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Generator House, Brodsworth Hall, Doncaster, South Yorkshire

Brodsworth

SE 5049 0715

Archaeological Building Recording

Report No. 1948

April 2009

CLIENT

English Heritage

Generator House, Brodsworth Hall, Doncaster, South Yorkshire

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Archaeological Building Recording

Summary

In advance of consolidation and adaption for use as welfare facilities for the Brodsworth Hall garden teams, the generator house between the hall and the stable block was subjected to a drawn and photographic survey. Limited historical research showed that the building was constructed in 1913 to supply power to the estate. Electricity was last generated in 1939 and shortly after the estate was linked to the national grid.

The structure is of brick under a slate roof and divides into three cells. The central part is the generating room, to the north is a small washroom and to the south a battery storage room. Within the generating room a number of concrete machine beds indicate where the engines and generators had once stood. An interesting feature are the remains of a small telephone exchange board. Little of note survives in the battery room; in the washroom a set-pot and small sink are probably original fittings.

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Report Information

Client:	English Heritage
Report Type:	Archaeological Building Recording
Location:	Generator House, Brodsworth Hall, Doncaster
County:	South Yorkshire
Grid Reference:	SE 5049 0715
Period(s) of activity represented:	Modern
Report Number:	1948
Project Number:	3387
Site Code:	GHB
Planning Application No.:	03/1049/P/MG/GD
Date of fieldwork:	January 2009
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Project Management:	Andy Swann, MAAIS
Fieldwork supervisor:	Andy Swann, MAAIS
Survey:	Mitchell Pollington, BA, MA
Report:	Andy Swann, MAAIS
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Acknowledgements

ASWYAS would like to thank the staff at Doncaster Archives, Doncaster Central Library and Yorkshire Archaeological Society for their assistance during the research. ASWYAS would also like to thank Mark Douglas from English Heritage for the provision of background material on the Generator House and to Helen Gomersall of the West Yorkshire Archaeology Advisory Service for allowing access to her private library collection.

1 Introduction

Archaeological Services WYAS undertook Archaeological Building Recording work at the generator house at Brodsworth Hall, Doncaster on Thursday 14th January 2009. The work was undertaken at the request of Dr Mark Douglas, Properties Curator (North Territory) for English Heritage.

Building Recording was necessary in advance of a proposed programme of repair and development. The results of the recording are to inform repair works, help implement a strategy for the reuse, conservation and repair of the building, and to record any fabric or features that will be removed or obscured during alteration and conservation.

The building is constructed of brick under a slate roof. It is divided into three rooms: at the centre the generating room, on the north-west side a small washroom and on the south-east side a battery store. The south-east part is in ruins, the washroom contains a set-pot and a small cast-iron hand-basin whilst the generating room has a series of machine bases for bolting-down the engine and the generator.

Site location and topography

The generator stands within the grounds of the Grade I listed Brodsworth Hall (constructed 1861-63) to the north-west of the house and to the south of the 18th-century stable block. It stands in the lea of a quarry face adjacent to some recent greenhouses. The building is centred at National Grid Ref. SE 5049 0715.

2 Aims and Objectives

The key objectives of the recording are to:

Provide background research into electricity generation in the context of the English country house. Using a number of available sources to identify key dates and events that help to illustrate the use of the building through time.

To produce an accurate measured and drawn survey.

To record and analyse the construction and fabric of the building as found, and elements that are revealed during conservation and repair.

Provide sufficient information to guide the nature and extent of a programme of conservation and repair and to inform decisions made during an agreed programme of conservation and repair.

3 Methodology

A risk assessment had been prepared in advance. This emphasised the need to take care when working at height above the building. Care was to be taken in the south-east room where brickwork over the door-head was collapsing. This area was also missing the greater part of its roof and there was some danger posed by the threat of falling slates. Voids and culverts in

the floor of the engine house were to be covered over whilst not being recorded directly. Patches of oil were noted on the floor towards the south-east end of the same room.

Drawn survey

The exterior of the generator house, together with parts of adjacent buildings, were surveyed using a Trimble 5500 EDM Total Station, to provide an accurate location for the building plan which could be tied into Ordnance Survey digital map data. This survey also established Ordnance Datum levels to an accuracy of +/- 1cm along the exterior wall of the Generator House, using a Bench Mark located at the north-west corner of a building approximately 75m to its north-east. The survey data were processed using Korec GeoSite and AutoCAD Map 3D 2008 software. Hand tapes and REDM readings were used to record interior detail.

Photographic record

A medium format (Mamiya 645) camera was used to record, in general and in detail, the interior and exterior of the standing structure and its environs. The record was black and white using Ilford Professional HP5 Plus 220 film. This was supplemented by the production of a small number of 35mm colour transparencies which form part of the project archive. A number of elevated views were taken using a hydraulic mast with a top-mounted high-resolution digital camera.

4 Historical Background

The Doncaster Archives, the Local Studies section of Doncaster Central Library and Yorkshire Archaeological Society were consulted for cartographic and documentary sources, which are listed in the bibliography. Additional background material was supplied by English Heritage. Leeds University Library and the West Yorkshire Archaeology Advisory Service Library were consulted for relevant secondary sources.

Map regression

Ordnance Survey, 1932, County Series 25 inch map sheet South Yorkshire 276.6, revised in 1930.

Only one historic map has been used as earlier ones predate the structure and later ones show no changes. The generator house is shown only in outline and has a plan which broadly corresponds with the survey evidence. It is located at the foot of the quarry face a short distance to the south of the stable block and to the north-west of the hall.

Documentary evidence

The following material is held in the Doncaster Archives Brodsworth Collection and relates to the Generator House. The ‘In-letter’ collection was examined for 1913, when it is known that the Generator House was built.

1st October1908: Tender for wiring within the buildings from Leonard G. Tate and Co. electrical and mechanical engineers and contractors, Mansion House Chambers, 20 Bucklesbury, London (Doncaster Archives Ref. DD BROD 13/8)

The tender outlines the process by which the wiring will be undertaken within the buildings, including using wood casing under the floor.

20th October 1908: Tender for Plant, etc for the electric lighting of Brodsworth Hall and various buildings by Dick, Kerr and Co. Ltd, Alchurch Yard, Cannon Street, London (Doncaster Archives Ref. DD BROD 13/6)

The tender is separated into three sections: switches and fittings, the substation equipment and the cabling, totalling £3229 (excluding the erection of the substation itself). A separate quote for connecting to the substation and colliery is also provided.

April 22nd to 17th May 1913: Series of Letters from S. Dixon and Son Ltd of Leeds to the Brodsworth Estate

Letters provide some information about the proposed generator system they would fit (either a Campbell or Hornsbys) and how they would install the wiring and electric fittings. A number of the letters are in regards to missed appointments.

April 24th 1913: Letter from Alnwick Castle Estates to Brodsworth Estate

The letter states that they have not heard of Dixons of Leeds, and that their electrical system was installed by Belshaws and Co.

13th May and 24th May 1913: Letters from Crompton and Co. Ltd to J. S. Mether of Brodsworth Estate

The first letter is thanking the estate for providing them with an Ordnance Survey map with the Generating station, etc marked on it, and for showing them around last week. They were going to prepare a scheme and estimates to be sent in a couple of days. The second letter is providing their regrets that they did not win the tender for the work. It goes on to state that they also make dynamos and switchboards.

23rd August 1913: Letter from The Yorkshire Insurance Company to the Brodsworth Estate

The letter is in respect of the insurance on the Electric Lighting Station, agreeing the cover the building for £150, and the oil engine, dynamo, switch board, accumulators and fittings for £700. They also state that they need to send over one of their surveyors to inspect the equipment.

11th September 1913: Letter from Golding, Hargrove and Golding to the Brodsworth Estate

The letter provides an agreement from the insurance company to cover the electric lighting storage.

25th September 1913: Letter from Vulcan General Insurance Co. Ltd to the Brodsworth Estate

The letter states that after a preliminary examination of the dynamo at Brodsworth Hall by the electrical inspector, it has been reported as being in good working order and they are able to accept it for insurance.

Discussion

Brodsworth Hall was built in the 1860s by Charles Sabine Augustus Thellusson, replacing an earlier, Georgian house which lay to the west of St Michael's Church. The new house was built following the settlement of Peter Thellusson's will, which had stipulated that the majority of his estate (approximately £600,000) was to be held in trust to be inherited by his great great grandsons. In 1859, some 62 years after Peter Thellusson's death and many years of legal proceedings, the Thellusson estate was divided between Charles Sabine Augustus Thellusson and the Fourth Lord Rendlesham (Kennedy 2000).

Between 1903 and 1919, Brodsworth Hall Estate was owned by Charles Thellusson, the second of Charles Sabine Augustus Thellusson's four sons. Charles Thellusson was responsible for a number of additions to the Brodsworth estate, including the building of cowhouses and a chicken farm to house his prize cows and chickens, along with the Electricity Generator House. Lighting and heating to Brodsworth hall had originally been by gas from a plant located within Brodsworth village (Sykes 1996). This was replaced by electricity in 1913.

The Generator House provided electricity to a number of buildings within the estate, including the brew house (Laundry), stable yard, joiners shop, cowhouses and chicken farm (Arrowsmith 2003). Brodsworth Colliery, which opened in 1905, and Brodsworth Church were also provided with electricity provided from the Generator House (Smith and Handley 1996). The main purpose of the Generator House, however, was to provide electricity to Brodsworth Hall and the house still retains many of the original pendant light fittings, lamps, switches and sockets. The chanderliers in the drawing room, which originally used gas, were converted to electricity and the bell for summoning staff was replaced by an electric bell system. Soon after the Generator House was built, an internal Ericsson telephone system was installed, which was powered by Leclanche cells – possibly the ones located in the Generator House (Anon. 2003). The provision of a regular electricity supply would have also allowed for the use of new 'labour saving' devices within the house, such as vacuum cleaners (Hannah 1979).

The Brodsworth estate was passed to each of Charles Sabine Augustus Thellusson's sons in turn and as none had any children themselves, the house was inherited by his daughter Constance's son, Charles Grant-Dalton in 1931 (Smith and Handley 1996). In 1940, the house was requisitioned by the army, although Charles Grant-Dalton and his wife Sylvia continued to occupy the property. Around the same time, the Brodsworth estate was connected to the National Grid, and the Generator House was no longer required. The generator equipment was dismantled and the parts were either sold or given away (Sykes 1996) and the building itself was used for storage (Arrowsmith 2003).

In 1988, the Brodsworth estate was inherited by Charles and Sylvia Grant-Dalton's daughter Pamela Williams. Unfortunately, by this time the house had fallen into serious disrepair and in the early 1990s the estate was purchased by English Heritage (Kennedy 2000).

