

6. Historic Environment & Built Heritage

Appendix 6.1

CONSERVATION MANAGEMENT PLAN

CONSERVATION MANAGEMENT PLAN

Fort Halstead, Kent

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CONSERVATION
MANAGEMENT PLAN
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REPORT

Quality Management

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1 INTRODUCTION

- 1.1 This Conservation Management Plan has been prepared by RPS Heritage on behalf of Merseyside Pension Fund in relation to Fort Halstead, Kent ('the Site'). It accompanies the revised information submitted as part of Application 19/05000/HYB. The description of development is:

Hybrid application comprising, in outline: development of business space (use classes B1a/b/c) of up to 27,773 sqm GEA; works within the X enclave relating to energetic testing operations, including fencing, access, car parking; development of up to 635 residential dwellings; development of a mixed use village centre (use classes A1/A3/A4/A5/B1a/D1/D2); land safeguarded for a primary school; change of use of Fort Area and bunkers to Historic Interpretation Centre (use class D1) with workshop space and; associated landscaping, works and infrastructure. In detail: demolition of existing buildings; change of use and works including extension and associated alterations to buildings Q13 and Q14 including landscaping and public realm, and primary and secondary accesses to the site.

- 1.2 This Management Plan has been specifically prepared in relation to the creation of a Historic Interpretation Centre (HIC) to provide a new use for the Fort Halstead Scheduled Monument and associated Listed and non-Listed Buildings. This Management Plan is an updated version of the Heritage Management Plan prepared by Heritage Collective in 2015 (Ref. 15/1231). That plan was submitted as part of a previously approved outline planning application for the Site (15/00628/OUT) which also included the creation of a Historic Interpretation Centre at the Fort.

The proposal

- 1.3 As part of the hybrid application it is proposed to create the HIC to provide a new, long-term viable use for the Fort and celebrate the history of Fort Halstead and the Site. It will also provide for the long-term sustainable governance, management and re-use of the Fort, the buildings within it and their settings, and make the Fort publicly accessible for the first time in its history.
- 1.4 The Fort, together with bunkers/magazines within the M Zone (see Table 2.1 for a full list of buildings to be retained and incorporated into the HIC) would be refurbished and form the physical framework and legacy of the HIC (Use Class D1). Casemates within the Fort would provide ancillary low-rent workshops for craftspeople as part of the visitor attraction.

Background

- 1.5 The Fort is the earliest extant development at the Site and includes a manmade defensible enclosure with a dry moat enclosing an area of traverses, within which ammunition was stored in casemate and magazine structures.
- 1.6 Fort Halstead was constructed in the late 19th century as a mobilisation centre, a defensible ammunition store forming part of the London anti-invasion stop-line, but was never mobilised. In 1937, after 16 years of private ownership, the War Office acquired the Site due to its remote location and contained nature to accommodate the Projectile Development Establishment for the development of Britain's rocket and atomic research programme. During the Second World War the High Explosives Research team moved to the Site from Woolwich and additional structures were built in and around the Fort to establish a top secret facility within a secure fenced enclave associated with the UK's development of the atomic bomb. The project was known as Blue Danube. After 1955 the Site served as a Government defence research establishment concentrating on explosives and other research. This function has remained but will contract following the departure of one of two current occupiers, DSTL. To the west of the Fort an area will remain operational by QinetiQ, thereby sustaining an element of the historic use outside of the redline boundary that is subject to the current hybrid application.

- 1.7 It was first suggested by Saunders and Smith in their assessment of the stop line Mobilisation Centres, that Fort Halstead should be developed for heritage and museological purposes once relinquished from Government ownership.

Safeguarding the Asset

- 1.8 One of the core principles of the National Planning Policy Framework is that heritage assets '*are an irreplaceable resource, and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations* (paragraph 184).
- 1.9 Fort Halstead has served an important role in the nation's military and political development from the late 19th century through to the present day. With the departure of DSTL the established function, uses and maintenance of the Fort will cease, posing a potential threat to future management of the designated and non-designated heritage assets within Fort Halstead. Without new uses and a programme of maintenance, the Fort, associated buildings and the wider associated landscape and setting could deteriorate. The buildings are purpose built for specific uses and would not easily lend themselves to adaptive reuse. Retention and incorporation of the assets as part of a visitor attraction presents an opportunity for safeguarding their future while illustrating and celebrating the Site's history.
- 1.10 The Fort Halstead Scheduled Monument and Listed Buildings within it are of national interest. The role the Fort has played is of national, regional and local significance, having been a significant employer and instrumental in scientific, technological and research-based developments.
- 1.11 Accordingly, and in recognition of an identified level of significance, securing a new use that safeguards the significance of the heritage assets both within and outside of the Fort and their setting through providing viable and appropriate new uses is a key issue and forms an important component of the hybrid application. Providing a heritage interpretation centre with ancillary craft units (D1 Use) as part of the application provides a viable proposal that addresses this key issue.
- 1.12 Key to accommodating, managing and sustaining new uses is an understanding of the significance of the assets. As a historically multi-phased development that has been used continuously, the heritage significance of Fort Halstead derives from a variety of elements including its origins, evolution, structures, associations and landscape. The Fort and its setting encapsulate and illustrate the history of the wider site with designations reflecting the importance of both original and later uses in a national context.

Statement of Purpose

- 1.13 The HIC will:
- Conserve built heritage assets through adaptive reuse following departure of current users;
 - Create a local visitor attraction as a long-term solution to conserving the significance of the assets;
 - Provide for the sustainable management and re-use of the heritage assets and their setting;
 - Record the history and uses of the Site for future generations in recognition of the Site's history, importance and interests;
 - Provide a tourism asset for Sevenoaks and Kent by repurposing the buildings within the Fort and Magazines;
 - Introduce public access for the first time to a historically secure and sensitive site;
 - Improve the setting and visibility of the Fort and the buildings within it through management and maintenance of landscape and structures;

- Provide information and interpretation as part of a visitor experience.

Purpose of the Plan

- 1.14 The purpose of the Conservation Management Plan is to:
- Define the scope of the HIC by identifying buildings, structures and landscape features included;
 - Summarise the key historical events, persons and information to be included;
 - Indicate the user experience;
 - Demonstrate that retained buildings within the Fort can accommodate a change of use to D1 Historical Museum with ancillary craft units;
 - Present a strategy for the on-going use of the heritage assets;
 - Establish a framework for future applications;
 - Explain the mechanisms by which this is achieved and controlled; and
 - State the approaches and actions to maintain the Site's importance.

Funding of the long-term management of Fort Halstead

- 1.15 One of the options for long term site management is that, pursuant to the hybrid planning application, a Community Trust could be established which would be a charitable organisation set up in the first instance by Merseyside Pension Fund. The Community Trust would be responsible for (inter alia) management of the woodland and biodiversity of the Site and wider Survey Area, community buildings and the Fort / Historic Interpretation Centre. It is envisaged that the Community Trust would comprise a mix of representatives from the existing local community as well as new residents, with representatives from SDC and Halstead, Dunton Green and Chevening Parish Councils (the Parish areas which the Site lies within) and Knockholt Parish Council which borders the Site.
- 1.16 An alternative strategy is for a Charitable Incorporated Organisation to be established, which would include employees of DSTL taking on a stewardship role for the HIC and assisting with its on-going management.
- 1.17 Under this scenario the Community Trust would also be gifted a proportion of intermediate rented housing units as part of the affordable housing provision, the income from which would be used to fund various responsibilities of the Community Trust. This ensures an ongoing income stream and a commitment to deliver the community benefits and facilities beyond the 2 to 5 years that is usually offered as part of an initial 'pump priming' Section 106 financial contribution.
- 1.18 The required funding of the Community Trust has been informed by estimates of the likely maintenance and management costs associated with the responsibilities, based on this Outline LEMP and other information.
- 1.19 The mechanisms and detail of this innovative feature of the proposals will be discussed further with SDC throughout determination of the planning application. Should this option ultimately not be pursued, site management will be undertaken by a management company and initial costs funded through a traditional S106 developer contribution.
- 1.20 Other options may also be explored to ensure the long-term management of the HIC and the on-going conservation of the heritage assets within the Site.

2 DEFINITION AND SCOPE

- 2.1 The Fort Halstead Site is approximately 62.70ha in area and includes over 300 buildings ranging in date from the late 19th to late 20th century. The proposed development would retain 62 buildings identified as heritage assets of varying degrees of significance, including the Scheduled Monument. 16 of these buildings are located within the Scheduled Monument and together with the three magazines beyond the Fort (M4, M5 and M6), would form the HIC (see Table 1 below). Other retained assets are outside the HIC and will be occupied as part of the development for other uses.
- 2.2 The Fort would be the focus of the HIC, with all the buildings and structures therein retained and the area open for public use.

Assets included within the HIC

- 2.3 Table 2.1 (below) identifies the scope of the structures included within the HIC. The F series buildings are located within the Fort Scheduled Monument. The M series buildings are located on the north side of Crow Road towards the east of the Site.

Table 2.1: Assets included within the HIC

Heritage Asset	Function	Date	Designation
Fort Halstead (Includes buildings F2, F3, F4, F5, F6, F7, F8, F9 and post 1900 works. Excludes post 1900 structures)	Late 19th century mobilisation centre with magazines (F03, F05, F06, F07, F09) and casemates (F02, F04, F08)	1892	Scheduled Monument (SM) Designated 29/04/1976 (revised 21/03/2013)
F10	Entrance Lodge	1946-1947	N/A
F11	Experimental filling shed	1936-1946	Grade II listed (within SM) <i>Designated</i> 21/03/2013
F12	Charge store (1949); Poss. Firing Shed (?)	1938-1939	N/A
F13	Magazine	1938-1939	N/A
F14	Ammunition Lab. (to c.1949); Administration (WWII on)		N/A
F15	Lavatory	1936-1946	N/A
F16 / F17	Explosives testing chambers	1947-49	Grade II* listed (within SM) <i>Designated</i> 21/03/2013
F18	Administration/Workshop		N/A
M4	Magazine/Distribution	1981-1984	N/A
M5	Magazine	1981-1984	N/A
M6	Magazine	1981-1984	N/A

Assets excluded from the HIC that provide context

2.4 Table 2.2 (below) sets out proposed retained buildings beyond the Fort that are excluded from the HIC but would be retained and reused within the Development. As parts of the proposed Village Centre these structures would have a degree of accessibility to visitors. In addition, these buildings form part of the setting of the Fort and provide relevant context that merits identification as points of interest and reference within the HIC. These structures may therefore be identified and interpretation offered to further illustrate the history and function of the buildings and their relationship with the Fort.

Table 2.2: Assets excluded from the HIC that provide context

Heritage Asset	Function	Date	Designation
Building Q14 (‘Penney Building’)	Laboratory block; Workshop, offices	1949-53	Grade II listed Designated 25/02/2011
Q13	Laboratory block (1944); CSAR Chemical lab (1947);	1936-1946	N/A
A10	Tube Process Building (1944); CSAR Main Laboratories (1947); Met Phys Chem Lab CSAR (Tube Processing building (1949)	1936-1944	N/A
A11	Block A CSAR Office (1947)/ Office	1936-1944	N/A
A13	Tool store; Site Hospital (1947); Winding Workshop; Site Shop; Social Club; Religious services; Photographic department	1896-1906	N/A
A14	Semi detached brick cottages for caretaker and labourer; main surgery (1952); Administrative Offices	1892	N/A
X2	CEAD Store / offices	1936-1944	N/A
X3	CSAR Store / Offices	1936-1944	N/A

X38	CSAR Physics laboratory	1936 – 1944	N/A
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Assets excluded from HIC and retained in use by Qinetiq

2.5 Table 2.3 (below) identifies buildings within the 'X' Area to the west of the Fort that would be retained in private use by QinetiQ and enclosed within a new security fence. These are excluded from the HIC with no provision of public access

Table 2.3: Assets excluded from HIC and retained in use by Qinetiq

Heritage Asset	Function	Date	Designation
X series	Various	Various	N/A

3 UNDERSTANDING SIGNIFICANCE

- 3.1 A full assessment of the significance of the buildings at the Site has been assessed within Built Heritage Statement and Appendices prepared by RPS Heritage and submitted as part of the hybrid application. An additional Heritage Note has also been prepared by RPS Heritage which provides additional information related to the revised development. An assessment of the heritage impacts arising from the development and the creation of the HIC is provided in the Built Heritage Statement and associated ES Chapter and Addendum.

The Fort (Scheduled Monument)

- 3.2 The Fort, a discrete heritage asset located towards the south eastern edge of the Site, is a Scheduled Monument (see Appendix B). It was first designated on 29 April 1976 (most recently amended 21st of March 2013). It forms a late 19th century mobilisation centre which was modified from the late 1930s for rocketry research, and in the late 1940s as part of the top-secret development of Britain's first atomic bomb.
- 3.3 As a Scheduled Monument, the Fort is the key element in understanding and appreciating the importance of the Site. It forms the earliest military related occupation of the Site and is of national, regional and local interest. The Scheduled Monument description notes that it represents an '*exemplar of design practice in the final phase of permanent Fortification for land fronts in the UK*' (English Heritage 1999). Unlike the contemporary and recently restored Reigate Fort, the Fort at the Site has been maintained and continued in practical use, adding to its interest. Overgrowth to ramparts and the addition of permanent and temporary structures or the deletion (infill) of sections of the moat or rampart have affected its integrity and significance.
- 3.4 Despite later alterations, the Fort retains all of its internal magazines and casemates (although modified in some cases to facilitate their use for explosive testing). It broadly retains its original shape and layout, its original entranceway and physical relationship with buildings A13 and A14, the only structures built beyond the moat. It could be argued that the state of preservation can be attributed to the continuity of Government use.
- 3.5 Elements of high significance include the man-made landforms and these are best illustrated in early plans. When constructed these ramparts, moat and earthen forms would have been void of tree and shrub growth. All growth within the Fort can be attributed to a lack of landscape management rather than a deliberate intent to mask, shelter or in some way enhance or complement the on-going uses. As such none of the plant and tree growth within the Fort contributes to its significance and removal therefore presents an opportunity to enhance the appearance of the Scheduled Monument and better reveal its significance. As disturbed ground there its archaeological potential is low and any disturbance caused by removal of roots would have a low impact.
- 3.6 Saunders & Smith¹ classify the Fort as being of the highest grade of historic importance and extent of survival as '*...an exemplar of design practice in the final phase of permanent fortification for land fronts in the UK*'. They go on to recognise that the state of preservation of the Fort has been affected by later uses, '*...use of the magazines and casemates for testing and experimental purposes has resulted in some damage to, and alteration of, their structure*'. The level of interest results in their suggestion that '*...should the site be relinquished from Government ownership and security restrictions, the Fort might have potential for heritage and museological development*'.

¹ Saunders, A & Smith, V 2001. Kent's Defence Heritage Maidstone

3.7 As one of 13 such structures built in the 1890s to guard London from possible landward attacks, the Mobilisation Centre illustrates the political fears about possible invasion at that time. The historic interest of this part of the Site's history is best summarised in the Scheduled Monument designation description, summarised below and set out in full at Appendix C.

3.8 The significance of the Fort Scheduled Monument can be summarised as:

- **Rarity and form:** one of 13 purpose-built mobilisation centres nationally erected in the late 19th century to defend London in the event of invasion. Fort Halstead was the largest and most expensive built and is one of only four designed for artillery deployment.
- **Survival and diversity:** although a section of the Fort's 19th-century ditch to the west of the north causeway approach has been in-filled, the mobilisation centre survives in a largely intact form (it is assumed the ditch survives beneath the infill). Original buildings associated with this phase survive but some of the casements and magazines have undergone limited alteration for later use. These modifications add to the Fort's interest.
- **Documentation:** the Site is of evidential value as it has the potential to significantly enhance our understanding of the development and operation of the late 19th century mobilisation centres. With regard to its later developments it is of nationally significant value in the interpretation and understanding of the significant atomic bomb research and other significant research, development and testing undertaken on the Site.
- **Group value:** within and just to the outside of the scheduled monument several buildings are protected as listed buildings. This group of assets are important representatives of the Site's later role as a military research establishment. The Fort also has group value in a wider context as part of the regional stop-line.

Listed Building: Building F11- Experimental Filling Shed (Building F11), Fort Halstead, 1938 (Grade II)

3.9 Located within the Scheduled Monument. The building's history and architecture is summarised in the list description as:

EXPERIMENTAL FILLING SHED (BUILDING F11) A two-storey concrete- framed building encased in buff brick laid in English bond. F11 is L- shaped in plan and has a sloping concrete framed roof. Its principal elevation faces east which has an external metal stair leading to a first floor covered walkway. There are two pairs of double doors to the ground floor and two pedestrian doors to the first floor, all with glazed lights. The fenestration comprises metal framed casements. Its rear (west) wall has four further external doors (two to the ground floor and two to the upper floor but now blocked) possibly all emergency exits, plus further metal framed casements. The south elevation has paired replaced casements to both floors. The north elevation is blind. Over-head cable gantries extend north from the building.

The interior was not inspected but it is known from English Heritage's Research Department report that internally the southern half of the building is occupied by brick-built vertical filling bays (to accommodate rocket casing for the assembly of a 9 foot rocket).

3.10 The list description summarises the significance as:

- **Rarity and early date:** this is the earliest surviving purpose- designed building associated with rocketry research and development nationally. Most buildings associated with this area of research are of post-war date rather than pre-war;
- **Design and form:** the building's function is legible through its form, the internal vertical bays to accommodate the filling of 9 foot (c. 3m) rocket casings survive particularly well;

- Historic interest: F11 is significant as part of the early research programmes at Fort Halstead under the Projectile Development Establishment and, given the specialist nature of this work, is of national interest.

Listed Building: Building F16 and F17, Fort Halstead (Grade II*)

- 3.11 These buildings are located within the Scheduled Monument. Building F16 is a bomb chamber and is described in the list description as:

BOMB CHAMBER (BUILDING F16) A reinforced rectangular concrete structure for the detonation of explosive devices with an E-shaped single armoured chamber. An external metal staircase attached to the south-east elevation provides access to the flat roof which has metal railings to the rear (north-east elevation) and sides (south-east and north-west elevations). The rear and side elevations have three horizontal rows of square metal plates with central bolts which are presumed to be fixings for the monitoring of any detonations. There are also electrical inlets and outlets in the rear elevation.

- 3.12 Building F17 is a detonation chamber and is described in the list description as:

DETONATION CHAMBER (BUILDING F17) A bi-partite building of reinforced concrete and brick. To the south and west it is a single storey flat roofed structure housing the armoured laboratory (in reinforced concrete); to the south and east it is faced in red brick English bond, but the north elevation is in concrete (the west elevation was not inspected). The laboratory has a large and prominent T-shaped funnel to its flat roof. The main access is via folding wooden doors in the east elevation. A porch has been added to protect a south pedestrian doorway. At its north-east corner the building rises to two storeys, again in red brick English bond. All windows are metal-framed casements with concrete heads.

The interior was not inspected but it is known that the bursting chamber is located in the single storey part of the building. It is divided into two parts described as 'large' and 'small' on original plans. Each section has armoured glass observation windows and the whole is flanked by camera rooms to either side. Explosions were recorded using an angled mirror and a high speed camera. The two-storey 'tower' housed a photographic dark room on the ground floor and a control room above from which the trials were overseen. Both buildings date from 1947.

