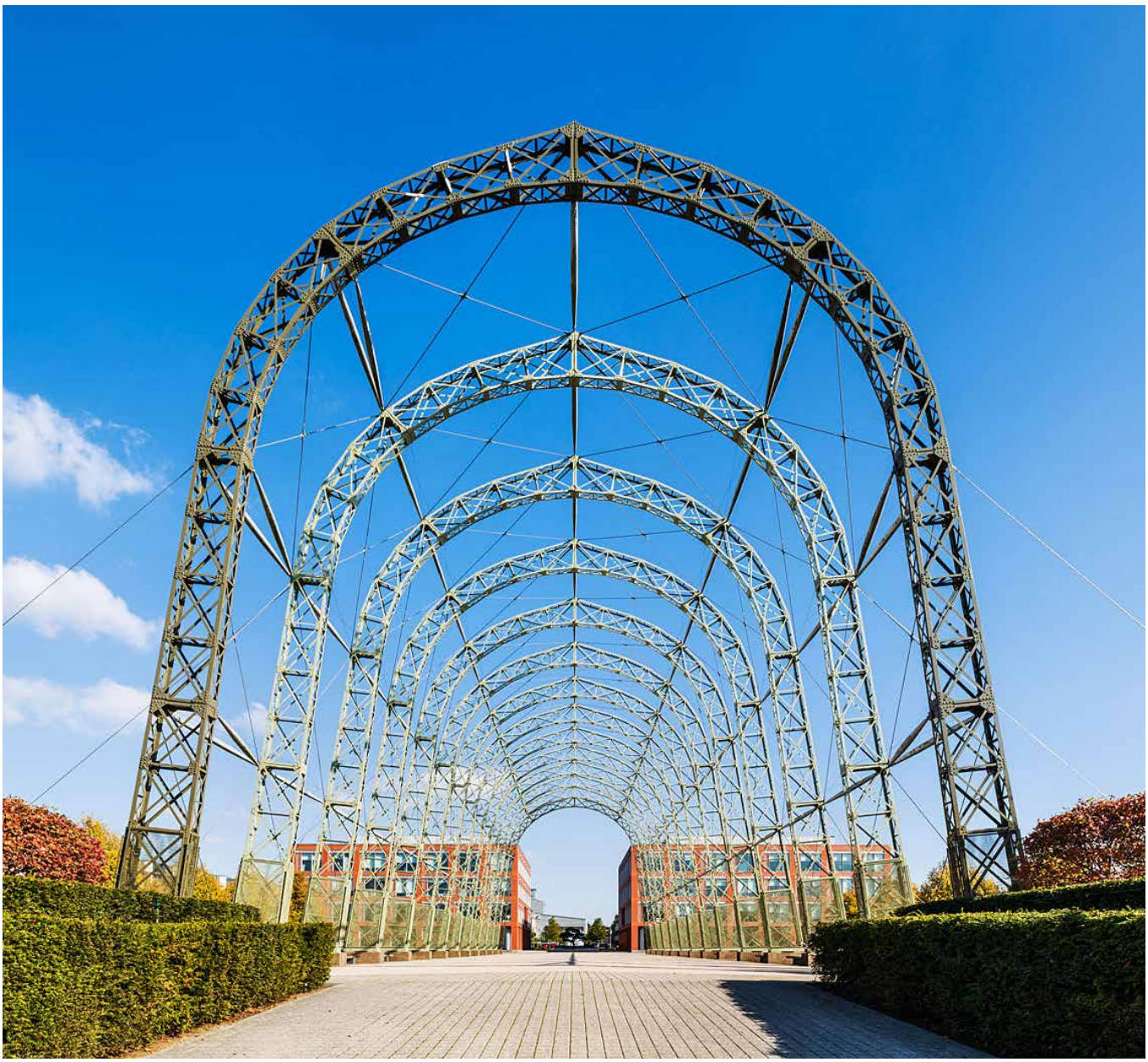
Historic England

Historic Military Aviation Sites

Conservation Guidance



Summary

This guidance is intended to promote the appreciation of historic military airfields and their associated buildings, so that their significance is properly recognised and conserved through appropriate management. It explains how the operational needs and development potential of these sites can be reconciled with the recognition of their special historic, architectural or archaeological significance. It is also intended to assist with the preparation of guidelines, agreements and plans for individual sites.

The guidance is aimed at anyone that has a role in deciding how these sites are used and managed, including owners, their professional advisers, local planning authorities and the relevant statutory agencies. It applies to active military establishments as well as those that have been sold by the Ministry of Defence (MOD) and adapted for other uses.

This guidance note has been prepared by Billy Reading, Will Holborow, Jeremy Lake, Veronica Fiorato, Wayne Cocroft and Alisa Moss.

First published by English Heritage 2003.

This edition published by Historic England October 2016.

HistoricEngland.org.uk/images-books/publications/historic-military-aviation-sites/

Front cover: Farnborough airship hangar
Portable airship shelter at Farnborough (Hampshire), originally constructed in 1912 and moved to its present position in 2004.

Contents

Introduction

Military aviation sites have left a unique imprint on the English landscape and, along with other military sites, serve as a reminder of the global conflicts and fast-changing technology of the 20th century. Their historical, cultural and environmental significance needs to be understood and protected through careful management. Of the hundreds of military aviation sites that were in use in the period up to 1945, comparatively few survive in a recognisable form. Most have either been swept away and returned to agriculture, or heavily adapted for alternative civilian uses. However, some of the permanent RAF stations have survived relatively unaltered. This guidance highlights 28 'key' sites which represent the best preserved airfield landscapes and the most historically significant groups of original buildings in England (see Appendix). Some are now designated as conservation areas. Many individual buildings and structures, both on these key sites and elsewhere, are now protected as listed buildings or scheduled monuments.

This guidance note demonstrates how the character of historic military aviation sites can be maintained and enhanced, whilst allowing for the changes necessary to ensure that they have a sustainable future. Finding the right balance between change and preservation requires a partnership approach between the owners, their professional advisers, local planning authorities and the various statutory agencies concerned, including Historic England. Any decisions about the development of military aviation sites should be based on a proper understanding of their special archaeological, architectural or historical significance. With reasonable flexibility and imagination, historic airfield buildings can be adapted to new uses without loss of significance. On sites where coherent groups of historic buildings survive – including the 'key' sites listed in the Appendix – it is desirable to maintain the scale and density of the original development and the visual connections between the original buildings. A sensitive approach to the design of

Runway at former RAF Coltishall (Norfolk), prior to closure as a fighter station in 2006.

First World War buildings at Stow Maries (Essex) prior to their repair in 2010.

any new buildings or extensions and a consistent policy towards minor alterations, maintenance and landscaping can all help to maintain the restrained and co-ordinated character of these sites.

Background

Research by English Heritage (now Historic England) on military airfields, beginning in the late 1990s, provided a coherent national overview of the most significant military aviation sites. This work led to the first edition of this guidance note, published in 2003. This edition updates the original guidance to include new information about designation and changes in national planning policy.

Scope of the guidance

This guidance relates to military aviation sites in England that were constructed during the period from just before the First World War up to the end of the Second World War in 1945. It also refers to later development on these sites up to the end of the Cold War in 1989. It applies to the whole landscape of military aviation sites: domestic and technical sites, married quarters, the airfields themselves, archaeological and landscape features, and individual buildings and structures.

Value of military aviation sites

Military aviation sites have left their mark on the English landscape and remind us of the global conflicts and fast-changing technologies developed during the 20th century. They are typically extensive and highly complex sites. While some remain in military use, the majority have returned to civilian ownership, and are used for commercial, agricultural, light industrial or residential uses, of value both to local communities and to the economy as a whole. Other uses include markets, warehousing, vehicle storage and green infrastructure – including solar and wind farms – and civil aviation.

Public interest is reflected in growing visitor numbers to museums and sites connected with military aviation, the promotion of airfield trails by local authorities and the numerous specialist publications and societies devoted to military history. There are around 80 local military aviation museums across the UK, the majority run by volunteers as trusts. Other redundant airfields have been integrated into areas of public amenity and wildlife habitats, as at Hornchurch in Essex and Greenham Common in Berkshire. Thus, military airfields are of cultural value, as well as having social and economic significance. The importance of individual sites varies, from those of international significance – such as Duxford – to those where only fragmentary remains survive, contributing to local character and a sense of place in the modern landscape.

Second World War RAF station at Westcott (Buckinghamshire), now used as a solar farm.