Electricity generation

The development of electricity production began with the discovery of electromagnetic induction by Michael Faraday in 1831, although it took the development of the 'durable incandescent lamp' by Joseph Swan in 1878, which provided a smaller and more manageable light source compared to the earlier 'arc lights', that electricity began to be used within a domestic context (Hannah 1979). Many county houses began to switch to electricity, primarily for lighting, soon after (Hannah 1979).

By 1866 it was well established that it was possible to produce electricity for as long as required by the continued rotation of a wire winding (the armature) within the magnetic field of fixed magnets. This produced an alternating current; the addition of a communicator to this produced a direct current, this generator became known as a dynamo. The chemical battery that was already familiar in this period produced direct current (Derry and Williams 1960). The rotation required could be supplied in a number of different ways: steam engines were initially popular but increasingly struggled to produce the high rotational speeds required as requirements increased. Water turbines were used where there were abundant supplies, such as at the Burnfoot engine house at Cragside (Irlam 1989). Alternatively gas or oil engines could be used. Often a second smaller engine was installed as a backup. The electricity produced could be used directly or fed into a battery (accumulator) capable of storing the power till required. These were often Leclanche cells; invented in 1866 they consisted of one copper and one zinc rod in a solution of ammonium chloride. These required minimal attention to keep them active and were good for supplying intermittent current (Derry and Williams 1960).

Isolated generation stations were built to supply a variety of functions, such as lighting, tramways and to provide power in a range of industrial settings. By the 1890s larger generating stations were being constructed to supply a range of customers over wider, particularly urban areas. A national network was not established until the 1940s (Lancaster University Archaeological Unit 1994).

Proposals for an electricity supply to Brodsworth Hall were first put forward in 1908. The Generator House was eventually built in 1913 and the electricity equipment was installed by Belshaw and Company of Victoria Street, London, who appear to have been recommended for the job by Alnwick Castle Estate manager (Doncaster Archives Brodsworth Collection 'Letters In' dated 24/04/1913).

A letter from August 1913 confirming the provision of insurance for the 'electric lighting station' lists an oil engine, dynamo, switch board, accumulators and fittings (Doncaster Archives Brodsworth Collection 'Letters In' dated 23/08/1913). This description corresponds well to oral history accounts collected by Virginia Arrowsmith in 2001 and 2002 from Wilf Hindle and Mollie Nicholls (nee Hindle), the children of Thomas William Hindle who was the estate manager in the 1930s. They describe how the 'Leclanche cells', glass tanks were

located at one end of the Generator House (the 'cliff end'), positioned up off the floor, and they could store up to 110 volts (DC) when fully charged (Arrowsmith 2003).

The next room along held the oil powered dynamo, described as having two engines or drive wheels of different sizes attached together by a belt and which had to be started manually using the fly wheel. In addition to the main generator, a second smaller generator was also located within the Generator House, although its purpose is unclear (Arrowsmith 2003). Between 75 and 80 'liquid acid' batteries were situated at the end of the room nearest 'cliff'. The batteries were housed in glass tanks with wooden covers, which were topped up regularly with distilled water and each stored up to 1½ volts (Arrowsmith 2003).

5 Building Description

External

The building comprises a central generating house, an adjoining washroom to the north-west and a ruinous adjoining room of uncertain purpose to the south-east. The building is constructed of red brick laid in English-garden-wall bond. The roof cladding is blue slate with ceramic ridges. The roof over the room to the south-east and that over the north-west end of the generating house and the washroom are both aligned north-east to south-west; the central roof is aligned south-east to north-west. A small, square brick chimney projects from the southern corner of the washroom (Photographs 1 and 2). At the south-east end of the front north-east facing elevation the gable wall of the ruinous room projects forward of the main building line. At the centre of the gable is a single segmental-arched window opening with a rounded brick sill and a two-over-two vertical sash frame (Photograph 6). In the short return-wall is a segmental-arched doorway with a softwood frame. The main body of the generating house is lit from this side by two segmental-arched window openings with rounded brick sills and two-over-two vertical sash frames (Photograph 3). Running above the windows at eaves-height is a gutter-board with a moulded lower edge, possibly a piece of inverted skirting-board (Photograph 5). Within the gabled part of the generating house elevation is a wide segmental-arched doorway with double outer-opening plank doors (Photograph 13). The front elevation of the wash room is set back and has a roof that slopes from its junction with the generating house roof. Within the elevation is a single segmental-arched doorway with softwood frame.

The north-west elevation of the wash room has a moulded gutter-board with a small segmental-arched window opening with rounded sill and two-over-two vertical-sliding sash frame. (Photograph 11). The rear south-west facing elevation presents as a single plane. There are no visible straight-joints within the elevation implying that the structure is of a single build. At the north-west end the wash room has a segmental-arched window opening with rounded brick sill and a broken two-by-two side opening sash (Photograph 10). A small chimney projects on the line of the wall with a ventilator grille to the side. In the apex of the rear gable is a second, slightly larger, ventilator grille (Photograph 9). Close-by, at a lower

level, is an iron fall-pipe bracket (Photograph 15). Beyond the gable the wall is interrupted by three almost equally spaced segmental-arched window openings with rounded brick sills and two-over-two vertical sash frames (Photographs 8 and 10). Running the length of the elevation is a back-board to support a gutter. At the end of the elevation and on the south-east elevation, the roof of the end room has collapsed (Photograph 7); the south-east facing wall is featureless.

Washroom, internal

The room has internal dimensions of approximately 2.1m by 2.8m. It is lit by sash windows in the north-west and south-west walls (Photographs 17 and 18). All walls are of brick and are 0.23m thick. In the southern corner is a set-pot set into a stone top, supported on a brick sub-structure (Photograph 20). The northern corner of the brick support is rounded (Photograph 17). Within the north-east face of the feature is an opening to stoke the fire below the pot. Rising above the stone top, hard into the southern corner, is a flue that emerges from the building as a small brick stack. A stone shelf projects forward from the side of the flue. In the eastern corner is a wall-mounted enamelled iron sink with central basin, plug-hole, overflow and rear soap holder (Photograph 21). The sloping roof is supported on a single softwood purlin and is clad on the inside with softwood matchboard. Above the window in the south-west wall a wooden ventilator has been nailed in position, possibly to support loose boards (Photograph 19). The door is missing from the opening in the north-east wall. The concrete floor surface may be a later feature. Found loose within the room were a plank-board with a central opening (possibly a seat from an earth-closet) and a similar piece with a larger opening and two hinges, thought not to be a toilet seat (Photograph 22).

Generator House, internal

The internal dimensions of the room are approximately 3.9m by 10.0m. Entry is made by the door in the north-east side near to the northern corner. All internal walls are of brick with remnants of a coating in some areas, probably whitewash. The floor is surfaced with diagonal-set square tiles. The north-west end is dominated by a large concrete block constructed adjacent to the north-west wall and extending a short way along the south-west wall. At the south-west end a step has been removed (Photograph 24). The block has a narrow chamfer along its top edge. Although possibly designed as an engine or machine bed the block has no evidence for bolting down or fixing positions and may have been utilised to hold a fuel-oil tank. Forward and to the side of the block are a series of recessed pipe or drain culverts. All are edged with angled metal strips designed to hold sections of grating (Photograph 25). The culvert that runs into the northern corner terminates in a double curved end. Further towards the south-east are two concrete machine or engine beds (Photograph 23). The larger of the two sits at the centre of the room and is aligned south-east to north-west. At its north-west end both corners are canted and a narrow chamfer runs along the top edge (Photograph 41). Six steel bolts protrude from the top of the concrete block with vestiges of square plate positions at their base. Along the north-east edge of the block a slot

has been cut through the floor surface. This remains unexcavated but may be a small pit for a flywheel, implying that the block was designed as an engine mounting. A recess along most of the length of the block aligns with the slot. Between the narrow slot and the north-east wall is a smaller south-east to north-west aligned block of concrete. This block has canted corners and a chamfered top edge. In the top surface is a recessed track with steel bolts protruding. Forward of each bolt, crossing both sides of the track, are metal plates (Photograph 42). Occupying a central position towards the south-east end is a further raised block of concrete (Photograph 27). The block is approximately 1.2m square in plan and has narrow chamfers around the top edge and down each corner. Along the south-east and north-west sides are pairs of plates with protruding bolts. Each of the four recessed plates holds two bolts. Between both lines of bolts is a recessed rectangular area defined on either long side by metal edges (Photograph 36). Near to the south-west side of the block a steel tube projects out of the tiled floor. On the north-west side a similar feature has been cut short.

Within the north-east wall are a doorway and two windows. Both windows are of similar design and have moulded architraves surrounding the sash frames (Photograph 27). Between the windows, level with the window heads are ventilators. To the south-east side of the door jamb is a line of three light switches connected to a metal conduit pipe. To the side is a single switch of different type connected to a plastic cable (Photograph 29). Attached to the face of the south-east wall are a number of electrical features. The wall is of brick with an opening communicating with the battery storage room to the south-east (Photograph 33). Below the opening four thick cables run into junction boxes attached to a wooden back-board (Photograph 34). The junction boxes are of cast-iron and are all of a similar type. All are marked ‘HENLEYS PATENT BOX No 1501 AA’. These are likely to be secondary features relating to a National Grid supply (Photograph 35). Attached to the wall to the left of the large opening are a number of electrical junction boxes. All post-date electrical generation on site. Whilst most of the features can be regarded as modern a small number of cast-iron boxes may date from the mid-1940s. Two probably contain transformers; one having the makers name ‘Pento’ on the casting (Photograph 37). The second, larger, example has two small boxes to its right (Photograph 38). These show different voltages of 250 and 500 volts (Photographs 39 and 40).

There are two windows in the south-west wall. To the side of the one nearest the southern corner is a telephone exchange board. This comprises a slab of white marble mounted onto a steel frame which in turn is wall mounted. At the top centre of the board is a dial with ceramic insulated resistors to either side. Below is an array of eight sockets designed to take small light bulbs. At the base of the panel is an elaborated brass switch handle (Photograph 31). A small maker’s plate at the centre of the panel identifies ‘BELSHAW & CO. MAKERS. VICTORIA ST. S.W.’ (Photograph 32). Between the two windows a piece of old skirting board has been inverted and has been used possibly to store keys or small tools (Photograph 30). The roof space has been fully clad with match board.

Battery storage room, internal

The room is in a ruinous state with the remains of its collapsed roof occupying its central area (Photograph 8). It has approximate internal dimensions of 5.3m by 3.6m. All walls are of brick with a wall thickness of 0.23m. The room is on the south-east end of the generator house with which it shares a shuttered opening in its north-west wall. Attached to the face of the wall, towards the segmental-arched doorway at the northern corner, are two wooden blocks, possibly associated with a shelving or racking system (Photograph 44). The walls within the room have been whitewashed but most of the coating has now fallen away. The room is lit by segmental-arched window openings with two-over-two sash frames in the north-east and south-west gable walls. The south-east wall appears featureless. Unfortunately the dangerous state of the structure at this point meant that floor surfaces had not been cleared and identification of floor type was not possible.

