CgMs CONSULTING

HISTORIC BUILDING RECORDING

At Cranes Foundry
Nacton Road
Ipswich
Suffolk

March 2012

Planning • Heritage

Specialist & Independent Advisors to the Property Industry

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1 NON-TECHNICAL SUMMARY

1.1 Pre-Construct Archaeology Limited was commissioned by CgMs Consulting on behalf of AquiGen (Nacton) LLP to undertake building recording at the former Crane's Foundry, Nacton Road, Ipswich, centred on Ordnance Survey National Grid Reference TM 19712 42169. The work was required by the Local Planning Authority as a condition of planning permission in advance of demolition of all of the buildings and the redevelopment of the land.

1.2 The building recording was undertaken in accordance with a Written Scheme of Investigation agreed in advance of the work by the Archaeological Officer for Suffolk County Council. The building recording was carried out broadly in accordance with that defined by English Heritage's Level 2 (English Heritage, 2006).

1.3 The former Crane's Foundry (Nacton Works) manufactured pipe fittings and allied products from the mid-1920s until its closure in 2008. The first buildings were erected in 1921 and in 1927 the works were extended. The works were further enlarged in the early 1930s, when the company started manufacturing radiators, boilers and valves. During the Second World War the works produced large quantities of materials for the war effort, including parts for trucks, tanks, machine guns and munitions. A number of air raid shelters were built on the site to protect the workforce from air raids. After the end of the war the works continued to expand, with substantial new units built on the site in the 1940s and 1950s. During the 1970s the works were reorganised and redundant units were demolished in the 1980s and 1990s.

1.4 Building recording, cartographic and documentary research identified that the earliest phase of buildings on the site was a rectangular block comprising Buildings 14, 27, 28, 29, 30, 31 and 33. A separate power house and water tower (Building 21) was built at the same time. The works were enlarged in 1927 with the construction of the plant's first malleable iron foundry. In 1930 the works were extended further with the construction of Buildings 25, 32, 34, 35 and the enlargement of foundry Building 14. Photographic and documentary evidence indicates that a new foundry and machine shop were built in 1937, when the width of the north elevation of the complex of industrial buildings was extended again on Buildings 25, 32, 34 and 35.

1.5 1938 saw the construction of the Laboratory Building 22 and Building 26 to the east elevation of the complex of industrial buildings. The north elevation of the complex of industrial buildings was also extended in this year with Buildings 35 and 24. The south elevation of the complex of industrial buildings was also extended at this time across its width with Buildings 27, 28 and 33 being enlarged. As part of this work air raid Shelter 1 was also constructed along with others at the north end of the site.

1.6 During the war years Building 18 and the Surgery Building 23 were built. Two years after the war ended a programme of large-scale expansion saw the construction of the old Bronze Foundry Building 5 and Buildings 7, 15 and 17. Buildings 1, 16 and 19 were erected during the 1950s and 1960s.

1.7 In the 1970s Cranes abandoned the manufacture of boilers and radiators, following which the foundry complex was modernised when the old cast iron and boiler cupolas were demolished in order to make way for a single centralised malleable iron production facility known as 'Central Melt', which comprised Buildings 11 and 12. Other buildings erected at this time included the 1974 Canteen (Building 6) as well as Buildings 2 and 9. The 1980s and early 1990s saw further consolidation and the demolition of No. 3 Malleable Foundry. Technical advances may have been behind the construction of 'Electric Melt', Building 13, in the 1990s; after this date the majority of the works on site involved the conversion of existing structures to serve new functions.

2 INTRODUCTION

2.1 Background

2.1.1 Pre-Construct Archaeology Limited was commissioned by CgMs Consulting on behalf of AquiGen (Nacton) LLP to undertake building recording at the former Crane's Foundry, Nacton Road, Ipswich, centred on Ordnance Survey National Grid Reference TM 19712 42169. The work was required by the Local Planning Authority as a condition of planning permission in advance of demolition of all of the buildings and the redevelopment of the land. The site is not located in a Conservation Area, there are no Scheduled Ancient Monuments within the site boundaries and none of the extant buildings are listed.