Vulnerability

Aviation sites are particularly vulnerable to change and demolition. Most airfield buildings and structures were built along strictly functional lines, without an eye to architectural expression or long-term durability. Therefore, the great majority of the airfield buildings and structures that were in place in 1945 have already been either altered or demolished. The significance of surviving airfield sites – and their original buildings and landscape character – may be threatened by:

- demolition in order to make way for new development (for example, airfields that are deemed to be 'brownfield' sites are under particular pressure)
- new development which is harmful to the setting of heritage assets
- disrepair of vacant buildings and the related risks of vandalism and theft
- inappropriate alterations and poorly executed repairs
- the subdivision of site ownership, which can result in changes to the original layout and character of a site
- the removal of airfield buildings and hard surfaces for the commercial reclamation of hardcore material, usually before the site's return to agriculture

1 Historic Character

1.1 Layout of Royal Air Force stations

Military aerodromes or air stations fall into various categories according to their function. Those built during the First World War included Home Defence Stations, Airship Stations and Seaplane Stations. During the inter-war period other types of station were built, including Bomber Command Stations, Fighter Command Stations, Coastal Command Stations, Flying Training Schools and Aircraft Storage Units. Military airfields demanded the integration of a wide range of requirements, from maintaining and servicing aircraft to housing communities of aircrew, technicians, administrators and their families. Airfield sites are organised into the separate functional areas of flying field, domestic areas and technical sites, and include many different building types such as control towers, hangars, technical and training buildings, barracks, officers' messes and other domestic buildings. Hundreds of different designs are represented within these groups, reflecting development over time and changing functions. *British Military Airfield Architecture* (Francis, 1996) provides a detailed description of many of the various standardised building types designed by the Air Ministry's Directorate of Works and Buildings. In the inter-war period the layout of RAF stations increasingly conformed to the requirements that fabric must be dispersed against attack from the air. During the Second World War, provision for close defence was often added in the form of pillboxes and battle headquarters.

Hullavington (Wiltshire) is an exemplary model of the improved architectural quality of 1930s RAF airfields; most is protected as a conservation area.

1.2 Flying fields and hangars

Until the adoption of perimeter dispersal from the late 1930s all the aircraft of an operational airfield – typically an omni-directional flying field of 1,000 yards diameter – would be accommodated in its hangars. Military planners responded to aircraft development through the planning and development of hangar buildings. Wooden construction had been used for many hangars before 1919. Subsequently, hangars were mostly metal-framed with the exception of parabolic concrete and steel hangars used on the aircraft storage units constructed from 1936. The now-familiar airfield landscape of runway, perimeter dispersals and flight control was only beginning to gain acceptance within the Air Ministry in the late 1930s, when increasing attention was being given in airfield planning to their ability to disperse and shelter aircraft from attack, ensure serviceable landing and take-off areas, and control movement. Early airfields (such as Duxford) incorporated an orthogonal arrangement of buildings, but in the 1930s this evolved into a fan arrangement for the hangars, as protection against multiple losses from a single stick of bombs.

1.3 Airfield defences and air raid shelters

Airfield defences were constructed in three main phases. The first phase was part of the huge programme of airfield building during the 1930s. At this stage defences were designed to provide protection from air attacks (including poison gas); dispersed layouts, air-raid shelters, protected buildings and anti-aircraft guns were the principal measures used. The second phase followed the realisation in the spring of 1940 that airfields would be targets in an invasion. This phase is represented by the construction of airfield defences, including pillboxes and battle headquarters buildings, from which defence of the airfield would have been co-ordinated.

Air-raid shelters dating from the inter-war period were built in basements of the major domestic buildings. Second World War air-raid shelters survive in great numbers, either as earth-covered shelters or free-standing structures. For much of the Cold War fixed airfield defences were far less evident. From the late 1950s remote Bloodhound missile sites protected the key nuclear deterrent bases. Later, the NATO hardening programme of the 1970s and 1980s offered nuclear, chemical and biological protection to essential airfield structures. In response to the threat of attack from terrorists and Soviet special forces more emphasis was also placed on ground defences. These included the addition of barbed-wire entanglements and prefabricated pillboxes. Mobile Rapier anti-aircraft missile deployments have left few traces. In the event of nuclear attack existing buildings were also identified as possible personnel shelters.

1.4 Technical and domestic buildings

There is a broad distinction to be drawn between the prefabricated structures of both world wars, whose survival is highly fragmentary, and the permanent structures of the inter-war period. From 1923, when the first phase of inter-war expansion commenced, air bases were built in permanent materials (mostly brick and concrete with slate, tile or concrete roofs) and planned on dispersed principles. The improved design of post-1933 buildings was a product of the government's request – spurred by popular fears over rearmament and the impact of air bases in the environment – for the RAF to liaise with the Royal Fine Art Commission over the matter of station design. A clear distinction was drawn between neo-Georgian styles chosen for domestic buildings and more modern styles for technical buildings. The gas decontamination centres and protected operations blocks that appeared on RAF bases from 1937, along with the flat roofs widely introduced for technical and domestic buildings in the same period, were designed to counter the effects of incendiary bombs and bomb fragmentation.

2 Historical Development

2.1 1909-14

The headquarters building and balloon store of the Royal Engineers' Air Battalion, built after April 1911, has survived at Farnborough. Remarkably, hangars have survived from the pre-1912 flying schools at Larkhill on the edge of Salisbury Plain (army) and Eastchurch in Kent (navy) and extensive ranges of buildings dated 1913-14 on newly established Royal Flying Corps (RFC) sites at Upavon and Netheravon, also around Salisbury Plain, and Montrose in Scotland. These survivals are of exceptional rarity and of international importance in the context of the development of military aviation.

2.2 1914-18

This period saw the completion of coastal stations (for both balloons and aircraft) for the navy and Home Defence Stations for the RFC, the latter integrated by the end of the war into a complex infrastructure linked to searchlight and anti-aircraft gun provision. Reserve Squadrons, from 1917 designated as Training Squadrons, trained pilots destined for the Western Front: the opening of Training Depot Stations from 1917 became the greatest airfield construction programme of the period. The RFC and Royal Naval Air Service were amalgamated to form the Royal Air Force (RAF) on the 1st of April 1918.

Officers' accommodation at RAF Netheravon (Wiltshire) dating from 1913-14. Restored in 2013.

The majority of buildings erected in the period 1914-18 – of temporary materials expected to last for the duration of the conflict only – were either cleared after 1919 (271 out of 301 sites that existed in November 1918) or have since decayed. Attention is consequently drawn to complete aircraft hangars and especially the principal hangar groups, of which six (Calshot, Duxford, Henlow, Hooton Park, Lee-on-Solent and Old Sarum) survive in England, and one (Leuchars) in Scotland. These exemplify their aviation use more clearly through their plan and form than isolated survivals of domestic or technical buildings. The best survival of the latter is at Stow Maries in Essex. Only one site, Old Sarum, has retained its suite of hangar and technical buildings fronting onto an airfield relatively unaffected by later developments. Cardington in Bedfordshire retains the only in situ and ex situ survivals of entire airship sheds from this period and East Fortune in Fife retains the best surviving group of technical buildings associated with a balloon station.

2.3 1919-23

When the RAF was formed as the world's first independent air force in April 1918, and during the period of retrenchment which lasted from the Armistice until the early 1920s, its founding father and first Chief of the Air Staff, General Sir Hugh Trenchard, concentrated on developing its strategic role as an offensive bomber force. His primary considerations were in laying the foundations for a technology-based service, through the training of officers at Cranwell and technicians at Halton. Delays in the construction of permanent buildings at Cranwell until the early 1930s have meant that only the Groves and Henderson Barracks at Halton relate to this relatively dormant period of development.

2.4 1923-40

More than 100 stations were built in permanent fabric between 1923 and 1940, dividing into two main periods of construction. Between 1923 and 1926, Trenchard's expansion of the air force was centred upon the building of offensive bomber bases in East Anglia and Oxfordshire, behind an 'aircraft fighting zone' some 15 miles deep and extending round London from Duxford in Cambridgeshire to Salisbury Plain. The second major phase of expansion and rearmament took place between 1934 and 1940, and commenced after Hitler's rise to power and the collapse of the Geneva disarmament talks in 1933. Bases constructed in this period were markedly improved in their overall design and architectural quality (see Section 1.4), resulting from discussions with the Royal Fine Art Commission and political sensitivities over the landscape impact of the construction programme. Development was concentrated on the establishment of training and maintenance bases behind an eastern front line facing Germany.

The airfields of this inter-war period, which comprised the bulk of those retained as the core bases of the RAF and United States Air Force (USAF) after 1945, have survived in the best condition. The completeness or otherwise of inter-war bases – and the extent to which they have retained their architectural detail, external fitments and inter-relationship as part of planned groups – is closely linked to the nature and intensity of post-war use. Upper Heyford, for example, which was the test bed for the planning of Trenchard's Home Defence Scheme stations, was greatly extended and adapted as a key USAF site in the Cold War period. Less intensive military use of Bicester - another of Trenchard's Oxfordshire bomber bases – has ensured its survival as the most complete group representative of developments on bomber airfields for the period up to 1939. Hullavington in Wiltshire, faced in Cotswold stone in response to representations by the Council for the Preservation of Rural England (now known as Campaign to Protect Rural England, CPRE), is in every respect the key station representative

of the improved architectural quality of post-1934 expansion. Kemble (on the Wiltshire/Gloucestershire border) has the greatest range of advanced hangar types on any of the 24 aircraft storage units built between 1936 and 1941.