- 3.13 The list description offers the following reasons for its listing:

- Rarity: these are unique buildings, specifically designed for the development of the trigger for Britain's first atomic bomb;
- Historic interest: both are vital buildings in our understanding of the nation's atomic bomb research and development, a top-secret programme under the aegis of the HER Establishment which through its work at the Site, and sister sites, was to prove one of
- Britain's major scientific breakthroughs in the field of military armament;
- Design and form: the original function of both buildings is legible through their specialised form and both remain little altered from their original design.

Listed Building: Building Q14 (Grade II)

- 3.14 Located outside of the Scheduled Monument. The building's history and architecture is summarised in the list description as:

MATERIALS: Red brick in Stretcher bond encasing presumed steel-frame. Concrete roof.

PLAN: Rectangular two-storey, flat-roofed building oriented N-S. Ground floor double-height workshop. First floor reached by staircase at S end.

EXTERIOR: Double-height ground floor. Main entrance in S elevation through glazed double doors. Further pedestrian entrances to its E (now blocked) and at NE corner of building. Blocked large equipment entrance to SW retaining its original exterior wall light. Door head suggestive of former roller shutter door, now partly obscured by later plant room (the latter is not of special interest.) E elevation, which was public facing at the edge of the HER compound until 1952 when the boundary moved out to the E, originally blind at ground floor level, presumably to conceal the highly secretive nature of the work taking place inside. Current ground floor windows therefore secondary insertions. Form of original fenestration to W and N elevations remains legible as double-height windows to the ground floor to light the workshop inside. These large openings now bricked up with smaller ground floor windows inserted. All first floor windows are uPVC replacements although re-use original window openings. Fire escape to N elevation. (Replacement uPVC windows and the fire escape are not of special interest.)

On the W elevation a memorial plaque bearing the crest of the Royal Armament Research and Development Establishment reads: 'In this building a group of scientists & engineers led by the then Dr W G Penney worked on United Kingdom atomic warheads during the period 1946 to 1952. This plaque was unveiled on 6th April 1982 by Lord Penney OM. KBE. MA. PhD. D Sc. FRS.'

INTERIOR: Not inspected but ground floor viewed through windows. With the exception of the S entrance area and staircase, the ground floor comprises a single double-height workshop space which has a later inserted ceiling. An English Heritage internal inspection in May 2008 confirmed steel framing in the ceiling void of the workshop area although it was not possible to establish whether this was structural or a gantry for the travelling crane which is known to have been here originally. Staircase appears slightly modified with replacement modern treads. The Waterman gazetteer (2009) confirms that the first floor has a spine corridor providing access to office space

Q14 was a purpose-built structure designed for the assembly of the prototype warhead and its ballistic casing: it was central to Rowland's task to ensure that all the component parts fitted together in the casing. It was the only place where all the component parts of the bomb were brought together and where a complete model was assembled, although inert model wooden replicas were used instead of the live explosive components. (The colloquial name for Q14 was the 'RAF Building', illustrating the close collaboration between Penney's team and the end user, the RAF.) It is not known where the electronic components of the trial devices, which were then taken to RAF Woodbridge (Suffolk) were assembled although Q14 is a possibility.

3.15 The list description summarises the significance and reasons for selection

- Historic interest (personnel): of considerable significance nationally for its association with William Penney, CSAR, who led Britain's atomic bomb development programme at the Site and which association is celebrated by a memorial plaque;
- Historic interest (bomb development): the only building nationally where the prototype bomb (without live explosive components) was put together and thus instrumental in the detonation of Britain's first atomic bomb in 1952;
- Form and design: purpose-built for Britain's atomic bomb development programme. Although a functional building without architectural embellishment its form expresses the secrecy surrounding the programme, being blind on the public-facing side, and which retains its original workshop space and support accommodation for the assembly of the prototype warhead and ballistic casing; and
- Group value: for its associations with the Fort and the contemporary buildings within and outside of the mobilisation centre which were also part of the atomic bomb development work.

Setting of Listed Buildings

- 3.16 The listed buildings within the Fort benefit from the visually enclosed confines of the earthworks of the Scheduled Monument. The structures are listed for their function, age, rarity, association and group value. A key part of the significance of the listed buildings is their immediate context and group value with the other listed buildings and the Scheduled Monument.
- 3.17 There is limited inter-visibility between the buildings within the Fort due to the casemate traverses. This arrangement and the presence of the traverses, forms part of their interest and setting of the buildings. Within the confines of the Fort, the listed and non-listed buildings are experienced as a group with related historic functions and shared history. Accordingly, the Fort, the spaces within and the physical placement of the structures form the setting and contribute to the significance of the listed buildings.

4 SUMMARY DESCRIPTION AND HISTORY OF FORT

Description

- 4.1 The Fort is the oldest area of the Site and comprises a late 19th century Mobilisation Centre with a number of later structures. The Mobilisation Centre at Fort Halstead was formed as part of the London Defence Positions - a series of 19th century earthworks that were to be fortified in time of war and was designed to defend the capital in the event of an invasion.
- 4.2 The Fort appears roughly circular, though it actually comprises 11 sides and is approximately 200m in diameter. It is surrounded by a moat, now partly in-filled on the north west side, with a sloping earth counterscarp and a concrete revetted scarp.
- 4.3 Four large traverses, which may have accommodated field gun emplacements, punctuate the rampart, whilst a large central traverse bisects the interior of the Fort. The magazines, which are located under the traverses at the north-east, south-west and south-west salient, have separate chambers for cartridges and shells, whilst three casemates (comprising of 17, 4 and 9 cells) are located under the western and north-eastern ramparts and under the central traverse.
- 4.4 The western and central casemates also accommodate 3 smaller magazines, labelled on a contemporary plan 'Q F Magazines', thought to stand for Quick Firing. 2 of these magazines became the current F7 and F9 magazines. These magazines probably served a number of small emplacements formed in the rampart. Revetted in dry blockwork, these emplacements appear to have been designed for quick firing artillery or machine guns and were grouped to defend the entrance causeway across the ditch/moat at the north of the Fort. The magazines and casemates were constructed in concrete reinforced with steel and mounded over with earth to provide additional protection. Furthermore, and observed only at Fort Halstead, a layer of flints were set in the earth with the intention they would detonate a shell before contact with the magazine itself.

Summary History

- 4.5 In March 1889 the London Defence Scheme was announced and 13 sites for forts were chosen along a 70 mile stretch of the North Downs. The London Defence Positions consisted of temporary forts which were backed up with permanent sites that housed stores and magazines that were to supply a volunteer force. Fort Halstead was the largest and most expensive of the London Defence Positions and was one of only four designed for artillery deployment.
- 4.6 Designed in 1894 and probably constructed between 1895-7, the forts were soon viewed as obsolete and a number were sold off in 1907. Fort Halstead may have served as a military store during the First World War before being sold by the War Department to former artillery commander, Colonel Bradshaw, in 1921. During this period the Site was occupied by Bradshaw, who lived in a laboratory (Building F14) constructed within the Fort during WWI. The remainder of the Site was used as a campsite for the Territorial Army, boy scouts and girl guides as well as accommodation for Russian refugees.
- 4.7 The re-occupation of the Site by the War Office began when 2 departments, the Research Department and the Design Department (established at Woolwich Arsenal in 1922) were moved from London to Fort Halstead in the late 1930s. Woolwich's position on the River Thames and its role within military research would have made it a priority target for Luftwaffe bombers during the Second World War. Safety and concerns for the site and personnel led to the move to the more remote Fort Halstead.
- 4.8 In 1936 the first team of researchers and technicians moved into the Fort. This team, headed by Alywn Crow of the ARD, were tasked with developing rockets for anti-aircraft defence, long range attack, air combat and assisted take-off units. In 1938 Fort Halstead became known as the Projective Development Establishment. During the Second World War and immediately after its conclusion the

Site was expanded beyond the boundaries of the Fort into what is now Zone A and Zone X. Within the old Fort itself several buildings were constructed, one of the earliest being an experimental filling shed erected in 1938.

- 4.9 After the Second World War armaments research continued at Fort Halstead though at a reduced level. In 1947 the British cabinet decided to pursue development of atomic weaponry and tasked William Penney to lead the project, codenamed High Explosive Research (HER). To accommodate the new team tasked with research in atomic work a fenced enclave was created within the Fort and a group of buildings to its immediate north (Zone Q). The enclave included all structures within the Fort and involved the construction of several new buildings, namely F12 to F18. Older structures dating to the original construction of the Mobilisation Centre were also adapted for use as workshops and stores.
- 4.10 To ensure the secrecy of the work being undertaken by HER and to protect the surrounding buildings, the most sensitive work, the testing of the atomic bomb's electronic detonators, was carried out within the earthen banks of the Fort in F16, F17 and F18.
- 4.11 The nature of the Site has resulted in many buildings serving a number of different uses during the latter half of the 20th century. The specialist aspects of the buildings within the Fort has, however, meant that a number of them have retained their original use. As of today the Fort contains 3 listed buildings: 2 Grade II* and 1 Grade II. The Fort itself is a Scheduled Monument.

5 HERITAGE POINTS OF INTEREST

- 5.1 The listed and non-listed structures set within the Scheduled Monument, as well as the Fort itself, share considerable group value. Their close physical grouping and their enclosure within the earthworks of the Fort result in a controlled setting with little inter-visibility with the wider Site. The configuration results in an important and condensed cluster of heritage assets that give a sense of place, history and character.
- 5.2 The continued ownership and uses undertaken in the Fort have contributed to the formation and preservation of its character and present an opportunity for minimal intervention to offer enhancement.
- 5.3 The physical form of the buildings, their relationship to one another, their setting and the landscape form the basis of the visitor's experience. As an enclave of heritage assets with a clearly defined perimeter the Fort provides a self-contained and private setting for the heritage assets contained within it.
- 5.4 This section describes key points of interest that would be included and celebrated in the HIC. This summarises important factual information that individually and collectively demonstrate the significance of Fort Halstead in either a local, regional or national context.
- 5.5 A key part of the significance of the of the Fort is its history of continued use and adaptation. The interpretation centre presents the opportunity to illustrate the use and development of the Site from its conception and construction through to its closure. This presents a timeline spanning from the 1890s through to 2015. Key topic areas to be presented as part of the HIC are set out below.
- 5.6 In addition to the core points illustrated below there is scope for the following to be presented in the HIC:
- Archaeological and topographical information
 - Political and historical context to events
 - Imagery: illustrative, cartographic and pictorial materials
 - Artefacts

Late 19th century Mobilisation Centre (The Fort, Area F)

- 5.7 One of 13 fortifications built at the end of the 19th century as part of the London Defence Scheme. Its construction is representative of Great Britain's fear of invasion following the growing naval strength of France and her soon- to-be ally, Russia. Fort Halstead was the largest and most costly of the mobilisation centres but ultimately was not used for its intended purpose, because the Navy Defence Act of 1889 sought to reinstate the Royal Navy's dominance and reduce the threat of invasion. It is one of the best preserved examples of a Mobilisation Centres, along with the Reigate and Henley forts.

Rocket Development (The Fort, Area F)

- 5.8 Having sold the Fort shortly after the conclusion of the First World War, the War Office repurchased the Site in 1937 with the intention of using the Fort as a secure location for experimentation into the mechanical, thermal and other physical properties of large cordite charges, relating to the development of rockets. Elements of the Research Department's ballistic branch were charged with conducting research and development into rockets. Following the success of the 3-inch rockets the unit became a separate Projectile Development Establishment. Building F11, built in 1938, is an Experimental Filling Shed and the earliest surviving purpose-designed building associated with rocketry research and development in the country.

The Second World War

- 5.9 The danger of air attack by German bombers at the beginning of the Second World War saw the Projectile Development Establishment being moved from the Site. The shuffling and re-organisation of military design offices, prompted by the growing complexity of research and development into armaments, saw the arrival of the Design Department at Fort Halstead in 1942. The Research Department followed suit and arrived from Woolwich Arsenal soon after. These organisations were re-designated as the Armament Design Department (ADD) and the Armament Research Department. The arrival of these departments at Fort Halstead saw large scale development, which would facilitate the Site's use as a top secret research and development facility.

Pioneering work into Armaments

- 5.10 During the Second World War the Fort saw a succession of significant developments in explosive and armament technology. Explosives such as the 'Minols' range and Torpex, which was used in the destruction of the Tirpitz and the Ruhr dams and in the famous 'Dambusters' raid, were developed, as were the explosives for the 22,000lb 'earthquake' bombs. Developments in ammunition included the SR365 incendiary ('tracer') rounds, hollow charge and Armour Piercing Discarding Sabot (APDS) anti-tank projectiles. The successful 17 pounder anti-tank gun and the recoilless Weapon of Magnesium, Battalion, Anti-Tank (WOMBAT) anti-tank gun were developed at the Fort, as were a range of anti-aircraft guns. Research into armoured fighting vehicles was also undertaken, resulting in the development of the Mark 1 and 2 Centurion tanks, with the Mark 3 following in the years following the war.

Atomic Research

- 5.11 Britain's atomic weapon research programme began soon after the conclusion of the Second World War and was initially based at Woolwich Arsenal, but was quickly transferred to the Ministry of Supply's facility at Fort Halstead. The project, code named 'Basic High Explosive Research' (HER) was headed by Dr (later Sir) William Penney who was involved with the Manhattan Project. Little is known of the exact work that was undertaken at the Fort by HER but the suggestion is that it included research into detonators and several buildings at the Site are thought to have been purpose built for this work (F16 and F17). Q14 is thought to have been used to assemble mock-ups of the UK's first atomic bomb prior to live assembly work at Foulness. As production progressed towards the production of a test weapon new facilities for handling plutonium became necessary. Furthermore, due to the work being spread across a number of test facilities in the UK, which led to confusion of authority and responsibility, it was realised that a single site was required. The Site was considered too small (AWE 2009), and in September 1949, a WWII airfield near the village of Aldermaston in Berkshire was allocated for the task. The technological advancements into atomic weaponry made at Fort Halstead and the subsequent creation of her first nuclear bomb allowed Britain to maintain its position in world politics.

Cold War: Captured German Technology

- 5.12 Following the departure of the HER programme, conventional research continued apace at Fort Halstead. Buildings S4 and S5 were based on the designs of buildings captured by the British T-Force during Operation Surgeon. S4 contained a large water tank used for testing the underwater behaviour of high velocity missiles and S5 housed wind tunnels for use in aero-ballistic research. The technology captured in the months and years after the conclusion of the Second World War allowed the UK to meet the perceived needs of the Cold War and for its armed forces to keep abreast of the technology and weaponry posed by the Soviet Union.

Cold War: First Digital Computer

- 5.13 In 1954 the Site acquired a digital computer - the first to be installed in a Government Research Establishment. This led to, amongst other developments, the invention in the early 1960s of the Mirfac computer language; similar in appearance to Basic, but pre-dating it by two years.

Cold War: Other Research

- 5.14 Though the research carried out at Fort Halstead during the Cold War is still subject to the Official Secrets Act, it is thought that in general, research incorporated areas such as electronic imaging and hypersonic weapons whilst continuing in the established fields of metallurgical analysis, fluid dynamics and the rheology of highly filled energetic materials.

The End of the Cold War

- 5.15 The Site continued in its capacity as a military research development site for conventional weaponry to be used by the Royal Navy, Army and Royal Air Force. Developments were inspired by particular projects though the buildings were constructed with speed of erection and flexibility of design, allowing for future changes of use. Spurts in the growth of the Site could be equally attributable to a rise in defence spending or the rationalisation and relocation of various departments, or indeed a combination of the two. The Site attained its maximum extent by the mid-1980s and comprised approximately 350 buildings. Following the conclusion of the Cold War, activities at the Site have been adapted to the defence requirements of the late 20th century and early 21st century.

Recent History: Post Cold War & Gulf War

- 5.16 Following the signing of the Treaty on Conventional Armed Forces in Europe (CFE) in 1990, the Centre for Defence Analysis (Land) (CDA), which had originated as a theoretical research group during WWII, became based at the Site. This was the first establishment in the world to evaluate the resulting balance of military power in detail (Clive 1997). The centre, which also existed to evaluate future equipment, specialised in the predictive modelling of future conflicts, often using computer supported war-games to analyse scenarios relating to both military action and civil unrest.

Recent History: Public Private Partnership, the creation of DSTL and QinetiQ

- 5.17 In 1998, a Strategic Defence Review recommended Public Private Partnership (PPP) as the best way to maximise the strategic value and operational cost effectiveness of the UK's defence research capabilities. DERA was split into two organisations, the areas retained by the MOD becoming DSTL in 2001; those that were considered appropriate for fully commercial operation were re-structured and re-created as the QinetiQ Group, a wholly Government-owned UK plc. In 2003, QinetiQ became a public private partnership which was then floated on the stock market in 2006. DSTL continue to supply scientific and technical research and advice for the MOD and other Government departments (DSTL website). QinetiQ provides research, technical advice, technology solutions and services to customers, including the MOD, in the defence and security industries and is now Europe's largest science and technology organisation.

Recent History

- 5.18 Recently, the principal functions of the Site have included research and forensic analysis into explosives at the Government's Forensic Explosives Laboratory, now operated by DSTL. The development of bomb disposal robotics, as tested in the area to the west of N11 and N11.1, and the

testing and analysis of existing and prototype military equipment are other avenues of research in which the Site has engaged. The latter being reflected in the recent expansion of the massive N2 'test house'.

Key Personnel

Alwyn Crow (10 May 1894 – 5 February 1965)

- 5.19 Sir Alwyn Douglas Crow was a British research scientist involved with research into ballistics, projectiles and missiles from 1916 to 1953 and headed the Projectile Development Establishment at Fort Halstead. He developed the Unrotated Projectile – an anti-aircraft weapon for the Royal Navy which was used in the early period of the Second World War. He was appointed to staff of the Royal Arsenal at Woolwich in 1917 where he became Director of Ballistics Research in 1919 and continued in this role until 1939. His other titles and roles included the Chief Superintendent of Projectile Development (1939-40), Director and Controller of Projectile Development (1940-45) and Director of Guided Projectiles at the Ministry of Supply (1945- 46).

Key Personnel: William Penney (24 June 1909 – 3 March 1991)

- 5.20 Sir William George Penney was a British mathematician who had an integral role in the development of Britain's nuclear programme, leading to the development of its first atomic bomb in 1952. He was also responsible for research and development into more conventional weaponry and made significant contributions to the application of collisions, explosion events that created shock waves and applications involving military use of hydrodynamics and gravitational waves. In 1944 Penney joined Tube Alloys, the secret nuclear weapon directorate and was made head of the British delegation working in the Manhattan Project. After the war Penney was made the Chief Superintendent Armament Research (CSAR) at Fort Halstead and was responsible for all types of armaments research. Following the decision to proceed with the British atomic bomb project in 1947, Penney was officially named to head the HER Project and began assembling teams of scientists and engineers to work on the new technologies that had to be developed at Fort Halstead. Centred at Fort Halstead the works proceeded under Penney until it was realised that a larger site was needed and the HER, along with Penney, moved to RAF Aldermaston in Berkshire.

Key Personnel: John Lennard-Jones (27 October 1894 – 1 November 1954)

- 5.21 Sir John Edward Lennard-Jones was a mathematician who was well-known for his work on molecular structure, valency and intermolecular forces though his main interest lay in atomic and molecular structure. At the outbreak of the Second World War, he was seconded as Chief Superintendent of Armament Research to the Ministry of Supply at Fort Halstead, which took over the mathematical laboratory for ballistics calculations and developed a team of mathematicians for this purpose. Between 1942 – 5, Lennard-Jones was the Director-General of Scientific Research (Defence) for the Ministry of Supply.

