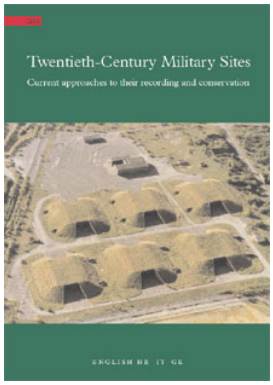
Historic England

Twentieth-Century Military Sites



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Although this document refers to English Heritage, it is still the Commission's current advice and guidance and will in due course be re-branded as Historic England.

Please see our website for up to date contact information, and further advice.

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Twentieth-Century Military Sites

Current approaches to their recording and conservation

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This pillbox formed part of an extensive and still recognisable system of coastal defences at Auburn Sands, near Bridlington in the East Riding. [© Roger J C Thomas]

Twentieth-century military sites and structures present practical and philosophical difficulties and challenges to those concerned with their recording and conservation. Their enormous range and variety is a direct reflection of the changing nature of threats to national security and the countermeasures built in response to them, from the construction of airfields, lines of pillboxes, radar sites and anti-aircraft batteries, to the humble Royal Observer Corps' and mine watcher's post. Some relate directly to crucial historic episodes, such as the Battle of Britain, but they all tell the story of the profound changes in warfare and its impact on the human experience that have marked the 20th century.

Pendennis Castle in Cornwall, built between 1539 and 1545 as part of a chain of defences constructed along the south coast by Henry VIII, is an example of one site that has defended the coastline of Great Britain through the centuries. Its military history, which extends to the Second World War, is being rediscovered and presented to the public as part of a wider initiative which also aims to explain the natural beauty and wildlife of this important headland.

Such was the speed of change in the development of technology and military strategy during this period that some sites and structures were superseded after only a year or so of active life and many sites – especially the hundreds of miles of trenches and earthworks excavated as anti-invasion measures in 1940 – were cleared or filled and levelled once the threat of invasion had receded. Many defence works, especially along the south and east coasts, have been cleared during the post-war period; development pressure and coastal erosion have accounted for the loss of others. The fact that so many of the structures erected during the Second World War were only intended to last 'for the duration' and did not have the capacity for long-term survival has accounted for the loss of many more. The consequence is a highly fragmentary rate of survival and even total extinction for some classes of site. When first hand memories come to an end – soon in the case of the Second World War – these structures will be left firmly in the realms of history and archaeology.

Twentieth-century military sites – many of which have their origins in the Roman period – form part of an exceptional sequence of defences around the British Isles. Largely untouched by the ravages of war, they are frequently better preserved than those constructed elsewhere in Europe. English Heritage directly manages a number of sites that have played an important role in Britain's defence for centuries, including the tunnels associated with the Dunkirk evacuations at Dover Castle. These tunnels have attracted over one million visitors since their opening in 1990. Other organisations play an important role in the presentation of key sites to the public: for example the Imperial War Museum at Duxford Airfield in Cambridgeshire, the Cabinet War Rooms in Whitehall and the National Trust site at Orford Ness in Suffolk. Local authorities and communities also value these sites for their connection with the global conflicts that many of their members have experienced, as evidenced by the participation of veterans, private trusts and societies in the conservation of the 1940 Emergency Coast Battery at Battery Gardens in Brixham (Devon), the First World War airfield hangars at Hooton Park (Ellesmere Port) and Coalhouse Fort in Tilbury (Essex).

The conservation and recording of recent military sites is now common practice across Europe and in the United States. In Europe this extends from the Atlantic Wall – built by the Germans to defend against an Allied invasion – to the airfields of the former Warsaw Pact. The study and recording of sites in Britain was first stimulated by volunteers working for the Fortress Study Group and the Defence of Britain Project, which was launched in 1995 and completed in 2002. County councils also make an important contribution, either through facilitating the Defence of Britain Project or, as in Essex, by recording and promoting the historical significance of their military sites. Sites recorded by these organisations and interested individuals are now finding their way onto the various county-based Sites and Monuments Records (SMRs) – now known as Historic Environment Records (HERs) – and English Heritage's National Monuments Record (NMR) in Swindon.

The traditional nature of defence

Until the 20th century, fixed defences against attacks from foreign raiders and threats of invasion were placed primarily on the coastline, concentrated around the naval bases and dockyards of Portsmouth, Plymouth and Chatham and along some of the beaches more vulnerable to invasion. Henry VIII introduced the first modern, nationally coordinated scheme in the 1540s when he built a series of coastal forts and batteries to protect the main anchorages of the Royal Navy, the traditional first line of defence. Fortifications multiplied in moments of national crisis, such as the threat of the Spanish Armada in 1588 and the danger posed by Napoleon Bonaparte in 1801–5. The enormous technological advances of the mid-19th century affected

Beacon Hill Fort, Harwich, is an important east coast fort whose structures illustrate nearly 100 years of the development of coastal defence. English Heritage conducted a detailed survey of the site in order to inform decisions concerning its management as part of a public park. Pictured here are an 1892 quick-firing gun emplacement (foreground); a 6-inch breech-loading gun emplacement, rebuilt for another 6-inch emplacement of 1904, below a Second World War casemate (centre); and a Cornwallis Battery of 1941 for twin 6-pounder guns (background).

warfare radically. Steam-powered, ironclad warships could now operate regardless of the limitations of wind and tide, while developments in artillery gave far greater range and accuracy to guns than ever before. These developments alarmed military engineers and, in part, stimulated the massive programme of coastal fortification during the 1860s, which concentrated on the south coast against the perceived threat of attack from France. At the turn of the 20th century, British coastal batteries were rationalised to cater for the new range of breech-loading guns appropriate for the weight and character of an anticipated attack. Their concentration on the east coast reflected the new perceived threat from Germany.