2.5 1940-45

The last of the stations planned in the inter-war period were not completed until 1941, although this period saw the country's total of 150 expanded to 740. The majority of the inter-war-period airfields were built with grass landing surfaces, but the increased weight of the new aircraft being introduced during the Second World War meant that concrete runways and hardstandings were laid during the conflict. Examples include Kenley, the most complete example of one of the fighter airfields around London, and Scampton in Lincolnshire, which achieved worldwide fame on account of its association with 617 Squadron and the Dambusters raid in May 1943.

Throughout the Second World War, new airfields were built with concrete runways and perimeters and sited amongst clutches of domestic and technical sites dispersed in the surrounding countryside and constructed from materials which were intended only to last for the duration of the conflict. Most of these were built for Bomber Command and the United States Army Air Force (USAAF). The location of these airfields reflected key strategic considerations. For example, they were sited in south-west England to protect shipping lanes, in eastern England in support of the Strategic Bomber Offensive, and in southern England in support of the Allied invasion of north-west Europe.

Temporary airfields of the Second World War

In contrast to the permanent structures and tightly defined sites characteristic of the inter-war period, the temporary structures of the stations built during the Second World War were spread across many square miles. Most were abandoned after the conflict and re-used for a variety of purposes. However, the US Navy site at Dunkeswell in Devon (see Appendix) survives as a remarkably complete example. Other fighter airfield landscapes with their fighter pens and defences have survived at Culmhead in Somerset, Croughton in Northamptonshire and Predannack in Cornwall. Elsewhere, the process of post-war clearance, including for hardcore in road building, has swept away the great majority of temporary airfield landscapes. Runways and perimeter tracks have only been retained and adapted in a minority of cases, for example in the case of the race circuit at Castle Coombe in Wiltshire and for poultry and turkey sheds in East Anglia. A recent survey (Francis, Flagg and Crisp 2016) has found that fewer than 20 of these landscapes survive in a legible state with their runways and perimeter tracks.

2.6 Post-1945 developments

After 1945, the wartime airfields that were retained and developed to meet new roles during the Cold War underwent radical rebuilding. With the introduction of jet aircraft, and increasingly heavy bombers, the wartime trend of replacing grass flying fields with concrete runways and hardstandings continued. By the 1950s the distinctive type of post-war airfield had evolved. This consisted of a long central runway, often with quick reaction platforms at either end and flanked by parallel taxiways connected to aircraft servicing platforms and dispersal hardstandings of various designs.

Most of these airfields were able to make use of pre-existing domestic and technical areas, although new structures were added where these areas were inadequate. The introduction of increasingly complex aircraft and weapons systems demanded new infrastructure, including avionics buildings, nuclear weapon stores, and facilities to maintain and store guided weapons. The USAF was a major presence in England during this era and many distinctive structures are associated with its airfields. Hardened structures – used to protect aircraft and the essential facilities on an airfield against Warsaw Pact attack – were a feature of the key military airfields from the mid-1970s.

Since the Second World War, air power has increasingly been used to transport troops and materials to overseas deployments and for close support on the battlefield. To accommodate these new roles existing airfields were adapted. At Brize Norton, Oxfordshire, a hangar was specially constructed to house large transport aircraft and at Lyneham, Wiltshire, a terminal building analogous to civilian examples was added to process troops before and after flights. Rotary wing technology underwent rapid progress, and helicopters have been developed to fulfil many functions including transport, rescue and low-level attack. They too were stationed on existing airfields and, thanks to their relatively small size, few adaptations to the existing fabric were necessary. At other places helicopter landing pads are often distinguished by a large letter 'H' painted onto concrete surfaces.

Layout of hangars, hardstandings and technical buildings at RAF Lyneham (Wiltshire) post-1945.

3 Research, Evaluation and Recording

3.1 Airfield studies and statements of significance

Any decisions about the management of individual historic aviation sites and structures should be based on a proper understanding of their special archaeological, architectural or historic significance.

An analysis of a site's significance should begin with the collation of available information. Sources of relevant information include:

- statutory list descriptions and scheduling documentation
- thematic survey reports prepared by English Heritage/Historic England
- conservation area designation statements and local list descriptions
- airfield studies and reports
- published works (see References)
- the Defence of Britain Project database: the project was completed in March 2002 and the records are held by the Historic England Archive, while the database can be searched online through the Archaeological Data Service
- Historic Environment Records (HERs), which can be accessed via the Heritage Gateway
- aerial photographs and site records in the Historic England Archives
- Airfield Research Group (ARG) Forum, formerly the Airfield Information Exchange

The National Archives, Imperial War Museums, Fleet Air Arm Museum at Yeovilton, and the RAF Museum at Hendon hold many primary documents relating to aviation sites, ranging from Building Committee minutes to plans, drawings and photographs. Contact details for these organisations are provided in Section 10.

A conservation plan can be a useful tool for explaining the significance of heritage assets and how that significance will be sustained. An example is the conservation plan for RAF Upper Heyford (September 2005).

3.2 Archaeological remains

It is most important to establish at an early stage whether below-ground archaeological remains exist on aviation sites, particularly where development is proposed. Archaeology exists under some airfields from earlier periods (for example Iron Age settlements at RAF Boscombe Down, or Roman sites and Saxon cemeteries at RAF Lakenheath). Archaeological remains are also likely to survive from the recent military occupation of the site (for example in the form of weapon pits and slit trenches, buried dumps containing redundant materiel, and even discarded ordnance). A guidance note on military aircraft crash sites is available from Historic England.

3.3 Local and communal values

Military aviation sites can be valued by local communities for a variety of reasons. They will have communal value through the personal links that may have developed between military sites and local communities. There are often strong associations with particular squadrons and with the individual service personnel of various nationalities who served in Britain during the Second World War. These associations are often commemorated by memorials, including war memorials which record the names of those who either lost their lives or served in the armed forces during wartime.

Many airfields that are no longer in military use are of value to local communities for leisure uses such as flying and weekend markets. The ecological significance of airfields (for example as semi-improved grassland) should not be overlooked. Parts of some airfields, usually on the periphery, lie within Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) or Special Areas of Conservation (SACs). Management of these areas is subject to consultation with Natural England.

3.4 Recording

Standard guidance on building recording is available from Historic England; the level of recording will be determined by the impact of the work and the significance of a structure.

Recording may be undertaken for a variety of reasons. Where flying is about to cease, photographic characterisation is particularly effective in portraying the activities and use of space on a base. An example of this is the report on RAF Coltishall in Norfolk undertaken by English Heritage (Cocroft and Cole 2007).

v

Kings Cliffe memorial stands on an abandoned Second World War airfield in Northamptonshire.

4 Statutory Protection

4.1 Assessment of sites in England

A programme of research in the late 1990s, initiated by English Heritage, established a comprehensive understanding and assessment of 20th-century military sites across the country. Key principles were initially set out in Monuments of War (English Heritage 1998). The programme produced:

- a thematic survey of airfield buildings up to 1945 and identification of key airfield sites (Survey of Military Aviation Sites and Structures: Summary Report, Lake 2003).
- A shortlist of the best surviving airfield defences and a study of control towers.
- A survey of Cold War sites (Cold War Monuments: An Assessment by the Monuments Protection Programme, Cocroft 2001).

1950s 'Gaydon' hangar built at RAF Wittering (Cambridgeshire) to accommodate Valiant bombers. It was listed in 2011.

4.2 International context

Work has been undertaken in other countries to identify the most important military aviation sites and structures for protection. Knowledge of this international context has contributed to our understanding of the significance of what remains in the United Kingdom. For example, the hangars at Leuchars in Scotland and the group of sites developed around the army training areas at Salisbury Plain (Larkhill, Upavon and Netheravon) represent a uniquely complete grouping dating from before the First World War.

4.3 Listing and scheduling

The vast majority of nationally significant airfield structures will be most appropriately protected through listing (under Section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990). To be listed, buildings must be of special architectural or historic interest, and the majority of designations are concentrated at those key sites listed in the Appendix. Historic England has published a guide to the selection of military sites and structures for listing which further explains the criteria for this. All national designations are entered on the National Heritage List for England, which is available online.

More detailed advice about listed building consent can be found on the Historic England website.

Less commonly, airfield heritage assets may be protected through scheduling (under Section 1 of the Ancient Monuments and Archaeological Areas Act 1979) because of their national importance. Examples of scheduled airfield structures include bomb stores at Bicester, fighter pens at Kenley, and the Cold War hardened aircraft shelters at Upper Heyford. A guide setting out the criteria for scheduling military sites is available on the Historic England website.