2.1.2 The site was occupied by the former Crane's Foundry (Nacton Works), which produced pipe fittings and allied products from the mid-1920s until its closure in 2008. The first buildings were erected on a previously undeveloped area of Priory Heath in 1921 and by 1927 the works were extended to include a malleable iron foundry. The works were further enlarged in the 1930s, when the company started manufacturing radiators, boilers and valves for commercial, domestic and industrial markets. During the Second World War the works produced large quantities of materials for the war effort, including parts for trucks, tanks, machine guns and munitions. A number of air raid shelters were built on the site to protect the workforce from air raids, at least two of which hit the works in 1941 and 1942. After the end of the war the works continued to expand, with substantial new units built on the site in the 1940s and 1950s. During the 1970s the works were reorganised and redundant units were demolished in the 1980s and 1990s.

2.1.1 The building recording was undertaken in accordance with a Written Scheme of Investigation agreed in advance of the work (Matthews, 2011). The project consists of three elements, namely a photographic record, a drawn record and a written account. The building recording was carried out broadly in accordance with that defined by Level 2 of English Heritage 2006 *Understanding Historic Buildings: A guide to good recording practice*.

2.2 Site Location

2.2.1 The site was located approximately 4km to the southeast of the centre of Ipswich, Suffolk (**Figure 1**). The site was roughly rectangular in plan, aligned northeast southwest, and was bounded to the north by the A1156 Felixstowe Road and the Ipswich to Felixstowe railway line (**Figure 2**). The western side of the site was bounded by modern industrial units on Leslie Road, aligned northeast southwest, and accessed from Nacton Road to the south. To the east, the A1189 Ransomes Way ran the length of the site and along the southern boundary, the site faced onto Nacton Road, where the existing site entrance was found. Proposals would retain this access from Nacton Road, and would also provide a second entrance from the existing large roundabout on Ransomes Way.

2.3 Geology and Topography

2.3.1 Located on an area of broadly level ground, the site is between 36m and 37m Ordnance Datum, with a slight fall in the ground level from north to south. Prior to the 20th century development of the land this fall may well been more pronounced and continues for approximately 2km to the River Orwell to the south and southwest.

2.3.2 The British Geological Survey (BGS) England and Wales 1:50,000 sheet 207 'Ipswich' indicates that the site sits on light well drained sands and gravels (Glacial sands and gravels and Kesgrave Sands and Gravels). A geotechnical investigation has been carried out that revealed uniformity in the area of the present buildings, for here there was shallow made ground less than 1m in depth (Hawkins, 2010: Appendix 2). While in the areas of undeveloped open space to the east this made ground was slightly deeper, up to 2m in depth, possibly due to excavated material redeposited during the construction of the factory buildings and below ground air raid shelters. At the northern end of the site, the excavation of a large lagoon and two

deep soak away ponds has resulted in several large spoil heaps and an overall deeper deposit of made ground averaging over 2m.

3 PLANNING BACKGROUND

3.1 Introduction

3.1.1 National legislation and guidance relating to the protection of historic buildings and structures within planning regulations is defined under the provisions of the *Town and Country Planning Act 1990*. In addition, local authorities are responsible for the protection of the historic environment within the planning system and policies for the historic environment are included in relevant regional and local plans.

3.2 Legislation and Planning Guidance

3.2.1 Statutory protection for historically important buildings and structures is derived from the *Planning (Listed and Conservation Areas) Act* 1990. Guidance on the approach of the planning authorities to development and historic buildings, conservation areas, historic parks and gardens and other elements of the historic environment is provided by Planning Policy Statement 5: *Planning for the Historic Environment* issued by the Department for Communities and Local Government in 2010.

3.2.2 Historic buildings are protected through the statutory systems for listing historic buildings and designating conservation areas. Listing is undertaken by the Secretary of State; designation of conservation areas is the responsibility of local planning authorities. The historic environment is protected through the development control system and, in the case of historic buildings and conservation areas, through the complementary systems of listed building and conservation area control.