6 Phasing

Phasing within the generator building is limited. The brick structure appears to be of a single phase, purpose built in 1913. Some of the internal fittings are original and some are later. It is known that around 1940 the hall received a direct power supply from the national grid and electricity was no longer generated on site; equipment was stripped out at this time. Within the washroom it is likely that both the set-pot and the sink are original features whilst the wall-mounted ventilator clearly occupies a secondary position.

A number of features in the Generator House are likely to be original. These include all four concrete mounting blocks, the drains at the north-west end and the wall-mounted telephone exchange board. Features dating from the 1940s include the cast-iron junction and transformer boxes mounted on the south-east wall and the light switches to the side of the entrance. Few diagnostic features survive in the battery storage room.

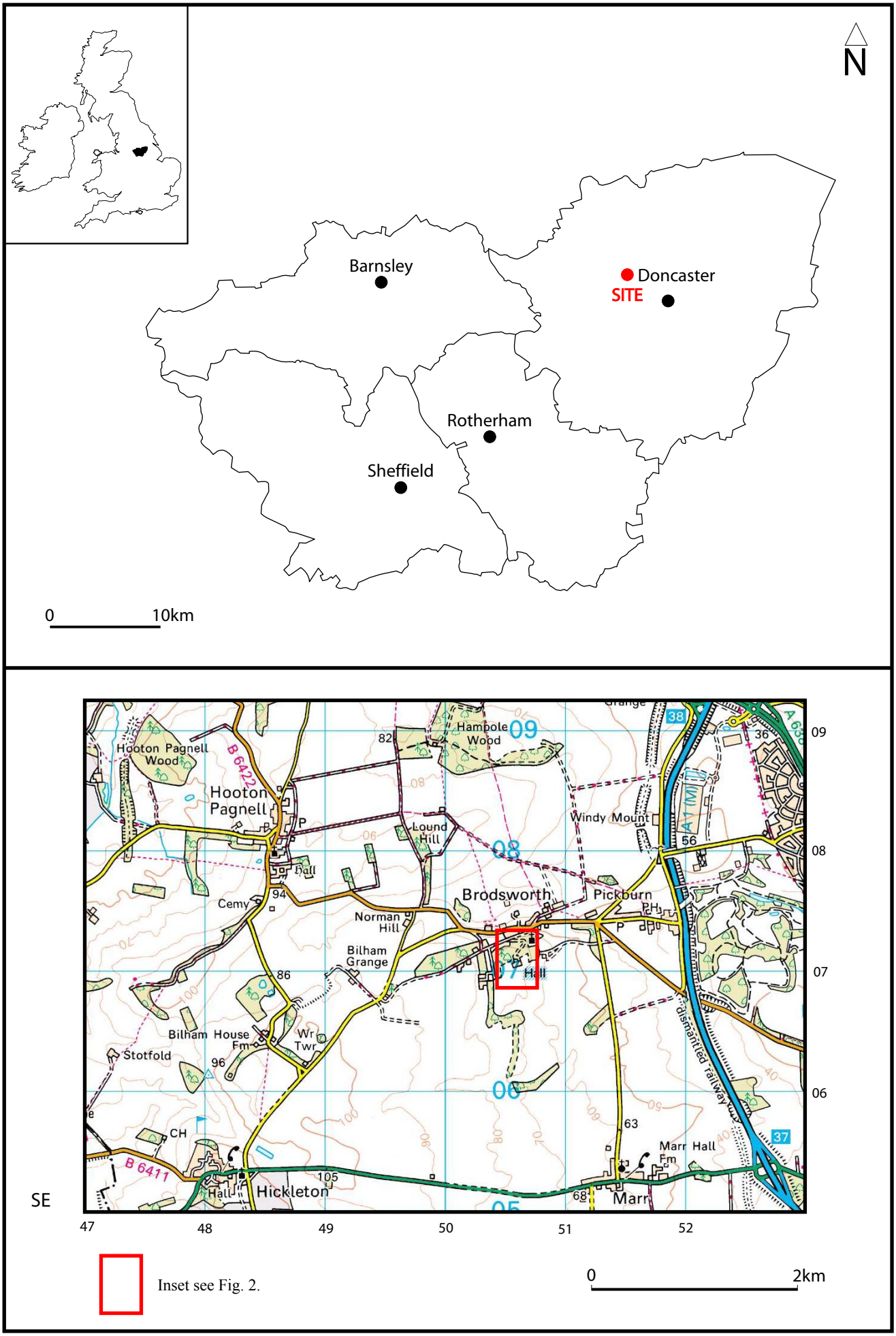


Fig. 1. Site location

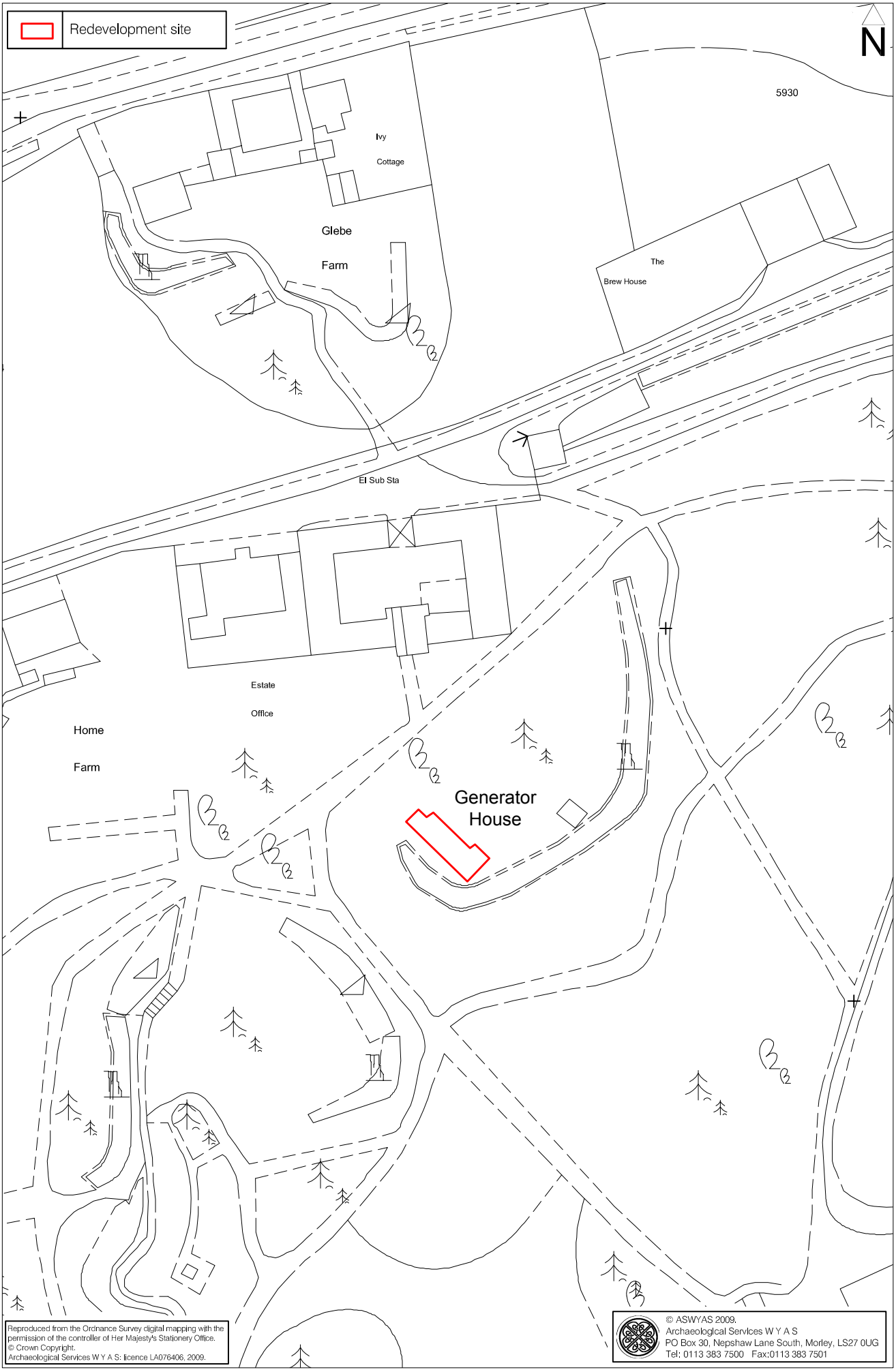


Fig. 2. Detailed site location

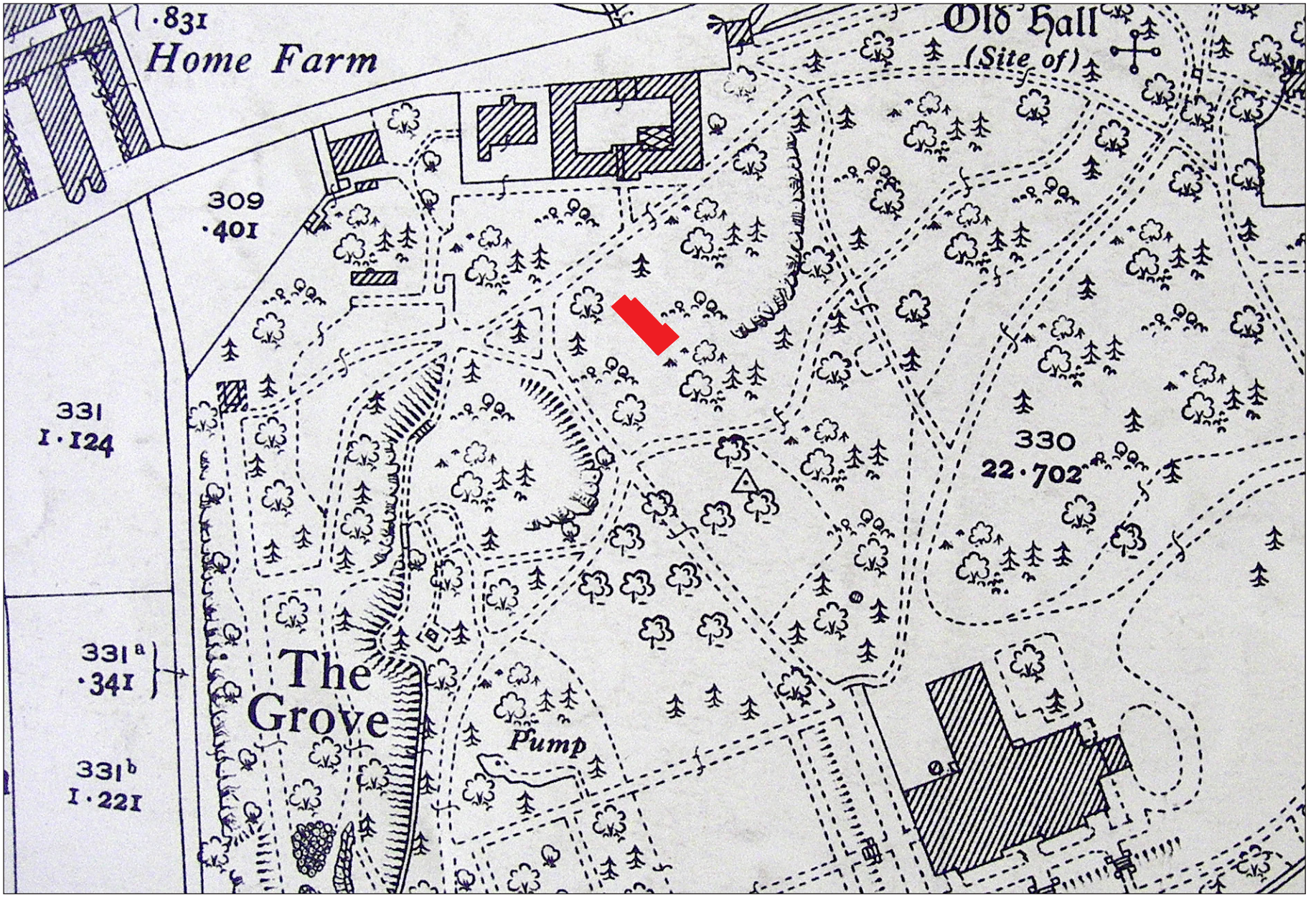


Fig. 3. Extract from the 1932 Ordnance Survey map 25 inch (sheet 276.6), with the Generator House highlighted in red

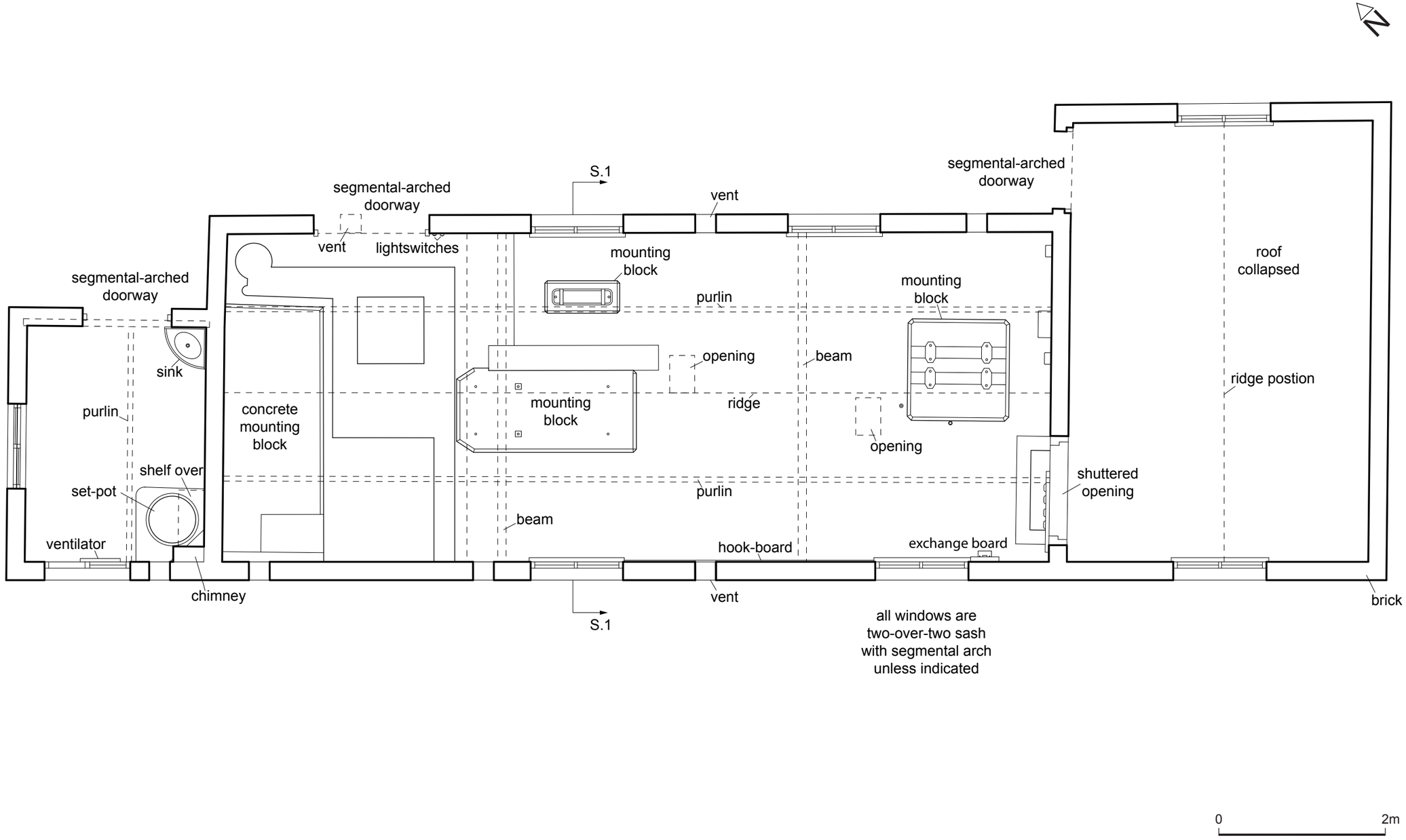


Fig. 4. Brodsworth Hall generator house plan (scale 1:50)

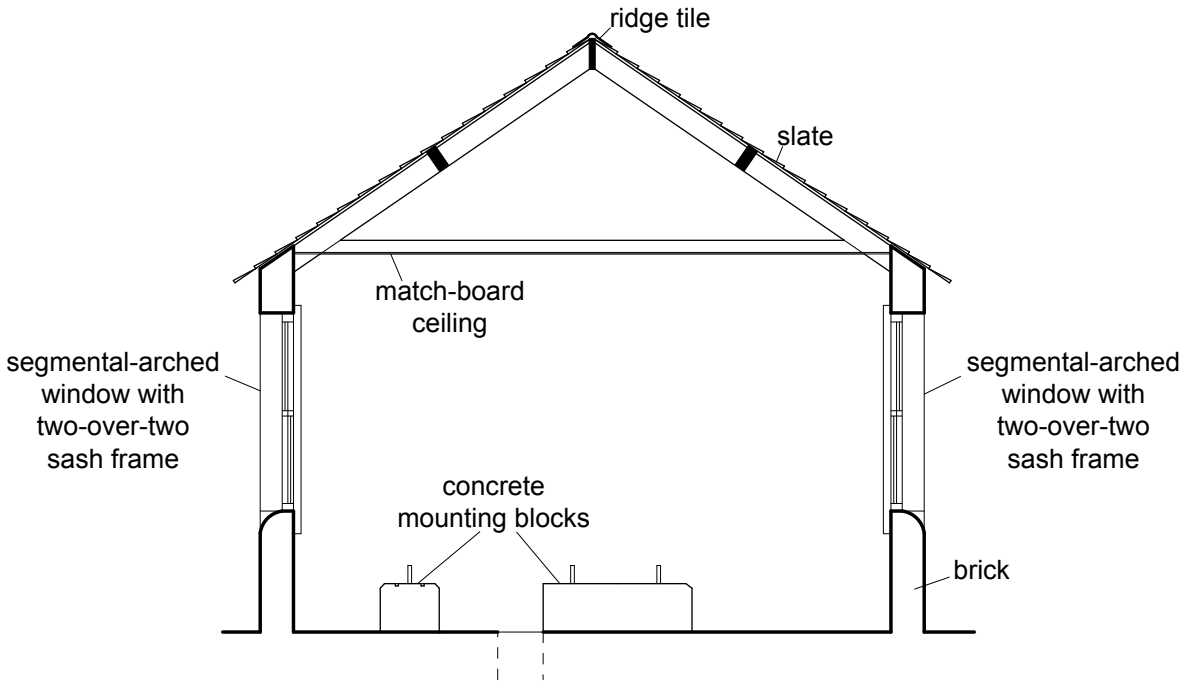


Fig. 5. Brodsworth Hall Generator-House section (scale 1:50)

Appendix 1: Specification

SE 50498
67156

ENGLISH HERITAGE

BRIEF FOR ARCHAEOLOGICAL BUILDING RECORDING WORK

The Generator House, Brodsworth Hall, Doncaster

1.0 Summary

1.1 A proposal has been forwarded by the Estates Team of English Heritage to make certain alteration to an historic structure at Brodsworth Hall, Doncaster, South Yorkshire. The building in question is the former Generator House on the site, which is not covered by any formal designation; however, it does stand within the Registered Park and garden

1.2 The project proposal involves the consolidation of the building and its adaptation for use as welfare facilities for the gardens team at Brodsworth hall.

