

Building Recording of Nissen Huts at former RAF Chelveston

by

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SUMMARY

Northamptonshire Archaeology carried out buildings recording at the former RAF Chelveston Airfield, Chelveston, Northamptonshire. Two of several Nissen huts constructed during World War 2 and used for the storage of small arms, ammunition and explosives were surveyed and photographed prior to their restoration for reuse as storage.

INTRODUCTION

Northamptonshire Archaeology were commissioned by CgMs Consulting to undertake archaeological buildings recording on two Nissen huts at former RAF Chelveston, Chelveston, Northamptonshire (NGR TL 006 688, Fig 1). The work was carried out in response to planning permission being granted to Northamptonshire County Council for the conversion of the two Nissen huts to a fire training facility.

The principal objective of the building recording was to record and understand the nature, function and character of the existing buildings and to place them in their historic, cultural and environmental setting (NA 2011). The recording was at Level 2 – a descriptive record (English Heritage 2006, 14).

A site visit was made on Thursday, 6 October 2011. All principal exterior elevations were photographed. The interiors were photographically recorded to include structural details that may be lost during alterations or moved to alternative locations within the building.

A representative plan and cross-section of the building was drawn. Fixtures and fittings that related to the use of the buildings were recorded, and former uses of the individual buildings were postulated where sufficient evidence remained to do so.

ACKNOWLEDGEMENTS

The project managers were Michael Dawson for CgMs Consulting and Steve Parry for Northamptonshire Archaeology. The fieldwork and the reporting were by Tim Upson-Smith and the drawn illustrations are by Amir Bassir. The client report (Upson-Smith 2011) will be available through the Northamptonshire Historic Environment Record and online through the Archaeology Data Service (ADS). This published version is essentially the same, but contains additional information provided by Graham Cadman on the recorded use of the Nissen

huts examined, extracted from the Chelveston Record Site Plans from 1944 and 1962 (Cadman 2012).

HISTORICAL BACKGROUND

CHELVESTON AIRFIELD

Chelveston Airfield lies in eastern Northamptonshire, close to the village of Caldecott on the county boundary with Bedfordshire (Fig 1). The area of the airfield is today largely pasture characterised by remnants of the former airfield dating to the Second World War (1939-46) and Cold War periods (1947-8 to 1991). The site is significantly degraded with large areas demolished after the airfield was closed.

Chelveston Airfield was built in 1940-1 and opened on 15 August 1941. It was a standard RAF 'A' pattern airfield and its fully developed form is recorded in contemporary plans and photographs (Chelveston Record Site Plan Site No1 [Airfield Site] October 1941). In mid-1942 the airfield was established as the base for the United States of America Air Force (USAAF) 301st Bomb Group, replaced in December by the 305th Bomb Group. During the winter months of 1942-3 the airfield's runways and dispersal areas were expanded to accommodate the B17 aircraft of the 305th Bomb Group. At the end of the war the airfield was returned to the RAF and from October 1945 to May 1947 it remained a sub-site of 25 Maintenance Unit.

The Second World War Airfield officially closed in 1947, but in 1951 it was re-commissioned to accommodate United States Air Force (USAF) B-47 bombers capable of carrying nuclear weapons, forming part of the USAF's Strategic Air Commands (SAC) world-wide system (the name had changed from USAAF to USAF in 1946). The re-commissioning required the construction of a rectangular concrete apron, headquarters building and crash tender shed, a new control centre as well as a new runway, dispersal and taxiways, and the base was handed over to the USAF Third Air Force on 1 December 1951.

Between 1951 and 1954 the airfield was almost entirely re-built. The former runways and taxi-paths were partially removed to accommodate the new designs (Smith 2006, 58, 60, 65). The Airfield remained under the jurisdiction of the USAF until 1 August 1962.