3.2.3 In combination with the East of England Plan, district and borough councils are responsible for preparing a planning document which is used as the basis for all planning decisions taken within the borough. This provides policies to guide development and decisions on planning applications ranging from household extensions to major development and also allocates particular areas as suitable for housing, industry, shopping or other uses such as recreation. Ipswich Borough Council's planning policies are contained in a document known as the Ipswich Local Plan (1997). The Local Plan has been reviewed as part of the Ipswich Local Development Framework and updated with the Ipswich Borough Council Core Strategy and Policies Development Plan Document (DPD) on the 14th December 2011.

3.2.4 The site does not lie within the boundaries of a Conservation Area and none of the buildings on the site are listed.

4 METHODOLOGY

4.1 Aims and Objectives

4.1.1 The aim of the historic building recording programme was to make an English Heritage Level 2 record of the buildings on the site prior to their demolition. This would analyse and record the structures, their fabric and evidence of their use and adaptation in order to disseminate these findings in the form of a detailed, illustrated report and ordered archive. The objective being to preserve by record the on site structures before their demolition and thereby produce a record suitable to mitigate their loss.

4.2 Documentary Research

4.2.1 A search of relevant primary sources was carried out at the Suffolk Record Office Ipswich Branch and The National Archives (TNA) at Kew. Secondary sources were also consulted to inform the historic background and development of the buildings and site. A number of site plans and construction drawings were discovered on site during the photographic recording process and these were also consulted throughout the production of this report. A sequence of Ordnance Survey and other historic maps was also compiled to illustrate the development of the site. The results of historical research are provided in Section 5 of this report.

4.3 On-Site Recording

4.3.1 The on-site visual analysis, photographic survey and a very limited drawn recording was carried out over fourteen days between 12th January 2012 and 2nd February 2012 by an archaeological photographer and historic buildings archaeologist.

4.3.2 Site plans were provided by the Client and these formed the basis of the drawn survey reproduced in this report (**Figures 2** and **4**). The exception to this was the production of on-site measured drawings of a double chamber air raid shelter found beneath the south end of the main building block. This plan and cross section were then drawn in AutoCAD and are included in this report (**Figure 3**).

4.3.3 The majority of the site recording work consisted of the photographic survey which recorded key features, interior spaces and external elevations, as well as the wider setting, including lagoons and soakaway ponds in the northern part of the site. Four below ground air raid shelters were also photographed with the aid of artificial lighting. The photographic survey was undertaken using a Bronica medium format camera with black and white film and a high quality digital camera. Due to the low temperatures encountered on site falling below the ideal working temperature range for the Bronica, on occasion a minor fault developed with the shutter and a very small number of shots were lost. However, as all film shots were bracketed this had a negligible impact upon the completeness of the photographic archive. A register of all the photographs taken on site is included in this report (**Appendix 1**) and a selection of these photographs has also been included (**Plates 11** to **86**). The direction that the plates were taken is shown on **Figure 4**.

4.3.4 Due to hazardous site conditions, including potential exposure to decaying asbestos products, structurally unsafe areas and insufficient lighting some spaces were not entered. These are identified in the building descriptions; however, an area in the centre of the main group of buildings was particularly inaccessible due to unsafe structures and inadequate lighting with unguarded drops, where large machinery had been removed leaving deep voids in the floor surface.

4.4 Project Archive

4.4.1 The project archive is currently held at the offices of Pre-Construct Archaeology Limited in Brockley, London, under the unique site code IPS 662. It is anticipated that the archive (copies of the report, drawings and photographs) will be lodged with the Suffolk Record Office Ipswich Branch in due course. Copies of the report will be sent to Suffolk County Council.

