammunition to rampart (Fig 28).

Section B

5) Artillery General Store: the door and window frames survive. Inside, although the concrete and paint work are peeling away, there are small patches of cream paint on the upper surfaces and green paint towards the bottom. The east and north walls have the remains of shelving, the former comprising three rows of ten small rectangular holes, some of which retain broken and protruding wooden fittings; the latter comprising five rusted metal brackets. There is also evidence of secondary electrical lighting on the southern wall. In the ceiling at the back of the room is a circular ceramic ventilation pipe.

6 and 7) Gun casemates: adjacent and identical rooms divided by a partition wall, with a gap at the northern end that allowed for passage between the two. Both rooms were to be provided with large double doors from the marshalling yard, only three metal pivots survive and it is uncertain whether doors were installed. In room 6 there is a drain in the floor, together with a number of concrete plinths, all possibly from Radio Station days. The walls have some small areas of peeling paint comprising cream on the bottom half and green on the top half. The west wall has five metal brackets for shelves together with two segments of shelving. The north wall has several holes in the wall which formerly held supports for shelves, as in room 5, one of which retains a piece of wood. Room 7 is very similar, with better survival of wooden shelving along the north wall. Circular ceramic ventilation pipes are located in the ceiling at the back of each room.

8) Artillery General Store: this casemate has an external doorway and window whose frames are largely intact. The north, south and west walls retain patches of cream paint, but the brick-built east wall is whitewashed. There are two lamp recesses in the east wall, bricked up on the side of casemate 9, and the adjacent recess vents have their metal grilles. The east wall also contains eight metal brackets, perhaps for shelving, of which further evidence on the north wall comprises a number of metal bolts in the northern third. A partly broken circular ventilation pipe is located in the ceiling at the back of the room.

9) Cartridge Store: the walls are whitewashed, with some metal brackets and piping surviving. There are two bricked-up lamp recesses in the west wall and a ventilation shaft set back in the western corner.

10) Cartridge Store: adjacent to cartridge store (9) and reached through a gap in the partition wall: there is no evidence of a door. The walls are whitewashed. There are two lamp recesses in the eastern wall, one of which is bricked up, and a ventilation shaft recessed

in the eastern corner of the north wall. Metal piping is continuous with that in casemate (6). On the floor are a number of storage boxes relating to late use of the site.

Externally there is evidence of a blocked doorway leading directly from the marshalling yard, but no sign of it inside.

Section C

11) Shifting Lobby: this casemate is subdivided into two rooms, separated by a partition wall. The wooden door from the marshalling yard is largely intact, leading into the larger part of the lobby: a brick wall, formerly incorporating a lifting barrier, separates the smaller room. The eastern wall of the larger room is covered by scaffolding, and contains one bricked-up lamp recess to casemate (13), no doors survive which would have led to the smaller casemates (12a) and (12b).

12) This casemate is triangular and divided into two parts with no inter-communication:

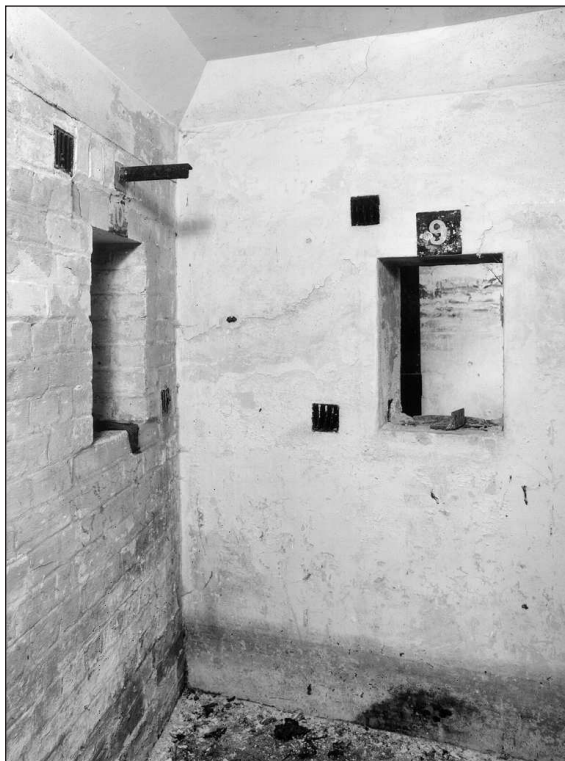


Figure 29
*Numbered lamp
recesses in lamp
room (12a)
(AA00/1100)*

12a) Lamp Room: a small room at the apex of the triangle, measuring 2.5m by 2.0m. It contains three lamp recesses, two in the west wall serving the adjacent cartridge store 10 - one of which retains its painted number, 10 – and a third in the north wall serving communicating with casemate 12b, which retains its painted number 9: all have adjacent small square ventilation holes (fig 29). There are brackets on the wall for shelves, where lamps for the front casemates were stored.



Figure 30
Door and lift
shaft of room
12b
(AA00/8503)

12b) This small room retains its original wooden door complete with cartridge store sign through to casemates 9 and 10. It effectively forms an extension of the shifting lobby. The roof contains the circular opening for an ammunition lift (Fig 30).

13) Shell Store: the green wooden door from the marshalling yard is intact

and there are the flaking remains of cream paint on the walls. The west wall has three large metal shelf brackets and a blocked lamp recess with its painted number, 8, above it. Two more recesses in the east wall are numbered 6 and 7; these are not blocked. The roof contains a circular shaft at the north end, and on the north wall is painted “IFT”.

14) Artillery General Store: the doorway from the marshalling yard, and the adjacent window, have intact wooden frames, with some glass still in the window. The interior walls have scraps of cream paint. There are two lamp recesses in the west wall, above the southern one an illegible painted number, and numerous holes in the west and north walls. The latter

are from shelving; the top row in the west wall has several wooden brackets and there is a single metal bracket in the north wall. In the roof at the back of the casemate is a circular ceramic ventilator.



Figure 31
Surviving
paintwork in
gun casemate
(room 15)
(AA00/8509)

15 & 16) Gun Casemates: a twin unit, partitioned down the centre, with a gap at the northern end for communication. Much of

the original paintwork survives, cream on the upper surfaces and green on the lower. Secondary lighting and metal piping survives along the walls and circular ceramic ventilator pipes pierce the roof towards the rear (Fig 31).

17) Artillery General Store: the door from the marshalling yard, and the adjacent window, retain parts of their wooden frames. The walls show flaking traces of cream and green paint along with shelving brackets on the west and north walls. A ceramic ventilator piper is located in the roof at the back of the casemate.

Section D

18) Shell Store: a small triangular room reached through an intact wooden door in the east passage, it retains the painted sign “Filled Shell Store”. The east wall, in whitewashed brick, is supported by scaffolding but contains two lamp recesses and the entire wooden frame and

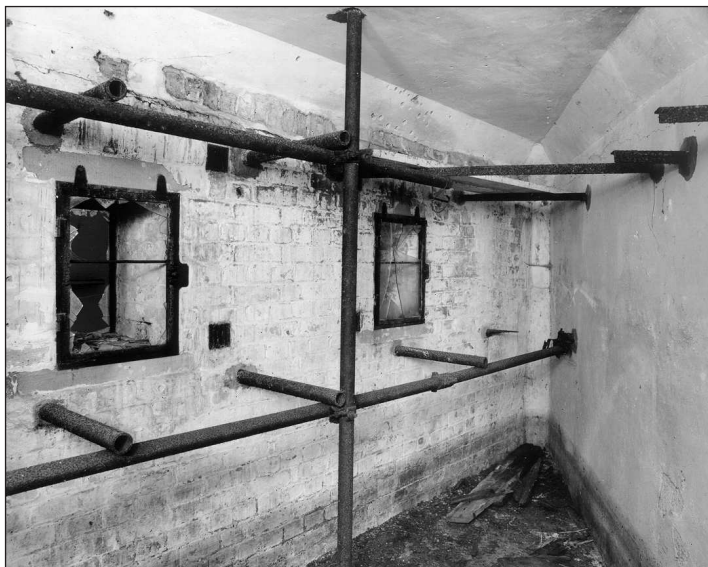


Figure 32
Lamp recesses
and
scaffolding in
shell store
(room18)
(AA00/8511)

lifting door of an issue hatch, which retains its painted sign “Issue Hatch”. The lamp recesses are very well preserved, with hinged metal frames and the some of the glass. A third lamp recess is in the west wall. All of the walls have several metal brackets for shelving and, unlike any of the other casemates, the roof slopes gradually down from west to east. A circular aperture for an

ammunition lift remains in the roof towards the back of the casemate, with its painted sign “Ammunition Lift” (Fig 32).