In 1977 the runways and most of the perimeter tracks were removed to be used as hardcore in the development of Milton Keynes. Later in the year the airfield site was re-commissioned as a Radio Transmitter site under the

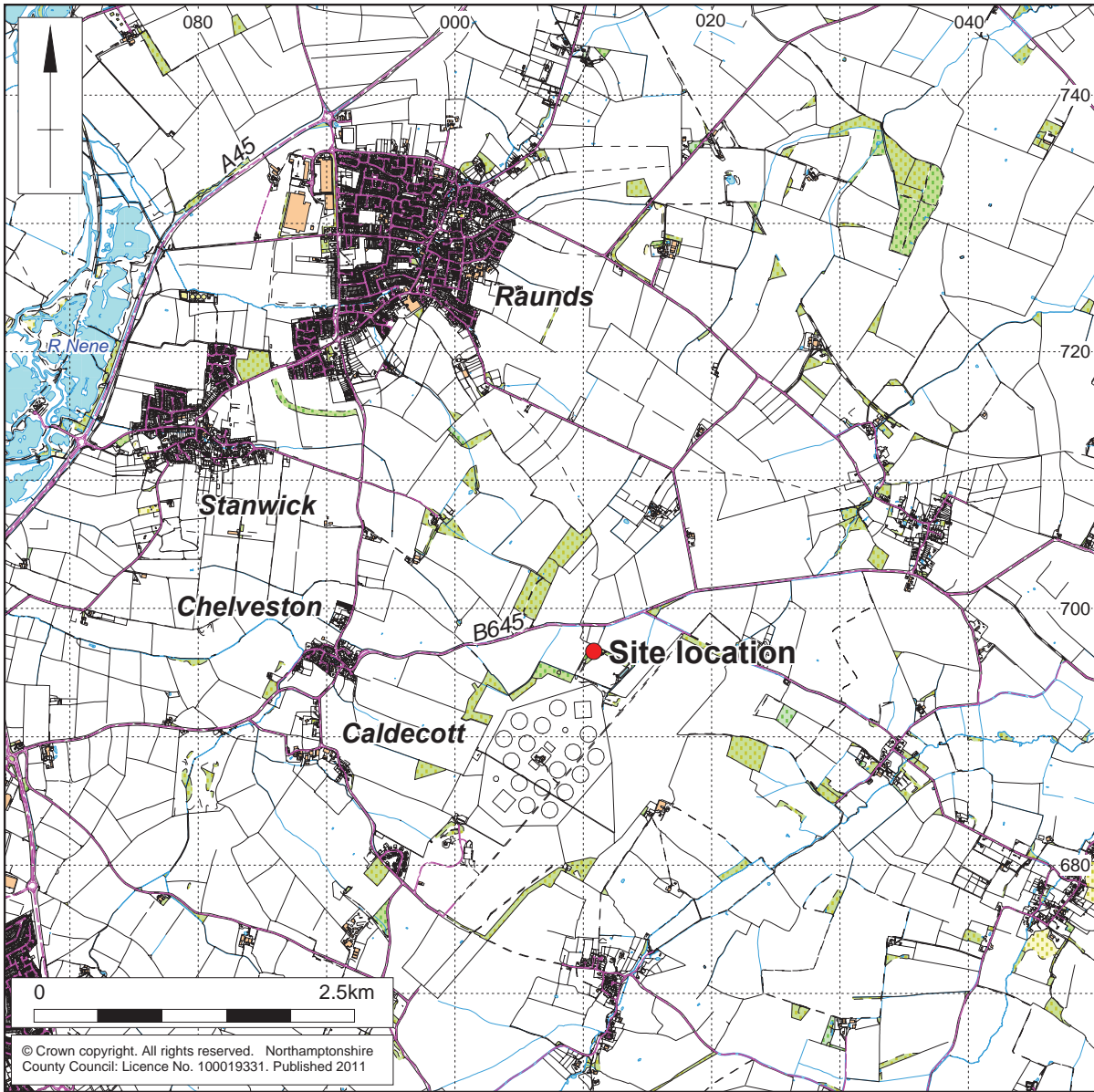


Fig 1 Site location

81st Signals Unit. Eighteen aerial masts were erected on the site of the former airfield and remained in use until December 2003. In June 2005 the site was sold by Bruton Knowles selling agents (Dawson and Hooper 2008, amended 2011).