The impact of 20th-century warfare

By the First World War, the changing nature of fortifications – in reaction to new developments in ordnance, quick-firing artillery and the machine gun – had been matched at sea by the development of torpedo boats, submarines and mines. In the inter-war period there was a growing realisation that air power, which removed the immunity of civilians as well as combatants well away from the battle zone, was a development with profound implications. By the beginning of the Second World War, combined with advances in communications and the extensive use of mechanised and armoured vehicles, air power introduced a new dimension to warfare with the threat of sudden, overwhelming bombing raids – blitzkreig (literally 'lightning war'). The doctrine of offensive deterrence, which underpinned the creation of the RAF as an independent service in 1918, guided the policy of the Allied air forces in the Second World War and was the underlying principal of the nuclear-based deterrence of the Cold War: an archaeology of conflict that is global in every sense.

The First World War

Throughout the First World War Britain continued to be guarded at sea by an elaborate system of naval patrols and local defence schemes, supported by the Grand Fleet in Scottish waters. With the shift of attention from southern to eastern coasts that took place in the years leading up to 1914, special attention was given to Harwich; the Humber; Tees and Tyne estuaries; the coast from Blyth to the Firth of Forth; Cromarty (the new naval dockyard of Rosyth); and eventually to Scapa Flow. Many new batteries, such as that at East Tilbury, were intended to protect the country's commerce, shipbuilding and munitions production from seaborne raiders as much as to defend naval bases and were usually combined with separate batteries of quick-firing guns to protect harbour installations from fast torpedo boats. The bombardment of Scarborough, Whitby and Hartlepool in 1914 demonstrated that the threat of hit-and-run raiding was real. Heugh Battery in Hartlepool, whose 6-inch guns successfully repelled German battleships from shelling the port in 1914, is one of the few surviving examples of a coastal battery with important historical associations.

Air power was initially conceived as an adjunct of the army and navy, and the first military airfields were built before 1914: for the army around Salisbury Plain and for the Royal Naval Air Service near the coast. Defence against air attack – first by Zeppelins and, from May 1917, by Gotha bombing planes – was another new requirement. This new threat was met by the establishment around London of fighter airfields, anti-aircraft guns and searchlights with a centralised control system, but there was little provision of air-raid shelters for civilians. Early forms of radio-direction and detecting stations, which included convex concrete sound mirrors, were set up along the south and east coasts. Fears of a German landing involving up to 70,000 men – at a time when the Home Fleet was diverted elsewhere or incapacitated – meant the retention of up to 500,000 troops in Britain who might otherwise have gone to

The three seaplane hangars at Calshot in Hampshire date from between 1914 and 1918 and range from a small wooden-framed hangar for the early Sopwith Bat (flying) Boats to a series of immense steel structures. Together they exemplify the remarkable development in aero engine and aircraft technology in this period better than any other site in Britain. Built on a spit projecting into the Solent, Calshot developed as a coastal fort from the Henrician fort built in 1538 and was opened as a Royal Naval Air Service base in March 1913. It became a key coastal base in defence of Home Waters during the First World War, especially in anti-submarine work. The hangars are all listed at Grade II and are now in use as one of the largest outdoor adventure centres in Britain. The great steel hangar erected in 1918 houses a range of activities, including a dry ski slope and the only indoor velodrome in the south of England.*

the Western Front. Counter-invasion measures, especially in Kent, East Anglia and the North-East, saw a combination of concrete pillboxes and trench systems constructed both along the coast and inland.

Between the wars

The expansion of the RAF through the 1920s had fluctuated according to events on the world stage and varying degrees of political support, but Hitler's rise to power and the collapse of the Geneva disarmament talks in 1934 forced the British government to review the country's defences, resulting in a massive programme of rearmament. This was concentrated on the establishment of training and maintenance bases behind a protective belt of fighter stations and a German-facing front line of bomber bases extending from Yorkshire to East Anglia. The marked improvement in the quality and design of stations under development from 1934 – the result of consultation between the Air Ministry, the newly-established Royal Fine Arts Commission and the Council for the Protection of Rural England – provided a response to public concerns over the issues of rearmament and the pace of environmental change. The newly developed radar systems were linked by telephone and teleprinter to a complex infrastructure put in place in the late 1930s by Sir Hugh Dowding, Chief of Fighter Command and best known for his key role in the Battle of Britain. In addition to the airfields and radar stations placed under Fighter Command's operational control, anti-aircraft (for heavy and light guns) and searchlight batteries were utilised, acting in unison with the deployment of barrage balloons. Decoy sites were used to divert enemy bombers away from their main targets. Arrangements for civil defence, such as air-raid shelters, were also put in hand for when the bombers got through.

The Second World War

In 1940 Britain steeled itself for the most devastating assault it had faced in its history. The rapid German advance through the Low Countries and Northern France led to the evacuation of British and some Allied troops from Dunkirk at the end of May and early June. The defeat of France exposed Britain to the immediate

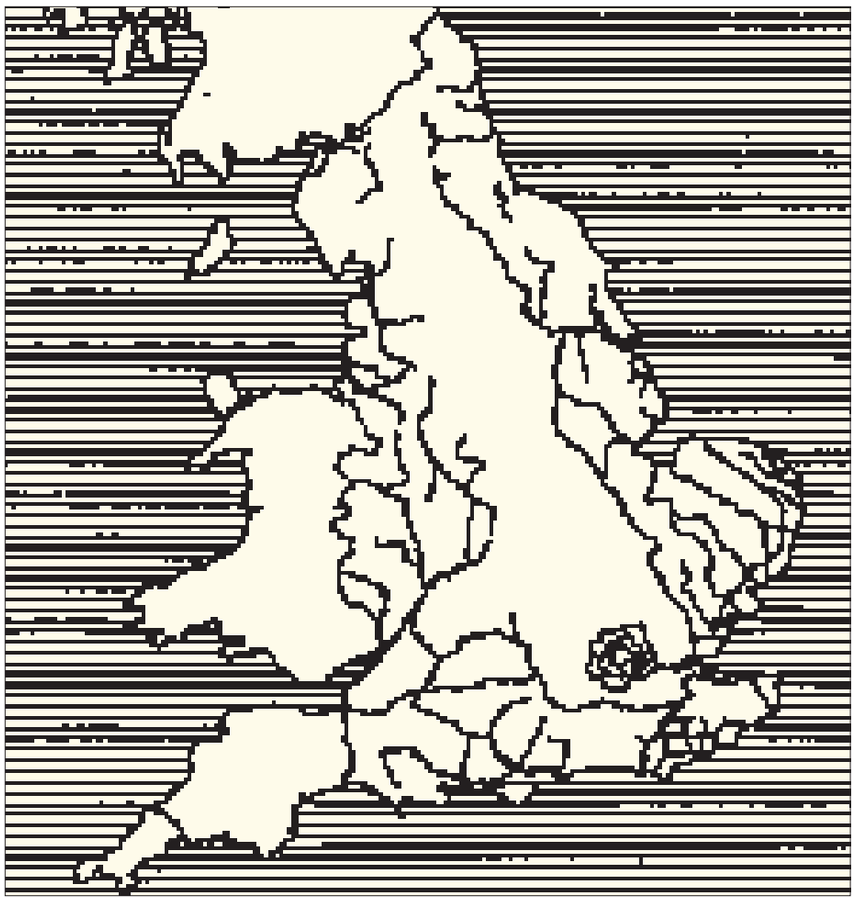
The officers' mess at RAF Hullavington in Wiltshire, one of the first stations planned after 1934. This design, like the other buildings on this station, makes use of Cotswold stone facing in order to address concerns from environmental groups.