19) Cartridge Store: this casemate is reached through nos 20 then 21, where there is a doorway to the marshalling yard. It is in a good condition, the brick walls whitewashed, and there is evidence for secondary lighting. On the west wall, there is the issue hatch to casemate 18 and the two lamp recesses, both retaining their metal frames, the southern one still its external grille. The east wall contains several rows of shelves. There is a ventilation shaft recessed into the western corner of the north wall, and is the only feature in the room

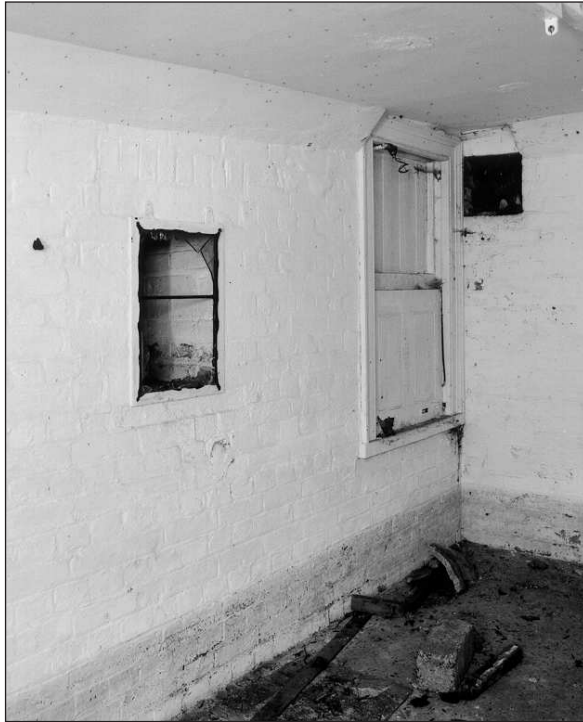


Figure 33
*Lamp recess,
issue hatch and
ventilation shaft in
cartridge store
(room 19)
(AA00/1095)*

which is in a deteriorating condition. There is a red-painted wooden door between to casemate 20 (Fig 33).

20) Cartridge Store: similar to casemate 19. The two lamp recesses in the east wall retain their original metal grilles. There are remains of strip lighting on the eastern wall together with what looks like a circuit box.

21) Shifting Lobby: this room, reached through a doorway from the marshalling yard, follows the usual partitioning into two. In the larger part, two lamp recesses in the west wall are reduced to ragged holes and there is a drain running at the base of

this wall. A painted sign on the north wall of the smaller room notes this suite as “No 1 Magazine Entrance”. There are the remains of secondary lighting and secondary storage, concrete markers and a generator box on the floor.

7. SURVEY AND RESEARCH METHODS

The main part of the archaeological survey was carried out during March 1999 by Moraig Brown and Anwen Cooper, with additional work in November 1999 by Moraig Brown and Paul Pattison. Hard detail and most features were surveyed using a Wild TC1610 Electronic Theodolite with integral EDM, using Key Terra-Firma surveying software. Data was captured on a Wild GRM 10 Rec Module and plotted via computer on a Designjet 750C Plus plotter. Further details of the plans were supplied with tapes using conventional graphical methods.

The report was researched by Louise Barker, Anwen Cooper and Paul Pattison, and written by Louise Barker and Paul Pattison. Illustrations and the assembling of the final report was carried out by Louise Barker using CorelDraw 8, AutoCAD Map 2 and CorelVentura software.

Site photography was carried out by Steve Cole.

The site archive had been deposited in the National Monuments Record Centre, Kemble Drive, Swindon SN2 2GZ, NMR number TL 50 SW 10 (Hob UID: 1310850)

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8. GLOSSARY

Caponier: a covered passage or casemated work across or projecting into a dry ditch, loopholed or embrasured to provide enfilading fire along the ditch.