Scheduled monument consent is required for almost any works which affect a scheduled monument. More detailed advice about the need for consent and the application process can be found on the Historic England website.

4.4 Local listing

Airfield buildings, structures or airfield landscapes which do not meet the criteria for statutory designation may nonetheless be of considerable local significance and may merit inclusion on a local list. A good practice guide for local listing is available to help local authorities and their community groups set up or improve their local list.

4.5 Conservation areas

Another mechanism by which the significance of an airfield can be highlighted, as a historic landscape, is through conservation area status. An assessment of the character and significance of an area is necessary to justify the designation and to provide the basis of its future management. An example is the appraisal for the RAF Hornchurch Conservation Area. Guidance about conservation areas is available on the Historic England website.

Trees in conservation areas benefit from additional protection. Anyone proposing to carry out works to a tree should notify the local planning authority in writing. They may not go ahead until the work has been granted consent, or six weeks have expired. If a tree is protected by a Tree Preservation Order, consent must always be obtained before works commence.

The following airfields have been designated as conservation areas:

Site	Local Authority	Year of designation
Bicester	Cherwell District Council	2002
Biggin Hill	London Borough of Bromley	1993
Coltishall	Broadland District Council / North Norfolk District Council	2008
Daedalus	Gosport Borough Council	1999
Duxford	South Cambridgeshire District Council	2007
Hornchurch	London Borough of Havering	1989
Hullavington	North Wiltshire District Council	1992
Kenley	Tandridge District Council & London Borough of Croydon	2005 and 2006
Old Sarum	Salisbury District Council	2001
Stow Maries	Maldon District Council	2008
Upper Heyford	Cherwell District Council	2006
Yatesbury	North Wiltshire District Council	1998

5 Managing Change

5.1 General character

The ‘campus’ character of many airfield sites derives from the open layout of the buildings, the consistent use of materials and the generous provision of trees and grassed areas. Many sites, especially those planned after 1936, were built on the principle of dispersal in order to minimise exposure to concentrated bombing. On sites where coherent groups of historic buildings survive, it is desirable to maintain the scale and density of the original development and the visual connections between the original buildings. Such cohesiveness may warrant designation of a conservation area by the local planning authority (see Section 4.5).

With care, most airfield buildings are capable of being adapted to new purposes without harm to their essential character. Many airfield buildings have already undergone some change of use, for example airmen’s barracks converted to residential use and offices and aircraft hangars converted to industrial use, archive storage or agricultural storage.

Former airfield powerhouse at Bicester (Oxfordshire), conserved and now used as a vintage car show room.

5.2 Development on historic aviation sites

The National Planning Policy Framework (NPPF 2012) requires the local planning authority to have a robust evidence base to support their plan-making process. Where this involves allocating a former airfield for development in their Local Plan, the local planning authority will need to have a clear understanding of its significance as a whole together with the significance of individual buildings or structures within it. An example is the planning brief for RAF Bicester, published by Cherwell District Council in 2009. This comprised informal development principles and conservation management guidelines for a surplus MOD site. The NPPF stresses the importance of conserving heritage assets in a manner appropriate to their significance. Any application should describe the significance of any heritage asset affected by proposed works, including any contribution made by their setting.

5.3 Development on former runways and flying fields

The continuation of flying activity on historic airfields will generally contribute to their character – by demonstrating their original use – and can help to maintain original buildings (particularly hangars) in appropriate use. Where the future of flying is in doubt, local authorities will need to weigh these advantages with other planning and technical considerations (for example, the impact of flying on local amenity).

If flying is discontinued, the layout of any new development on the former airfield should respect the setting of any listed buildings or scheduled monuments and the special architectural or historic interest of any conservation area. A Good Practice Advice note on the setting of heritage assets is available. It may be possible to incorporate features such as runways, perimeter tracks and defensive structures into new development proposals. In cases where preservation of standing structures can be shown to be unsustainable, it may be appropriate to maintain their footprint as a 'ghost' in any new layout. This applies particularly to temporary, prefabricated or ancillary structures.

Many airfields are in open countryside or on green belt land, or are located alongside such areas. In these cases any development potential may be limited by planning policies designed to protect the wider landscape. There is relevant advice in NPPF Section 9, 'Protecting Green Belt land.'

5.4 Extensions

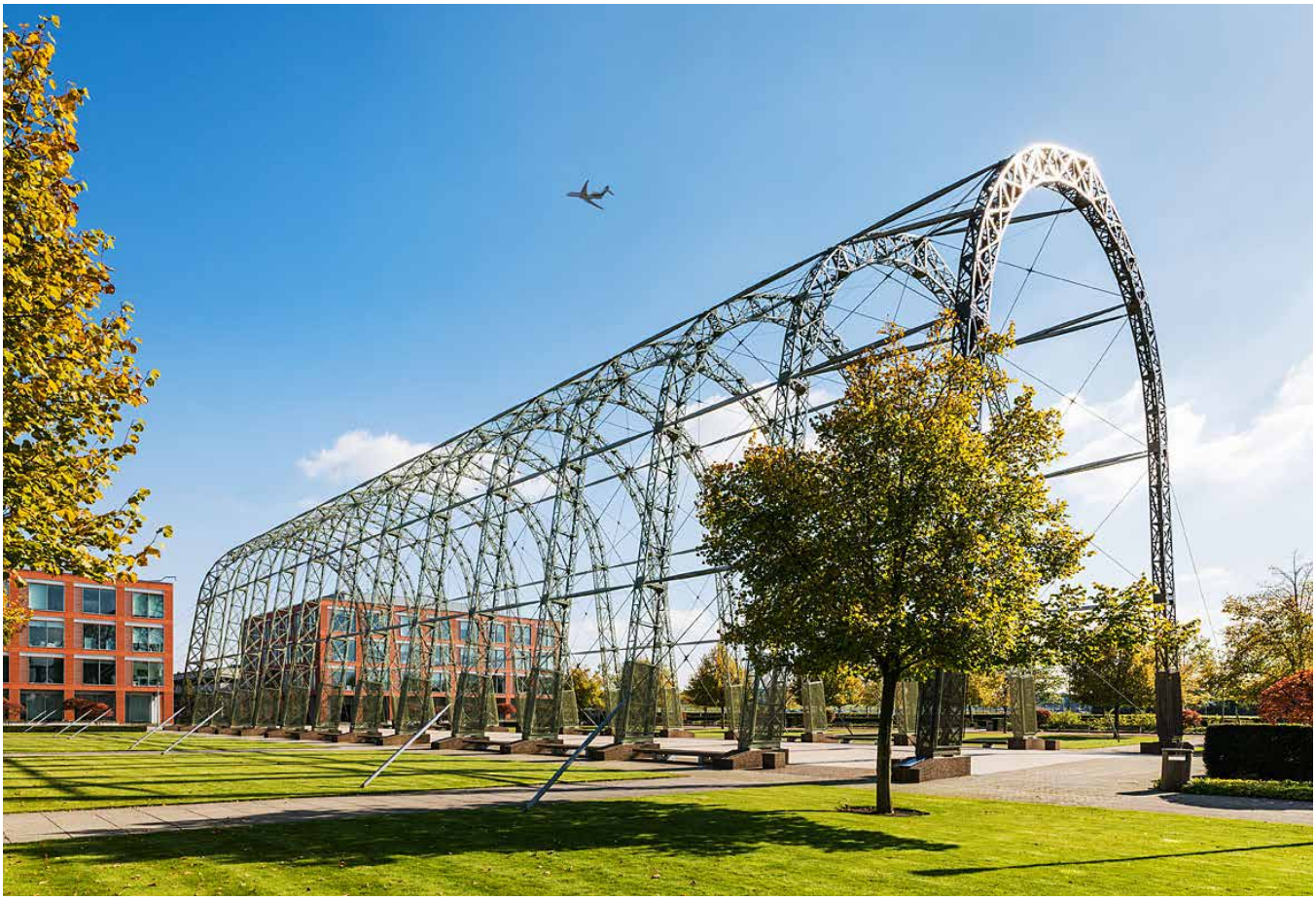
The scope for extending historic airfield buildings will depend on a number of factors, including the degree of formality in the original architecture and site planning. Where sites were designed or laid out according to a strictly applied symmetry or formal arrangement, care will need to be taken to sustain and enhance this when considering extensions or alterations.

Most aviation buildings are characterised by simplicity in detailing and consistency in the use of materials. It is therefore appropriate that the design of any new extensions should respect the prevailing character.

5.5 Conservation management

The key to successful conservation management lies in establishing a good relationship between the various parties involved, including the owner and the local planning authority, and in discussing proposals for development at an early stage. On large sites it may be useful to hold regular liaison meetings at which future work programmes are discussed. Management guidelines can set out an agreed approach to re-use, development, alterations and repairs.