The military-industrial complex of the inter-war period produced some of the most impressive monuments to the 20th-century scientific and technical revolution. The wind tunnel building at the Royal Aircraft Establishment at Farnborough (Hampshire), now listed at Grade II, was constructed in 1934–5 for testing models, aero engines and whole aircraft. Other wind tunnels have been protected: for example at NASA's Langley Field site in Virginia (USA), Meudon in France and Germany's first military airfield at the Adlershof research and development centre at Johannisthal near Berlin.*

peril of seaborne invasion, as well as air attack from German bases across the English Channel and as far north as Norway. Virtually all heavy military weapons, tanks, artillery and other British Army equipment had been left behind in France and there was an acute shortage at home of such essential weapons as anti-tank guns.

German preparations for an invasion continued, despite the misgivings of the German naval command, but Hitler demanded air superiority before giving the order to sail. There was, therefore, a determined attempt in August and September 1940 to knock out Britain's southern fighter airfields and the radar chain. The resulting Battle of Britain was fought by the new front line of defence: the Royal Air Force's Fighter Command. They utilised some hastily erected bases but mostly employed the infrastructure of established fighter stations around London, which included such famous names as Biggin Hill, Kenley and Duxford.

A vast amount of anti-invasion defences were thrown up in the sixteen weeks beginning in May 1940 to counter the expected German invasion. The seriousness of the danger – at its height in September of that year – required urgent action. New 'emergency batteries', using the store of surplus naval guns from the long-scrapped warships of the First World War, were built along the coast, together with strong points and anti-tank obstacles. The use of airborne forces and parachutists to capture or destroy airfields and strategic points was greatly feared, as the Germans had demonstrated this tactic to great effect elsewhere. Measures were therefore taken to hinder the landing and take-off of troop-carrying aircraft using obstacles and ditches, and to protect airfields and factories from hit-and-run attacks.



The hitherto-unknown extent of the 'stop-lines' erected during the early stages of the Second World War in England has been revealed by documentary research for English Heritage combined with the Defence of Britain Project. These defences form part of the layered history of the landscape and it is now appropriate that they should be managed, recorded and promoted as archaeology.

This loophole, cut in a cemetery wall at Alnwick, Northumberland, formed part of an extensive system of anti-invasion defences. [© Roger J C Thomas]

Anti-tank blocks on the main inland stop-line – the GHQ line – close to the river Ock in Oxfordshire.

Defence policy under General Ironside (Commander-in-Chief of Home Forces from June 1940) was based on maintaining a 'coastal crust' of beach defences, through the deployment of the few mobile columns available combined with static defended lines extending over a wide area of the country. Their purpose was to obstruct and contain the advance of an enemy from the coast or an inland airborne landing, both by the use of obstacles and by fire from troops on the ground, thus allowing time for relief by a mobile reserve. The pivot was the General Headquarters (GHQ) Line, which employed most of the existing anti-tank guns in association with anti-tank obstacles and followed, where possible, topographical and man-made features such as rivers, canals and railway embankments. It was centred on the protection of London and the principal production centres in the Midlands and was supplemented by a series of command, corps and divisional stop-lines to confine, break up and delay a German advance from the coast. The stop-lines, consisting of pillboxes for anti-tank guns or light machine-guns, were normally combined with roadblocks and weapon positions in the form of trenches and pits. Where there were no natural or man-made obstacles, massive anti-tank ditches were dug. Strong points were concentrated at strategic locations to create 'anti-tank islands'. This policy was countermanded

Sleeping quarters in the prisoners' compound of the former Prisoner of War camp at Harperley, Co Durham. Harperley was established by January 1943, initially to house Italian PoWs captured in North Africa. The prisoners provided agricultural labour, and some were housed in local hostels and farms. In 1944 those Italians remaining in the camp were dispersed to make room for 716 Germans deemed to be a low security risk, who were again employed in local agriculture.

The stage and orchestra pit of the theatre in Hut 11 at Harperley; the prisoners built the theatre within a normal recreation hut. Harperley is now scheduled and a conservation plan for the site is being developed.

by Ironside's successor, General Brooke, in August 1940, giving greater emphasis to mobility rather than static defence, which was already regarded by some senior officers as fostering a 'siege mentality'. In October 1940 Brooke ordered that the dwindling supply of cement be concentrated on the completion of beach defences. Fortifications came to be concentrated on nodal points, supplemented by more flexible layouts of infantry trenches with new anti-tank weapons such as the spigot mortar (from 1941). The threat of invasion was lessened by Hitler's advance into the Soviet Union from June 1941 and in February 1942 Home Forces banned the construction of pillboxes.