Key Personnel: Frank Ewart Smith (31 May 1897 – 14 June 1950)

- 5.22 Sir Frank Ewart Smith was a military scientist who served in the Government appointed role of Chief Engineer & Superintendent of Armament Design (CEAD) for the Ministry of Supply at Fort Halstead during the Second World War. He had a leading role in the design and development of the Projector, Infantry, Anti-Tank (PIAT) weapon, for armour piercing, which was the British equivalent to the American Bazooka. His military science experience when reading intelligence reports led him in 1943 to predict the development and deployment of long range rockets by Germany. Fortunately, he had Winston Churchill's ear, and V-2 launch sites were targeted by Allied forces

Other distinguished former staff

- 5.23 Dr Douglass Hartree, after whom the Hartree unit of atomic energy is named, and the Hartree-Fock method of approximating n-body wave functions. Joined the Projectile Development Establishment at Fort Halstead
- 5.24 Sir Nevill Francis Mott, a British physicist who won the Nobel Prize for Physics in 1977 for his work on the electronic structure of magnetic and disordered systems. During the latter part of the Second World War he led a theoretical group at the Armament Research Department at Fort Halstead that worked on the role of plastic deformation on the progression of fracture cracks.

6 CREATION OF A HERITAGE INTERPRETATION CENTRE

Context: Kent Visitor Attractions

- 6.1 Kent has a rich military history offering numerous visitor attractions celebrating this heritage and its material legacy. Kent's proximity to mainland Europe, its strategic position relative to London, its geographic features such as the River Medway, Thames Estuary and dramatic coastline, have all played a part in this County's important place in the offensive and defensive history of Britain.
- 6.2 Creating an HIC visitor attraction at Fort Halstead will add to an existing diverse range of museum and educational facilities within the county that cover a broad period covering the navy, air force and army. The Fort Halstead HIC offers a unique but complementary visitor attraction to those already established, offering information on the key topics of late 19th century land defence, and the research, development, testing and analysis of explosives.
- 6.3 Relevant military related attractions in Kent include:
- Reigate Hill Mobilisation Centre (National Trust);
 - Spitfire and Hurricane Memorial Museum, RAF Manston;
 - The Historic Dockyard Chatham;
 - Chatham Lines and Fort Amherst;
 - The RAF Manston History Museum;
 - Royal Engineers Museum, Gillingham;
 - Kent Battle of Britain Museum;
 - Battle of Britain National Memorial;
 - The Shoreham Aircraft Museum;
 - The Romney Marsh Wartime Collection & Brenzett Aero Museum;
 - Ramsgate Maritime Museum;
 - Ramsgate Tunnels;
 - Dover Castle, Deal Castle, Upnor Castle, Hever Castle, Leeds Castle, Rochester Castle;
 - Secret Wartime Tunnels, Dover;
 - Richborough Fort and Roman Amphitheatre;
 - Martello towers (various);
 - U-475 Black Widow Russian Submarine (Cold war);
 - Shoreham Aircraft Museum.

Constraints on reuse and adaptation

- 6.4 Works affecting Scheduled Monuments are subject to control in order to preserve their heritage interests. Applications for such proposals are determined by the Secretary of State, based on recommendations made by Historic England.
- 6.5 Any proposed works seeking the demolition of a listed building or for its alteration or extension in any manner which would affect its character as a special architectural or historic interest require an

application to the local planning authority for listed building consent (except for cases where the building is also part of a Scheduled Monument and only Scheduled Monument Consent is required).

- 6.6 Scheduled Monument or Listed Building consent will be sought as necessary for the final proposed works, following the grant of outline planning permission.
- 6.7 Use of buildings for storage and testing of explosive and other materials presents potential for contamination of land and structure. Any reuse and adaptation will follow necessary survey and remediation.

Governance and Management

- 6.8 A governance structure for the whole site would need to be established and would most likely include a Board of Trustees, stakeholders, an employed manager and a pool of volunteer workforce. The organisation would be a not-for-profit enduring institution rather than a business opportunity seeking short term expediency and limited life vision. This organisation would be responsible for the Fort HIC.
- 6.9 Early discussions have been held with DSTL about taking on an operative responsibility for the HIC following DSTL's departure of the site and cessation of operational work. The early indication is that this may take the form of a Charitable Trust and that employees of DSTL take on a stewardship role. This has been done elsewhere and the operational costs are funded by a mixture of grant, entry fees, donations and s106 contributions. This suggest a third party engagement by persons with a knowledge of how to display to best effect the assets as a good way forward
- 6.10 Management would seek to secure the long-term operation and development of the attraction for the wider constituency rather than for the benefit of those governing the attraction.
- 6.11 Consideration of accreditation has not been undertaken at this stage.

'Level' of attraction

- 6.12 Fort Halstead HIC will form a permanent visitor attraction principally operated by volunteers.
- 6.13 Visitors will experience historic structures in their setting, principally the man-made landscape of the Fort and the built and natural landscape in which it is located. It will also be visually linked to the historic Penney buildings outside of the Fort with access granted from the new 'Village Centre' within the Site.
- 6.14 Information on the buildings, their historic uses and processes and functional relationship with each other and the wider Fort Halstead Site, will be presented through illustrated boards and signage.
- 6.15 Displays (temporary and permanent) would be included with diverse and specialist subjects relating to Fort Halstead's history. In addition, related and expanded topics would be included to provide context and substance to support and compliment the specialist areas. These may include history and technology subjects related to the national schools curriculum, local history, civil defence and the human, social and moral consequences of warfare.
- 6.16 Opportunities exist to utilise multi-media and interactive systems such as audio and audio-visual productions, image databases and websites, multimedia guides and mobile apps.

Landscape management

- 6.17 Selective tree and shrub clearance and maintenance are proposed within the Fort subject to feasibility (as it is unknown to what extent roots might be holding parts of the Fort together or what the archaeological impacts may be).

- 6.18 The purpose of this is threefold: to better reveal the historic form of the earthworks; to enable an understanding of the spatial relationship between buildings; and to selectively expose sightlines from gun emplacements to illustrate the defensive role of the Fort.

Parking

- 6.19 Parking for the Fort will be provided within the nearby village centre parking. Vehicular access to the Fort is not proposed and it is anticipated that deliveries will be made to the nearby village centre for collection by occupiers of the workshops as necessary. Existing vehicular access will be maintained.

Opening Times

- 6.20 Inclusion of craft use would result in the Fort being accessible all year round. External elements of the HIC would be accessible and opening times would be in effect for the buildings.
- 6.21 Comparable visitor attractions tend to operate the hours of 9am to 4pm/5pm and are either open all year around, seasonally or by appointment. Hours of opening and operation will be influenced by visitor numbers/demand and may only be established by market research.

Visitor Experience

- 6.22 The visitors will experience the approach and sense of arrival at the Fort by accessing the HIC via the causeway over the moat. The presence of a perimeter fence, gate and entrance lodge will illustrate the secure nature and former privacy of the place. These features are important in defining the character and sense of place.
- 6.23 Upon entering the Fort visitors will be drawn to building F11 as the focus structure and hub of the HIC.
- 6.24 It is proposed that Building F11 (the Experimental Filling Shed which is Grade II listed) close to the Fort entrance would be used as display space, displaying material such as a time line recording the history of the Site and its use for defence and forensic activities, John Penney's work on creating the detonators for the British atomic bomb, and imagery of explosive work undertaken on Site. The display will also incorporate information on how Fort Halstead has performed a defence role in a wider network of sites, and its relationship with the surrounding network of villages over time.
- 6.25 Buildings F16 and F17, the explosives testing chambers which are Grade II* listed will be preserved (with conservation measures as appropriate) in their current form and can be opened with advance notice to interested parties to see inside.
- 6.26 The casemates (buildings F2 and F7 & F9) within the Fort will be used as craft workshops (Use Class D1) and may provide some local employment, at a small-scale ancillary to the D1 Use Class. These buildings will form a visible part of any walk-through experience of the Site given they have formed an important role in the development of the Fort. There may be opportunity within buildings F7 & F9 to provide any necessary visitor facilities such as toilets, further display spaces and any multimedia experience.
- 6.27 Building F15 is a lavatory and will continue in this role. It is intended that this will be for private use available to persons associated with the craft uses.
- 6.28 The earthworks and open space between the buildings can be used to demonstrate former parade areas and defence lines. This may include better exposing a gun emplacement and selective tree and shrub clearance (subject to assessment on archaeology and slope stability) to demonstrate the relationship and elevation between the gun emplacement and the wider landscape.

- 6.29 Visitors will be advised on the individual functions and design characteristics of each building. Explanation of construction, siting, function specific characteristics and uses can form part of the learning and educational experience.

Interpretation, Information and Display Material

- 6.30 In addition to the presentation of the buildings and their setting the user experience would be enhanced through presentation of display material. Display of archive materials including pictorial, cartographic, documentary and artefactual evidence is intended to form the basis of the intellectual sensory experience.
- 6.31 Documentary, cartographic and pictorial materials exist in public repositories, including the Public Records Office, and subject to the necessary permissions such materials can be reproduced to illustrate the Site's history and development.
- 6.32 DSTL retain an archive of documentary, pictorial and artefactual evidence that relates to uses and activities as well as the development of the Site. Subject to security clearance and agreement display of artefacts and archive materials would be intended.
- 6.33 The website forthalstead.org, which is maintained by the Friends of Fort Halstead (a mixture of military and civilian former employees) also contains a wealth of material related to the history of the Fort. Furthermore, the Friends of the Fort may also be able to provide further oral history related to the development and use of the Fort.
- 6.34 Security restrictions relating to recent uses and activities principally apply to the results of the testing and research, not the methods and activities themselves. Accordingly there is good potential for display of processes such as the high shutter speed photographic recording of materials testing and explosives, even if the detailed technical results have prohibited access. This has been confirmed by DSTL.

Management of access

- 6.35 Retention of the security measures in the form of a perimeter fence to the Fort, gated entrance to the causeway and retention of the security lodge (Building F1) will maintain the important sense of historic controlled access and provide security of the Fort when not open to the public.

Anticipated visitor numbers

- 6.36 Detailed market research to establish potential visitor numbers has not been undertaken at this stage. Establishing visitor numbers will inform the nature of the information display systems and may influence the personnel and management of the facility.
- 6.37 Three examples of visitor attractions are summarised below as case studies. These range in type and scale, each with different factors that affect visitor numbers.
- **SMALL SCALE** - Reigate Fort: This 19th century monument was built as a mobilisation centre and is contemporary to Fort Halstead. It retains casemates and buildings (fewer than Fort Halstead), gate piers, moat, ramparts and traverses. It is owned and maintained by the National Trust with free entry from dawn to dusk every day. Access to the buildings is restricted save for open days or by special charter. As a free entry monument visitor numbers are not recorded. Recording of visitor numbers occurs when paid events are held, such as re-enactment days.
 - **MEDIUM SCALE** - Spitfire and Hurricane Museum, which is an established attraction located in former RAF buildings, experiences footfall of between 2,000-4,000 visitors per month. It offers a free admission and provides two permanent galleries with artefacts, displays and information on their specialist subject with a degree of diversification of subject matters and

displays to attract the entire family and school parties. The museum includes a shop and visitor facilities. The museum has a Board of Trustees, three paid staff and a pool of c.60 volunteers.

- **LARGE SCALE - Dover Castle:** operated by English Heritage and celebrating historic periods from the Roman, Medieval and Napoleonic periods through to the World Wars and Cold War. The attraction may experience 2-3,000 visitors per day. Admittance is in the region of £17 per head. As well as impressive structures, landscape and tunnel system the attraction includes collections, displays and interpretative information.

6.38 It is anticipated that the Fort Halstead HIC may attract up to a total of approximately 5000 visitors per annum. Visitors may include individuals, local groups and local school parties. The majority of visitors are anticipated to be local, sub- regional and regional.

6.39 Interest and visitor numbers would be influenced by a number of factors:

- Creation of a new museum/facility;
- Introduction of public access to a historically private and highly secure site;
- Subject matter and site-specific values and interests;
- Its location and proximity to other military visitor attractions celebrating Kent's rich military history and role in Britain's history.
- Local and regional importance as a major employer;
- Transportation links and accessibility.

6.40 Requirements to provide visitor facilities within the fort are greatly reduced by the proximity of the Village Centre, which will include a shop.

Craft uses

6.41 Local craft uses would provide a suitable and sustainable new use to the casemate buildings. Such uses may result in minimal adaptation of structures or their inherent character and appearance. Craft uses also present the additional benefit of complimenting the visitor attraction and contributing to the visitor experience.

6.42 Buildings within the Fort benefit from services (water, drainage, electricity). Service runs tend to be surface mounted and include raised and supported lagged services that follow and cross paths and connect buildings. Whilst the fabric and material of the service runs are not historically sensitive these features have formed part of the character and appearance of the Fort in recent years and reuse would prevent excavation of trenched services within the Scheduled Monument.

Deliveries

6.43 Vehicular access within the Fort is currently limited to transportation of materials and vehicles for servicing. The lack of vehicles (moving or parked) is part of the character of the place that is desirable to maintain.

6.44 The craft uses would likely require deliveries. These are anticipated as being small scale and likely to be delivered by vehicles up to 7.5 tonne. It is proposed that delivery vehicles do not enter the Fort. Instead deliveries would be made to the side gate to the Fort where modern intrusion has resulted in better access than the historic causeway. From here deliveries would be transferred into and around the Fort by electric vehicles, such as the 'milk float' vehicles that currently serve this role for the delivery of materials between magazines and testing chambers.

Access for All

- 6.45 There would be level access between the car parking provided for the Village Centre and the Fort, via the entrance causeway. Within the Fort the external tarmac pathways would be maintained as an established surface treatment. These paths link each of the buildings without steps and are suitable for wheelchair access. Minor slopes exist that may necessitate aid.
- 6.46 Many of the buildings within the Fort have level access to at least part of the structure. Except for Building F11 the buildings within the Fort are single storey. The internal areas proposed for display within the HIC will be located at ground floor level and within accessible buildings.
- 6.47 A full access audit would be undertaken to inform an access strategy looking to improve access to buildings. Measures to improve access may be subject to requirement for listed building consent and/or scheduled monument consent.

New Facilities

- 6.48 It is not anticipated that new facilities would need to be constructed within or beyond the Fort to create the HIC.



APPENDICES

Appendix A

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Public Record Office

Document References:

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DEFE51/2

DEFE51/2

DEFE 51/17

DEFE51/21

ES1/271

HLG 131/414

WO195/13579

WO195/14113

Appendix B

Site Location

Notes:
 Do not scale from this drawing.
 All contractors must visit the site and be responsible for taking and checking dimensions.
 All construction information should be taken from figured dimensions only.
 Any discrepancies between drawings, specifications and site conditions must be brought to the attention of the supervising officer.
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- Key
- Outline Planning Application boundary
 - Applicant's land ownership boundary
 - - - Detailed Planning Application boundary
 - Existing buildings

Rev	Date	Description	Drawn	Check
P2	06.04.20	Submitted for Planning	ECC	RT
P1	10.03.20	Submitted for Planning	CDS	ECC

FOR PLANNING

Client
 Merseyside Pension Fund



Project
 Fort Halstead

Drawing Title
 Site Location Plan

Scale @ A0	1:2500	Job Ref.	005561
Drawing No.	005561_SD1	Revision	P2

Scale bar: 0 20 40 60 80 100m

M 25

Appendix C

Scheduled Monument Description



Fort Halstead

Overview

Heritage Category:
Scheduled Monument

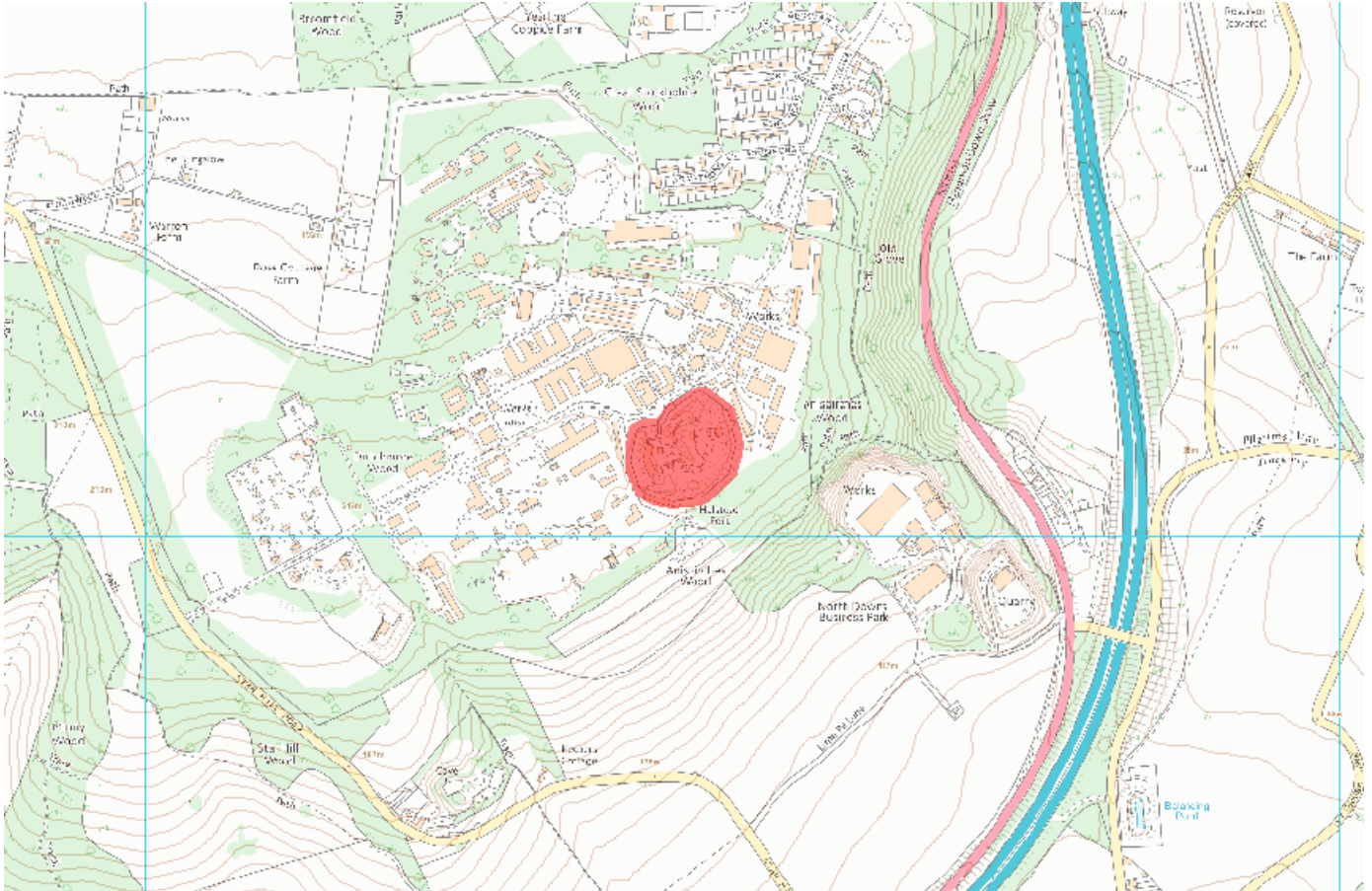
List Entry Number:
1004214

Date first listed:
29-Apr-1976

Date of most recent amendment:
21-Mar-2013

Statutory Address:
Fort Halstead, Dunton Green, nr Sevenoaks, Kent

Map



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The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - [1004214.pdf](#)

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 27-May-2020 at 15:42:13.