Casemate: a bombproof vaulted chamber providing an emplacement for gun(s) or sheltered accommodation for troops and stores.

Counterscarp: the exterior slope or revetment of a ditch.

Dacoit Fence: an unclimbable vertical iron palisade protecting the perimeter of a work or a ditch

Glaçis: the exterior slope of a rampart, usually carefully and gradually extended in a long slope towards the field or ground level.

Gorge: the rear of a defensive work, whether open or closed.

Parapet: a wall or earthen breastwork for the protection of troops on the top or forward edge of a rampart.

Rampart: the main defence of a work, comprising a mass of excavated earth, often revetted, on which a large part of a garrison and its weaponry are concentrated.

Redoubt: a small enclosed defensive work without bastions.

Revetment: the retaining wall of a rampart or ditch, usually in turf, brick or stone.

Scarp: the exterior slope or revetment of a rampart (or the inner side of a ditch).

Talus: the rear or internal slope of a rampart

Terreplein: the level surface on top of a rampart and below the parapet, where guns are mounted.



Trace: the plan of any defensive work

Traverse: an earth bank, usually placed on or across the *terreplein*, designed to protect troops from enfilade fire or covering small buildings housing stores of ready ammunition

ABBREVIATIONS

BL: Breech-loading

LMG: Light machine gun

RML: Rifled muzzle-loader

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- *CPE/UK/2016: 3156-3158, 4156-4158 (17/4/47)*
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- *58/764: 5010-5012, 5053-5055 (28/7/51)*
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10. PHOTOGRAPHS TAKEN DURING THE SURVEY

| | |
|--------------|--|
| AA00/1067 | Concrete water tank, located at the back of the marshalling yard, let into the base of the gorge rampart (B&W) |
| AA00/1068 | Dismantled radio mast located on east side of the glacis (B&W) |
| AA00/1069 | South eastern infantry position (B&W) |
| AA00/1070-71 | Second World War Allen Williams Turret (B&W) |
| AA00/1072 | Internal detail of the Second World War Allen Williams Turret (B&W) |
| AA00/1073-74 | Section of the ditch on the east side of the redoubt taken from the glacis (B&W) |
| AA00/1075-76 | View looking down the west ramp into the gorge, showing part of the gorge casemates (B&W) |
| AA00/1077 | View of the eastern entrance steps down into the gorge casemates (B&W) |
| AA00/1078 | View looking south east along the gorge showing the gorge casemates and the western face of the caponier (B&W) |
| AA00/1079 | View along the east face of the caponier to the gorge casemates (B&W) |
| AA00/1080 | View looking north west along the gorge showing the gorge casemates and east face of the caponier (B&W) |
| AA00/1081 | View looking south east along the gorge casemates (B&W) |
| AA00/1082 | Exterior detail of the gorge casemates showing the steel doors and window bars (B&W) |
| AA00/1083 | View across the bridge looking north into the redoubt (B&W) |
| AA00/1084 | View across the bridge looking south towards the 1893 caretakers quarters (B&W) |
| AA00/1085 | View looking west along the south face of the radio station workshop incorporating the earlier 1903/1904 shell and cartridge stores. In the background there is the structure located on the site of the 1904 proposed tent and blanket store which is later known to have been used as a boiler room and the 1892 caretakers quarters (B&W) |
| AA00/1086 | View of the interior of the radio station workshop which incorporates the earlier 1903/1904 shell and cartridge stores (B&W) |