4.5 Guidance

4.5.1 All works were undertaken in accordance with standards set out in:

- Association of Local Government Archaeological Officers: Analysis and Recording for the Conservation and Control of Works to Historic Buildings (1997)
- British Archaeologists and Developers Liaison Group: *Code of Practice* (1986)
- British Standards Institution: *Guide to the Principles of the Conservation of Historic Buildings (BS 7913)* (1998)
- English Heritage: *Guidance Paper 98:* GLAAS: *Guidance Paper 3-Standards and Practices in Archaeological Fieldwork in London*
- English Heritage (Clark K): *Informed Conservation* (2001)
- English Heritage: *The Presentation of Historic Building Survey in CAD* (2000)
- IFA: *Standards and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures* (1999)
- English Heritage *Understanding Historic Buildings; a guide to good recording practice* (2006)

5 HISTORICAL BACKGROUND

5.1 Introduction

5.1.1 A search of primary and secondary source materials was made at the Suffolk Record Office (SRO) Ipswich Branch and The National Archives (TNA) at Kew in order to reconstruct the historical development of the Crane's Foundry. The Cranes archive held by the SRO is provisionally catalogued under the reference HC477; a comprehensive paper catalogue of this resource is available at the SRO Ipswich Branch. Owing to staff sickness at the SRO and the provisional nature of the catalogue it was not possible to consult the contents of this resource at the time of writing. Historical maps held by the SRO were used to determine the phasing and development of the footprint of the works.

5.2 The origins of Crane Co. in the United States

5.2.1 The story of the Crane Company's engineering works at Nacton began on the far side of the Atlantic in the mid-19th century. In July 1855 Richard Teller Crane (1832-1912) and his brother Charles founded the firm of R.T. Crane & Bro in Chicago to cast brass lightning conductors (SRO HC477 Richard Teller Crane 'just part of the story', n.d.). Within ten years the company had diversified into the manufacture of plumbing parts and steam pumps; by 1867 it was also engaged in the production of lifts and elevators. In the mid-1890s Crane sold off that part of his business to a consortium of manufacturers led by Elisha Graves Otis, enabling the company to concentrate upon its core business of producing heating pipes and enamelled cast iron products including boilers and radiators (*ibid*).

5.3 The growth of Crane-Bennett Ltd and the establishment of the Nacton Works

5.3.1 While Crane had become an established concern in North America by the turn of the 20th century, the company that was to become its main European subsidiary began life as a coppersmith's business started by James Ernest Bennett in 1906. The following year Bennett founded the firm of E. Bennett & Son Ltd, which traded initially as 'Brewers' Engineers' from premises at 7 Aldgate East Chambers, Whitechapel High Street, becoming a registered limited company in 1908 (*ibid*).[1] Although Bennett became a dealership for Crane's products the same year, the company was described simply as 'Engineers' in directories of 1910 and 1915, and it was not until after the First World War had ended that it acquired sufficient capital to expand from its pre-war premises (SRO HC477 'Crane Ltd Ipswich' 22/02/1986; SRO HC477 Richard Teller Crane 'just part of the story', n.d. *Post Office London Directory 1910*: 678; *Post Office London Directory 1915*: 690).

5.3.2 On 1st July 1920 Crane Ltd, Montreal (the Canadian subsidiary of Crane Co.) purchased the assets of E. Bennett & Son Ltd and a new private limited company named Crane-Bennett Ltd was formed, with J.E. Bennett as Managing Director and David MacIntyre as Company Secretary.[2] Crane-Bennett Ltd thereafter became the London branch of the Chicago firm, acquiring new offices around the corner from the Aldgate East Chambers at 45-51 Leman Street E1. While the company's new premises in the capital included a three-storey office and a warehouse, Bennett soon enlarged the operation even further through the acquisition of 42 acres of hitherto undeveloped land on Nacton Heath the same year (SRO HC477 'Crane Ltd Ipswich' 22/02/1986; SRO HC477 Richard Teller Crane 'just part of the story', n.d.; **Figures 5** and **6**).