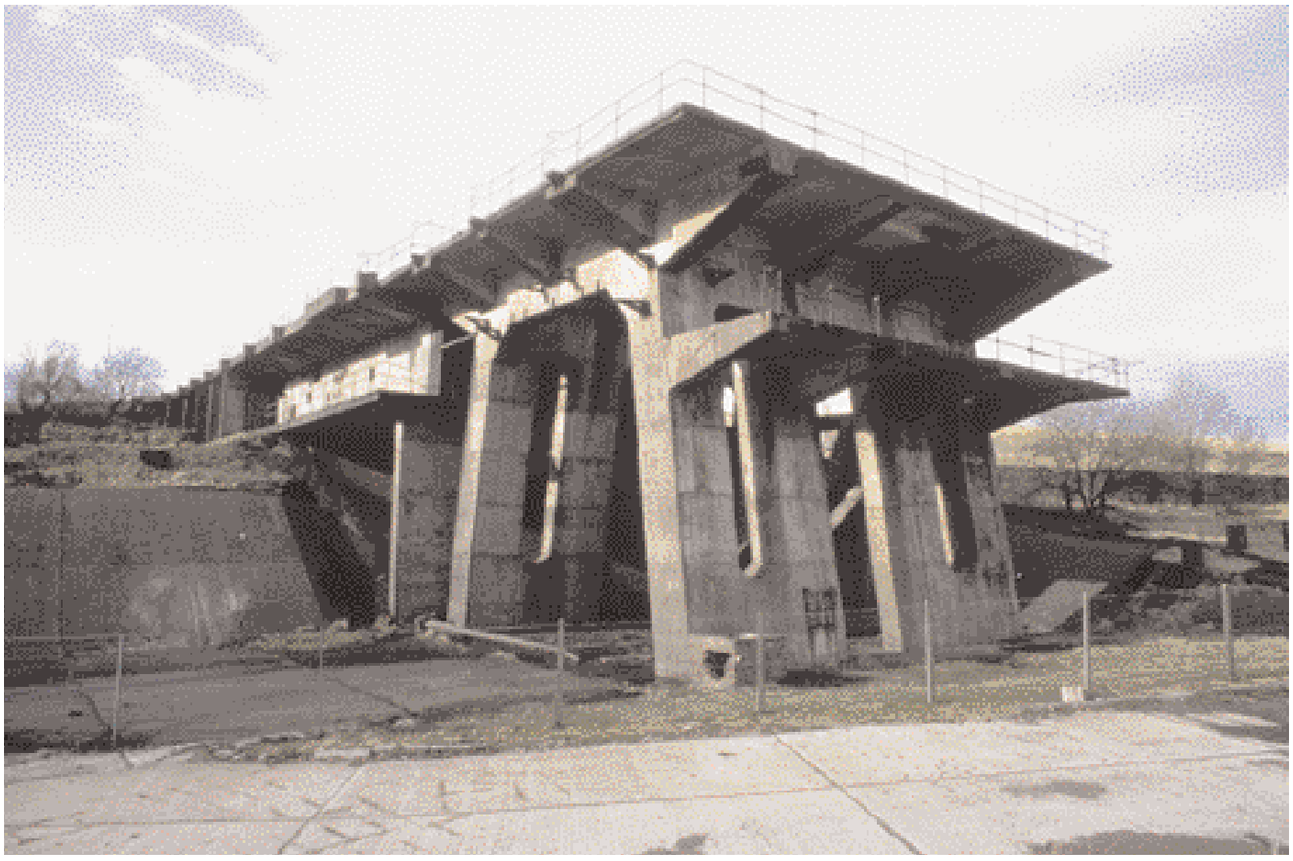
During this period of activity at least 20,000 pillboxes were constructed, along with hundreds of miles of anti-tank ditches and obstacles. Nine million square miles of British land (20%) came under military control in the Second World War, with provision for training areas and the construction of airfields taking a good proportion of the total. Nearly 600 airfields were built between 1939 and 1945, including satellite fields and decoy sites as well as front-line airfields. Their deployment reflected key strategic considerations, for example reaction to the German occupation of north-west France, support of the bomber offensive in the east of England or the advanced landing grounds sited in southern England to support the Allied invasion of northern Europe. The many aircraft crash sites are further evidence of the air war: over 1000 wartime crashes are estimated to have occurred in Suffolk and over 750 along the coast of Lincolnshire. Sites have been excavated under licence from the Ministry of Defence (MoD) and some of the aircraft recovered have been restored. A guidance note on the management of these crash sites has been produced by English Heritage (*see* Further reading).

As the war proceeded, preparations were put in hand for the liberation of Europe. The construction sites for the Mulberry Harbour installations associated with D-Day have left their traces along the south coast, such as at Lepe in Hampshire, as have the embarkation points constructed for the largest seaborne invasion force ever gathered: the most spectacular of these survives at Torquay in Devon. A remarkable series of structures associated with the training of American GIs survives at Braunton Sands on the north Devon coast, including concrete landing craft facing onto a mock invasion beach.

The Cold War

The Cold War was a confrontation between 'superpowers' whose weapons were highly complex machines operated by relatively small teams of technicians. Their technological developments extended into space during this period. From 1950, 'Rotor' radar stations enabled the Army and the RAF to operate an air defence scheme to direct both aircraft and anti-aircraft artillery. New early-warning systems were later developed, for example the dramatic 'golfballs' at Fylingdales on the North Yorkshire moors, now demolished. The Royal Observer Corps operated a system of underground monitoring posts and protected regional seats of government were created (for example in the chalk cliffs beneath Dover Castle). The RAF's V-bomber force was matched from the late 1950s by the establishment of American bomber and Thor missile bases on British soil. New weapons appeared and were tested: for example rocket development at the Needles (Isle of Wight) and at Spadeadam (Cumbria), as well as the development of nuclear weapons technology at Orford Ness (Suffolk).

Part of the rocket test facilities at Spadeadam in Cumbria, constructed in the late 1950s in support of Britain's Intermediate Range Ballistic Missile, named 'Blue Streak'. Almost identical facilities were constructed at Woomera in Australia. Although the programme was cancelled in 1960, this monumental site – still owned by the MoD – occupies an important place in the development of aerospace technology. It has been recorded as part of English Heritage's survey of Cold War sites. [© Roger J C Thomas]



DEFENCE STRUCTURES – types and categories

The enormous variety of defence structures can be divided into six main categories, within which there are many different elements and types. Recognition and identification of these different elements can be extremely difficult. It has been estimated, for example, that for airfields there may be at least 250 different types of structure or comparable structures serving different functions: a specialist field indeed. The correct identification of these components is crucial if they are to be accurately recorded and assessed, although only a very small proportion will achieve statutory protection.