Structures on airfields often pose a risk to health and safety because they have become structurally unsound, or because they may contain hazardous materials such as asbestos or explosive ordnance. It is important that structural engineers and those responsible for



Portable airship shelter at Farnborough (Hampshire), originally constructed in 1912 and moved to its present position in 2004.

clearing ordnance and other hazardous materials are made aware of any historic significance attached to the areas concerned. Abandoned or unattended buildings and structures on airfields can be dangerous. Safety measures (for example to restrict access) need to be designed carefully to avoid irreversible damage and to minimise their impact. Where assets are listed or scheduled, early consultation with the statutory authorities is essential to establish whether proposed safety measures need consent and to agree an appropriate solution.

Rather than demolishing a dangerous structure it may be possible to make it safe by temporary support or by preventing unauthorised access. Where partial demolition is unavoidable, it may be necessary to agree a method of working that will minimise the risk of damage.

Under the Enterprise and Regulatory Reform Act of 2013, it is possible for the owner of a listed building and the local planning authority to enter into a Listed Building Heritage Partnership Agreement. This allows the local planning authority to grant listed building consent for specified works of alteration or extension (but not demolition) of those listed buildings covered by the Agreement. The first example to be concluded, in 2014, is for the Stow Maries First World War aerodrome in Essex.

6 Alterations and Repairs

This section is concerned principally with works to listed buildings but may also be applicable to other heritage assets built for military aviation purposes. The advice of the local planning authority should be sought regarding the need for Listed Building Consent for any works referred to below.

6.1 Hangar structures

Most historic airfields retain one or more hangar structures built for the maintenance or storage of aircraft. The need to provide large, unobstructed covered spaces has given rise to specialised long-span structures that are technically distinct from other aviation buildings. Although built to standardised designs, they range in durability from lightweight demountable structures of timber and canvas to hardened aircraft shelters built in reinforced concrete. In most cases hangar designs were purely utilitarian, using materials that have a limited life – such as corrugated metal or asbestos sheeting. In some cases, however, higher-quality materials such as brick or stone were employed for aesthetic reasons. The essential characteristics of historic hangars, such as their overall form, structure and cladding, should be maintained as far as possible. Any decisions relating to alterations and repairs are likely to require the advice of a structural engineer. On MOD sites, technical advice may be sought from the Defence Infrastructure Organisation. Information on the different types of hangar can be found in *British Military Airfield Architecture* (Francis, 1996).

6.2 Roofs and roof coverings

The roof form and construction is often the defining characteristic of airfield structures and the original roof form – whether pitched, flat, curved or 'saw-toothed' – should be retained. Flat roofs are characteristic of certain periods, particularly of 1930s' modernist architecture, and their replacement with pitched roofs is generally to be avoided. Original features such as lantern lights and rooflights are often a distinctive feature of roofs and should normally be retained.

The original roofing materials – such as tile or natural Welsh slate – should be retained and repaired. Where it is not practical to replace like-for-like, every effort should be made to match the original appearance. For example, where original asbestos-cement slates need to be replaced, it may be necessary to specify a replacement slate of another material but of matching size, thickness and colour.

Earth-covered roofs (for example, on hangars) should not be stripped of their earth covering unless there are compelling reasons to do so. The exposure of waterproof membranes such as asphalt will tend to hasten their decay as well as changing the original appearance of the building.

Earth roof covering, Bicester (Oxfordshire).

6.3 Brickwork and pointing

Many 20th-century brick structures were built using a cement-gauged mortar mix. Where repairs are required, any replacement bricks should be carefully matched to the original colour and size, and laid to match the original bond. Any original features within the brickwork – such as vents made from sawn tile – should be retained. Repointing should be executed to match the appearance of the original work and be restricted to those areas where the existing pointing is substantially decayed.

The temporary structures built during the Second World War are often found to be decaying due to the use of incompatible materials – for example highly porous under-fired bricks laid in hard cement mortar. In such cases, a balance needs to be struck between maintaining the authenticity of the structure, both in terms of its appearance and materials, and ensuring a durable repair that helps to maintain the asset in a sustainable condition. This will usually mean repointing in a weak cement mix or possibly using lime mortar to minimise future harm to the bricks. For more detailed advice, see *Practical Building Conservation: Mortar, Renders and Plasters* (Ashgate 2011).

6.4 Concrete

Concrete is used in many different situations on airfield buildings and structures – such as flat roofs, floor slabs, structural members, staircases, retaining walls – and on some sites concrete is the dominant external facing material. Many airfield defences such as pillboxes were built with concrete of varying quality.

Some concrete structures were built in mass concrete; others, more commonly, were reinforced with steel bars. These may have corroded where the concrete cover is failing or gives insufficient depth of cover to the steel. This corrosion can cause the concrete cover to delaminate. The majority of repairs will involve the removal of damaged concrete in order to expose the reinforcement so that it may be completely de-rusted by chemical or mechanical means, followed by anti-corrosion treatment. The concrete can then be reinstated back to the 'cleaned' steel.

It is usually possible to repair damaged concrete to maximise retention of original material. However, where extreme degradation of concrete elements has taken place, it may be necessary to dismantle and rebuild. New reinforcement should be given adequate cover.

Work to reinforced concrete will normally require the advice of a structural engineer.

For more detailed advice on the conservation of concrete, see *Practical Building Conservation: Concrete* (Ashgate 2013).

6.5 Camouflage

It is important to retain any surviving evidence of camouflage techniques applied during the Second World War. The replacement of bricks or mortar within affected areas of masonry will require careful colour matching. However, replacement bricks should be colour matched to the original brick colour and not to the camouflage colour. The subsequent treatment of bricks to tone their colour to match the effect of weathered camouflage paint can be achieved with a thin wash of natural hydraulic lime paint or other lime-based washes. It is best to assess trial panels over a few months, as the eventual colour will depend on the properties of the brick.

Most of the hardened airfield structures built during the 1970s and 1980s were treated with a chemical colouring, 'Novolant', to produce a dull rusty brown finish. This is in line with NATO policy to dull down the appearance of its bases from the air to make them less vulnerable to attack by manned aircraft.

6.6 External painting

A consistent use of paint colour for external joinery and metalwork can greatly contribute to the disciplined character appropriate to a military site. Paint research using archival sources and an analysis of paint samples can provide a basis for choosing an appropriate colour scheme. External brick surfaces, some of which may retain traces of original camouflage colours, should not be painted.

At RAF Bicester a paint scheme has been adopted which is based on an unpublished report (*Report Following an Investigation of the Paint Colours on the External Joinery and Metalwork* prepared for English Heritage by Patrick Baty of Papers and Paints, March 2000).

6.7 Doors and windows

Original doors and windows should be retained and conserved in a manner consistent with their significance. They should be repaired and maintained by an experienced joiner. If the originals are beyond repair, they should be replaced to match the existing design and materials. Their replacement with modern substitutes made of aluminium, stained hardwood or PVCu will almost always be damaging to the character of the building.

It may be necessary to improve the energy efficiency of external doors and windows. Guidance on the application of Part L of the building regulations to historic buildings is available from Historic England.

6.8 External rainwater goods

Original details such as cast iron rainwater gutters and downpipes should usually be retained or, where necessary, replaced to match the original in appearance, profile and material. The use of alternative materials such as PVCu should be avoided. However, it is essential that the water-disposal arrangements perform effectively, to ensure the preservation of the building. It is important to check that gutters and downpipes can cope with the predicted volume of water run-off from the roof, and that they are capable of easy inspection and maintenance. Further advice on this topic is included in *Practical Building Conservation: Building Environment* (English Heritage 2014).

6.9 External services

All external service fittings – such as vent terminals, conduits, air-conditioning plant, aerials and bin stores – should be carefully considered. Consultation will be necessary to ensure that they are suitably designed and located, and to establish whether consent is required.

Watch tower at Thorpe Abbots (Norfolk) following restoration in which the original windows were refurbished and the glass house rebuilt.

6.10 Internal layouts and partitions

The majority of airfield buildings have functional interiors which can sustain some degree of change without damage to their architectural or historic significance. It is recognised that these interiors will need to be adapted from time to time in response to new or changed uses (for example by subdivision of original spaces). However, the demolition of structural elements such as solid partition walls or staircases should be avoided, unless it is essential to allow the ongoing use of the building. Great care should be taken where the internal layouts are particularly well preserved, or where the interiors retain a strong decorative character (for example in officers' messes) or provide evidence of a significant function (for example, operations rooms).

Some buildings may retain underground air-raid refuges that may also be subject to listed building controls, even if not included in the list description.

6.11 Internal finishes and fittings

Care should be taken to retain any original plasterwork, joinery, tiling and decorative features such as skirtings, architraves, picture rails, dados, doors and fireplaces. Evidence of previous uses or occupation – for example signage, fittings, murals and graffiti – should be retained where possible and recorded where appropriate.