Location

Statutory Address:

Fort Halstead, Dunton Green, nr Sevenoaks, Kent

The building or site itself may lie within the boundary of more than one authority.

County:

Kent

District:

Sevenoaks (District Authority)

Parish:
Dunton Green

National Grid Reference:
TQ4990059145

Summary

A late C19 mobilisation centre which was modified from the late 1930s for rocketry research, and in the late 1940s for the top-secret development of Britain's first atomic bomb.

Reasons for Designation

Fort Halstead, a late C19 mobilisation centre which was modified from the late 1930s for rocketry research, and post-war for the top-secret development of Britain's atomic bomb, is scheduled for the following principal reasons: * Rarity and form: one of 13 purpose-built mobilisation centres nationally erected in the late C19. Fort Halstead was the largest (and most expensive) built and is one of only four designed for artillery deployment. Also, a highly significant site in terms of mid-late C20 rocketry and atomic bomb research and development; * Survival and diversity: a mobilisation centre which survives in largely intact form. Although a section of late C19 ditch has been infilled, this survives intact as a buried feature. The fort also includes evidence for the site's later research and development role with limited alteration of some of the casements and magazines for this later use; this modification adds to the fort's interest; * Documentation: the site has the potential to significantly enhance our understanding of the development and operation of the late C19 mobilisation centres constructed to defend the capital, also to aid our understanding of the nationally significant atomic bomb research and development undertaken here; * Group value: with listed buildings within and immediately outside the Fort representative of the site's later role as a military research establishment.

History

Fort Halstead is one of fifteen late C19 mobilisation centres interspersed with entrenchments established to defend London in the event of invasion. The capital was not encircled by these centres but was protected to its north-east, east and south, the anticipated directions of attack, and their construction represents a lack of confidence in the Royal Navy's ability to protect the country from its enemies at that time. Designed in 1894, Fort Halstead was probably constructed between 1895-7 and was intended to be a nodal point where volunteer forces could collect equipment and ammunition if the need arose. Unusually for a site of this type it also had the provision to mount machine-guns in emplacements. The fort is not shown on the 1896 Ordnance Survey map (although the associated caretakers' cottages are depicted) and therefore it is not clear whether the fort area had been deliberately left blank for security reasons (a common convention for military structures on early maps) or whether it had yet to be built. In common with many of the other mobilisation centres, Fort Halstead was generally unoccupied although its upkeep and security was ensured by on-site caretakers for whom two cottages were built outside of the fort ditch. Most mobilisation centres also had a contemporary tool store, located outside of the fort, although at Fort Halstead the tool store was not built until 1920. The London Defence Scheme, of which Fort Halstead was a part, was abandoned in 1906.

During the First World War the fort was used as a defensible ammunition store forming part of the London anti-invasion stop-line. In 1937, after sixteen years of private ownership, the War Office bought the site to accommodate the Projectile Development Establishment as it provided a remote and contained site for rocket development building on earlier work by the Ballistics Branch at the Royal Arsenal in Woolwich. From the late 1930s the site expanded with a number of buildings constructed inside and outside the fort. After the end of the war, Fort Halstead became the top-secret High Explosives Research headquarters with the task of developing Britain's atomic bomb (developing the Mark 1 warhead which when assembled in its casing was known as 'Blue Danube') and this work was to dominate the work at Fort Halstead. Other structures associated with Blue Danube have been scheduled recently at the former RAF Barnham. Additional structures for this research were built in and around Fort Halstead, all within a secure fenced enclave. As was common to projects of the time different research establishments were responsible for developing different components of weapons systems. Although few records exist it is known that Fort Halstead

personnel were responsible for developing both high explosive and electronic detonators for the atomic bomb. Britain exploded her first atomic bomb on the Mont Bello Islands, Australia on 3 October 1952.

Atomic weapons research and development continued at Fort Halstead until 1955 when staff transferred to the Atomic Weapons Research Establishment at Aldermaston (Berkshire). Fort Halstead has since continued as a government defence research establishment concentrating on explosives and other research.

Details

Fort Halstead is located on the crest of a steep chalk escarpment of the North Downs, to the north-west of the village of Dunton Green and overlooking the Darenth Valley. The fort is polygonal in plan and is surrounded by an earth rampart and a deep external ditch with a sloping earth counterscarp and concrete revetted scarp. The ditch is extant for much of the circuit except at the north-west and west of the fort where it has been infilled although it survives as a buried feature. Within the base of the ditch to the south is a brick compound built against the concrete revetment and containing a domed structure of unknown function.

The original access to the interior parade is from the north-west where two of the eleven angles of the fort form a re-entrant. There is a later additional entrance to the south-west linking the fort interior with the wartime experimental rocket filling area to the south-west of the fort. This entrance is shown on an aerial photograph of 1952 but not on one of 1946. The original entrance is via a north-south causeway over the ditch which is flanked by low concrete walls topped with original metal fence posts and a modern wire mesh fence. Originally the whole fort would have been enclosed within a high steel fence with gates hung on steel girders at the entrance (traces of which survive). Where the roadway cuts through the rampart it is flanked by concrete retaining walls.

The rampart is a massively built earthwork, part revetted in concrete, with a parapet, banquette (infantry fire-step) and terreplein (a platform or level surface on which heavy guns are mounted). Along the crest of the rampart are surviving traces of the brick-revetted emplacements for machine-guns positions some with small expense magazines set into the rampart. (Nine appear to be shown on the Bradshaw plan of 1922). At the north-east corner of the fort is an additional structure of Second World War date, possibly a fire watchers post. This is of brick and concrete construction and has a protected entrance. A number of traverses project from the internal face of the rampart, the majority of which are mounded over magazines or casements. There is a linear central traverse which crosses the parade in a broadly north-south axis, centrally to the fort, curving to the north-east at its northern end.

There are three magazines cut into traverses to the north-east (Building F3), south-east (Building F5) and south (Building F6). These are concrete built and cellular providing chambers for the storage of ammunition (shells and cartridges). All are provided with safety lamp recesses with glazed and metal grill covers: these recesses ensured that the flame of the lamp was separated from, but lit, the ammunition storage areas. The earth-covered reinforced concrete roofs have an added layer of flint within the earth cover designed as a bursting layer to detonate any enemy shell before it reached the magazine.

There are also three sets of casemates, to the west, north and east. All the casemates are concrete built and cellular although with some discreet elements in brick. The northern (Building F2 which was not available for inspection) is cut into the northern end of the central traverse. In plan this has nine casemates running broadly north-south with a covered access corridor to the west. An associated ammo store is cut into the rampart to the north-west across the access passage. The eastern group (Building F4) is cut into the rampart. These casemates were available for inspection and have access steps leading down from the north parallel to an access ramp. To the east of the covered corridor are the four chambers. These have solid planked double doors with timber-framed overlights. The passage is now (2012) covered in a clear plastic corrugated roofing material and there is extensive pipework in the corridor above head height. The western and largest group of casemates (Building F8) comprises 17 chambers with a reinforced concrete roof, and also two ammunition stores for small arms (Buildings F7 and F9) set west of the concrete revetted access passage within the rampart. It was originally earth-covered but this has been removed. Two flights of steps lead from the passage up onto the rampart. Access was prohibited at the time of inspection but it is understood that these casemates have experienced some minor alterations for use from the mid C20 onwards but that their C19 form remains legible. Photographs from c1989 show that the corridor, its roof covering and chamber entrances are of the same form as Building F4. However, many of the entrance overlights had been bricked-up at that time. The same photographs suggest that the internal chamber divisions are at least partly brick built.

At least one C19 hydrant survives within the fort.

EXTENT OF SCHEDULING

The monument excludes all buildings and structures constructed post-1900 (although the ground beneath them is included), the one exception being the Second World War firewatcher's post on the north ramparts which is included. For the avoidance of doubt Buildings F2, F3, F4, F5, F6, F7, F8 and F9, which are all part of the C19 fort, are included in the scheduling as are any post-1900 modifications to these structures.

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:

KE 303

Legacy System:

RSM - OCN

Sources

Books and journals

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Aerial Photograph (October 1946): RAF CPE UK 1789 11 Oct 1946, frame 4473

Aerial Photograph (April 1947): RAF CPE UK 1982 11 April 1947, frame 1110

Aerial Photograph (May 1952): RAF 540/731, 15 May 52, frame 4075

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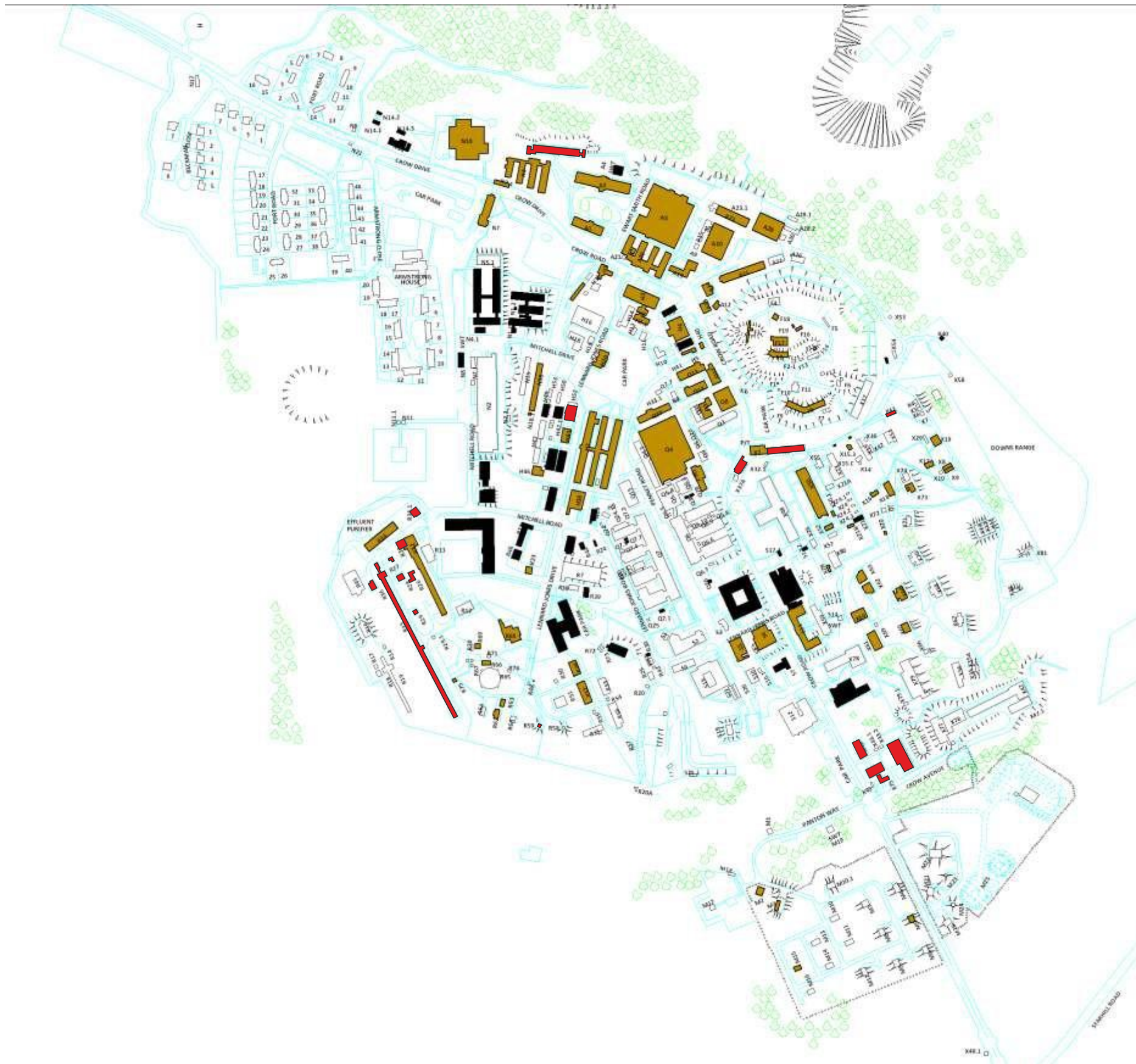
Legal

This monument is scheduled under the Ancient Monuments and Archaeological Areas Act 1979 as amended as it appears to the Secretary of State to be of national importance. This entry is a copy, the original is held by the Department for Digital, Culture, Media and Sport.

End of official listing

Appendix D

Historic Plans



- Accessed for internal inspection (Waterman)
- Accessed for internal inspection (Heritage Collective)
- Demolished prior to survey