Coastal defences *include all structures built to prevent enemy forces bombarding ports and naval facilities or establishing a beachhead. Many are easily recognisable, such as pillboxes and strong points, emergency gun batteries and other gun emplacements. Less conspicuous are the anti-tank obstacles of various sorts, from walls placed behind beaches, concrete road blocks and rails to infantry trenches. Coastal artillery batteries required their own close defence in the form of obstacles and pillboxes, and their vital support systems of command and control – command bunkers, position finding cells and radar – became increasingly sophisticated and dispersed.*

Inland defence or 'defence in depth' *was provided to restrict movement of the invasion forces once ashore. This was achieved by covering strategic points such as road junctions and bridges with linear arrangements of anti-tank obstacles and ditches, pillboxes, defence posts, strong points, weapon pits and trenches. In 1941 discrete systems of defence became increasingly concentrated around nodal points, such as the anti-tank defences around Blandford Forum in Dorset. Open spaces were often trenched or set with posts or mounds to obstruct their use by troop-carrying aircraft. Underground Auxiliary Unit Operations Bases were constructed for use behind enemy lines in the event of invasion, or to form the core of the British resistance movement after occupation.*

Airfields and airfield defences *include all structures associated with military aviation including technical sites, barracks and married quarters. Some 301 airbases had been built by the end of the First World War, but most of these had been demolished by the time a new phase of construction began in 1923. Though more than 100 new, more permanent bases were built during this phase, only 150 airbases remained by the beginning of the Second World War. This total increased to 740 during the course of the conflict, though most of these were of temporary construction and on sites dispersed over several square miles. Airfields had different functions, including the training of technical and flying personnel and the storage of reserve aircraft, as well as the more obvious divisions into bases for flying boats, fighters and bombers. Airfield sites break down into the separate functional areas of flying field, technical and domestic sites, while their building types can be subdivided into control towers, hangars, technical and training buildings, barracks, officers' messes and other domestic buildings. Within these groups are hundreds of different designs reflecting development over time and changing functions. In addition there are the pillboxes and battle headquarters associated with the close defence of airfields, structures associated with gunnery and the bombing ranges for training.*

Anti-aircraft defences *were developed due to the rapid advances in aviation technology before the First World War. This resulted in the first layouts of anti-aircraft guns in the spring of 1914, followed by measures to provide early warning of approaching aircraft and airships. Early warning systems included acoustic mirrors dating from the First World War and the 1920s, the various types of radar station developed from the 1930s onwards, as well as Royal Observer Corps posts and centres. Besides early warning and Fighter Command, Britain depended for the defence of its air space upon searchlight-aided anti-aircraft artillery. There were four main types of heavy anti-aircraft battery, comprising large guns designed to engage high-flying bombers. Light anti-aircraft defence, primarily used for protection against low-flying aircraft, depended upon much smaller guns with individual mountings, sometimes placed on purpose-built towers. Bombing decoys were built to lure enemy bombers away from their intended targets. From summer 1944, a series of emplacements were built in order to counter the threat posed by V1 flying bombs. This deployment around London and the east coast was known as 'Operation Diver'.*

Naval and harbour defences *throughout this period included booms, anti-submarine/torpedo nets, blockships, submarine mining establishments, torpedo stations and minefield control posts as well as close-defence batteries and searchlights. Early warning systems included signal stations, radar, High Frequency Direction Finding (Huff/Duff) and hydrophone stations. Flying boat bases and seaplane stations, directed mainly to reconnaissance and anti-submarine measures, were amongst the earliest air stations constructed.*

Infrastructure *formed the basis of successful and carefully marshalled defence. During the Second World War various levels of command and control system were in operation, from the Cabinet War Rooms in Whitehall to the local fighter operations rooms. Munitions, aircraft and tank factories, which had been anticipated in the immediate pre-war period, were extended. Supply depots and communications systems were created anew. Research and development establishments also figure prominently. Camps of all kinds sprang up across the country, from the barracks for the new coastal batteries and anti-aircraft defences to those of the Women's Land Army and for prisoners of war. Civil defence provision included air-raid shelters, emergency water supplies, gas decontamination centres and warden's posts.*

These multifarious aspects of warfare had a dramatic effect on the built environment of town and countryside and the remains of many sites are still visible in the landscape.

A strategy for management and protection

Through its advisory role, English Heritage seeks to influence the future management of historic buildings and sites, whether through development control, recording prior to clearance, their inclusion in local heritage initiatives, by management agreement or statutory protection – scheduling or listing. English Heritage is also the national body of survey and record, the NMR being responsible for the task of compiling information relating to the historic environment and its promotion to a wider public.

Options for protection

English Heritage's characterisation and designation teams are undertaking a review of the country's archaeological resource, one outcome of which has been the statutory protection of some key sites. Where statutory protection is appropriate, the recommendation that English Heritage makes to the Department for Culture, Media and Sport (DCMS) must be compelling and demonstrate the significance of the site or building in a national context. Because scheduling and listing operate under different statutes, the definition of significance is couched in rather different terms: the site's national importance (in the case of scheduling) or the structure's special interest (in the case of listing). The form of protection is chosen to encourage the type of management that will best ensure the site or structure's long-term future. Scheduling can be used where the future of a site as a monument is the preferred option: this will usually be the case, for example, with defensive positions – including the fighter pens around airfields – and anti-aircraft sites. Listing will generally be more appropriate where the continuing or new use of a built structure is desirable, as in the case of airfield buildings.

Where statutory protection is not appropriate, non-statutory advice in the form of planning guidance has a significant role. Government guidance on the protection of archaeological sites – Planning Policy Guidance (PPG) 16, published in 1990 – made a presumption in favour of the *in situ* preservation of nationally important remains, whether scheduled or not. Another significant development was its clear message that archaeology should be a material consideration in the planning process, thus stating the requirement for archaeological recording in advance of redevelopment or removal. Similar guidance for historic buildings and areas, PPG 15 (1994), gives support to the drafting of policies in local and strategic plans that seek to protect the historic fabric and character of the landscape. Conservation areas, which can be designated by local authorities, can also play a significant role – alongside local plans – in maintaining the character of what are considered to be those sites most representative of their type and period.