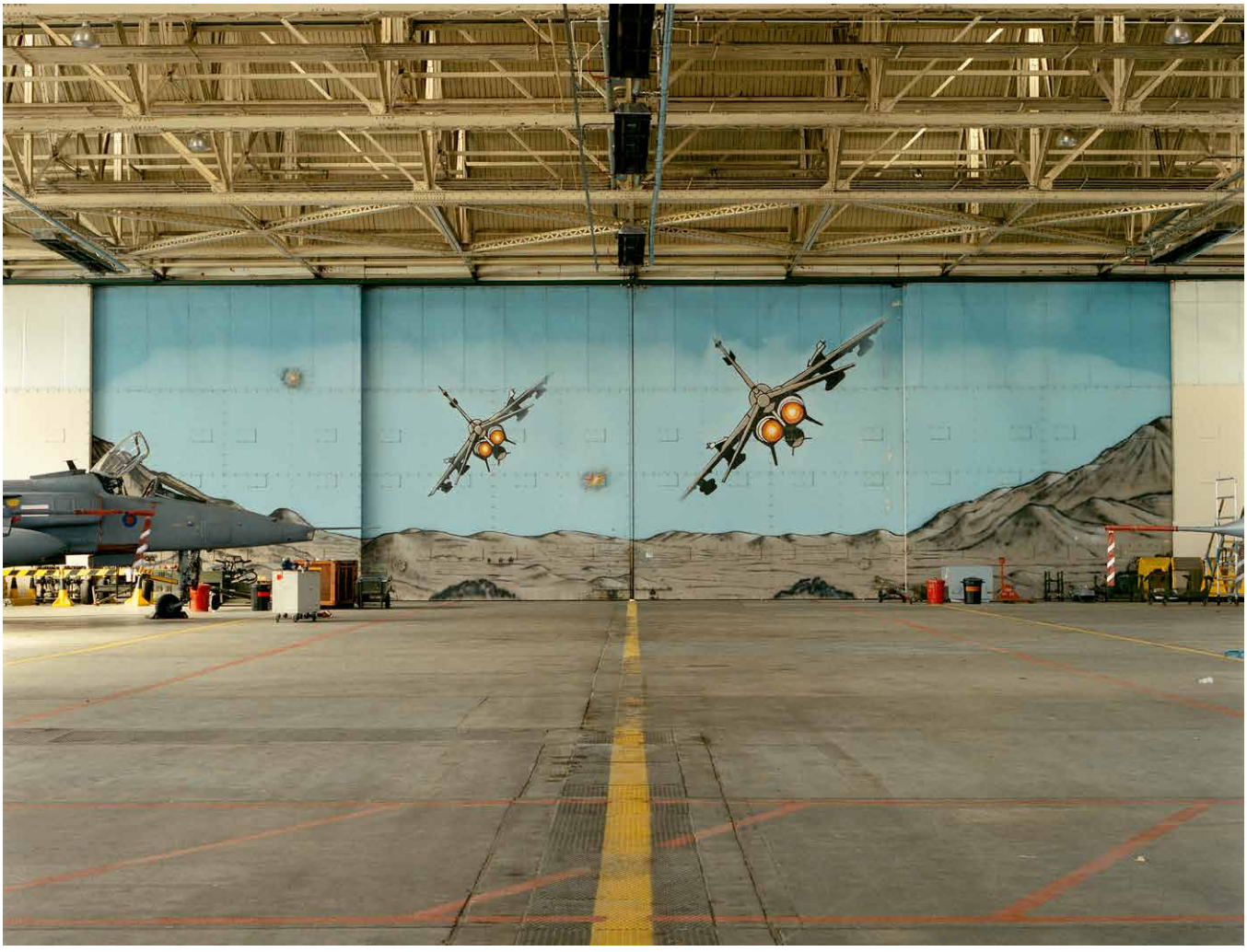
6.12 Wall Art

Wall art may be broadly categorised as images varying from casual doodles to elaborate murals that may occupy whole walls. They form an important and often personal link to the heritage of the units and personnel who have served on an airfield. Ideally, wall art should be cared for in its original position. More information is available in Historic England's guidance on military war art; see also *War Art, Murals and Graffiti: Military Life, Power and Subversion* (Cocroft et al 2006).

6.13 Internal services

In some instances original services installations that form an intrinsic part of the building's original function are of interest (for example the extraction plant in decontamination centres).

Internal works to install central heating, air conditioning, plumbing, sanitary installations, security systems, fire detection and so on should be carefully planned so that their impact is minimised, especially where they relate to notable interiors. Such works will require consent if the local authority considers that they affect the significance of the listed building.



Murals in the hangar at the former RAF Coltishall (Norfolk).

7 References

Military aircraft crash sites: Archaeological guidance on their significance and future management. Swindon: English Heritage, 2002. Product code 50704. http://www.historicengland.org.uk/images-books/publications/military-aircraft-crash-sites/

Monuments of War: The evaluation, recording and management of twentieth-century military sites. English Heritage, leaflet, 1998, 2nd edition 2003. Product code XH20098. http://www.historicengland.org.uk/images-books/publications/monuments-of-war/

Brookes, Robin J, 2014 *Aerodromes of Fighter Command Then and Now*. Old Harlow, Essex: Battle of Britain International Ltd.

Buchan Innes, G 1995 *British airfield buildings of the Second World War*. Earl Shilton: Midland Publishing Limited

Buchan Innes, G 2000 *British airfield buildings Volume 2: The expansion and interwar periods*. Earl Shilton: Midland Publishing Limited

Cocroft, W D 2001 *Cold War Monuments: An Assessment by the Monuments Protection Programme*. This can be found in the Historic England library.

Cocroft, W D and Thomas, R J C 2003 *Cold War building for nuclear confrontation 1946-1989*. Swindon: English Heritage

Cocroft, W D, Devlin, D, Schofield, J and Thomas, R J C 2006 *War art: murals and graffiti – military life, power and subversion*. York: Council for British Archaeology

Cocroft, W D, and Cole, S, 2007 *RAF Coltishall, Norfolk: A photographic characterisation.* English Heritage Research Department Report Series 68/2007 https://www.historicengland.org.uk/images-books/publications/raf-coltishall-photographic-characterisation-rdrs-68-2007/

Dobinson, C 1998 *Twentieth-century fortifications in England, vol. IX. Airfield themes: studies in the evolution of Britain's military airfields 1918-1945*. York: Council for British Archaeology

Dobinson, C 2000 *Twentieth-century fortifications in England, vol. X. Airfield defences in World War II: policy and fabric for the ground defence of airfields, 1940-45.* York: Council for British Archaeology

Dobinson, C, Lake, J and Schofield, J, 1997 'Monuments of war: defining England's twentieth-century defence heritage'. *Antiquity* **71**, 288-99

Francis, P 1993 *Control towers: The development of the control tower on RAF stations in the United Kingdom*. Ware: Airfield Research Publishing

Francis, P 1996 *British Military Airfield Architecture: from airships to the jet age*. Sparkford: Patrick Stephens

Francis, P, Flagg, R and Crisp, G 2016 *Nine Thousand Miles of Concrete: A Review of Second World War Temporary Airfields in England*. https://www.historicengland.org.uk/images-books/publications/nine-thousand-miles-of-concrete/

Freeman, R A 1997 *Airfields of the Eighth Then and Now*, 7th edn. London: Battle of Britain Prints International Ltd.

Freeman, R A 1994 *UK Airfields of the Ninth Then and Now*, 7th edn. London: Battle of Britain Prints International Ltd.

Freeman, R A 2001 *Bases of Bomber Command Then and Now*. London: Battle of Britain International Ltd.

Lake, J 2003 *Survey of Military Aviation Sites and Structures: Summary Report*, rev. edn. This can be found in the Historic England library.

Lake, J and Schofield J 2000 'Conservation and the Battle of Britain', *in* Addison, P and Crang, J (eds) *The Burning Blue: A new history of the Battle of Britain*. London: Pimlico, 229-42

Lake, J 2004 'Historic airfields: evaluation and conservation', *in* Schofield, J, Johnson, W G, and Beck, C M (eds) *Matériel Culture: the archaeology of twentieth-century conflict*. London: Routledge. One World Archaeology **44**, 172-88

Lake, J, Dobinson, C and Francis, P 2005 'The evaluation of military aviation sites and structures in England', *in* Hawkins, B, Lechner, G and Smith, P (eds) *Historic Airports. Proceedings of the International 'L'Europe de l'Air' Conferences on Aviation Architecture*. London: English Heritage.

Loechi S K, Enscore S I, Tooker M W and Batzli S A 2009 *Guidelines for Evaluating Historic Military Landscapes.* US Army Corps of Engineers

Lowry, B (ed) 1996 *20th-century defences in Britain: An introductory guide* rev edn. Walmgate: Council for British Archaeology, practical handbooks in archaeology 12,

Ramsey, W G (ed) 1989 *The Battle of Britain Then and Now*, 5th edn. London: Battle of Britain Prints International Ltd.