| | |
|--------------|--|
| AA00/1087 | Detail of an original 1903-1904 shell/cartridge store window, incorporated into the later radio station workshop (B&W) |
| AA00/1088 | The 1893 caretakers quarters (B&W) |
| AA00/1089 | Detail of external brick structure, occupying the site of the 1904 proposed tent and blanket store and which was later used as a boiler room (B&W) |
| AA00/1090 | View looking east along north face of radio station workshop, which incorporates the earlier 1903/1904 shell and cartridge stores (B&W) |
| AA00/1091 | Cisterns located in south face of gorge, with the radio station workshop in the background (B&W) |
| AA00/1092 | View of the south face of the 1892 caretakers quarters and structure located on the site of the 1904 proposed tent and blanket store, later used as a boiler room (B&W) |
| AA00/1093 | View showing the southern faces of the 1892 and 1893 caretakers quarters along with the structure located on the site of the 1904 proposed tent and blanket store, later used as a boiler room (B&W) |
| AA00/1094 | View looking east along the south side of the external buildings range, showing the 1892 caretakers quarters, a structure on the site of the 1904 proposed tent and blanket store, later used as a boiler room; and the radio station workshop which incorporates the earlier 1903/1904 shell and cartridge stores (B&W) |
| AA00/1095 | Detail of the front casemates showing the issue hatch, lamp recess and ventilation shaft within cartridge store (room 19) (B&W) |
| AA00/1096-97 | Detail of the front casemates showing lamp recess, partition wall and sign reading 'No 1 Magazine entrance' of shifting lobby (room 21) (B&W) |
| AA00/1098 | Detail of the front casemates showing a view through the open lamp recess of artillery general store (room 14) to the bricked up No '8' lamp recess of shell store (room 13) (B&W) |
| AA00/1099 | Detail of the front casemates showing the two numbered lamp recesses and circular shaft in the roof with partially surviving sign of shell store (room 13) (B&W) |
| AA00/1100 | Detail of the front casemates showing lamp room (room 12a) of shifting lobby (room 11) with two numbered lamp recesses (B&W) |
| AA00/8502 | Detail of the front casemates showing room (12b) forming part of shifting lobby (room 11) with ammunition lift and door looking through to cartridge store (room 10) (B&W) |

- AA00/8503 Detail of front casemates showing the original door of room (12b) through to the 'cartridge store' (B&W)
- AA00/8504 Detail of front casemates showing the issue hatch and grilled lamp recess of shell store (room 4) (B&W)
- AA00/8505 Detail of the front casemates showing shifting lobby (room 1) with the painted first aid sign, rebate for a barrier and part of the partition wall (B&W)
- AA00/8506 Detail of the front casemates showing the covered ventilation shaft and doorway through to cartridge store (room 3) of cartridge store (room 2) (B&W)
- AA00/8507 Detail of the front casemates showing lattice grill and partially surviving glass of the lamp recess in cartridge store (room 19) (B&W)
- AA00/8508 Detail of the front casemates showing view through doorway of cartridge store (room 20) through to the issue hatch of cartridge store (room 19) (B&W)
- AA00/8509 Detail of the front casemates showing the painted walls of gun casemate (room 15) (B&W)
- AA00/8510 Detail of the front casemates showing the shelving brackets in the artillery general store (room 17) (B&W)
- AA00/8511 Detail of the front casemates showing the lamp recesses of shell store (room 18) (B&W)
- AA00/8512 Detail of the front casemates showing the ammunition lift shaft and sign of shell store (room 18) (B&W)
- AA00/8513 Detail of the front casemates showing the issue hatch and ammunition lift shaft of shell store (room 18) (B&W)
- AA00/8514 Detail of the front casemates showing the issue hatch of cartridge store (room 3) (B&W)
- AA00/8515 Detail of the front casemates showing the lamp recesses of cartridge store (room 3) (B&W)
- AA00/8516 External view of front casemates showing the entrances to shifting lobby (room 11), shell store (room 13) and artillery general store (room 14) (B&W)
- AA00/8517 View looking north west across the marshalling yards showing the external face of the front casemates (B&W)

- AA00/8518 View looking east along the roof of the front casemates and down into the marshalling yard (B&W)
- AA00/8519 View looking north up the stairs of the east gallery out to the infantry positions (B&W)
- AA00/8520 View looking north along the east gallery with the door to shell store (room 18) (B&W)
- AA00/8521 Detail of the only remaining ventilation capping on the roof of the front casemates serving shifting lobby (room 21) (B&W)
- AA00/8522 Detail of the lift shaft capping on the roof of the front casemates (B&W)
- AA00/8523 Mast bases to the west of North Weald Redoubt looking towards North Weald Bassett (B&W)
- AA00/8524 Mast base to the west of North Weald Redoubt (B&W)

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