Early experiments in acoustic early warning systems resulted in the construction of concrete sound mirrors from 1917. This is part of a group at Denge in Kent, now a scheduled monument, which includes a 200ft (61m) strip mirror constructed between 1928 and 1930.

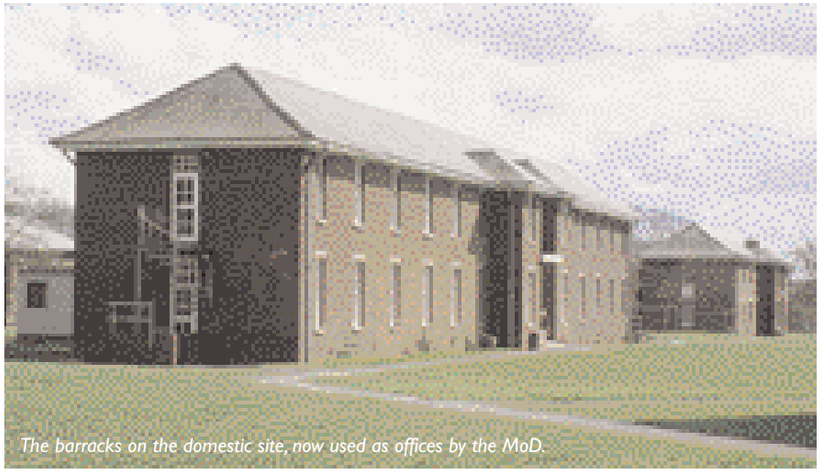
Documenting and understanding

Despite their recent date, our understanding of the rates of survival and historical context of 20th-century military sites has been, until recently, surprisingly poor. In 1994 English Heritage commissioned a programme of documentary research from the Council for British Archaeology (CBA) (undertaken by Dr Colin Dobinson), which aimed to provide an overview of eleven classes of monument, and a further study of military airfields using material held in the Public Record Office. This material survives in staggering quantities and ranges from Cabinet papers to the daily records of military units and service and civilian departments, together providing information on the typology, distribution and construction dates of these sites. Subsequent work involved researching contemporary and current aerial photographs to determine which sites have survived compared to the population from which they derive.

Documented sites can be checked against modern maps and recent aerial photographs, in order to locate those that survive and assess how complete they are in relation to their original form and extent. Information about the survival and location of the major categories of First and Second World War anti-invasion defences, which can be more readily

English Heritage's survey of military airfield sites and structures has established that RAF Bicester is the best-preserved of the bomber bases constructed as a key part of the 1920s expansion of the RAF. Better than any other military airbase in Britain, it retains the layout and fabric relating to both pre-1930s military aviation and the development of Britain's strategic bomber force in the period up to 1939. The grass flying field still survives, bounded by a group of bomb stores built in 1938–9 and airfield defences built in the early stages of the Second World War.

One of the defended air-raid shelters, adapted for close defence of the airfield, sited in front of a hangar.



The barracks on the domestic site, now used as offices by the MoD.

Bombing decoys, put in place during the Second World War to deceive enemy bombers and lure them away from their intended targets, are one of the monument classes assessed by English Heritage's Monuments Protection Programme (MPP). Of the 839 decoys built in England and documented in public records, only twelve survive in anything like their original form. One of the best examples is on the north bank of the Humber, where a series of decoys were built for Hull docks. These took the form of shallow concrete tanks of water, in which a dim light suspended from a wooden pole was reflected.

identified in the field, cannot be so easily gained in this manner given the number of sites involved and the nature of the documentary records that survive. The work carried out over many years, by various individuals and bodies such as the Fortress Study Group, has contributed greatly in this area, as has the focused fieldwork conducted for the Defence of Britain Project.

Defining significance

The significance of 20th-century military sites is determined according to a standard set of non-statutory criteria for determining sites of national importance (for purposes of scheduling for example) and historic interest (for listing). Prominent among these are: the site's survival or completeness and the legibility of what remains; group value, which recognises the importance of networks of defences and those with surviving spatial relationships; the rarity or representivity of examples of distinctive site or building types (taking into account unfamiliar as well as commonplace types); and historic importance. Some examples of the application of these criteria follow.

The degree of a site's completeness or rarity is fundamental to its significance. Thus the 'Chain Home' radar mast at Stenigot in Lincolnshire was listed in 1997 as the only complete example of its type. Only 57 of the 981 heavy anti-aircraft gunsites originally built survive in anything like their original form and coastal erosion will account for others in the decades ahead, so all surviving examples should be considered for protection. Significance will further increase for those anti-invasion defences that survive in their original configuration (conveying 'group value') – for example in strong visual relationship to canals, bridges and other defensible positions. Their grouping in strategic locations is another factor to be considered; around ports and cities, along vital stretches of coastline – for example Pevensey and Hythe Bays in Sussex – and in areas with a long history of defence provision. The great naval and dockyard establishments of Portsmouth, Plymouth and Chatham are cases in point, as are the major naval and commercial harbours such as Dover, Harwich, the Humber, the Tyne and Tees, Portland and Falmouth. There is also a remarkable group of military airfields, with fabric dating from 1910 to 1918, around the army training areas on Salisbury Plain. Strategic continuity frequently led to a superimposition of works of several periods on the same site. Thus the ruined Saxon Shore fort at

Duxford, near Cambridge, is one of the earliest RAF stations. Construction started in October 1917, and included the three double-bay, timber-trussed hangars that are still in use and are now listed. Built as a pilot training station, Duxford became a fighter station in 1924 and in the Second World War played a key role in the Battle of Britain and as a USAAF base. It is now home to the Imperial War Museum's world-famous aircraft collection.

Pevensey Castle (Sussex), built by the Romans as part of a string of defences around the coast, partially adapted for a Norman castle and armed during the Spanish Armada crisis, was selected by 45 Division in October 1940 as one of its key nodal point defences. Dover Castle is another example – a medieval castle converted into a Napoleonic War fortress and further adapted during two world wars and the Cold War.