1.2 This document provides a brief for a scheme of historic building recording that is necessary in advance of the proposed of a programme of repair and development. Understanding and interpreting a building, in its setting is an essential first step for all conservation work, and preparing an appropriate record of the work carried out is an important final stage in any repair programme. The aim is to examine the building in its setting in context to understand the character, dating, form, architectural and archaeological development of the structure. The results of this investigation will provide information needed to prepare:

a programme of repair works
a strategy for the sustainable re-use, conservation and repair of the building.
a record of fabric and features that will be hidden, altered or demolished

1.4 The contractor is to provide a costing for a level 3 survey in accordance with standard guidelines contained within *Understanding Historic Buildings: a guide to good recording practice* (English heritage 2006).

2.0 Site Description

2.1 The generator house stands within the grounds of Brodsworth Hall, a grade I listed structure. The building is situated towards the northern side of the grounds, close to the 18th century stable block. The area itself does not form part of the visitor route connected with the hall.

2.2 The site is owned by English Heritage.

3.0 Archaeological and Historical Background

3.1 Brodsworth Hall is a late 19th century Grade I listed country house set within a registered garden and parkland. The house is Italianate in style and is of a single phase of construction (1861-1863), being built to replace a demolished 18th century house the site of which is located a short distance to the north. The generator house was constructed in 1913 to supply power to the house and other service buildings. Built of red brick it is characteristic of a range of upgraded and updated farm/estate buildings constructed at the same time around the estate. The generator was the sole electric power supply to the hall from its introduction until 1939. From the 1940's onwards the now redundant generator house was used for storage and has slowly deteriorated. Internally, a number

of early features have survived including bells and board of one of the four telephones which was used to communicate with the hall. In addition there are remnants of the original floor covering, early light fitting and suspended wooden ceiling.