Figure 2: The buildings at the site showing those accessed during the survey

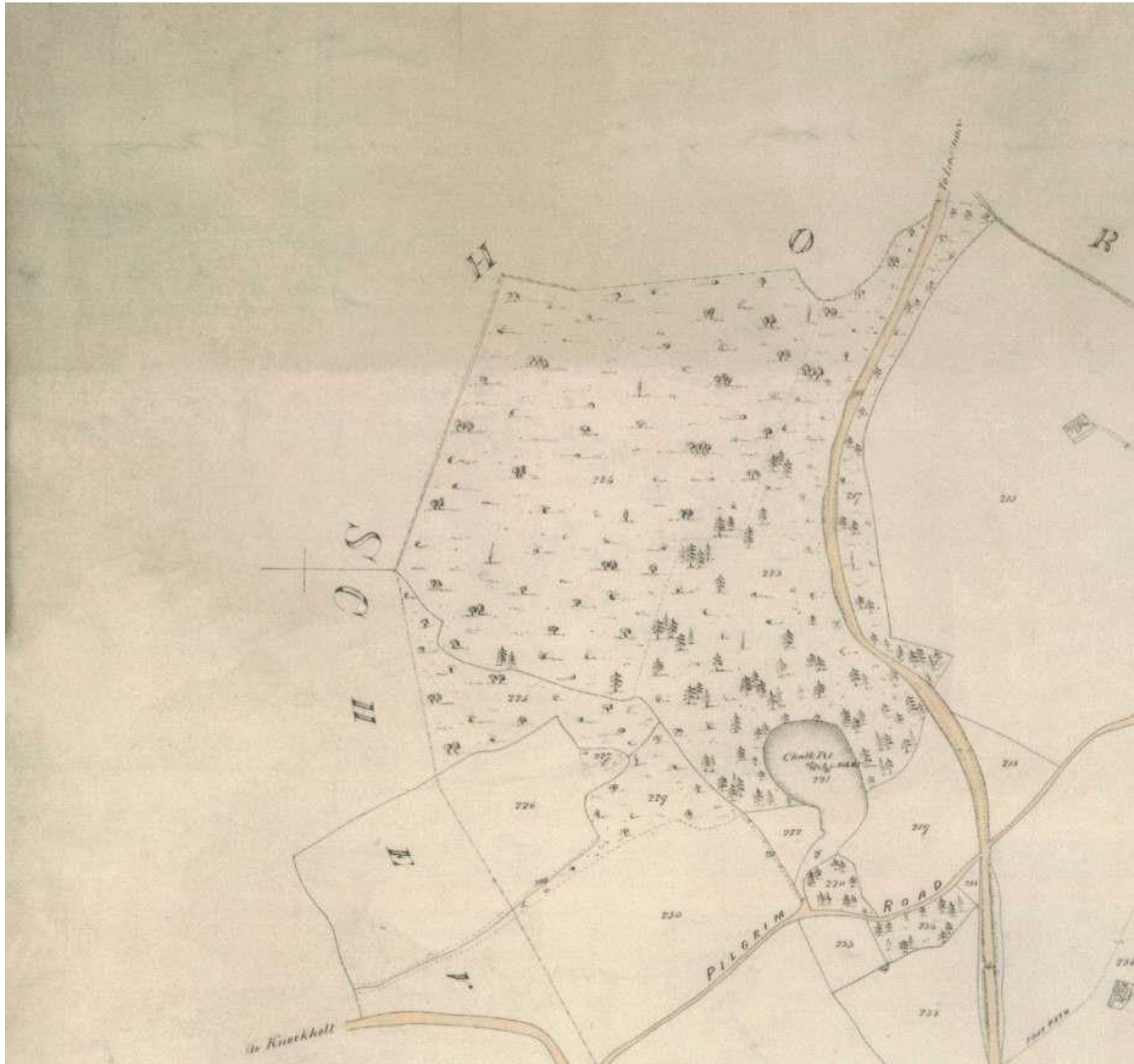


Figure 3: Otford Tithe Map 1844

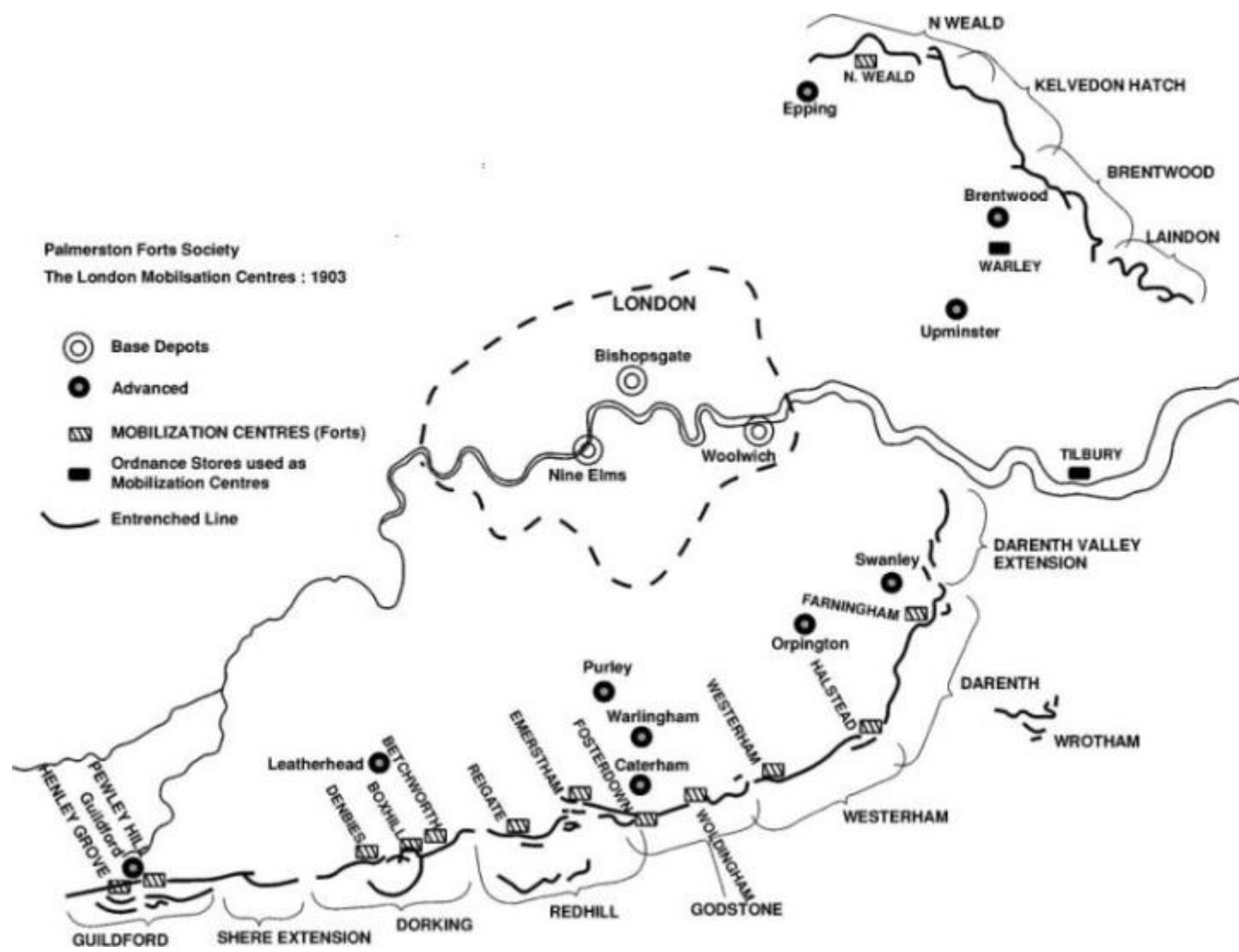


Figure 4: The London Mobilisation Centres

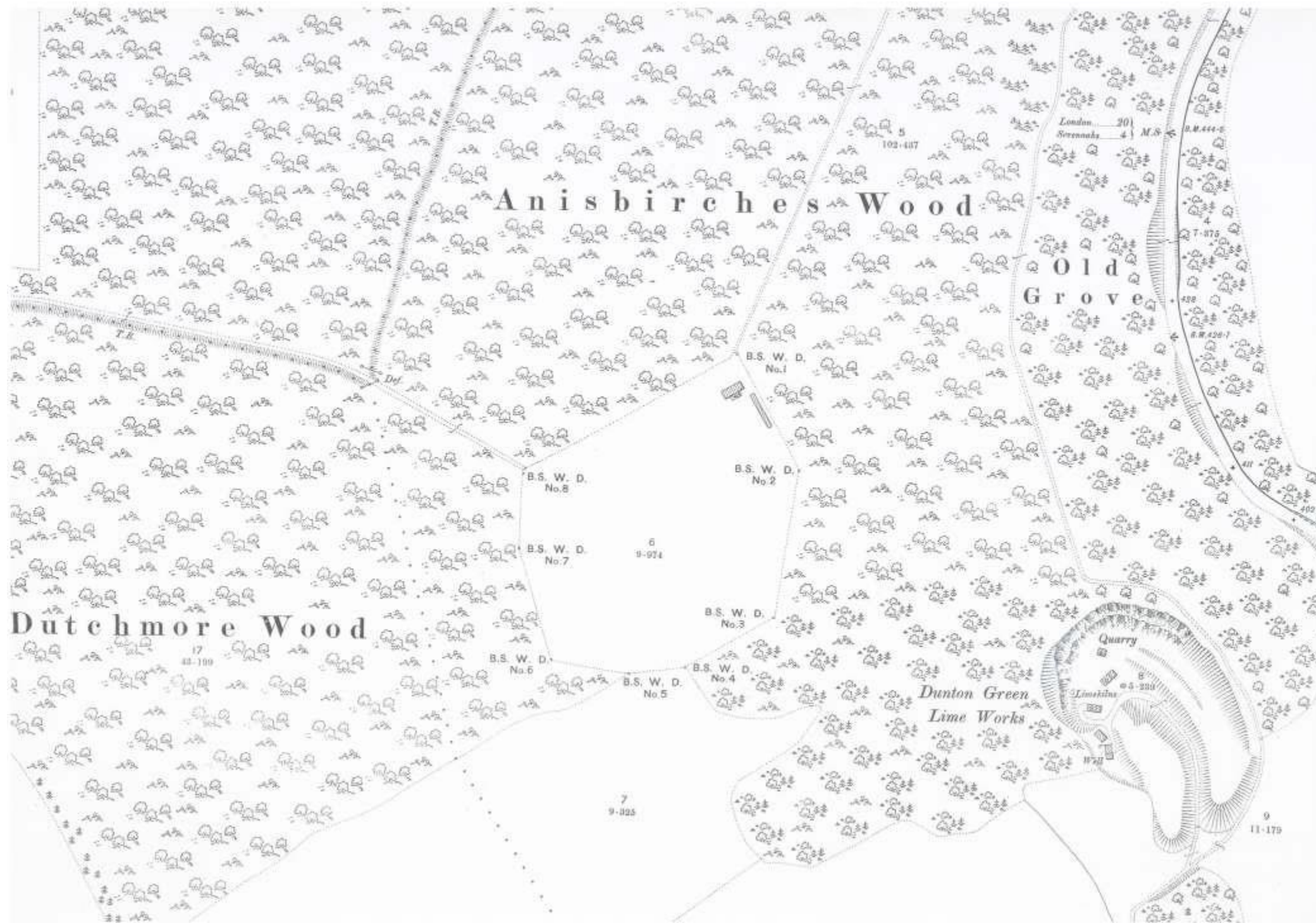


Figure 5: 1896 Ordnance Survey Map

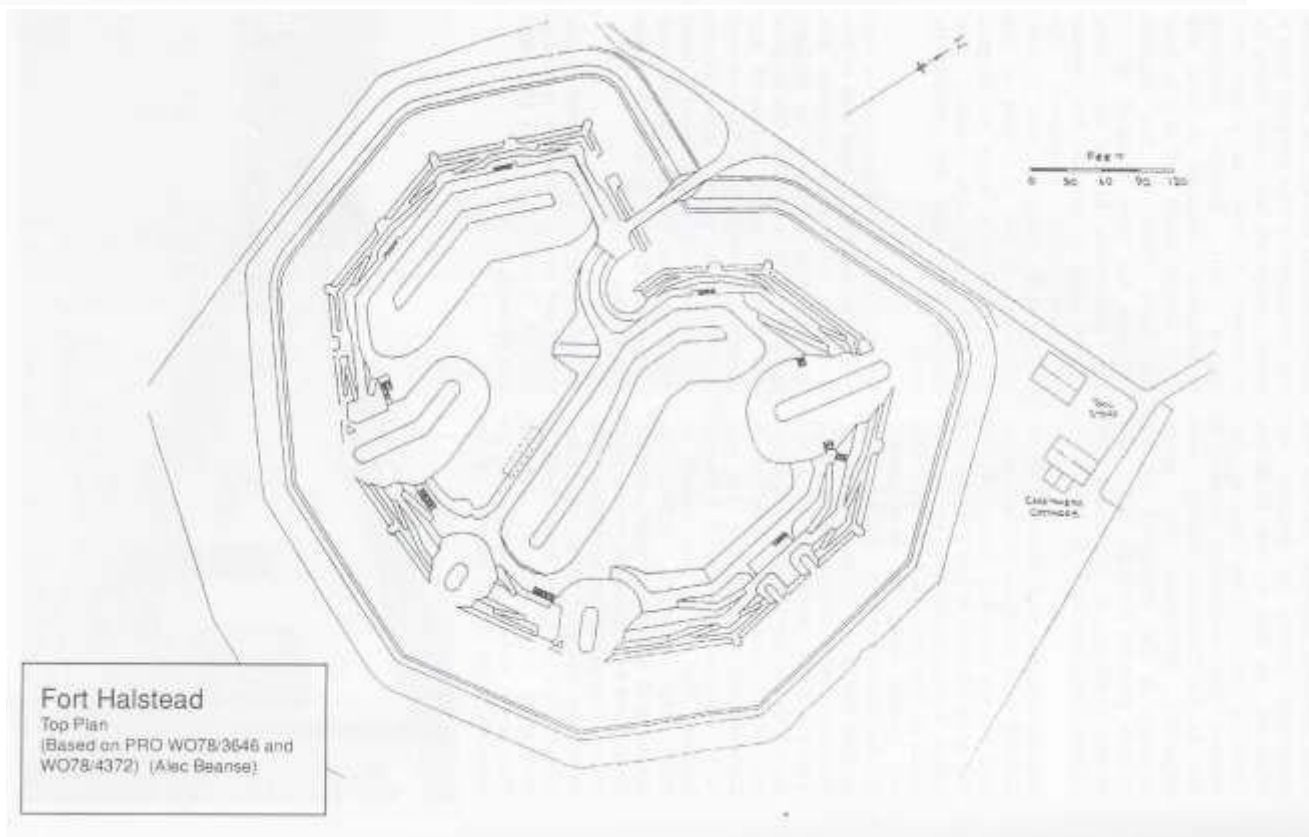
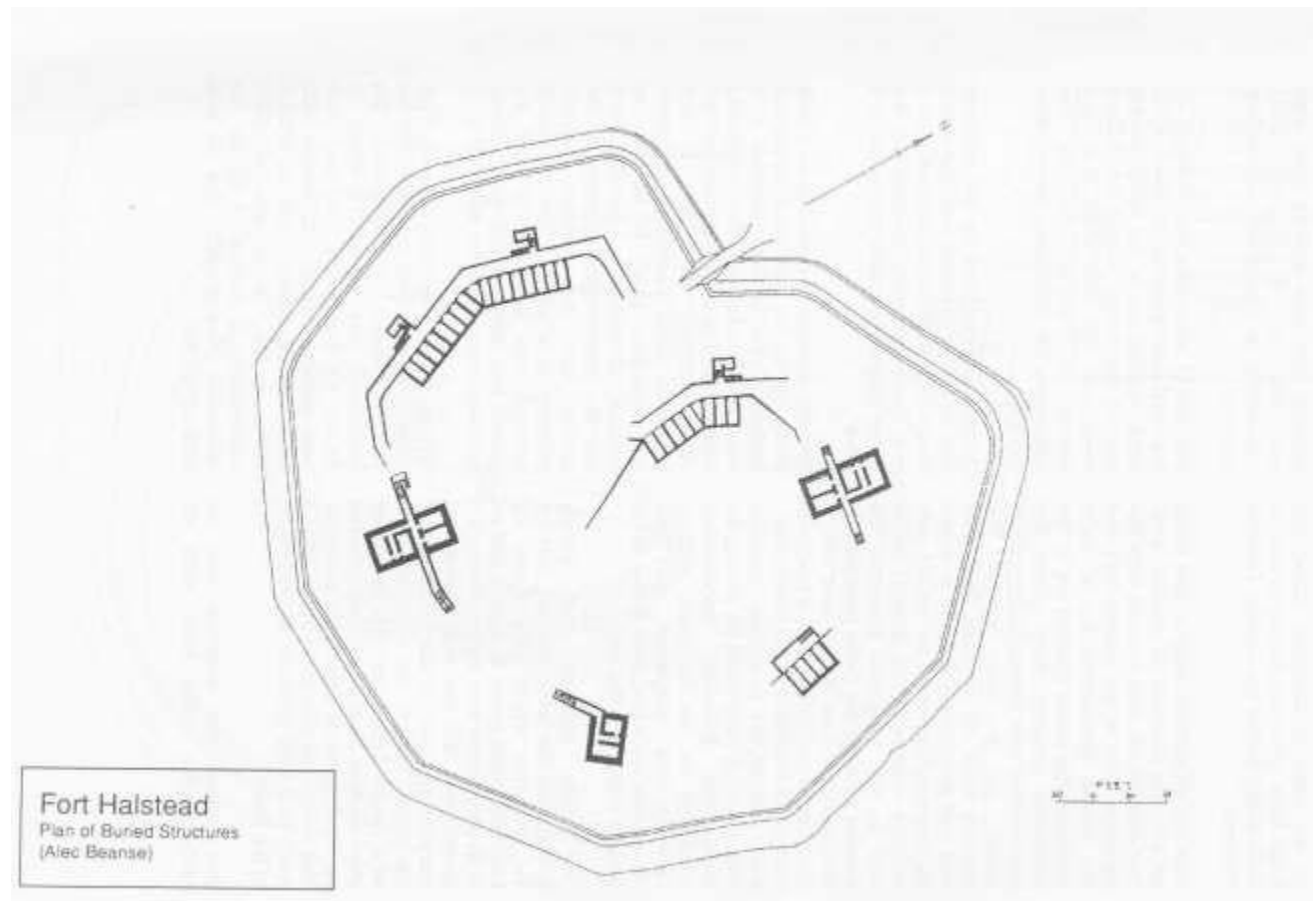


Figure 6: Fort Halstead Mobilisation Centre (after Beane & Gill 2000)