THE CHELVESTON NISSEN HUTS

Airfield Record Sites Plans exist for the majority of Northamptonshire WW2 and Cold War military airfields. Once restricted, these provide detailed plans of all airfield structures together with schedules identifying building type (with ministry drawing numbers). Dyaline copies of the 1:2500 scale plans for Chelveston, dated October 1944 and June 1962, are held by Northamptonshire HER, copied from the originals held by RAF Museum, Hendon. The information below has been provided by Graham Cadman (2012), and is abstracted from the Record Site Plan.

The 1944 records (Table 1), make it clear that the Nissen huts surveyed and examined, huts 137-145, were all used in WW2 for the storage of lighter munitions of various sorts; small arms and ammunition, small bombs and sea markers and flame floats (see Fig 7). The small arms and ammunition storage (SAA) in huts 137-140, could presumably have included varying calibres of weapons (up to 20mm/40mm for ground defence anti-aircraft guns?). Both incendiary and high explosives could be involved as would almost certainly be the case with the small bomb container stores in huts 141-144, which were provided with intervening brick blast walls. Flame floats, hut 145, were floating flares dropped on the water at night so the rear gunner could observe them and estimate the drift of the aircraft due to wind.

These nine Nissen huts were dispersed close to the northern perimeter of the airfield, and all were served

by the same stretch of airfield service loop road. In close proximity were the WW2 main Bomb Stores. These buildings were all isolated from the rest of the airfield for obvious reasons, and the 1944 Site Plan includes the safety distance radius around each group of structures, including buildings 141-144.

The usage in 1962 seems to be more general storage, although still including small arms maintenance in hut 140, while huts 141-144, with their blast walls, still served as magazine stores. By 1962 the nearby Bomb Store was no longer in use, and was probably partly demolished.

The recorded drawing numbers indicate that buildings 141-144 are of the same Ministry standard, while the other five buildings are of a different standard and of variable types.

NISSEN HUTS

The design of the Nissen hut goes back to the First World War when, in April 1916, Major Peter Norman Nissen of the 29th Company Royal Engineers began to experiment with hut designs.

Nissen was a mining engineer and inventor. He constructed three prototype semi-cylindrical huts, the shape of which was derived from the drill-shed roof at Queen's University, Kingston, Ontario. The design was subject to intensive review by his fellow officers, which helped Nissen develop the design. After the third prototype was completed, the design was formalized and the Nissen hut was put into production in August 1916. At least 100,000 were produced in World War I.

Production continued in the interwar period, although at a slower rate, and at the start of the Second World War the company waived their patent rights for war time production. Due to the flexible nature of the design the

Table 1: Chelveston, Record Site Plan, Sheet 4385/44. October 1944

| Building | Description | Construction (N for Nissen) | Type | Drawing number |
|-----------|--------------------------------|--------------------------------|------|-------------------|
| 137 & 138 | S.A.A. STORES (GROUND DEFENCE) | N | B | 12725/41 |
| 139 | S.A.A. STORE (GROUND DEFENCE) | N | C | 12725/41 |
| 140 | S.A.A. STORE (AIRCRAFT) | N | C | 12725/41 |
| 141 - 144 | SMALL BOMB CONTAINER STORES | N | - | 15797/41 |
| 145 | SEA MARKERS & FLAME FLOATS S?? | N | D | 12725/41 |

S.A.A. - small arms & ammunition. Illegible letters indicated by '?', probably STORES

Table 2: Chelveston, Record Site Plan, CHE/374. Amended 2?-6-1962

| Building | Description | Construction (N for Nissen) | Drawing number |
|-----------|----------------------|--------------------------------|----------------|
| 137 - 139 | STORES SPARES | N | STANDARD |
| 140 | SHOP. ARMS MAINT | N | STANDARD |
| 141 - 144 | STORAGE, SEG MAG. | N | STANDARD |
| 145 | STORES, SPARES ????? | N | STANDARD |

Illegible letters indicated by '?'

huts were built in their thousands and were a common site on military bases across the allied countries.