3.2 Although the house, gardens and surrounding landscape of Brodsworth have been extensively studied, little work has been carried out on the generator house (some historical documentation is held by the curatorial staff of the hall).

4.0 Objectives

4.1 The objectives of the survey, research, analysis and archaeological investigation are as follows:

- To provide limited amount background historical research into electricity generation in the context of the English country house. Identify key dates and events, which will illuminate the construction, use and alteration of the building through time, drawing on historic maps, photographs and primary sources (sources for this information should include English Heritage, the County Record Office, County Historic Environment Record, National Monuments Record and any documentation held by the current or former owners and estate);

- to provide an accurate metric survey using image-based or measured survey techniques to record the monument in a format that is suitable for use by all professionals involved in the project;
- As a minimum the survey should include a ground plan (at an appropriate scale) and one section (one which provides the maximum information)

- to provide analytical drawings and a written report on the structures sufficient to illustrate and explain architectural and archaeological details and any changes and developments through time with regard to the construction techniques, materials, surface treatments, function and use of the structure and setting. This should also include any significant fabric that is revealed during works (eg: roof structures) and any features likely to be lost or hidden as a result of an otherwise beneficial programme of conservation and repair;

- To provide sufficient information to guide the nature and extent of a programme of conservation and repair and to inform decisions made during an agreed programme of conservation and repair. This may include:

The client will ensure that all material is cleared from within and surrounding the building. That vegetation is removed from the rear of the building and boards removed from all windows.

5.0 Method

5.1 The contractor must demonstrate that all staff, including subcontractors, are suitably qualified and experienced and understand the work required of them.

5.2 The contractor must ensure any plant and machinery is operated in scheduled area with due care and attention.

5.3 There may be a requirement for the contractor to be present during conservation and repair works, therefore a day rate for this work should be supplied.

5.5 All measurements will be expressed in metres. Plans, sections and elevations will be produced at an appropriate scale using reliable and repeatable control measurements by establishing a metric based co-ordinate system.

5.6 All photographic recording of features should use the most appropriate method to fulfil the objectives of the project (35mm colour slide, black and white print, Digital photograph) and should be agreed in advance of the fieldwork.

5.8 Lose architectural fragments should be treated as small finds and recorded individually (with reference to the appropriate repository standards and guidelines). The find location should be recorded three dimensionally.

5.9 All drawings to be provided as ink on film or where facilities are available as digital drawings in a .dwg or .dxf format.

6.0 Archive and Report

6.1 The site archive will be prepared to the standards specified in *Understanding Historic Buildings: a guide to good recording practice* (English heritage 2006; 18). Archive preparation and deposition should be undertaken with reference to the appropriate repository guidelines and standards. The contractor must demonstrate that arrangements have been made with an appropriate organisation for the deposition of the project archive in advance of any work on site.

6.2 The contractor will provide for a written, illustrated report within 4 months (or shorter period by mutual agreement) on completion of the fieldwork. A copy of the report should be sent to the English Heritage Properties Curator, local authority conservation officer, and to the English Heritage, regional Inspector of Historic Buildings Inspector and the County Historic Environment Record. The National Monuments Record should be asked if they wish to receive copies of the archive and report. The report should contain as a minimum:

- Non-technical summary
- Introductory statement
- Site description
- Aims and objectives
- Methodology
- Summary statement of the results
- Conclusion
- Index and location of archive
- References and bibliography
- Copy of project design

6.3 Where appropriate arrangements should be made to publish the results of the investigations through a local or national journal.

7.0 Timetable and Monitoring

7.1 Ideally the fieldwork should start on ***to be mutually agreed***.....
to ensure completion by ... .
The first draft of the report should be submitted within 2 months of the completion of the fieldwork.
The final report should be submitted within 4 months of the completion of the fieldwork.

7.2 The project will be monitored by the English Heritage, Properties Curator, Mark Douglas who will be given at least two weeks notice, (or shorter period by mutual agreement) in writing of the commencement and timetable of the work.

7.3 The contractor will ensure that arrangements are made for monitoring visits. As a minimum;

- At the beginning of the contract
- At least one progress meeting during the fieldwork
- At least one post-fieldwork meeting to discuss the report and archive

7.4 The contractor will report any unexpected discoveries immediately to the project monitor

8.0 Health and Safety

8.1 The contractor should comply with the Health and Safety at Work Act and subsequent additions and amendments. All fieldwork must be carried out under an agreed Health and Safety Policy. A risk assessment should be carried out prior to the commencement of work (and risk assessment documentation supplied) and the project should have a nominated Safety Officer.

8.2 If the Provisions of Construction, Design and Management (CDM) Regulations 1994 are appropriate the employer will appoint a Planning Supervisor who will prepare a Health and Safety Plan which will be made available to the contractor prior to the commencement of work.

Dr Mark Douglas
2008
English Heritage
Properties Curator (North Territory)
37 Tanner Row
York
YO1 SWP

24th November

Appendix 2: Photographic register and photographs

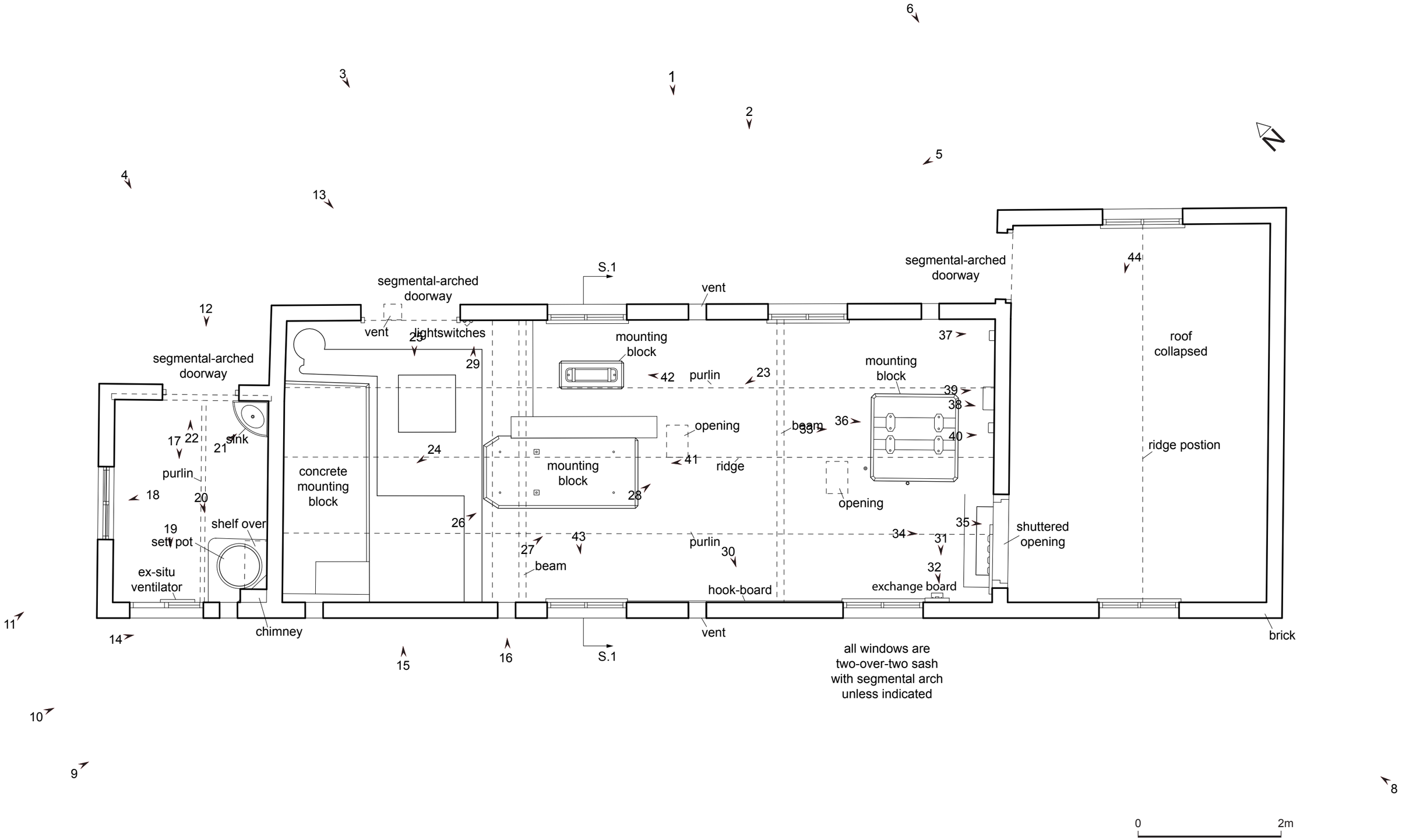
Photographic Register for Generator House, Brodsworth Hall

N Photograph Number
FF Frame and Film Number
BN Building Name/Number
FL Floor Name/Number
RN Room Name/Number
DR Direction

N	FF	BN	FL	RN	DR	Description
1	09D009_3387_0015				SW	General elevated view showing the slate roof covering
2	2_11				SW	North-east elevation with the quarry face in the background
3	2_9				SW	North-east elevation with the quarry face in the background
4	2_12				S	North-east elevation showing the washroom to the right containing the enamelled sink and the corner set-pot
5	4_7				W	North-east elevation showing the window openings with rounded brick sills, above is a moulded wooden eves board
6	4_5				S	North-east facing gable showing a segmental-arched window opening with a rounded brick sill. The window opening has a wooden two-over-two vertical sliding sash frame
7	3_8				W	General view from the east showing the building set against the quarry face
8	3_6				N	General view showing the building with stable block to the north
9	2_17				E	South-west elevation showing the chimney stack from the corner set-pot in the washroom
10	3_1				E	View showing the window openings in the north-west and south-west elevations of the washroom
11	2_15				SE	North-west elevation showing the window opening with a rounded brick sill. The wooden window frame is a two-over-two vertical sliding sash
12	2_14				SW	Segmental-arched door with wooden frame in the north elevation of the washroom
13	2_13				SW	Wooden double doors with large internal chamfered midrail in the north-east wall
14	3_2				SE	Drainage channel against the south-west wall
15	3_5				NE	Wrought-iron strap for a fall pipe in the south-west elevation
16	3_4				NE	Ventilator grille below a section of moulded wooden eves board in the south-west elevation
17	1_15				SW	Brick fireplace with stone cap into which is set a cast-iron pot. The fire is vented through the chimney stack in the corner