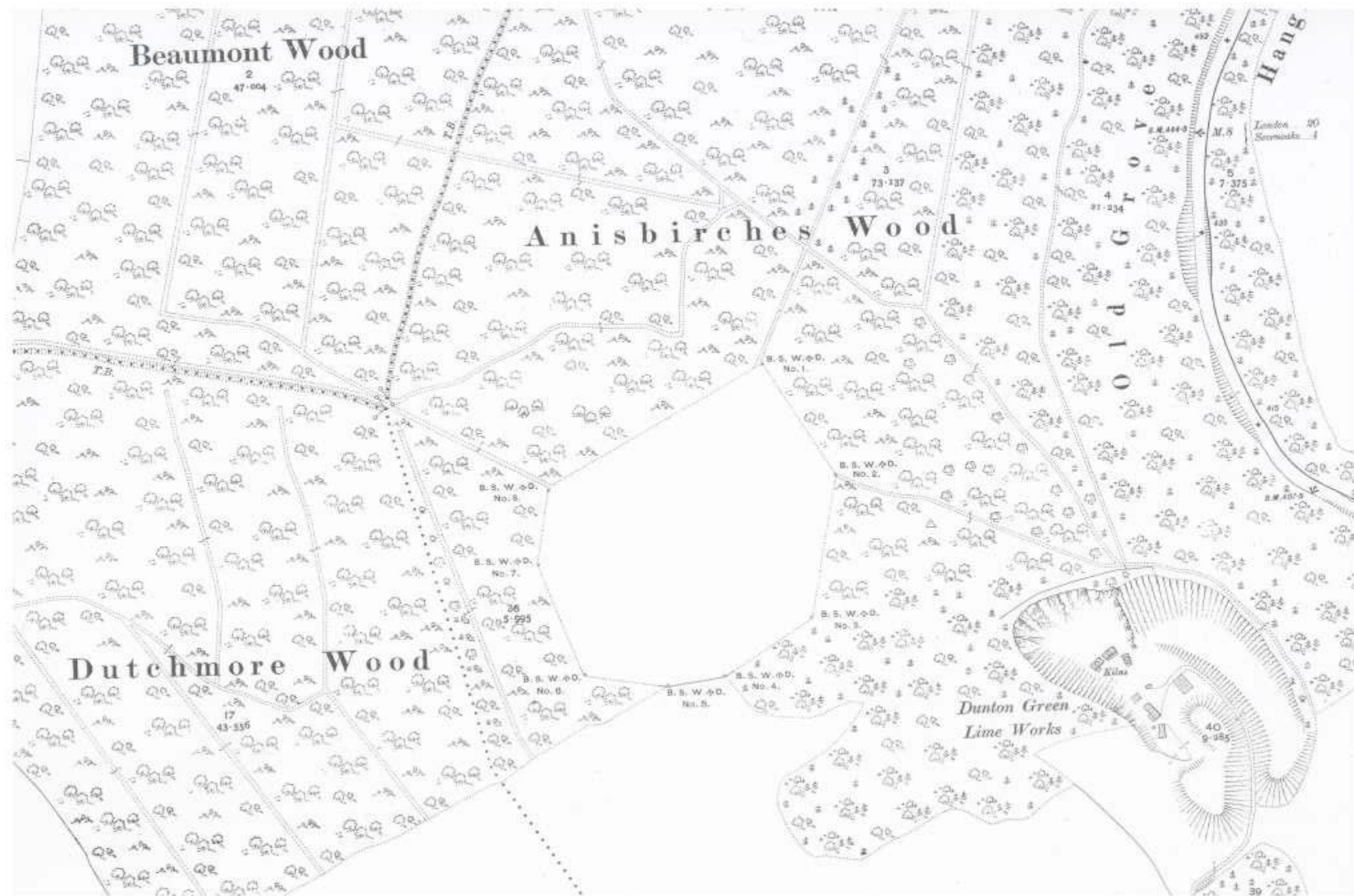


Figure 7: 1909 Ordnance Survey Map



Figure 8: The Fort, as auctioned in 1921

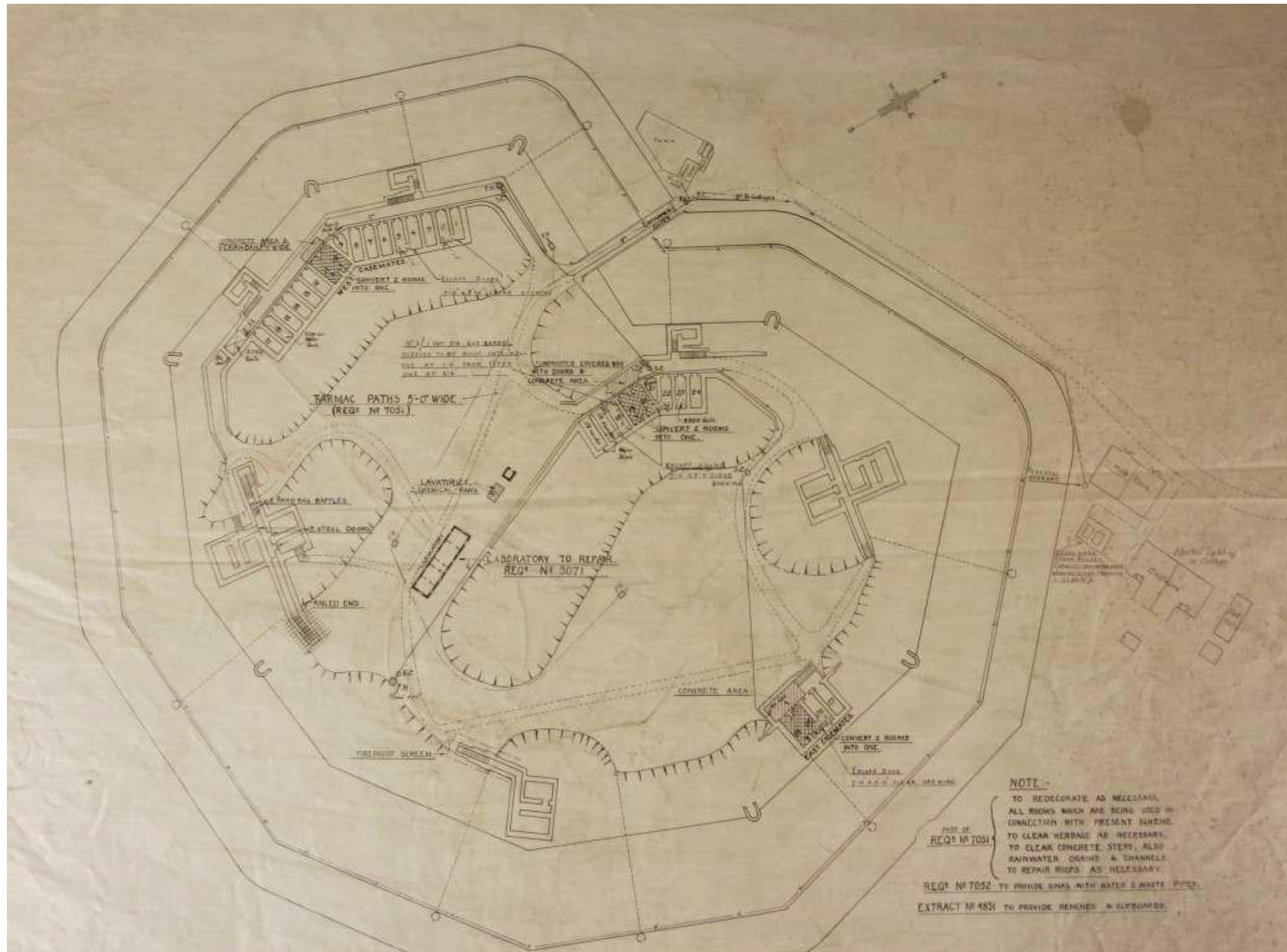


Figure 9: 1937 Plan showing proposed alterations to the Fort

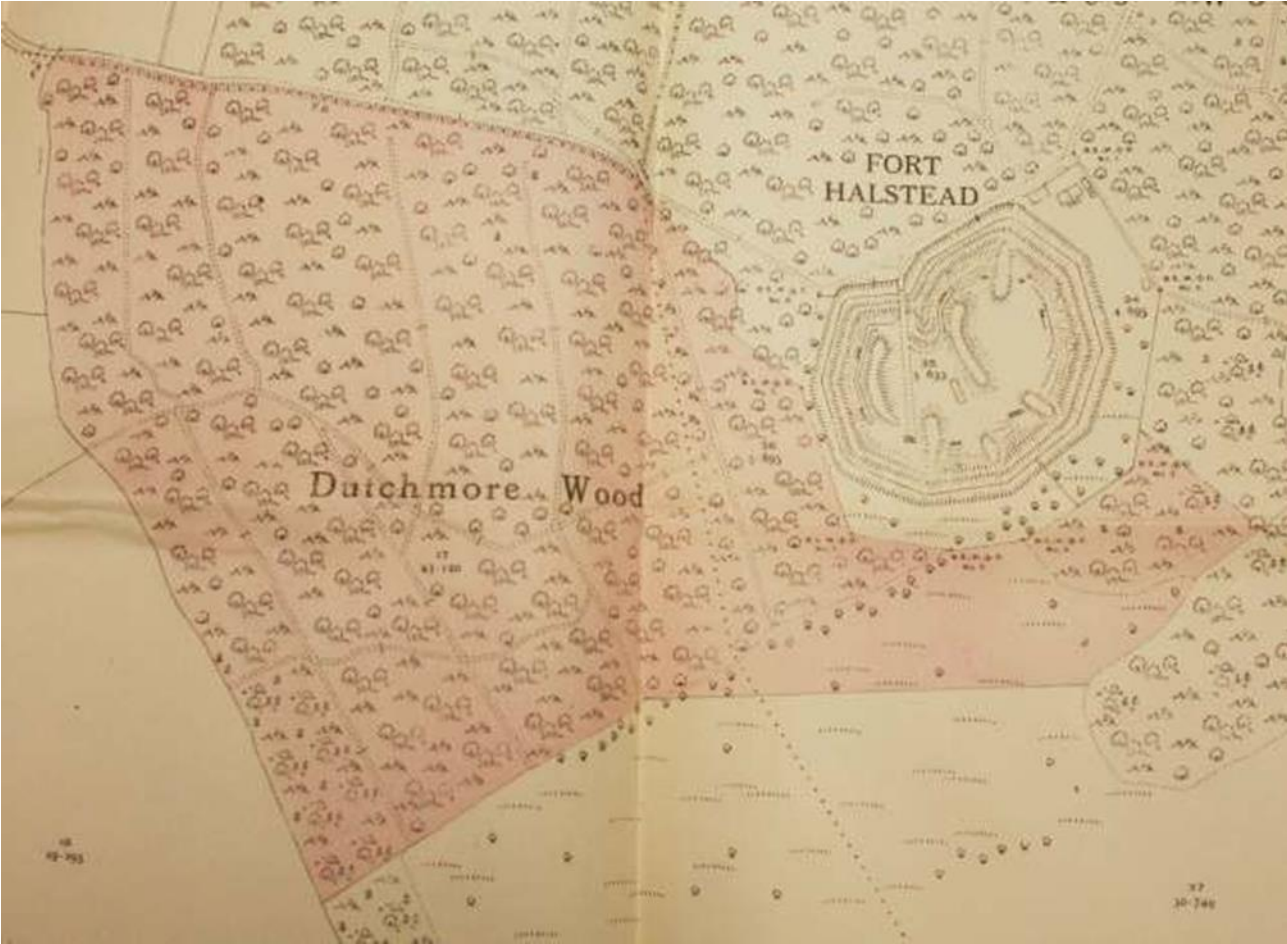
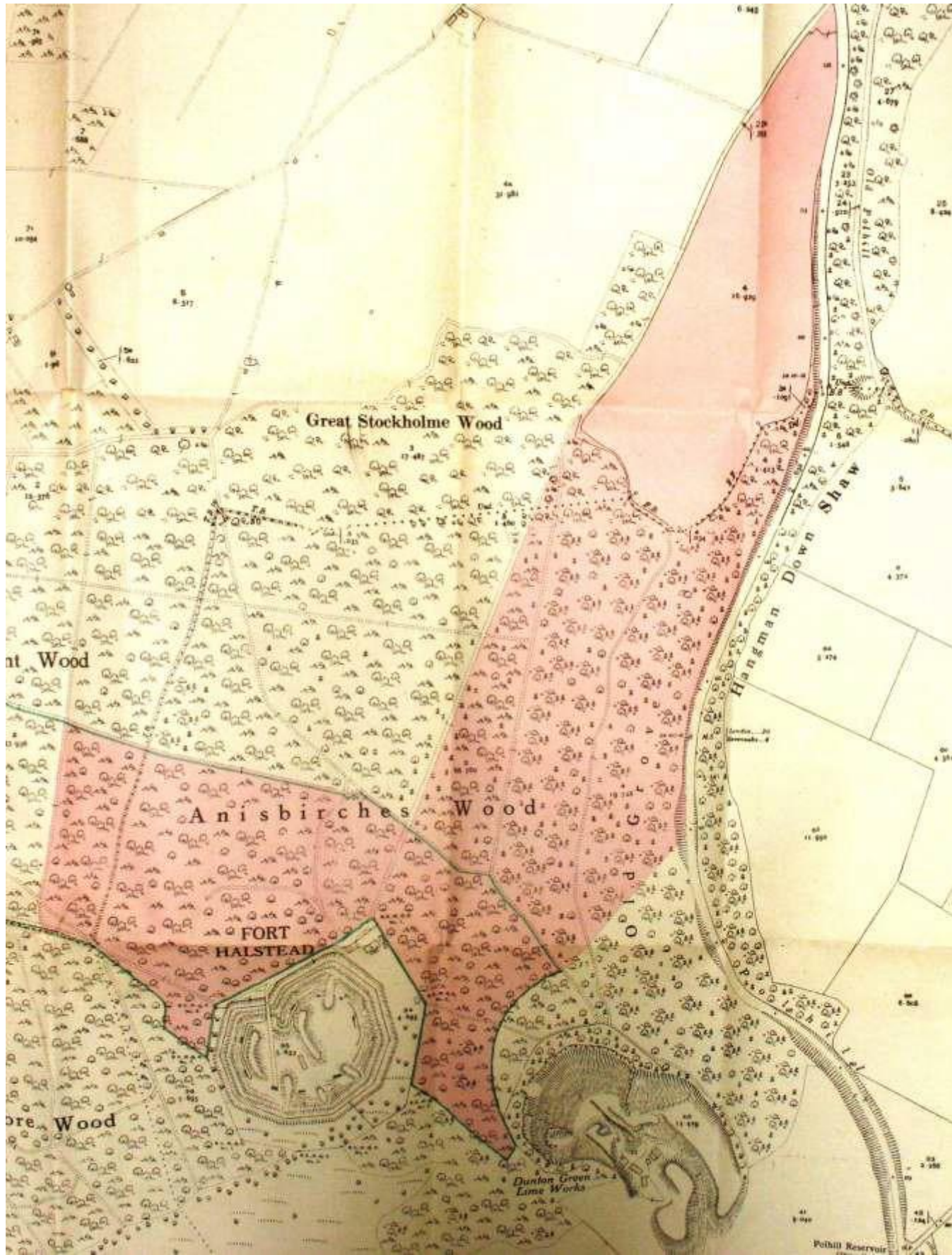