Various authors, various dates. *Action Stations* A series providing short histories of most UK airfields published by Patrick Stephens.

Various authors, various dates. A series of books on Second World War airfields, arranged by English county, published by Countryside Books.

8 Glossary

Airmen's institute A building housing recreational facilities for airmen and corporals, and operated by the Navy, Army and Air Force Institutes (NAAFI).

Air Ministry Founded in 1918. The Air Ministry's responsibilities included the selection and purchase of airfields; its Directorate of Works and Buildings took charge of the design and building of fabric. The Air Ministry became part of the unified MoD in 1964.

ASU Aircraft storage unit.

Avionics building A building used for the inspection and maintenance of complex electronic flight control equipment.

Barracks A building or group of buildings accommodating service personnel in dormitory rooms with additional rooms for corporals.

Bloodhound A surface-to-air missile system deployed by the RAF during the Cold War.

Bomber Command One of four specialised commands of the RAF formed in 1936.

Control tower A building from which all movements on and above an airfield are controlled. On RAF stations, this building type was referred to as the watch office.

Dispersal The scattered deployment of aircraft on hardstandings – or dispersal platforms – around the perimeter of an airfield to reduce their vulnerability to aerial attack.

Dispersed layout The scattered layout of buildings that was intended to minimise their vulnerability to concentrated bombing.

Domestic site Site for the accommodation of personnel including barracks and messes.

Expansion period A period of rapid expansion of the RAF during the inter-war period. This expansion took place in two stages: the first from 1923–6 and the second from 1934–40.

Fighter Command One of four specialised commands of the RAF formed in 1936.

Fighter pen Hardstanding for fighter aircraft with a protective traverse.

Hangar Structure to house or service aircraft.

Hardened structure Structures, including aircraft shelters, constructed from reinforced concrete and designed to withstand a pre-emptive attack. Characteristic of NATO bases of the 1970s and 1980s.

Hardstanding A generic term describing any open area of concrete or tarmacadam on which an aircraft or other vehicle might be parked.

NATO North Atlantic Treaty Organisation. Founded in 1949.

Officers' mess Building for purposes of officers' dining and recreation, typically with a 'club' atmosphere. Often contains accommodation for officers and servants.

Operations room/block Room or building from which the deployment of forces over a wide area is monitored and controlled.

Pillbox Typically a circular or hexagonal concrete structure built for close defence.

RAF Royal Air Force. Formed in 1918 through the union of the Royal Flying Corps (RFC) and Royal Naval Air Service (RNAS).

Squadron A unit of a definite number of aeroplanes with its officers and men.

Technical site Area of an airfield where the functions of maintenance and engineering are accommodated.

Thor IRBM Intermediate-range ballistic missile deployed between 1959 and 1964.

Traverse An earthen bank forming a protective barrier.

USAAF United States Army Air Force.

USAF United States Air Force. Founded September 1947.

Weapon pit Position cut into the earth for protection of artillery piece, mortar or machine gun.

Wing A unit formed from a number of squadrons.

9 Appendix

‘Key’ sites in England

The following list summarises the pre-1945 military aviation sites in England that retain the best-preserved airfield landscapes and/or most historically significant groups of original buildings. Almost all of these sites started out as RAF stations and many of them are still in military use. Some of them are also designated conservation areas (see Section 4.5).

Bicester, Oxfordshire

Bicester was built as a bomber station from 1924. It retains – better than any other aviation site in Britain – the layout and built fabric relating both to the first expansion period of the RAF and subsequent developments up to 1940. The grass flying field survives with its 1939 boundaries largely intact. It is surrounded by a group of bomb stores built in 1938-9 and airfield defences built in the early stages of the Second World War.

Biggin Hill, Greater London

Biggin Hill, Britain’s most celebrated fighter station, retains a particularly fine officers’ mess of 1934 and a good group of technical and domestic buildings (mostly 1930-4). The latter include the best-preserved group of married quarters buildings – dating from the 1920s – associated with a nationally important site. The flying field, with later runways, retains defence posts and fighter pens from 1939. The Memorial Chapel dates from 1951.

Calshot, Hampshire

Calshot Activity Centre on the Solent makes full use of its unique surviving group of seaplane hangars. These were sited next to one of Henry VIII’s coastal forts, which were built in the 1530s in order to help defend shipping in this strategically crucial area. It retains the best-preserved group of early seaplane hangars in Europe, ranging from a small timber hangar built early in 1914 for housing Sopwith Bat Boats to the immense steel-framed hangar, now in use as a sports centre and velodrome, which housed the Felixstowe flying boats used on anti-submarine patrols.

Catterick, North Yorkshire

Originating as a Home Defence Station in 1914, Catterick is the best-preserved fighter station in the north of England. It retains a group of First World War hangars (later reclad) and buildings dating from the expansion periods of the 1920s and 1930s. Fighter pens and defences were added around the airfield at the beginning of the Second World War.

Coltishall, Norfolk

Construction of RAF Coltishall began in February 1939. It was originally planned as a bomber station, but in May 1940 the still unfinished station was handed over to Fighter Command, and it played a distinguished role in the Battle of Britain. Since this date it has been associated with air defence and fighter aircraft and as such has probably been the most active RAF airfield in East Anglia. In the early 1950s it was adapted to accept jet fighter interceptors. In the 1990s it was closely associated with the Jaguar force’s operations in the 1991 Gulf War and the conflict in the former Yugoslavia. The airfield exemplifies the geometric layout and open character of the 1930s’ expansion period and how these were adapted to meet new post-war requirements.

Cranwell, Lincolnshire

The development of the Cadet College at Cranwell, begun in 1929, was a cornerstone of Britain's independent air force. College Hall (1929-33) and its formal setting make up the most architecturally impressive set-piece designed for the RAF. Although best known for the Cadet College, Cranwell has in addition a long aviation history dating back to 1918.

Debden, Essex

Opened as a fighter station in 1937, Debden retains much of its 1930s' character. It is also noted for the largely intact preservation of its flying field and defensive perimeter. Its historical importance resides chiefly in its role as one of the important 11 Group sector stations during the Battle of Britain.

Dunkeswell, Devon

The airfield, begun by the contractor George Wimpey in 1941, was occupied by US Air Force and Navy Liberator bombers whose task was to patrol the sea areas traversed by U-boats en route between their bases in France and their hunting sites in the North Atlantic. The bulk of the airfield site, with its runways, perimeter track and hardstandings, has survived as a very rare example of a substantially complete Second World War airfield site. The historical and landscape importance of this site has underpinned recommendations to protect key fabric, notably the operations block – a complete hangar with its associated hutting and the control tower group.

Duxford, Cambridgeshire

This famous fighter station is known for its Battle of Britain associations and later used as a USAAF fighter station. Much of the First World War technical site survives, including three paired hangars. The domestic site was built in the 1930s. The architecture, which is representative of both expansion periods, is remarkably well preserved and the airfield is largely intact.

Farnborough, Hampshire

Farnborough is one of the key sites in Europe relating to the development of aviation technology and aeronautical research. Originating as the base for the Royal Engineers' School of Ballooning in 1906, the site was occupied by the Royal Engineers' Air Battalion from 1911, and later by the Royal Aircraft Establishment. It closed as a military research establishment in 1999. Although much altered, the site retains a small number of historically significant buildings, including two Grade I-listed wind tunnels of 1934-5 and 1939-42.

Halton, Buckinghamshire

Halton was established as the centre for technical training for the Royal Flying Corps in 1917. After the First World War the site was developed to house the Aircraft Apprentice Scheme. The domestic site retains an extensive and well-preserved group of buildings from the 1920s and 1930s including the Groves and Henderson Barracks.

Henlow, Bedfordshire

The five general service sheds at Henlow comprise the most complete ensemble of hangar buildings on any British site for the period up to 1923. The domestic site retains an extensive group of married quarters, built in the Garden City tradition, and barracks and office buildings that date to 1933-5. These display a unique architectural treatment for a military air base.

Hullavington, Wiltshire

Hullavington opened in 1937 as a flying training station. It embodies, to a unique degree, the improved architectural quality associated with the post-1934 expansion of the RAF. Most of the original buildings have survived and form a particularly coherent and well-ordered ensemble. The flying field remains, with groups of hangars along its boundaries.

Kemble, Gloucestershire/Wiltshire

Kemble is the most strongly representative – by virtue of its range of hangar types – of 24 aircraft storage unit (ASU) sites planned and built by the Air Ministry between 1936 and 1940. The hangars are dispersed in pairs around the airfield and include the most advanced Air Ministry hangar types of parabolic form and concrete construction.