N	FF	BN	FL	RN	DR	Description
18	1_17				NW	Two-over-two vertical sliding sash window in the north-west wall of the washroom
19	4_4				SW	Part of a louvred ventilated wooden frame, which appears to have been cut and attached to the wall to prop the matchboard above
20	1_18				SW	Detail showing the cast-iron set-pot in the south corner of the washroom
21	4_1				E	Enamelled cast-iron sink in the washroom
22	4_2				NE	Wooden toilet seat from an earthen closet, also a softwood board with metal strap hinges which has a larger diameter hole. These were found in the washroom during survey but not *in situ*
23	3_10				NW	General view from the south-east end showing the large concrete block against the north-west wall
24	1_11				NW	Stepped concrete mounting block at the north-west end showing no obvious bolting positions
25	3_18				SW	Recess in the floor, near the entrance door to the generator room
26	1_12				NE	The roof over the main generator room is under drawn by softwood matchboarding, this is angled upwards at the north-west end to accommodate machinery mounted on a large concrete block
27	3_11				SE	General view from the north-west end showing the concrete mounting blocks and the diamond-set ceramic floor covering in the generator room
28	1_9				SE	Wooden-lined ventilator shaft in the ceiling over the main generator room
29	1_13				NE	Early to mid-20th-century light switches to the right of the main entrance door in the generator room
30	3_14				S	Wall-mounted, moulded softwood board with nail hangers fixed to the south-west wall
31	3_12				SW	Board manufactured by Belshaw and Co. Possible part of the early 20th-century telephone system
32	09D009_3387_0035				SW	Detail of the manufacturer's plate on the switchboard panel
33	1_4				SE	General view of the south-east wall in the generator room, showing the relative positions of the electrical fittings
34	1_8				SE	Electrical fittings; the metal boxes have a patent no.1501AA
35	09D009_3387_0036				SE	Detail of one of the metal boxes with the patent no.1501AA

N	FF	BN	FL	RN	DR	Description
36	1_2				SE	Concrete mounting block showing eight bolting positions
37	1_7				SE	Wall-mounted cast-iron box, possibly containing a transformer with an isolation switch to the right. The words 'Pento' and '500 volts' are part of the casting
38	1_5				SE	Wall-mounted cast-iron boxes. The two boxes to the right show different voltages of 250 and 500, each of the boxes have isolation switches
39	09D009_3387_0037				SE	Detail of the casting at the top of the wall-mounted transformer box
40	09D009_3387_0038				SE	Detail of the casting at the bottom of the wall-mounted transformer box
41	3_15				NW	Concrete mounting block showing six bolting positions
42	3_17				NW	Concrete mounting block showing two bolting positions
43	3_13				W	Two-over-two vertical sliding sash window in the south-west wall
44	4_6				W	General view into the room at the south-east end of the building



Brodsworth Hall Generator House, photographic directions on plan

Photograph 1 Film 09D009_3387_0015 Direction SW

General elevated view showing the slate roof covering

Photograph 2 Film 2_11 Direction SW

North-east elevation with the quarry face in the background

Photograph 3 Film 2_9 Direction SW

North-east elevation with the quarry face in the background

Photograph 4 Film 2_12 Direction S

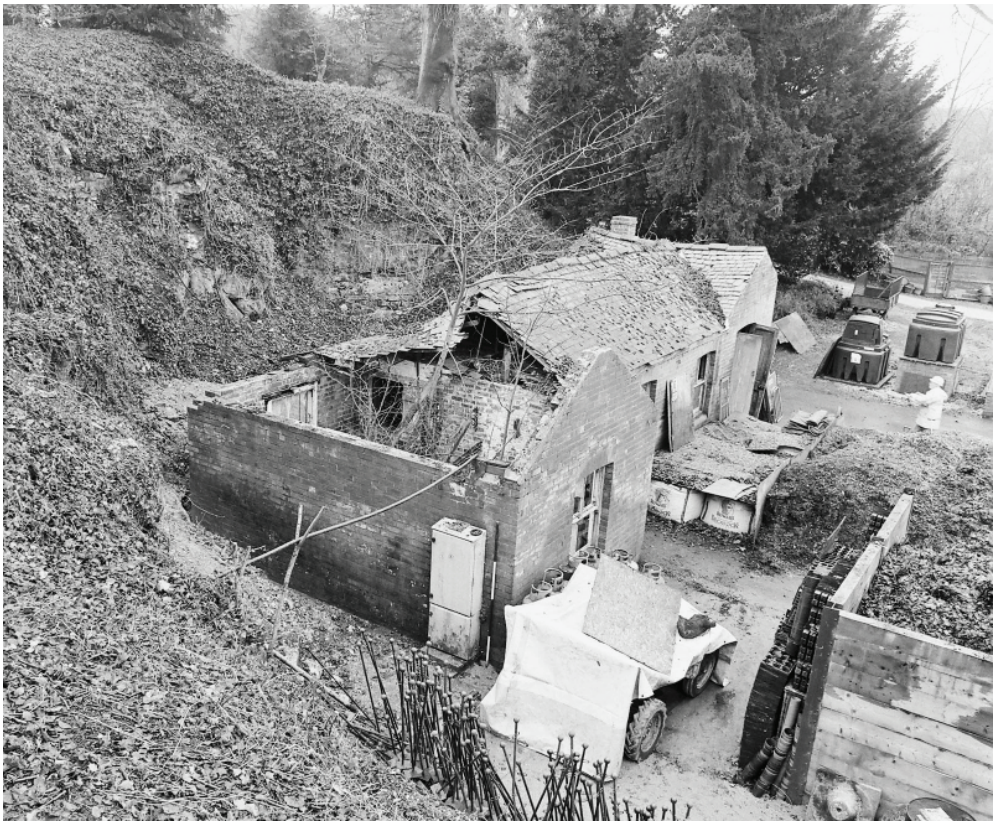
North-east elevation showing the washroom to the right containing the enamelled sink and the corner set-pot

Photograph 5 Film 4_7 Direction W

North-east elevation showing the window openings with rounded brick sills, above Is a moulded wooden eves board

Photograph 6 Film 4_5 Direction S
Room No:e1

North-east facing gable showing a segmental-arched window opening with a rounded brick sill. The window opening has a wooden two-over-two vertical sliding sash frame



Photograph 7 Film 3_8 Direction W

General view from the east showing the building set against the quarry face

Photograph 8 Film 3_6 Direction N

General view showing the building with stable block to the north

Photograph 9 Film 2_17 Direction E

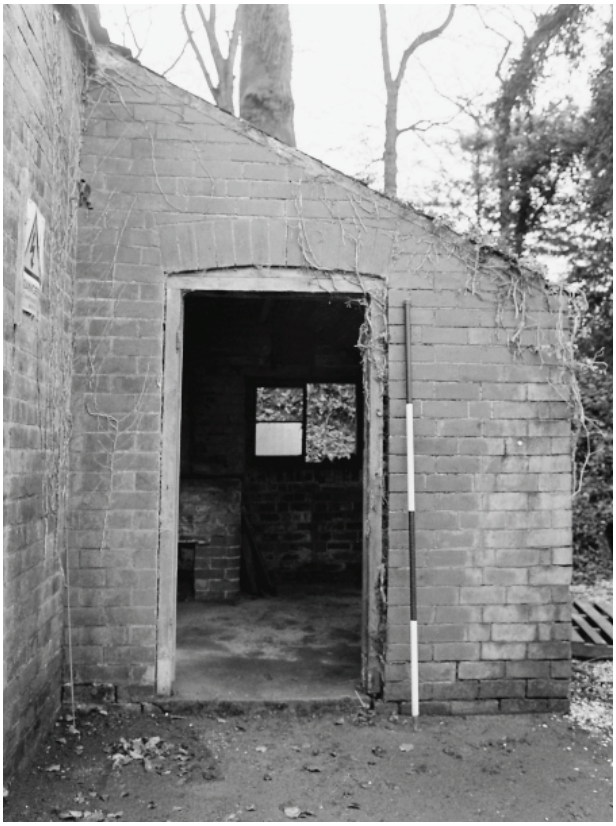
South-west elevation showing the chimney stack from the corner set-pot in the washroom

Photograph 10 Film 3_1 Direction E

View showing the window openings in the north-west and south-west elevations of the washroom

Photograph 11 Film 2_15 Direction SE

North-west elevation showing the window opening with a rounded brick sill. The wooden window frame is a two-over-two vertical sliding sash



Photograph 12 Film 2_14 Direction SW

Segmental-arched door with wooden frame in the north elevation of the washroom

Photograph 13 Film 2_13 Direction SW

Wooden double doors with large internal chamfered midrail in the north-east wall

Photograph 14 Film 3_2 Direction SE

Drainage channel against the south-west wall

Photograph 15 Film 3_5 Direction NE

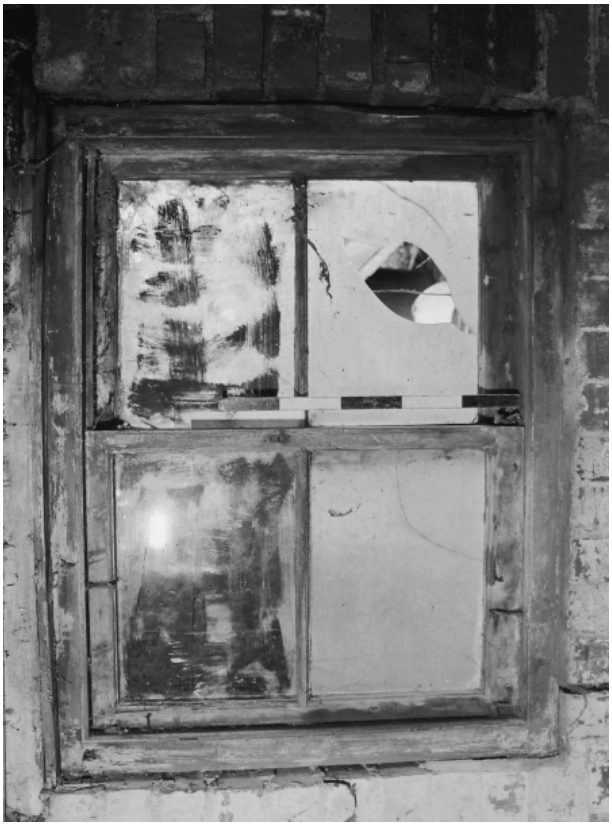
Wrought-iron strap for a fall pipe in the south-west elevation

Photograph 16 Film 3_4 Direction NE

Ventilator grille below a section of moulded wooden eves board in the south-west elevation

Photograph 17 Film 1_15 Direction SW

Brick fireplace with stone cap into which is set a cast-iron pot. The fire is vented through the chimney stack in the corner



Photograph 18 Film 1_17 Direction NW

Two-over-two vertical sliding sash window in the north-west wall of the washroom

Photograph 19 Film 4_4 Direction SW
Room No:n1

Part of a louvered ventilated wooden frame, which appears to have been cut and attached to the wall to prop the matchboard above