This history of the Nissen huts has drawn on material available online through Wikipedia (http://en.wikipedia.org/wiki/Nissen_hut: accessed December 2011).

Figures 2-5, showing how a basic Nissen hut was assembled, are from the website: <http://www.nissens.co.uk/default.htm> (accessed December 2011), which describes itself as the “definitive Nissen Hut site”.

The cross-section was not precisely semi-circular, as the bottom of the hut curved in slightly. The exterior was formed from curved corrugated steel sheets, 10 feet 6 inches by 2 feet 2 inches (3.2m x 0.70m), laid with a two-corrugation overlap at the side and a 6 inch (180mm) overlap at the ends. Three sheets covered the arc of the hut (about 54 sheets in all were required, for a standard hut of 6 bays). These were attached to five 3 × 2 inch (75 x 50mm) wooden purlins and 3 × 2 inch wooden spiking plates at the ends of the floor joists.

The purlins were attached to eight T-shaped ribs (1¾ × 1¾ × ⅛ inch / 45 × 45 × 5mm) set at 6 feet 0.5 inch (1.8m) centres. Each rib consisted of three sections bolted together using splice plates, and each end was bolted to the floor at the bearers. With each rib were two straining wires, one on each side and a straining ratchet (or in some cases a simple fencing wire strainer). The wires were strained during construction (see Fig 17). The straining wires do not appear in the original Nissen patent.

The purlins were attached to the ribs using a “hook” bolt, which hooked through a pre-drilled hole in the rib and was secured into the purlin. The hook bolt was a unique feature of the Nissen design.

Interior lining could be horizontal corrugated iron (as at Chelveston) or material like Masonite attached to the ribs. The roof and lining formed a circular space with a radius of 8 feet 0.5 inch (2.4m), although, because of the inward curve, the floor was only 15 feet 10 inches wide (4.8m). The space between the interior and exterior lining could be used for insulation and services, if required

The walls and floors rested on foundations consisting of 4 × 4 inch (100 × 100mm) blocks with 15 × 9 inch (380 × 230mm) sole plates. On these were 4 × 3 inch (100 × 80mm) bearers and 4 × 2 inch (100 × 50mm) joists at 2 feet 10 inch (1.0m) centres. The floor could be made from tongue and groove floorboards or concrete, as at Chelveston.

At either end the walls could be made from a wooden frame with weatherboards nailed to the outside, or they could be in brick, as at Chelveston.

Nissen huts came in three internal spans - 16ft (4.90m), as at Chelveston, 24ft (7.3m) or 30ft (9.20m). The bays were in multiples of 6ft (1.83m).

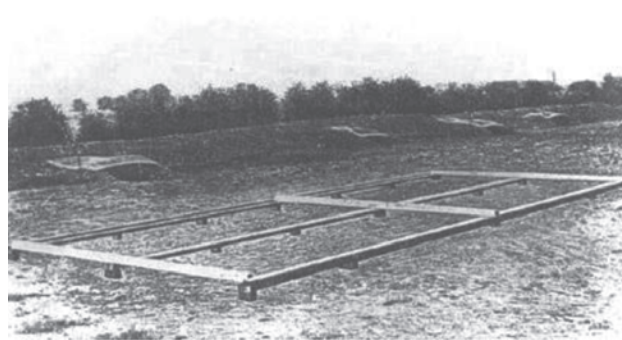


Fig 2 Wooden bearers are laid on level ground



Fig 3 Steel ribs are bolted to the bearers and wooden purlins are fixed to the ribs with hook-bolts



Fig 4 Wooden joists, screwed to the bearers, support wooden floor panels



Fig 5 The hut is clad in corrugated iron



Fig 6 View of Nissen huts 141-144, looking east

BUILDING ASSESSMENT

The buildings surveyed were two of a group of four Nissen Huts that appeared to be contemporary with each other (Fig 6), with the huts being numbered in sequence 141-144, with the same stencilled information on each. They formed part of a wider group of nine Nissen Huts surviving in the northern corner of the airfield, 137-145 (Fig 7).