Kenley, Greater London/Surrey

Kenley, one of the key fighter stations, is famous for its associations with the Battle of Britain. Although most of the original buildings have gone, the officers' mess and airmen's institute survive. The airfield, which was completed at the beginning of the Second World War, is uniquely well preserved and retains runways, fighter pens and perimeter tracks, as well as elements of its defences.

Lee-on-Solent, Hampshire

Lee-on-Solent – the best-preserved seaplane base in Britain – has three seaplane sheds of 1918 grouped around the original slipway. A major rebuilding took place after 1931, including the addition of a particularly fine officers' mess of 1934. HMS Daedalus later occupied this site.

Manby, Lincolnshire

Manby was built as an armament training school from 1936-8. After Hullavington, it is the most complete and architecturally unified station of the post-1934 expansion period in Britain. Both the technical and domestic buildings show a meticulous attention to layout and detail. The airfield is now in agricultural use.

Netheravon, Wiltshire

Begun in 1912, Netheravon is the most complete of the sites that date to the crucial formative phase in the development of military aviation in Europe, which occurred prior to the First World War. The domestic site retains a remarkably well-preserved group of single-storey barracks and mess buildings dating from 1913-14. The grass airfield remains intact.

Northolt, Greater London

Northolt was one of the 11 Group fighter stations that played a significant operational role in the Battle of Britain. Although parts of the site have been subject to post-war redevelopment, a number of the original buildings of the 1920s and 1930s survive. Among these are the officers' mess, four barracks blocks, two hangars and the operations room. A fine memorial commemorates the contribution of Polish airmen to the Allied war effort during the Second World War.

North Luffenham, Rutland

Opened in 1940, North Luffenham is representative of contemporary bomber bases. It retains two J-type hangars as well as a coherent group of contemporary technical and domestic buildings. The runways, perimeter tracks and dispersal platforms were added in 1944 and form one of the most complete airfield landscapes of that period. The site was adapted in the Cold War period as a Thor IRBM (intermediate-range ballistic missile) site and a Bloodhound missile tactical control centre was also added.

North Weald, Essex

North Weald is a fighter sector station with Battle of Britain associations. After Kenley and Debden, it retains the best-preserved of the airfield landscapes put in place by Fighter Command at the beginning of the Second World War.

Old Sarum, Wiltshire

Old Sarum is one of the best-preserved flying fields of the First World War period. It is bounded by one of the most complete suites of technical and hangar buildings of the period.

Scampton, Lincolnshire

Opened in 1936 as a bomber station, Scampton's association with 617 Squadron and the Dambuster raids make it Bomber Command's most famous base of the Second World War. It also played an important role in the Strategic Bomber Offensive and the daylight raids in support of the Allied offensive in Europe. Scampton retains its layout and flying landscapes, complete with its full complement of hangars (including 617's offices). After the war, the airfield was further remodelled for V-bombers, the nuclear-armed deterrent force of the early Cold War period.

Stow Maries, Essex

Aircraft flew in the defence of London against Zeppelins and, after June 1917, Gotha bombers, from the Home Defence station at Stow Maries in Essex. The flying field, together with 24 workshop and barracks buildings, has survived. It is the largest known surviving group of Royal Flying Corps buildings on a First World War aerodrome which, being abandoned in 1918, was not adapted for further military use later in its history.

Upavon, Wiltshire

Founded in 1912 as the Royal Flying Corps's Central Flying School, Upavon is one of three sites around the Army training ground on Salisbury Plain that date from the crucial formative phase in the development of military aviation in Europe prior to the First World War. Several buildings of the 1913-14 period survive, including a guardroom, officers' cottages, airmen's barracks and institute, and the finest RFC officers' mess.

Upper Heyford, Oxfordshire

RAF Upper Heyford opened in 1916 and from that date was mainly concerned with aircrew training. Many buildings from the inter-war period survive. From the early 1950s it was occupied by the USAF and modified to accept long-range bombers. In the late 1970s it was substantially remodelled with the addition of hardened aircraft shelters and other protected structures. It is one of the best examples of a late Cold War airfield.

West Malling, Kent

A barracks square, officers' mess with its associated garages and control tower survive at West Malling, one of the RAF's key front-line fighter stations. After the Second World War it became the main rehabilitation centre for POWs returning from Germany to Britain.

West Raynham, Norfolk

This site, which was opened in April 1939 as a bomber station, has retained fabric in a remarkable state of preservation thanks to its 'mothballing' after closure. These include domestic and technical buildings with flat concrete roofs offering protection against bomb blast and incendiary bombs. The runways were extended during the Second World War and the airfield was further modified as part of West Raynham's establishment as a premier fighter base at the start of the Cold War. Construction work on a Bloodhound missile site on the south side of the base, near a well-preserved set of Second World War bomb dumps, commenced in 1964.

10 Where to Get Advice

The first point of contact for any planning or listing enquiry regarding a historic military aviation site should be the local planning authority or Historic England office. For more specialist enquiries, particularly those concerning historical information, please see the next page for details of other organisations.

Historic England

East Midlands
2nd Floor, Windsor House
Cliftonville
Northampton NN1 5BE
Tel: 01604 735460
Email: eastmidlands@HistoricEngland.org.uk

East of England
Brooklands
24 Brooklands Avenue
Cambridge CB2 8BU
Tel: 01223 582749
Email: eastofengland@HistoricEngland.org.uk

London
1 Waterhouse Square
138-142 Holborn
London EC1N 2ST
Tel: 020 7973 3700
Email: london@HistoricEngland.org.uk

North East
Bessie Surtees House
41-44 Sandhill
Newcastle Upon Tyne
NE1 3JF
Tel: 0191 269 1255
Email: northeast@HistoricEngland.org.uk

North West
3rd Floor, Canada House
3 Chepstow Street
Manchester M1 5FW
Tel: 0161 242 1416
Email: northwest@HistoricEngland.org.uk

South East
Eastgate Court
195-205 High Street
Guildford GU1 3EH
Tel: 01483 252020
Email: southeast@HistoricEngland.org.uk

South West
29 Queen Square
Bristol BS1 4ND
Tel: 0117 975 1308
Email: southwest@HistoricEngland.org.uk

Swindon
The Engine House
Fire Fly Avenue
Swindon SN2 2EH
Tel: 01793 445050
Email: swindon@HistoricEngland.org.uk

West Midlands
The Axis
10 Holliday Street
Birmingham B1 1TG
Tel: 0121 625 6870
Email: westmidlands@HistoricEngland.org.uk

Yorkshire
37 Tanner Row
York YO1 6WP
Tel: 01904 601948
Email: yorkshire@HistoricEngland.org.uk

Government Historic Estates Unit
gheu@HistoricEngland.org.uk
http://www.historicengland.org.uk/services-skills/our-planning-services/advice-for-government-historic-estates/

Historic England Archives
Tel: 01793 414600
archive@HistoricEngland.org.uk
http://archive.historicengland.org.uk/

Other organisations and contacts

Air Historical Branch (RAF) and Publications Clearance Branch (Air)
Tel: 020 8833 8175
ahb.raf@btconnect.com
http://www.raf.mod.uk/ahb/

Airfield Research Group Forum (previously Airfield Information Exchange (AiX)
https://www.airfieldresearchgroup.org.uk/forum

The American Air Museum in Britain
http://www.americanairmuseum.com

Defence of Britain Project
http://archaeologydataservice.ac.uk/archives/view/dob/

Imperial War Museums
http://www.iwm.org.uk/

The National Archives
Tel: 020 8876 3444
http://www.nationalarchives.gov.uk/

Natural England
Tel: 0300 060 3900
enquiries@naturalengland.org.uk
https://www.gov.uk/government/organisations/natural-england

Royal Air Force Museum
Tel: 020 8205 2266
http://www.rafmuseum.org.uk

Royal Navy Fleet Air Arm Yeovilton
Tel: 01935 840565
http://www.fleetairarm.com

11 Acknowledgements

Images

Page 6: © Aspire Defence Services Limited
Page 2, 12, 22: © W D Cocroft
Page 16: © W Holborow

All other images: © Historic England
Cover: DP184104
Page 1: DP035664
Page 3: 27292_036
Page 4: 26903_014
Page 9: 26917_012
Page 13: AA99_09854
Page 18: DP184097
Page 20: DP173121
Page 23: AA054405

Every effort has been made to trace the copyright holders and we apologise in advance for any unintentional omissions, which we would be pleased to correct in any subsequent editions.

Historic England

We are the public body that looks after England's historic environment. We champion historic places, helping people understand, value and care for them.

Please contact
guidance@HistoricEngland.org.uk
with any questions about this document.

HistoricEngland.org.uk

If you would like this document in a different format, please contact our customer services department on:

Tel: 0370 333 0607
Fax: 01793 414926
Textphone: 0800 015 0174
Email: customers@HistoricEngland.org.uk

Please consider the environment before printing this document

HEAG048
Publication date: v1.0 2003 © English Heritage
Reissue date: v1.2 October 2016 © Historic England
Design: Historic England