Photograph 20 Film 1_18 Direction SW

Detail showing the cast-iron set-pot in the south corner of the washroom

Photograph 21 Film 4_1 Direction E

Enamelled cast-iron sink in the washroom

Photograph 22 Film 4_2 Direction NE
Room No:w1

Wooden toilet seat from an earthen closet, also a softwood board with metal strap hinges which has a larger diameter hole. These were found in the washroom during survey but not in situ

Photograph 23 Film 3_10 Direction NW

General view from the south-east end showing the large concrete block against the north-west wall

Photograph 24 Film 1_11 Direction NW

Stepped concrete mounting block at the north-west end showing no obvious bolting positions

Photograph 25 Film 3_18 Direction SW

Recess in the floor, near the entrance door to the generator room

Photograph 26 Film 1_12 Direction NE

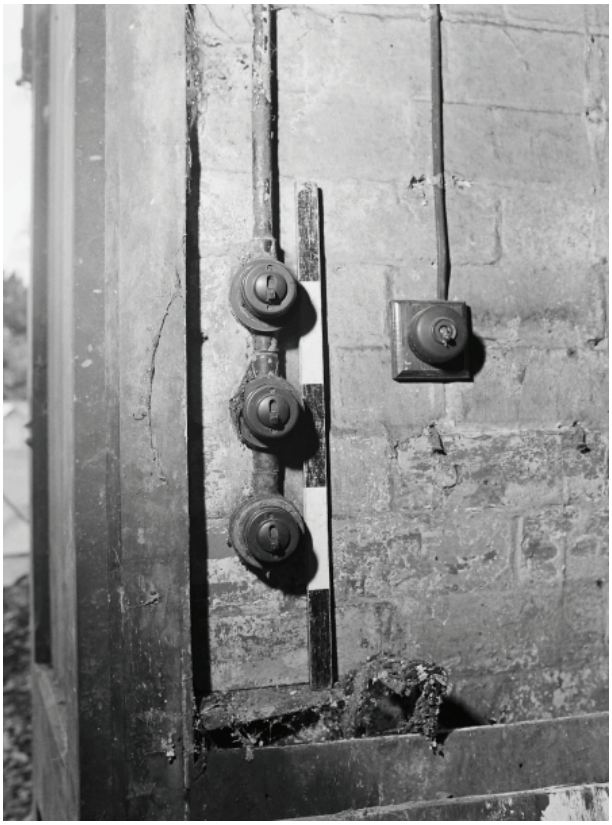
The roof over the main generator room is under drawn by softwood matchboarding, this is angled upwards at the north-west end to accommodate machinery mounted on a large concrete block

Photograph 27 Film 3_11 Direction SE

General view from the north-west end showing the concrete mounting blocks and the diamond-set ceramic floor covering in the generator room

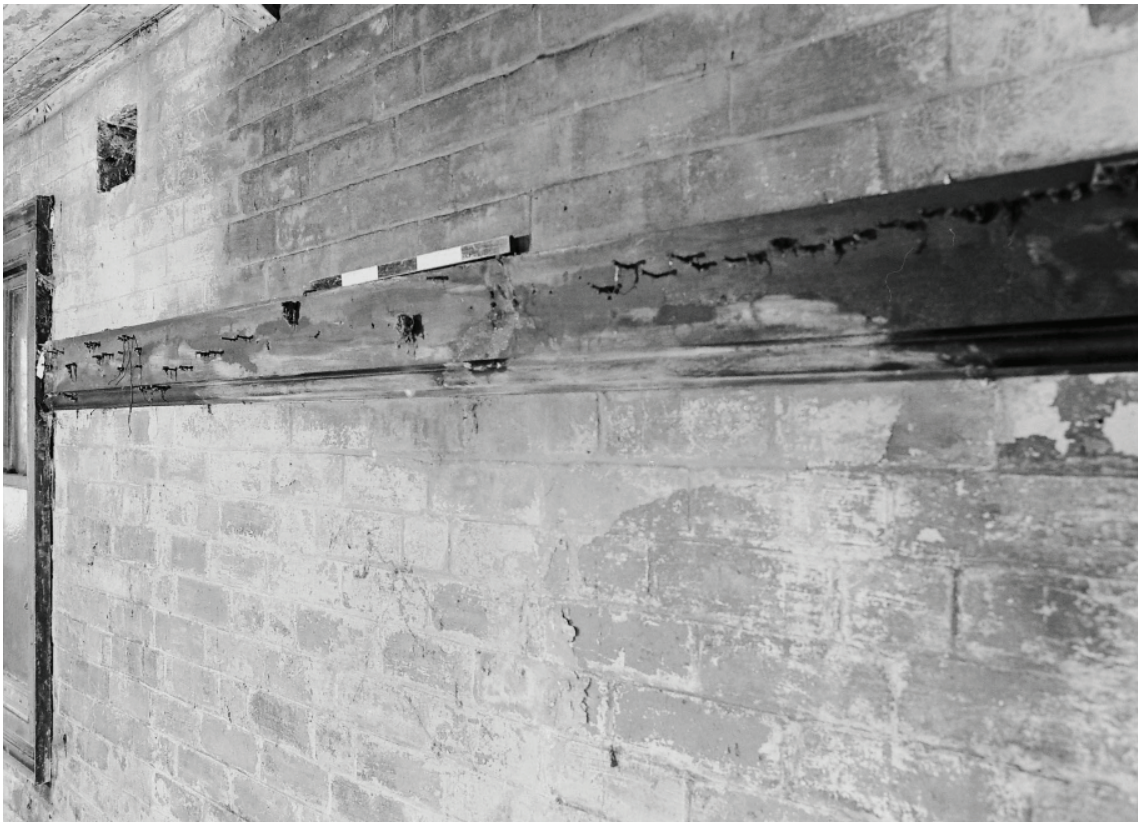
Photograph 28 Film 1_9 Direction SE

Wooden-lined ventilator shaft in the ceiling over the main generator room



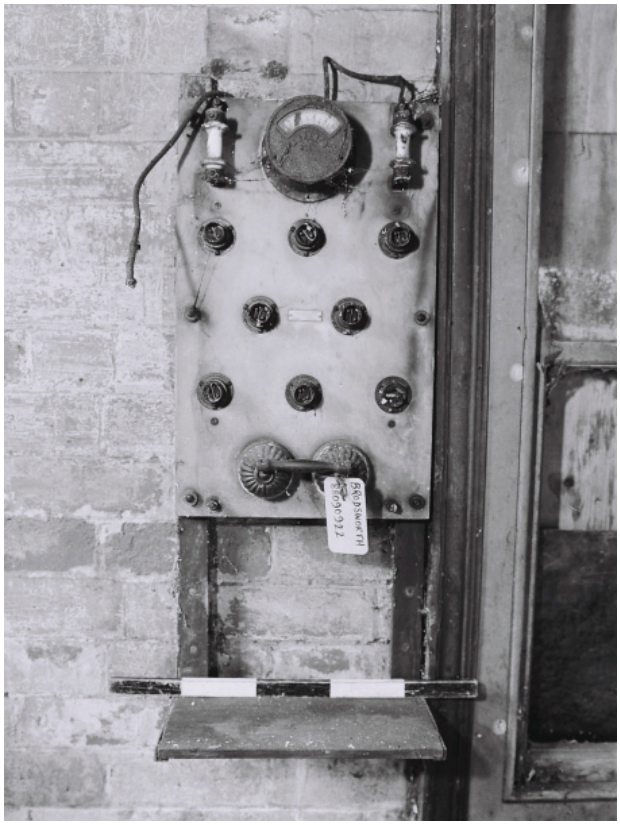
Photograph 29 Film 1_13 Direction NE

Early to mid-20th-century light switches to the right of the main entrance door in the generator room



Photograph 30 Film 3_14 Direction S

Wall-mounted, moulded softwood board with nail hangers fixed to the south-west wall

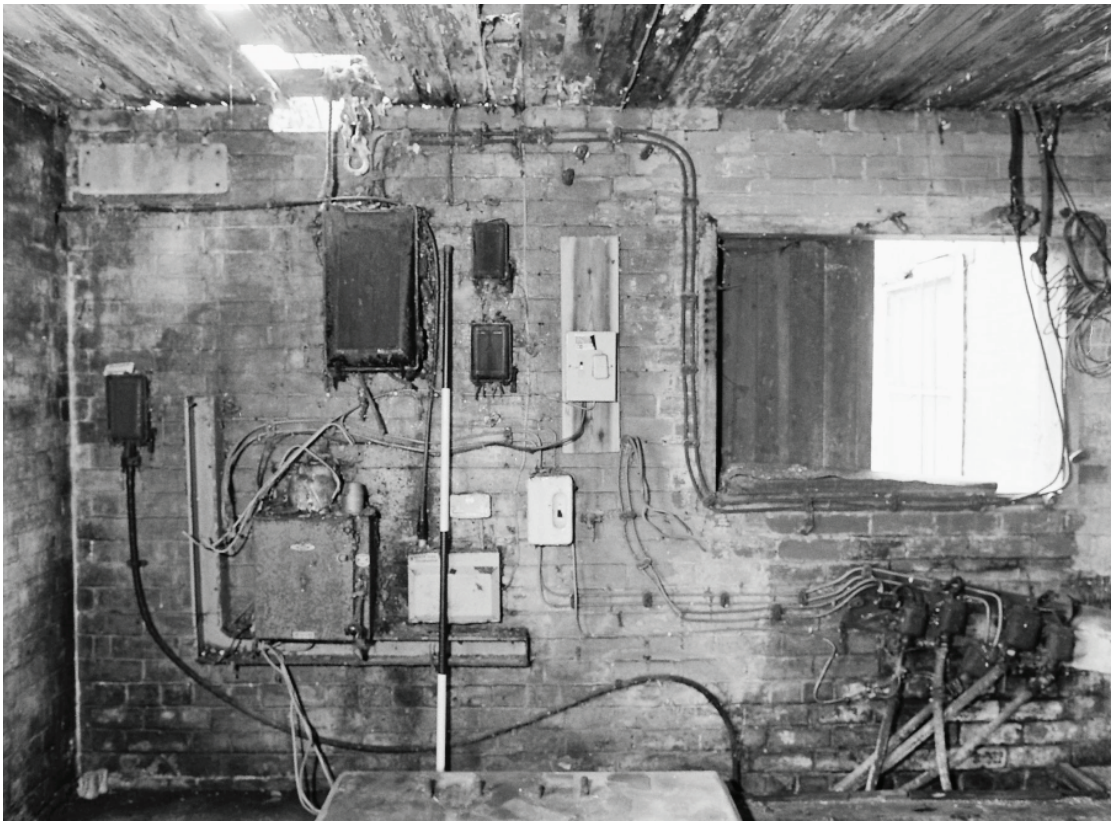


Photograph 31 Film 3_12 Direction SW

Board manufactured by Belshaw and Co. Possible part of the early 20th-century telephone system