Historic military airfields provide good examples of the application of these criteria and of the importance of historical association in particular. The identification of the most complete, representative and historically important airfield sites is the most effective method of protecting building types which are otherwise well-represented in altered or less significant contexts. The effective conservation of key sites calls for the full range of options for protection, including listing for the most significant buildings, scheduling for earthworks and pillboxes, and conservation area designation. Guidelines for management will also reduce areas of uncertainty relating to crucial issues of maintenance and adaptation. Such key sites are remarkably few in number.

The fighter airfield at Duxford in Cambridgeshire, now the site of a world-famous air museum, retains the best-preserved group of First World War hangars and associated technical buildings in Britain, in addition to fabric dating from both phases of inter-war expansion. Its distinguished wartime associations, both in the context of the Battle of Britain and the United States Air Force's involvement in the European theatre, illustrate the important criterion of historical association. This has already served to underpin the listing of the Cabinet War Rooms in Whitehall – its importance as the central shelter for government and military strategists during the Second World War prompted an announcement in Parliament in 1948 that it should be preserved as a historic site – and Atlantic House in Liverpool, the basement of which was used as the operational command centre of the Battle of the Atlantic. Association with the Battle of Britain formed the basis of the designation of Biggin Hill as a conservation area by Bromley Borough Council in 1993. Other significant sites and structures, from radar to sector operations rooms, remain from the front-line operational bases and the infrastructure of command, which ensured the economic marshalling of Britain's air defence during the Battle of Britain. These include the underground operations room at RAF Uxbridge, from where Air Vice-Marshal Keith Park commanded the deployment of squadrons within 11 Group, which bore the brunt of the Luftwaffe onslaught during the battle. Fabric has survived at Biggin Hill, Northolt and other 11 Group sites, with Kenley having a uniquely complete airfield landscape, including runways, perimeter tracks and fighter pens of the type installed at Dowding's insistence in Fighter Command's key fighter airfields from 1939.

The strategic bomber offensive of 1942–5 was more diffuse in nature and involved a much larger number of bases. A notable example, which has been identified for protection, is Scampton in Lincolnshire. This First World War training site was reopened as a bomber base in 1936, becoming the most feted base in Bomber Command by virtue of its role in the Dambuster Raids in 1943 and 617 Squadron's pioneering of precision bombing. The impact of this site on its landscape is dramatic, extending from the airfield itself to its hangars and sites and structures associated with Scampton's use in the Cold War: as one of the main bases for the V-force and later the 'Blue Steel' nuclear missile. Among those structures recommended for listing are Wing Commander Guy Gibson's offices; Gibson led 617 Squadron on the Dambuster Raids, for which he won the Victoria Cross. Scampton's continued use and survival contrasts with the fate of hundreds of the stations erected during the Second World War, many for the bomber offensive; of temporary construction and spread across many square miles of land, the great majority are now in an advanced state of decay, leaving only the remains of runway strips and ruinous control towers. The fragmentary archaeology of these and other camps, such as those on training areas or for prisoners of war, is clearly a consequence of their temporary and transient use.

CASE STUDY – Plymouth

The fortifications around the port of Plymouth and the naval base of Devonport Dockyard have expanded steadily as weapons technology has advanced. Plymouth Sound is the best location in Britain to see the evolution of coastal defences within a compact area. In the late 15th and early 16th centuries, small blockhouses were built along the cliffs of the Hoe. By 1600 Plymouth Fort had been built, where the Royal Citadel now stands, and Drake's Island was better fortified. Mount Batten tower was built following the Civil War. The Royal Citadel was then constructed on the Hoe in the 1660s and the naval dockyard begun thirty years later. During the 18th century, the almost continual wars with France saw an expansion of Plymouth's defences: on Staddon Heights to the east and into Cornwall on Maker Heights. The Devonport Lines protected the dockyard and its associated town from landward attack. In the 19th century, the greater effectiveness of artillery led to the construction of new batteries to protect the Sound, quickly followed during the 1860s by further expansion seawards and also by a ring of land defences to the north and east. By the beginning of the 20th century, the employment of long-range breech-loading guns pushed the defences to their furthest limits.

In the First World War, the Cattewater was recognized as a natural location for a seaplane station and some early hangars and slipways of 1917–18 still survive at Mount Batten. During the Second World War, Plymouth required air defences in the form of anti-aircraft batteries, searchlights and barrage balloon positions. Well-preserved heavy anti-aircraft batteries survive at Maker Heights, Down Thomas, Wembury and Bere Alston. To counter the threat of fast torpedo boats, the long-range coastal guns were supplemented by new close defences of twin 6-pounder batteries. Numerous subsidiary features, such as searchlight positions, minefield control observation posts and pillboxes, were also constructed and trenches were dug.

Plymouth area showing successive arcs of defence.

For those wishing to understand the changing technology and progression of coastal defence in Britain, the forts and batteries around Plymouth Sound present a visible and coherent story. The best all-round view is obtained from Western King where one can follow the fortifications clockwise from Firestone Bay blockhouse, round to the Citadel, Mount Batten tower and seaplane base, Fort Stamford, Staddon Heights and Fort Bovisand. The 20th-century outer batteries of Renney and Penlee are out of sight, but in the centre of the Sound are Drake's Island and the ironclad Breakwater Fort built in the 1860s.