The other two huts within the group of four, buildings 142 and 144, have recently been renovated and are being reused. These four huts are separated by brick walls, 1.8m high, which acted as blast walls (Figs 6, 8 and 9). These were the only group of huts in this part of the airfield to have walls between them.

The two surveyed Nissen huts were to all intents and purposes the same and are described together. All four of the huts in the group are six-bay Nissen huts, with brick walls blocking either end (Fig 8). No windows were present in the huts. The rear walls of the two surveyed examples had originally had a door, which had been subsequently bricked up (Figs 10 and 11). The outside of the wall had been rendered in cement covering the bricked up doorway indicating that there was a change of function at some point in the use of the buildings. Four iron rungs were built into the back of the surveyed huts, the bottom pair were horizontal and the upper pair were vertical (Fig 11), but the function of these rungs was unclear.

The front brick wall to each hut has a 2.4m wide opening, with doors (Fig 12).

The front walls were also cement rendered, and to the right of the doorway at head height each building had a small stencilled panel recording: Building No; Resistance-...Ohms; Date of inspection.

It was not possible to determine the date of inspection on the two huts which were surveyed, although Hut 140, which stood in the woods to the west, had a recorded inspection date of 22/11/63, indicating that the huts were rendered pre-1963 (Figs 13 and 14).

The resistance reading may relate to the building's earth, as it was a metal building used for storing munitions, where sparks would have been very undesirable.

The huts were clad in corrugated iron sheeting, with the covering varying in its state of completeness and condition, allowing various details of internal construction and fittings to be viewed, such as the wooden purlins attached to the ribs (Figs 15).

Various fittings were present on the brick and rendered end walls. There were simple metal ventilation grilles in the end walls of each hut, three in the front wall and four in the back (Fig 16). Air vents were often utilised to manage humidity levels and thereby help maintain the condition of some forms of stored munitions and fuses. On Hut 143, there was straining ratchet, used to tension the supporting wires during construction (Fig 17).

Each of the two surveyed huts had an electrical supply, with the junction boxes surviving on the front walls to the left side of the opening (Fig 18), but the associated internal wiring had been removed. No other internal fixtures or fittings were observed.

A further hut, 145, which was not subject to survey, lay to the east in the woods (Fig 19). This hut appeared to be in its Second World War condition, with no sign of the later stencilling, and with a steel-framed window in its back wall (Fig 20).

A further group of three huts lay in woods to the north-west of the surveyed group, but these were in a poor state of repair (Fig 21).