Figure 10: Additional land purchased in 1939

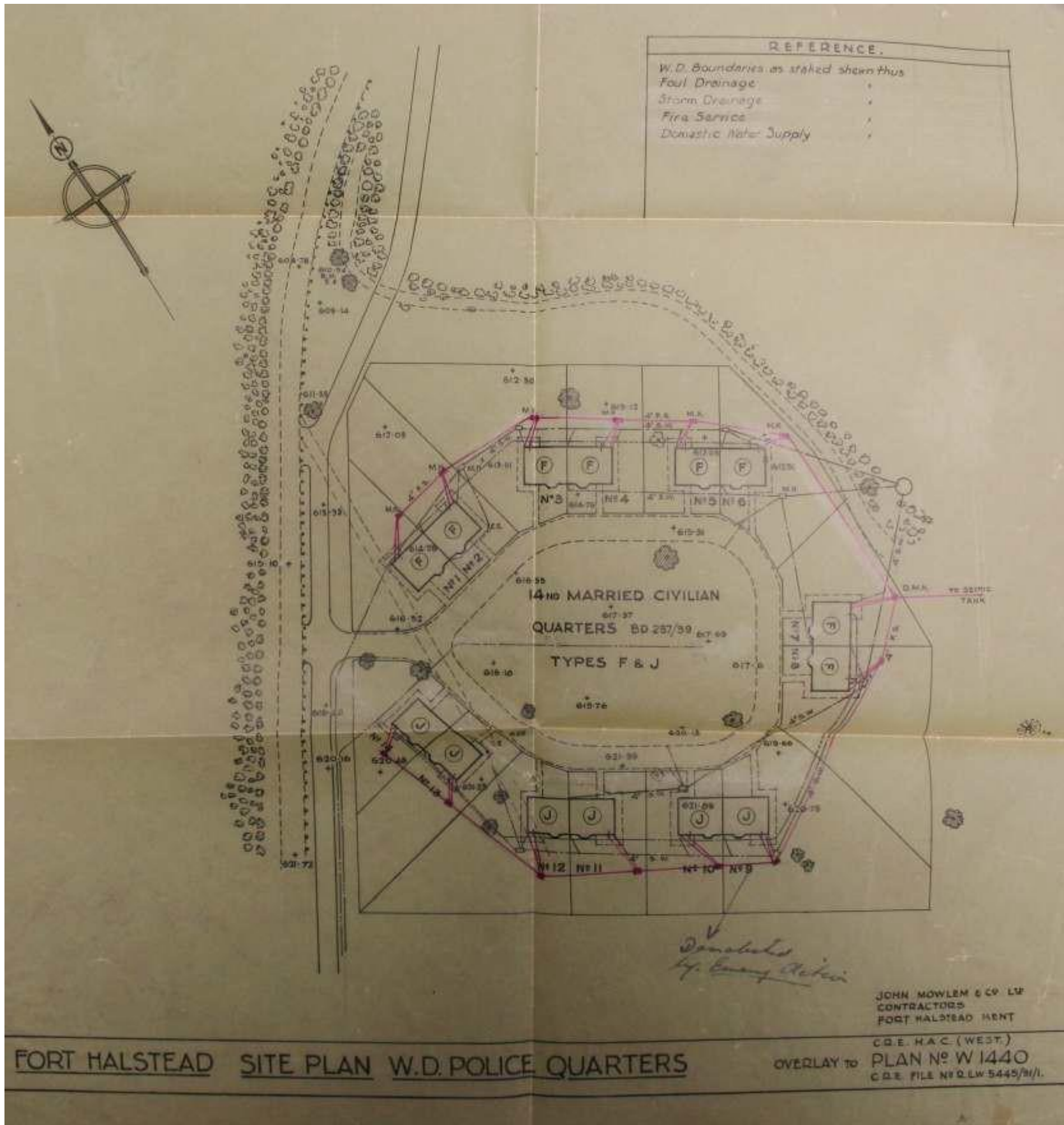


Figure 11: Numbers 1 to 13 Fort Road

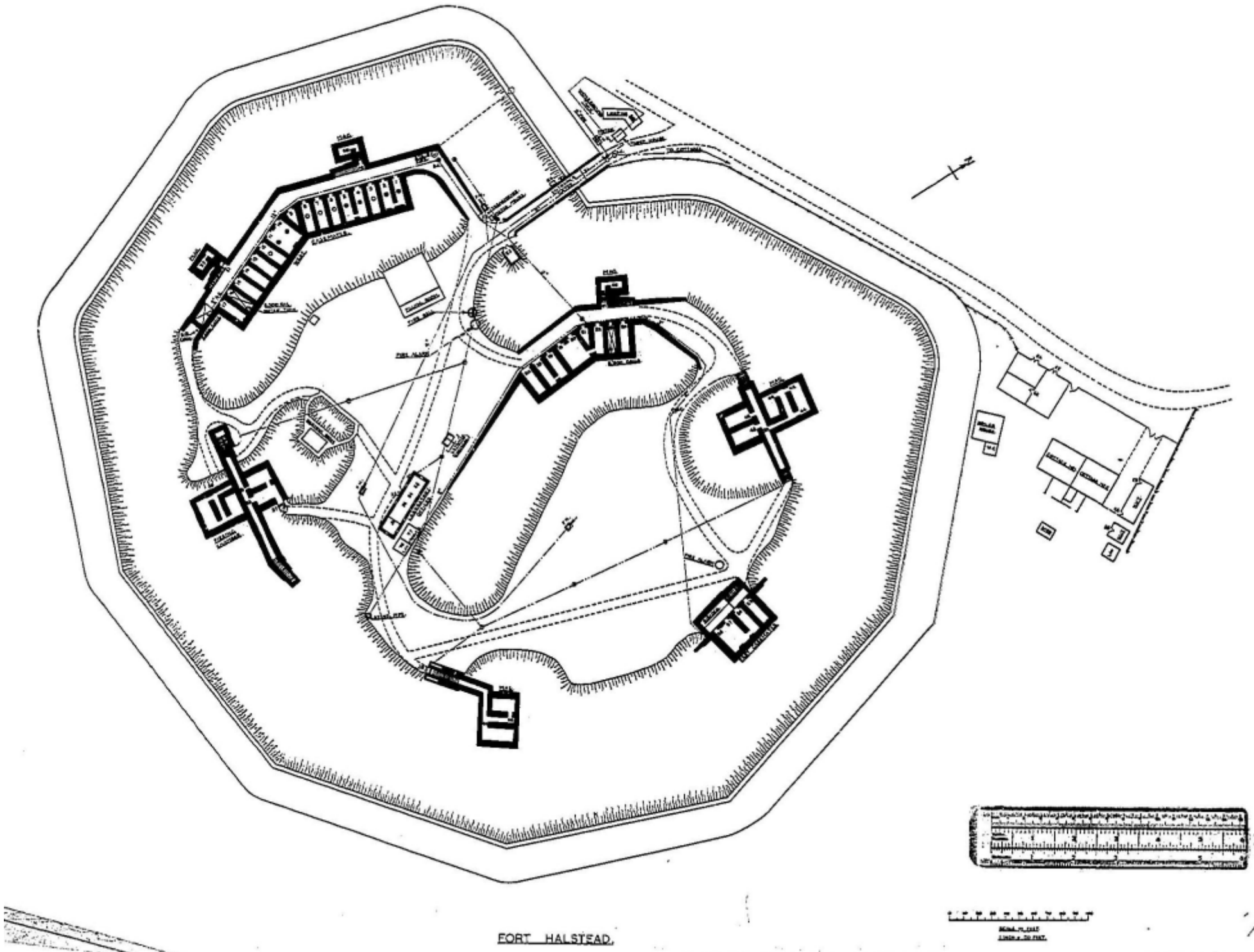


Figure 12: War-time plan of the immediate area of the Fort

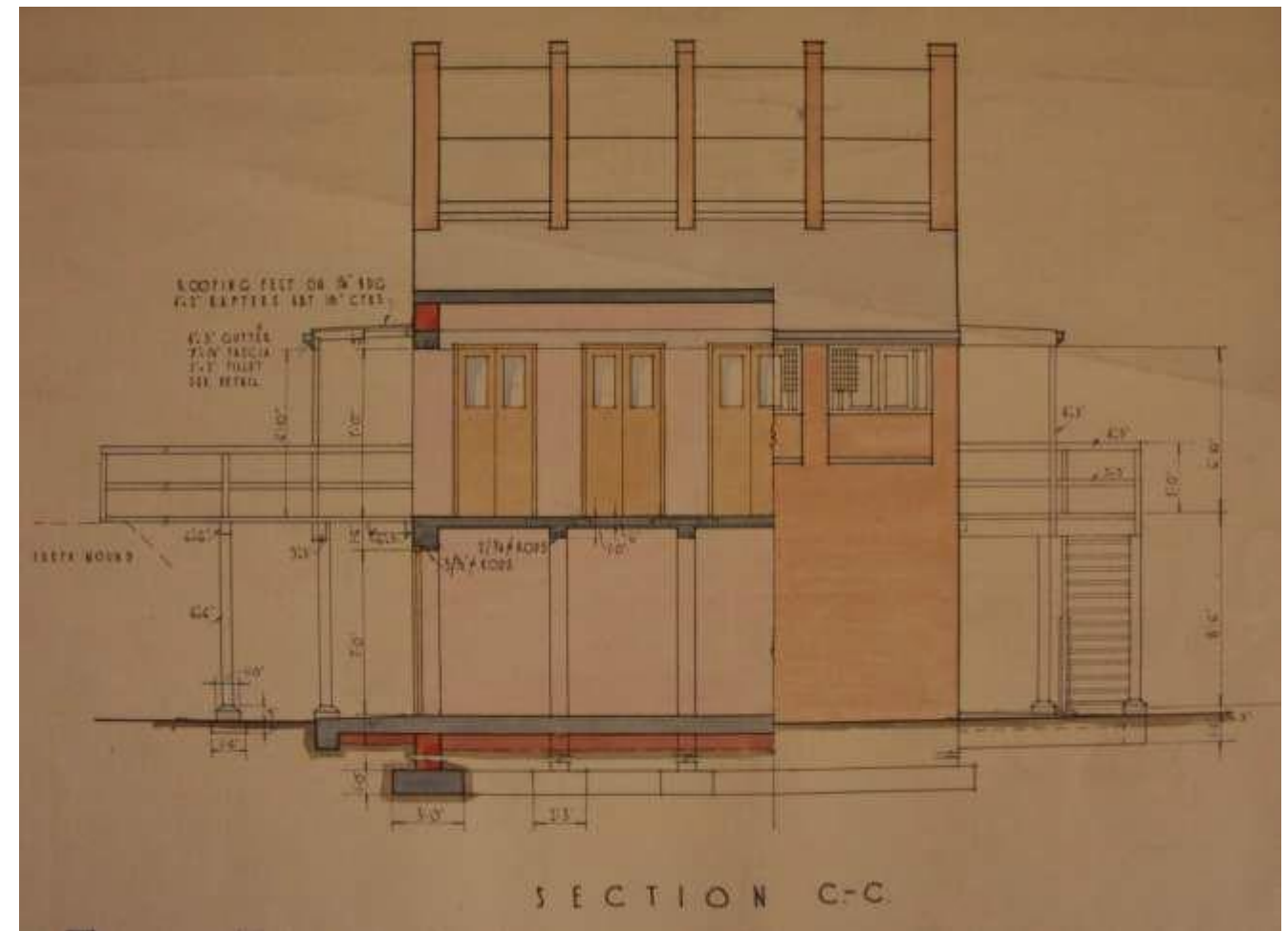
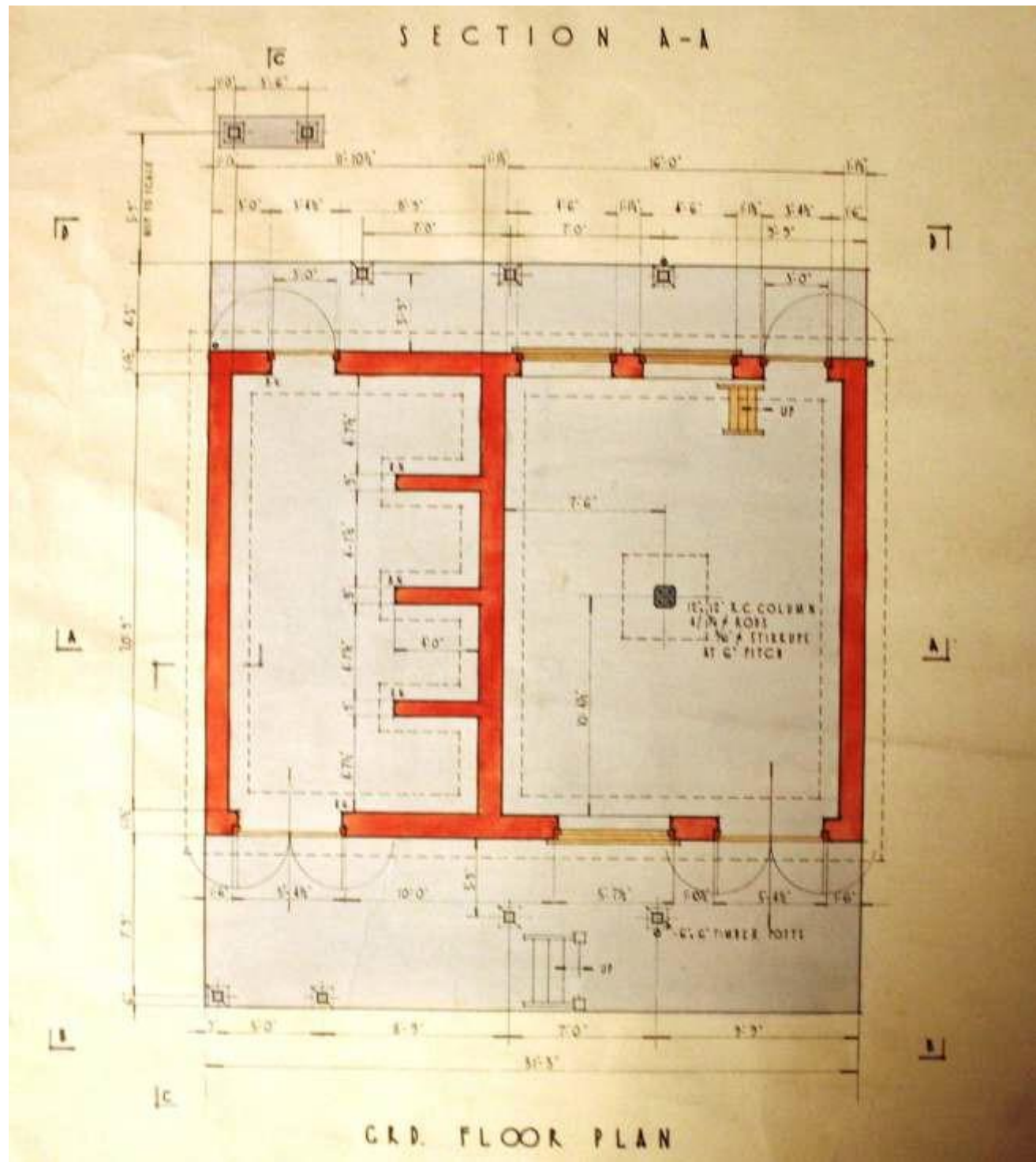