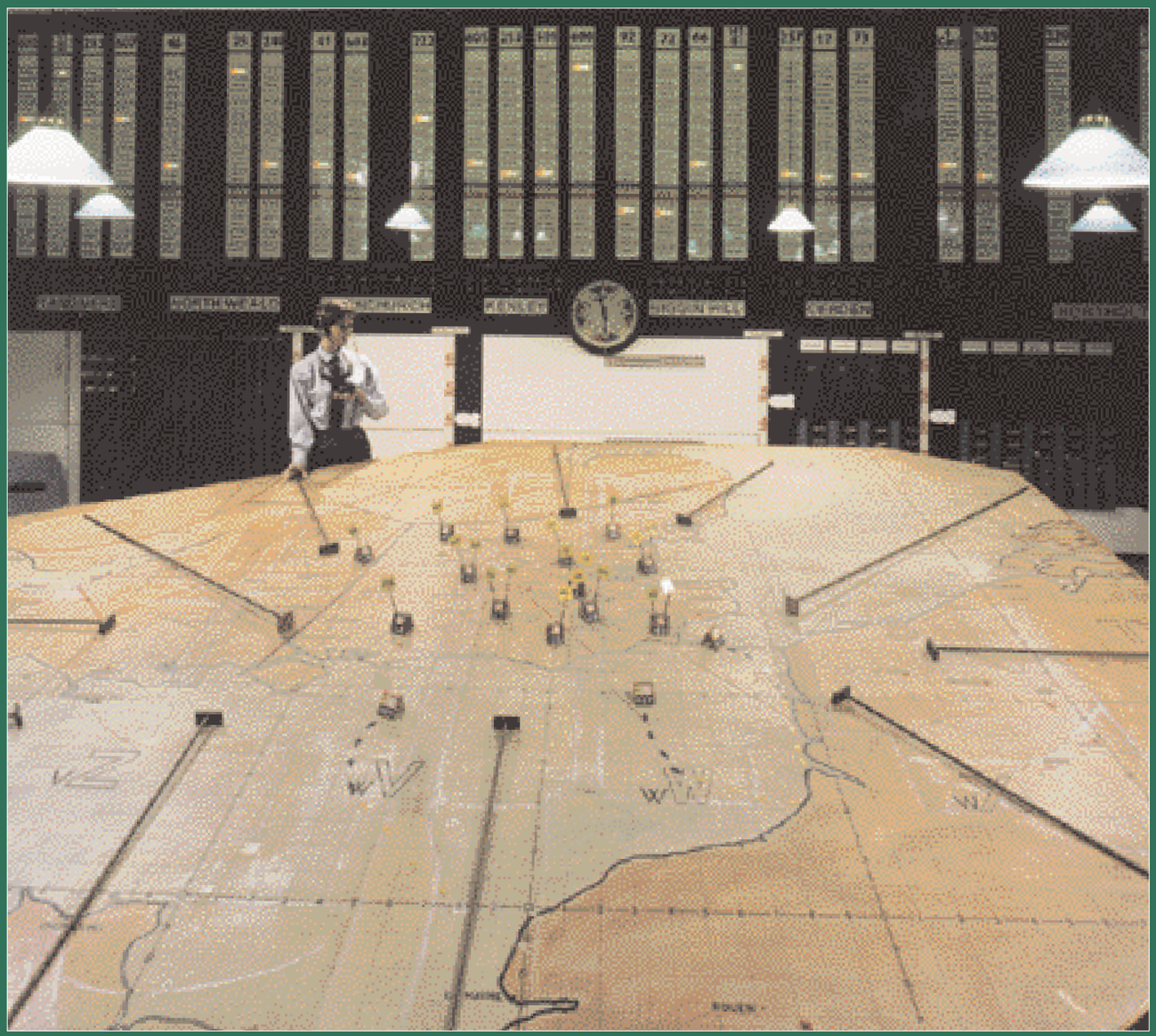
On the Cornish side is Garden Battery below Mount Edgcumbe, then Devil's Point Tower and the close defences of Western King itself. It is a remarkable prospect bringing together over five and a half centuries of coastal defence and deterrent.

A great ring of Victorian land defences lies to the north-east of the city centre with Crownhill Fort as its focus and, to the west, the great Cornish forts of Tregantle and Scraesdon, together with forts and batteries above Cawsand and Whitsand Bays. Twentieth-century close-defence works still remain on Drake's Island and at Western King. Renney Battery, one of a pair of powerful 9.2-inch batteries built in 1905–6 to keep the largest battleships out of range of the Dockyard, and the adjacent Lentney Battery for 6-inch guns are among the best preserved of this period. At Fort Austin there is a Cold War Civil Defence centre.

This well-preserved heavy anti-aircraft site at Maker Heights in Cornwall forms part of an exceptional group of defences around Plymouth. Only 57 out of an original total of 981 sites of this type have survived in a complete or near complete state. Light anti-aircraft sites were generally ephemeral in nature and only 3% have survived to any degree of completeness. 1190 further positions were built for Operation Diver, which was to counter the threat of the German flying bomb in 1944–5, and 90% of these positions have been destroyed. [Cornwall County Council]

THE WAY AHEAD

Our knowledge of the huge number of documented sites has grown enormously and will continue to do so. Many have disappeared; others are only intelligible from aerial photography or detailed archaeological field survey. At the other end of the scale, structures such as those associated with the Cold War experimental site at Spadeadam are awesome and enduring features of the landscape. It is not feasible to try to preserve all these remains. A balance must be struck between understanding the entire resource (through documentary research and field survey) and the protection of those sites and structures whose survival and management will most graphically inform present and future generations. It is also important to ensure the correct choices for management and recording. English Heritage's aim, therefore, has been to ensure adequate levels of recording and protection for 20th-century military sites and, at the same time, document their historic context in order to inform owners and other interested individuals and groups of the wider historic significance and educational potential of these sites. As such, they can be appreciated by the public at large and the amount of ill-considered demolition and alteration should be much reduced.



The plotting room in the underground bunker at RAF Uxbridge was built in 1938 and restored to its wartime appearance by the MoD. The bunker became the strategic centre of 11 Group's operations during the Battle of Britain.

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It is a pleasure to acknowledge the work of Andrew Saunders, past Chief Inspector of Ancient Monuments at English Heritage and Chairman of the Fortress Study Group, whose studies of fortifications have contributed so much to our understanding of them and to the content of this booklet.

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English Heritage: www.english-heritage.org.uk

Public Record Office (now the National Archives): www.pro.gov.uk

RAF Historical Branch: www.raf.mod.uk/history

Front cover
Cruise missile shelters at the former airbase at Greenham Common in Berkshire. The base acted as a focus for major peace demonstrations after its selection as a site for American cruise missiles in 1980. When the base was closed in 1992 the built area was developed as a business park, and the former airfield has been restored to its original heathland state.

Back cover
The watch office at the former Second World War airfield at Coleby Grange in Lincolnshire, now included on an airfield trail promoted by North Kesteven District Council.

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