Fig 7 Location of Nissen huts

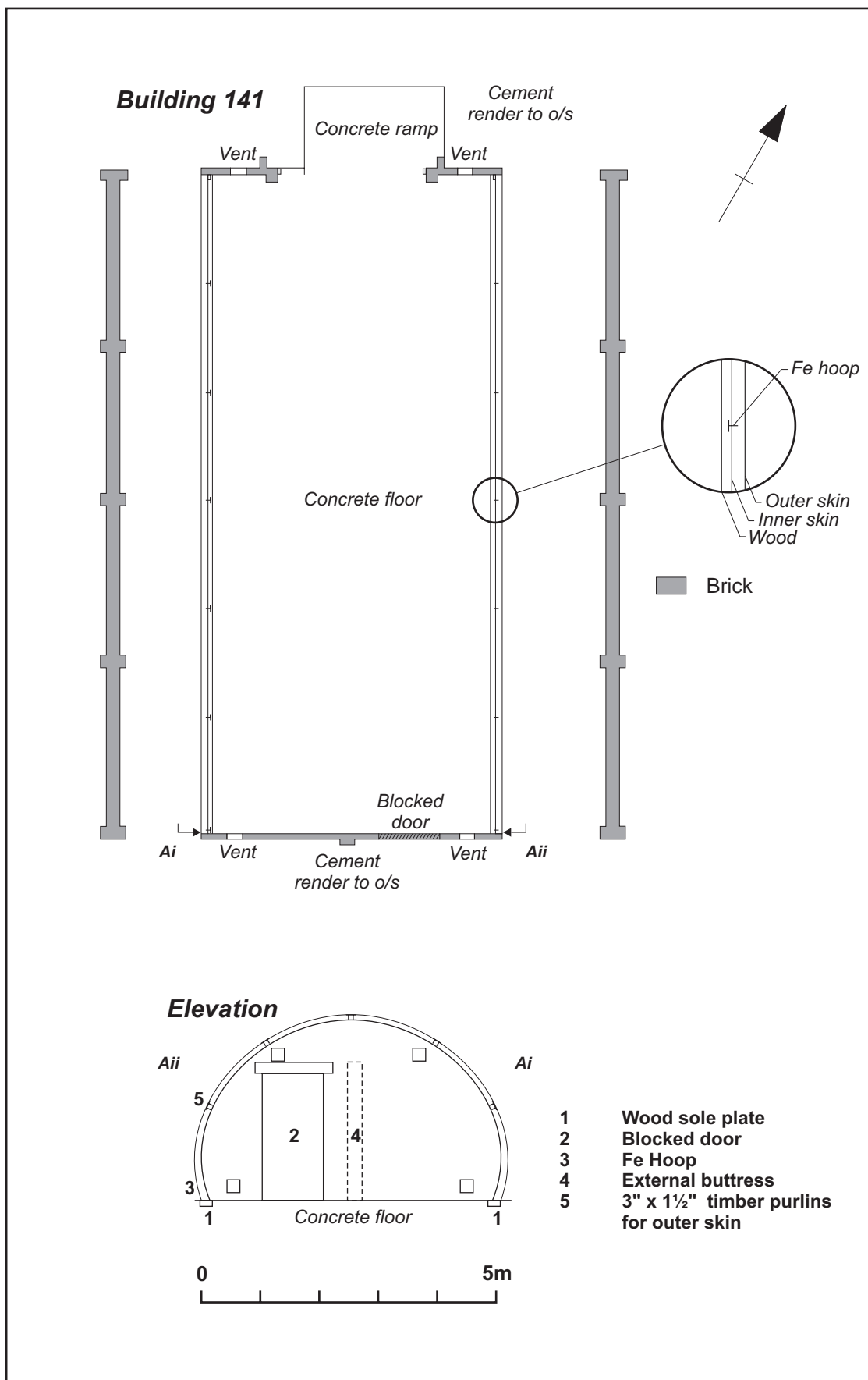


Fig 8 Plan of Hut 141



Fig 9 View of the brick wall, with Hut 141 behind, looking east



Fig 10 Interior of Hut 141, showing blocked door (left of the 1m ranging pole), looking south

DISCUSSION

The survey recorded the two Nissen huts in a group of four that had not been previously renovated. The survey demonstrated that the huts were of standard build, and within the variations of the basic structures that were available. The only alteration which appears to have taken place was the blocking up of the door on the back

wall of the two surveyed huts. It was noted that on the two previously restored huts that the door in the back wall had been reinstated, no doubt for use as a fire exit.

The date of the buildings inspected raises a slight issue as the USAF left Chelveston in 1962 and the readable stencil on Hut 140 gave a date of 1963, suggesting that there may have still been a USAF presence, as the site remained as a reserve airfield.



Fig 11 Back wall of Hut 141 showing concrete render over the blocked door, the vents and four iron rungs, looking north



Fig 12 Front wall of Hut 143, looking south



Fig 13 Hut 140, looking south-east



Fig 14 Stenciled panel on Hut 140



Fig 17 Straining ratchet on Hut 143



Fig 15 Wooden purlin in Hut 143



Fig 18 Electric junction box on Hut 141



Fig 16 Detail of metal grille over wall vent



Fig 19 Hut 145, showing front wall and doorway, looking north-east



Fig 20 Hut 145, showing the steel-framed window



Fig 21 Group of three huts, 137-139, to the north-west of the surveyed group, looking north-east

The other surviving huts in the woods were subject to basic photographic recording as they formed part of the wider group of huts in this part of the airfield.

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