Figure 13: Architect's drawings of Building F11, dated February 1938

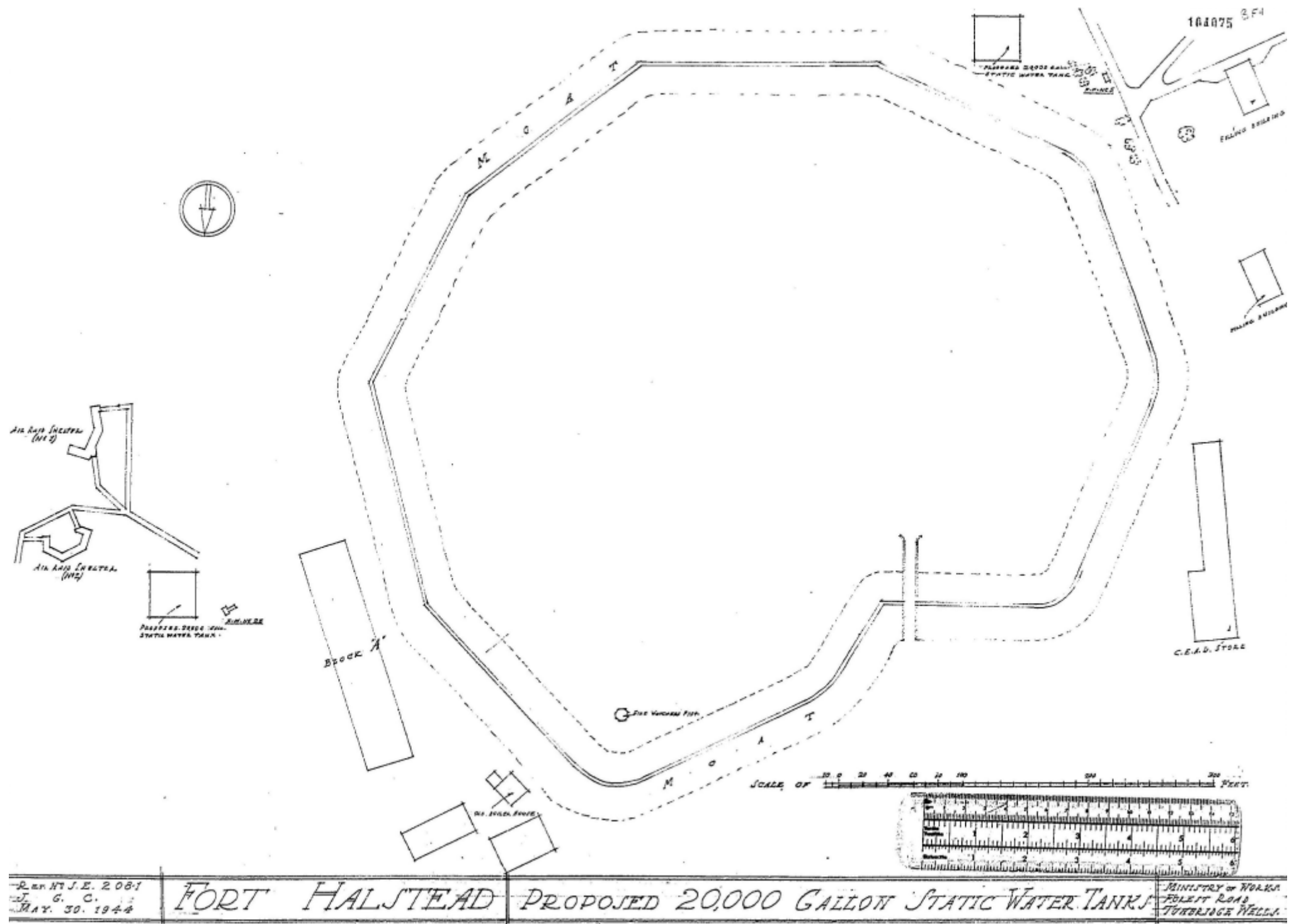


Figure 14: Plan of the immediate area of the Fort in 1944

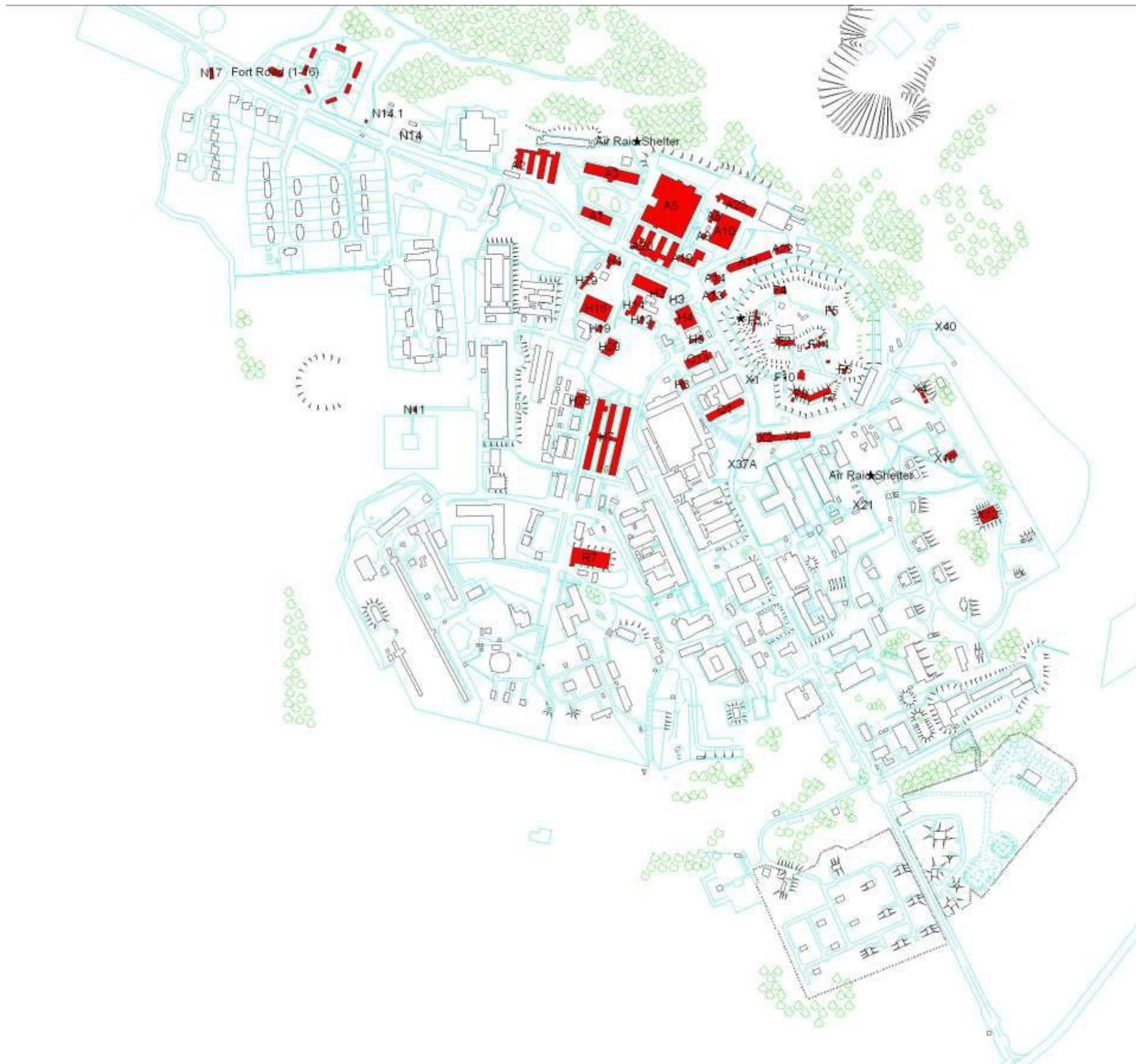


Figure 16: Pre-1947 structures surviving within the Site

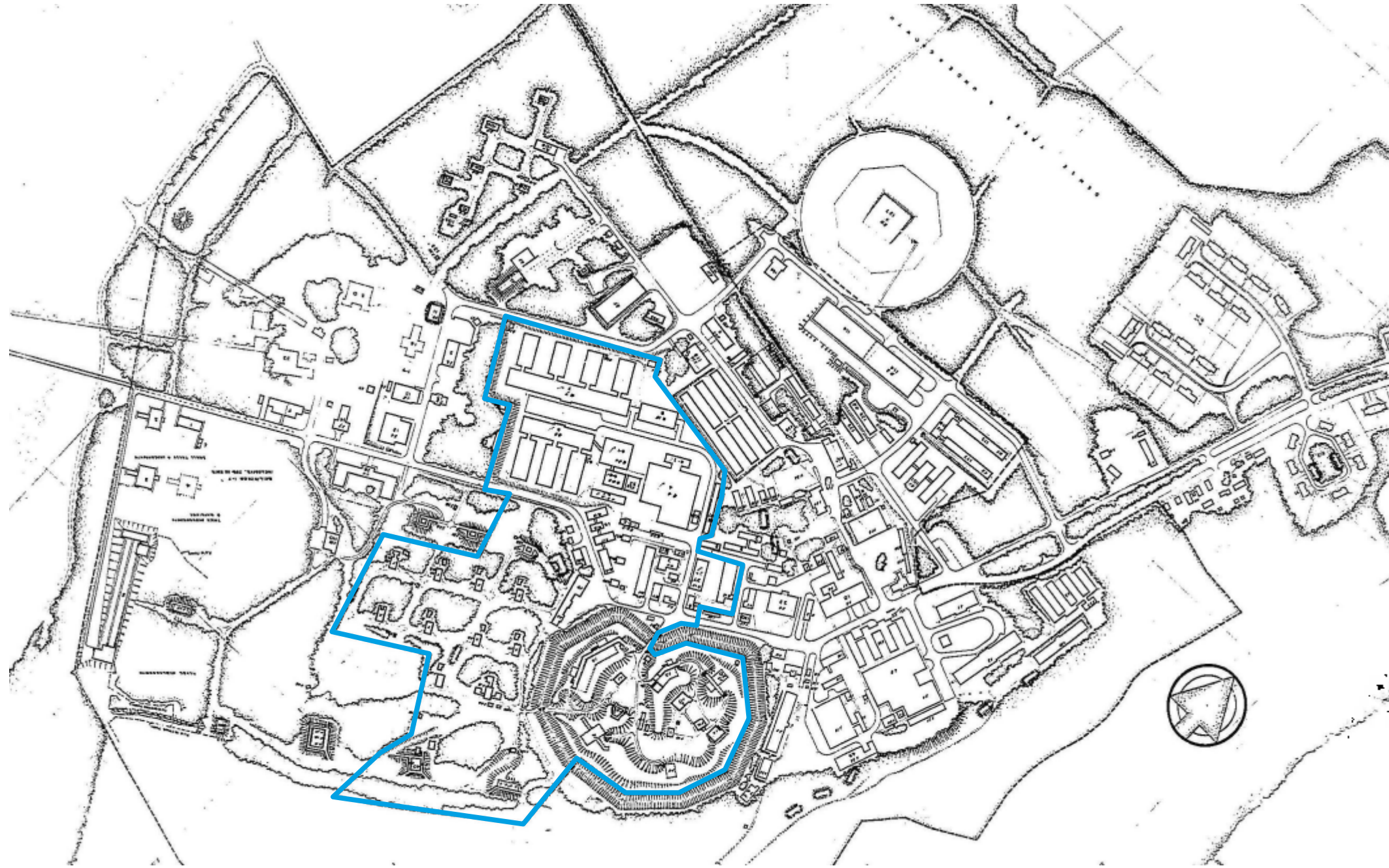


Figure 18: Plan of the Site in 1953 showing secure inner area

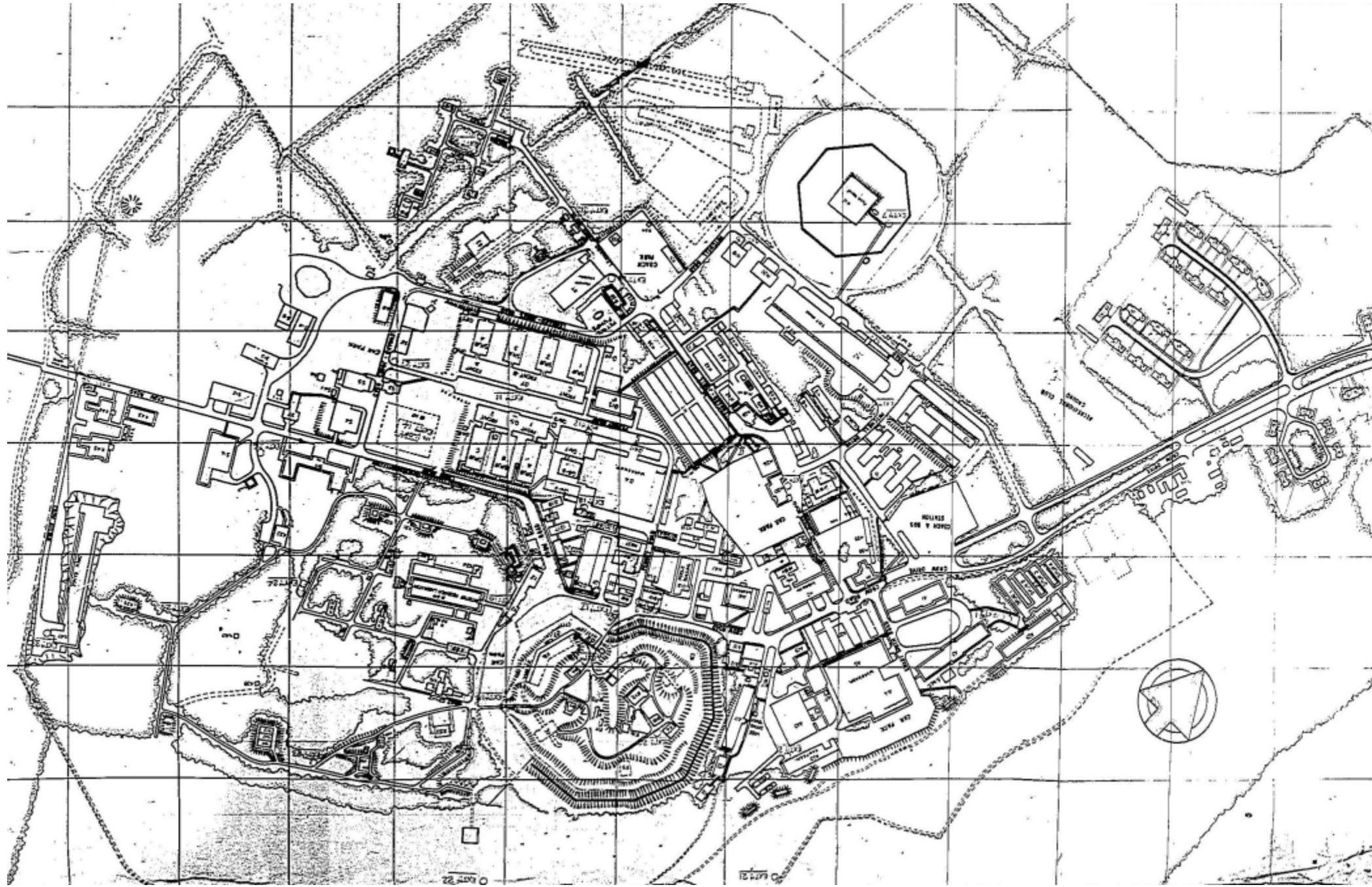


Figure 19: Plan of the Site in 1962

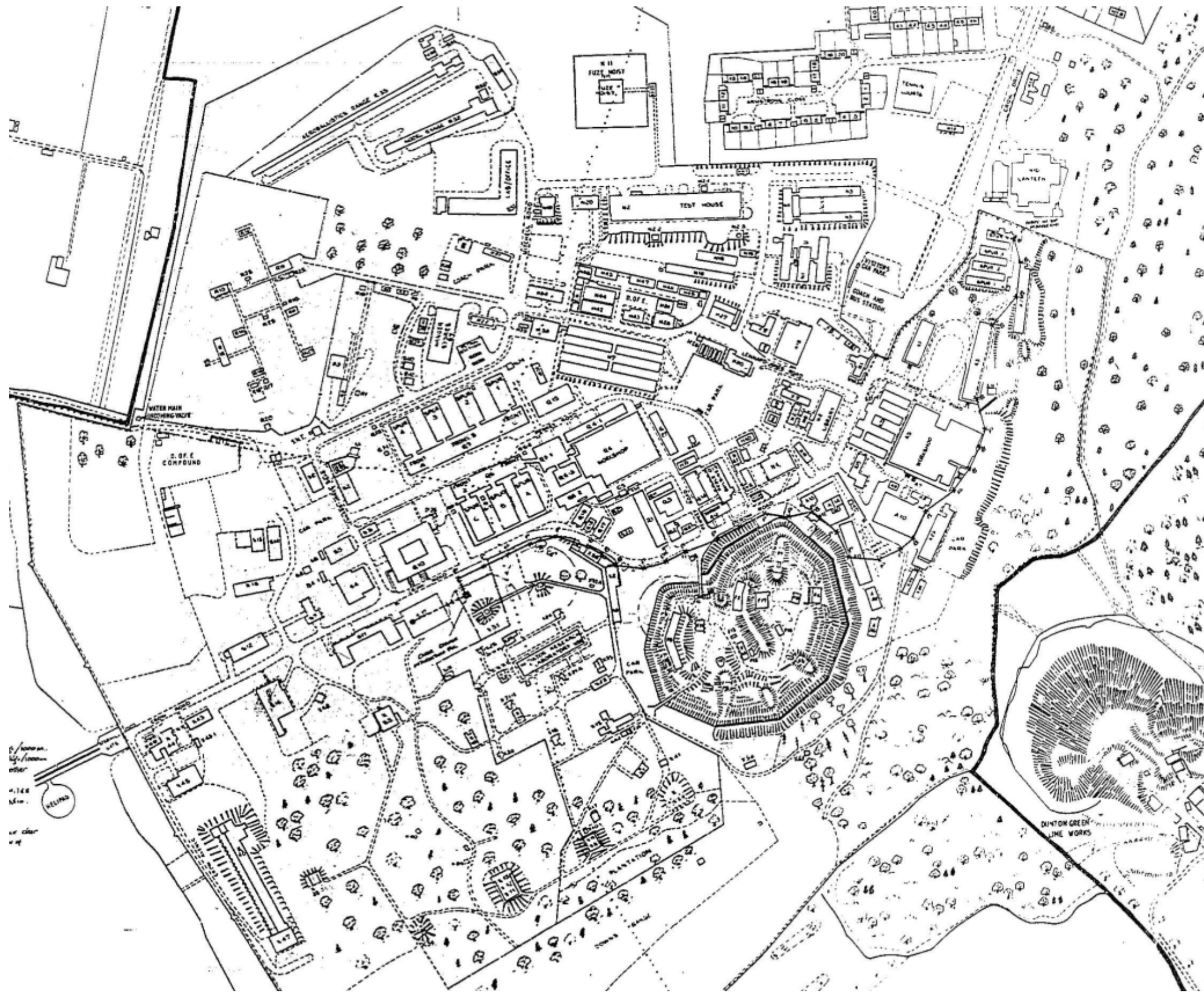


Figure 20: Plan of the Site in 1962

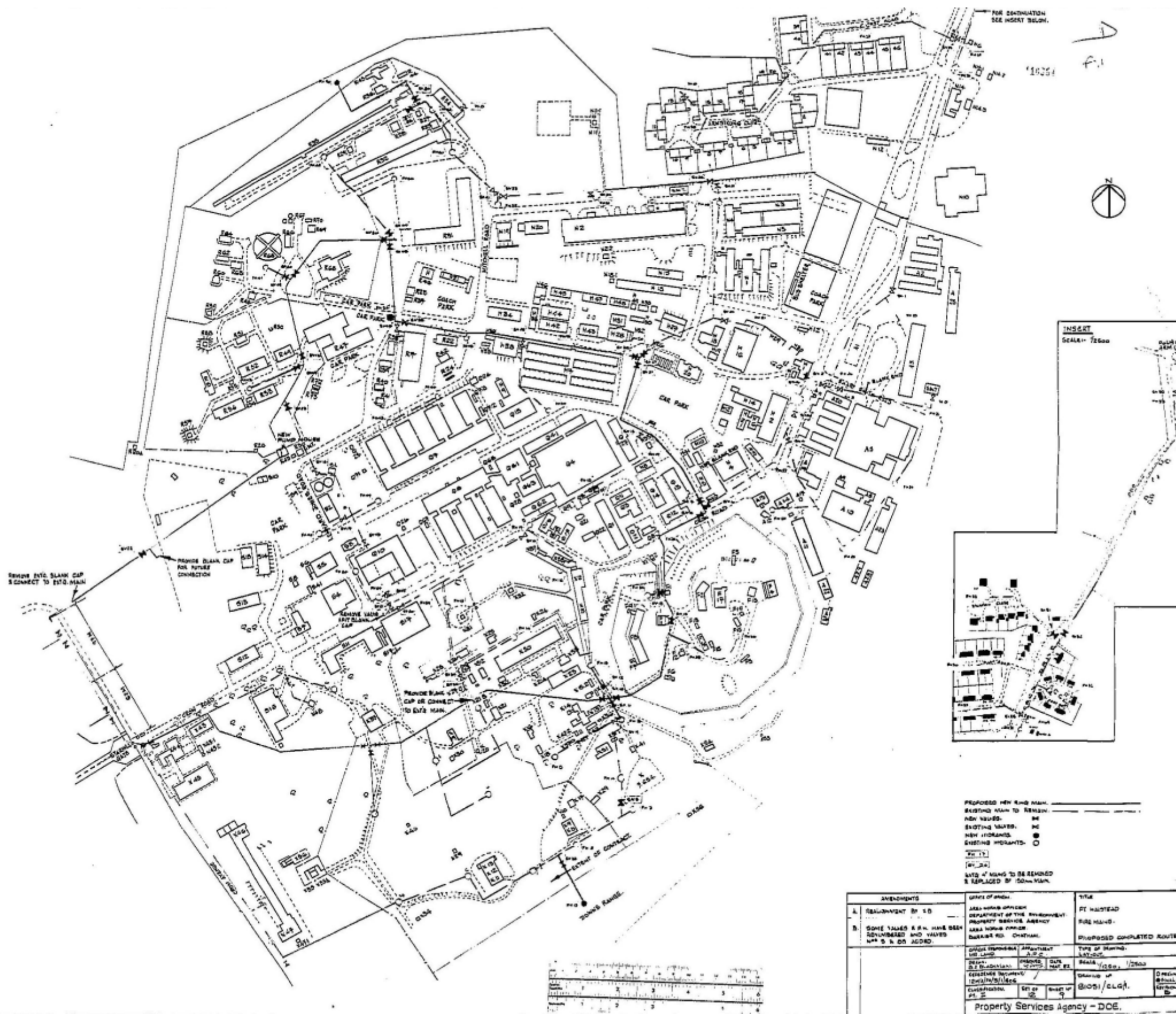


Figure 21: Plan of the Site in 1982

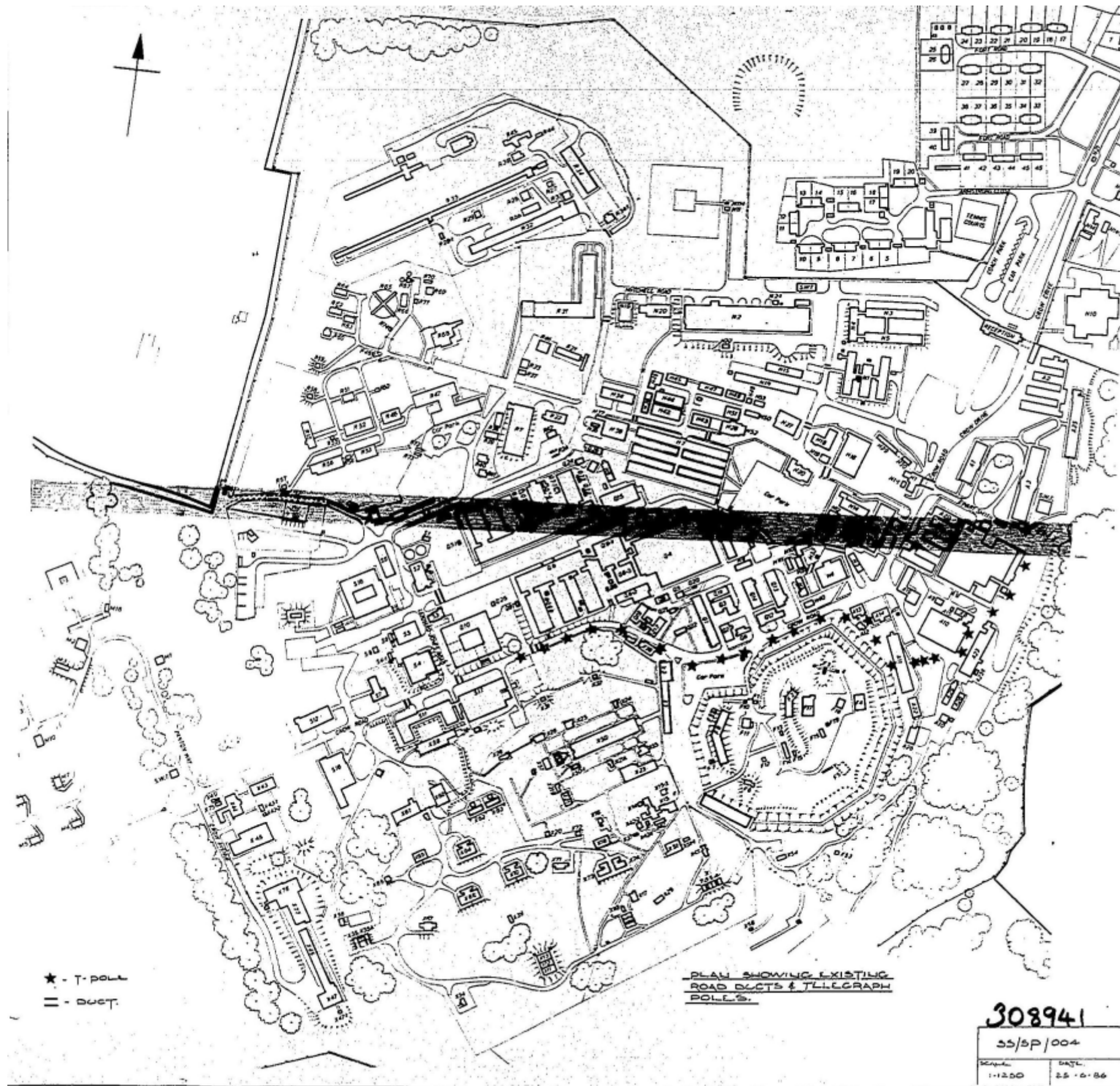


Figure 22: Plan of the Site in 1986, showing the Site at its maximum extent

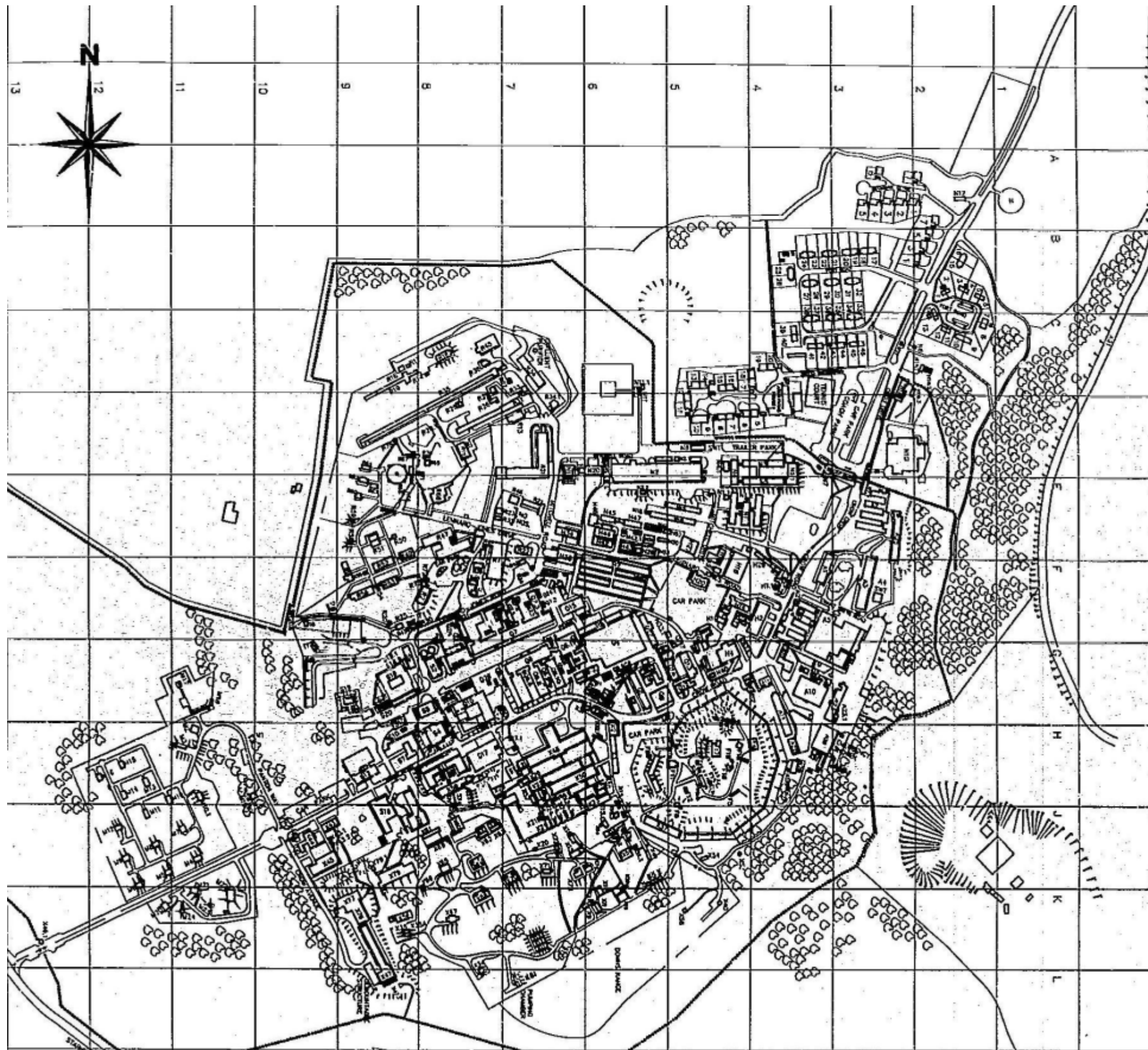
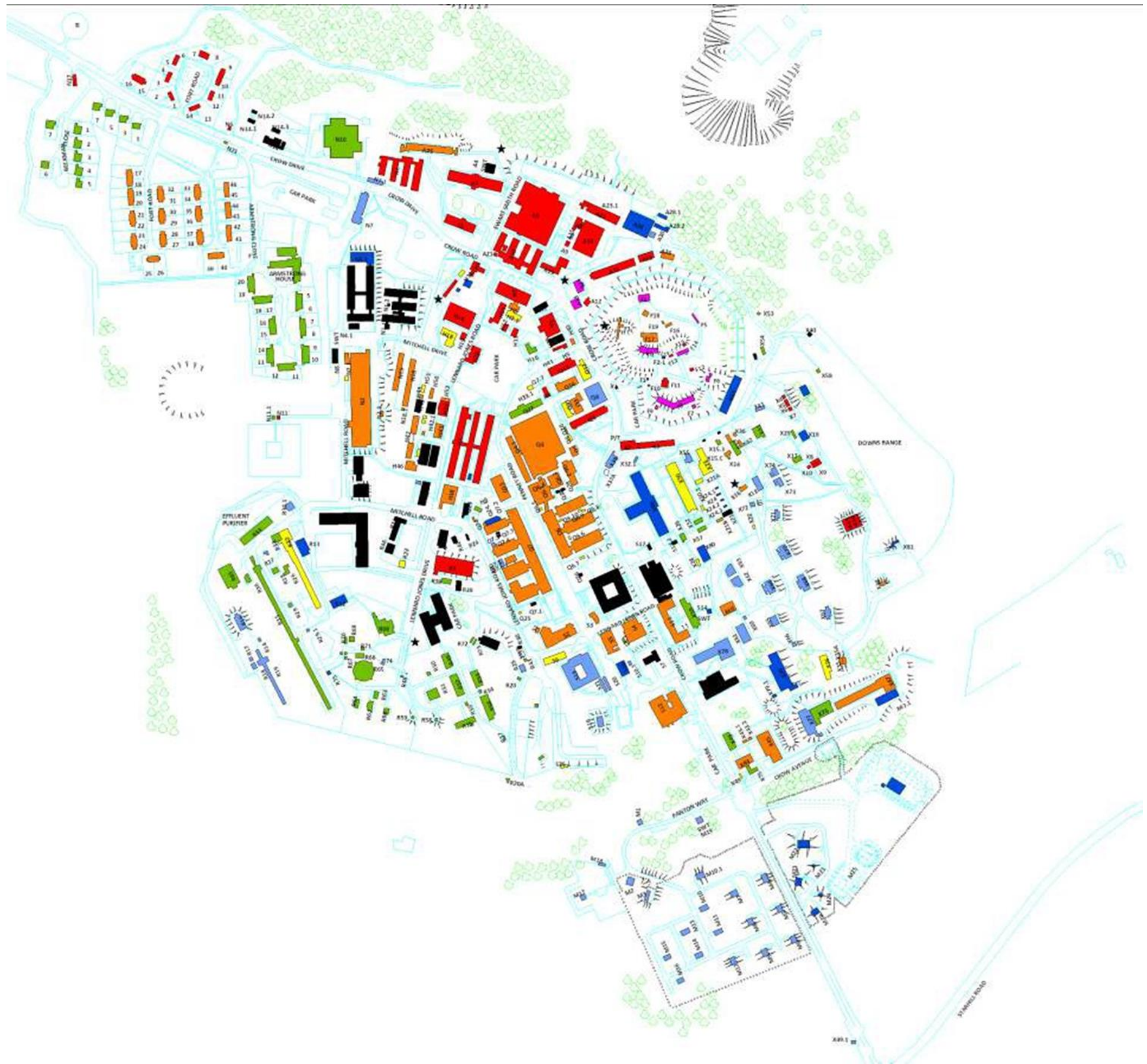


Figure 23: Plan of the Site in 1993



Date Ranges
 (As determined through examination of Site plans and aerial photographs)

- Pre 1936
- 1936 - 1947
- 1947 - 1957
- 1957 - 1967
- 1967 - 1978
- 1978 - 1986
- 1986 - Present Demolished prior to survey

Figure 24: Date of construction of surviving buildings at Fort



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