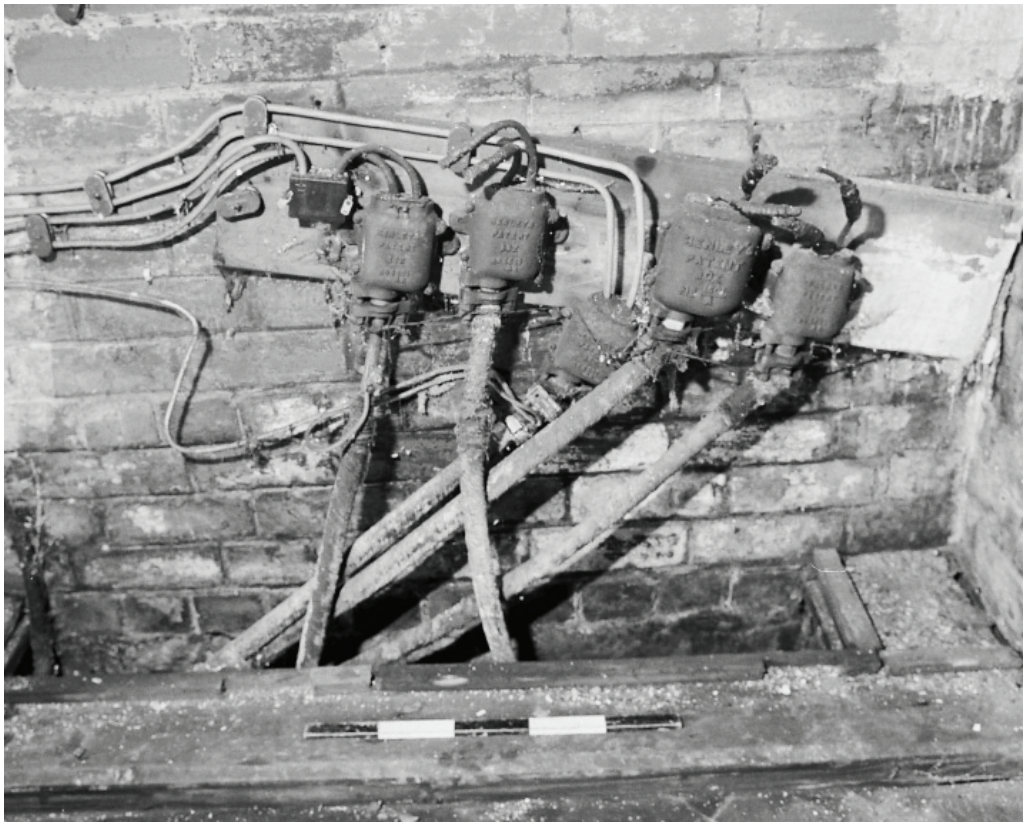
Photograph 32 Film 09D009_3387_0035 Direction SW

Detail of the manufacturer's plate on the switchboard panel



Photograph 33 Film 1_4 Direction SE

General view of the south-east wall in the generator room, showing the relative positions of the electrical fittings

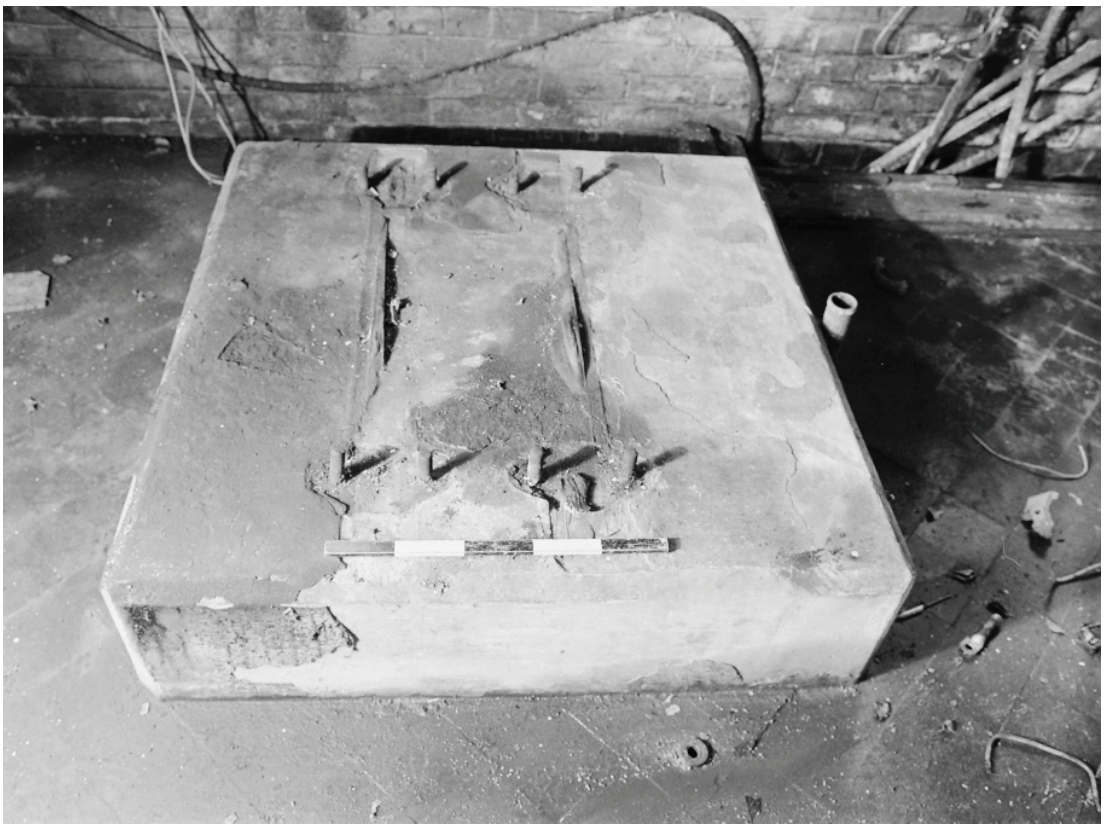


Photograph 34 Film 1_8 Direction SE

Electrical fittings; the metal boxes have a patent no.1501AA

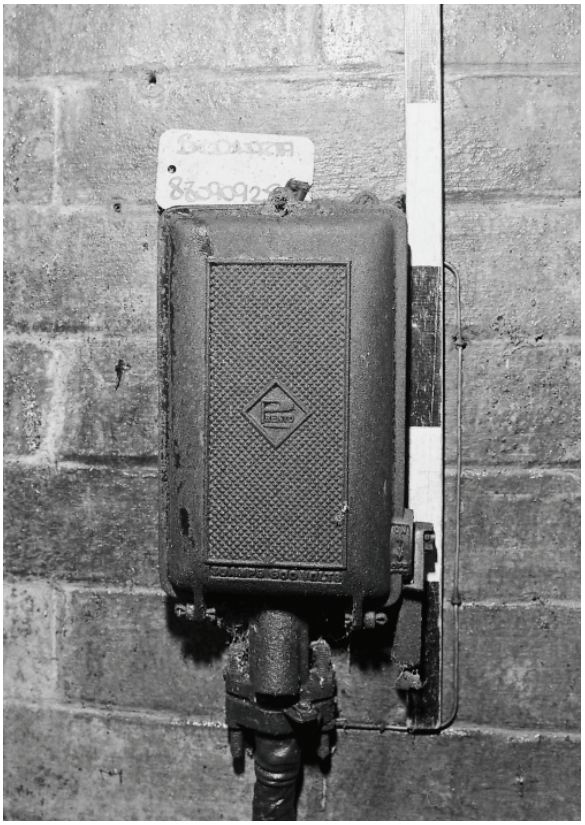
Photograph 35 Film 09D009_3387_0036 Direction SE

Detail of one of the metal boxes with the patent no.1501AA



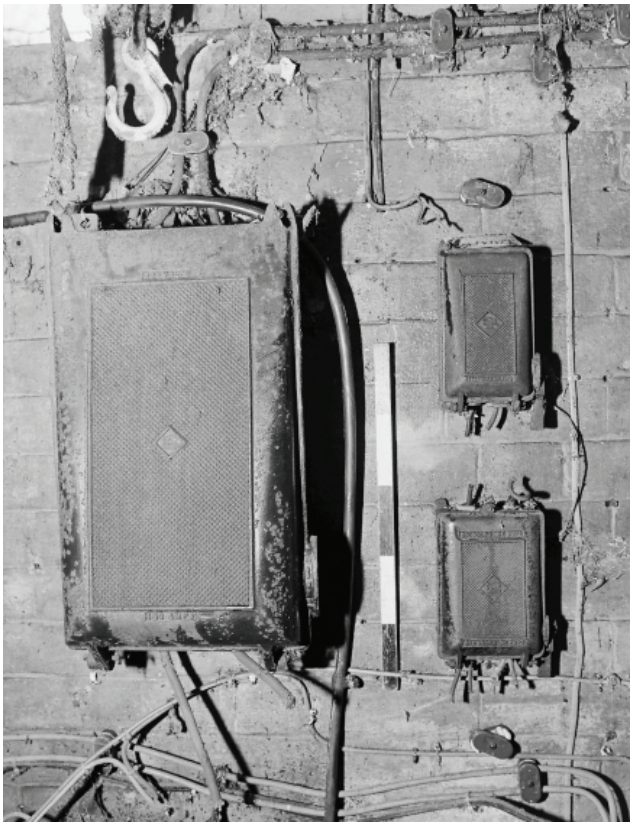
Photograph 36 Film 1_2 Direction SE

Concrete mounting block showing eight bolting positions



Photograph 37 Film 1_7 Direction SE

Wall-mounted cast-iron box, possibly containing a transformer with an isolation switch to the right. The words ‘Pento’ and ‘500 volts’ are part of the casting



Photograph 38 Film 1_5 Direction SE

Wall-mounted cast-iron boxes. The two boxes to the right show different voltages of 250 and 500, each of the boxes have isolation switches

Photograph 39 Film 09D009_3387_0037 Direction SE

Detail of the casting at the top of the wall-mounted transformer box

Photograph 40 Film 09D009_3387_0038 Direction SE

Detail of the casting at the bottom of the wall-mounted transformer box

Photograph 41 Film 3_15 Direction NW

Concrete mounting block showing six bolting positions

Photograph 42 Film 3_17 Direction NW

Concrete mounting block showing two bolting positions

Photograph 43 Film 3_13 Direction W

Two-over-two vertical sliding sash window in the south-west wall

Photograph 44 Film 4_6 Direction W

General view into the room at the south-east end of the building

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