5.3.3 The land at Nacton Heath was selected to be the site of Crane's first manufacturing operation outside North America, and on Thursday 17th February 1921 members of the Bennett family, Mr and Mrs J.E. Stark (representing the parent company) and Mr G. Edwards, the engineer of the new plant, assembled at Nacton to lay the foundation stone of the new works (SRO HC477 Catalogue Envelope 122: Sheet 7). However

[1] The Directors of the new company were James Ernest Bennett, S. Briggs and J.E. Francis
[2] The other Directors included Richard Teller Crane Junior, son of the founder, E.C. Townsend and J.A. Murphy

the decision to build the Nacton plant coincided with the Depression that followed the end of the First World War, and work seems to have been postponed until 1923, when the first machine shop was completed (SRO HC477 'Crane Ltd Ipswich' 22/02/1986). A brief history of the works published to mark the 75th anniversary of the Ipswich Engineering Society noted that the factory did not become a fully commercial proposition until 1925, when the machine shop began to turn out malleable iron pipe fittings, machined from castings supplied by the American parent company (Ipswich Engineering Society (IES), 1974: 72). The earliest incarnation of the works was depicted on the 25" to one mile Ordnance Survey map of 1926, reproduced here as **Figure 7**.

5.4 The enlargement of the Nacton Works in the late 1920s

5.4.1 The complex of three small buildings shown on the 1926 and 1927/8 Ordnance Survey maps (**Figures 7** and **8**) was soon engulfed by a much larger factory, built during an expansionary phase that began in 1927 as the economy began to recover from the stagnation that had persisted since the post-war depression ended nearly five years earlier. By 1927 it had become apparent that the practice of machining malleable iron pipe fittings from American castings was incapable of meeting demand, so a modern malleable iron foundry was built at the works, immediately to the north and north-west of the existing buildings. The foundry cast its first metal on 31st March 1927. The foundry was equipped with modern annealing ovens, which were fired by pulverised coal and which remained in service until they were replaced by electric ovens at the end of the 1950s.

5.4.2 The enlarged works also included a machine shop, servicing, testing and despatch departments, which together provided employment for as many as 275 people (IES, 1974: 72, 76; SRO HC477 'Crane Ltd Ipswich' 22/02/1986). Railway sidings from the LNER Derby Road to Felixstowe line were also built at around the same time. Photographs of the newly completed MI Core Shop dated 1927/8 are held by the SRO Ipswich branch.

5.5 The continuing expansion of Crane's Ipswich Works during the 1930s

5.5.1 In 1930 the company re-registered as Crane Bennett Ltd, its nominal capital being raised to £400,000 in £1 shares, with Crane Ltd (Canada) retaining the principal share of 300,000 shares (SRO HC477 'Crane Ltd Ipswich' 22/02/1986). As part of an effort to establish a shared corporate identity with its North American parent, the company's name changed at the beginning of January 1932 to Crane Ltd. Under this name the company developed formidable sales and marketing departments, establishing new showrooms in the capital in Wigmore Street W1, regional branches in Birmingham, Bristol, Glasgow and Manchester, as well as advertising regularly in national trade publications and publishing glossy high quality trade catalogues (SRO HC477 'Crane Ltd Ipswich' 22/02/1986; Crane Ltd, 1938).

5.5.2 At the beginning of the 1930s Crane Bennett Ltd entered the burgeoning industrial and domestic heating market with the construction of a new foundry and machine shop for the production of cast iron radiators and central heating boilers (IES 1974: 72). A large scale Ordnance Survey map of the works shows that these structures were extant by 1939 (**Figure 10**).

5.5.3 A new boiler plant introduced in 1937 enabled the company to produce large cast iron boilers and undertake vitreous enamelling of these products. By 1938 the company built a wide range of radiators and boilers for commercial, industrial, institutional and domestic use. Customers included H.M. Office of Works, the Admiralty, the War Office and the London County Council (Crane Ltd, 1938: 3). Amongst the radiators manufactured at the works were two, four and six column cast iron varieties, 'easy-clean' models designed specifically for use in schools and hospitals and even a line of copper radiators designed for use in soft water districts (*ibid*: 4-31). Boilers manufactured for commercial, industrial and institutional customers included the Carlton range ("the Boiler that has set a new standard"), 'Whitehall' solid fuel and oil burning boilers and a number of customised 'Whitehall' models 'for special systems'. Models for domestic use included the 'Ipswich' and 'Regent' ranges of hot water boilers, the 'Circular' hot water and central heating boiler and the 'Sectional' solid fuel

boiler (*ibid*: 34-95). Castings for central heating boilers were made on large jolt-roll-over machines and surfaced on 6' diameter horizontal grinders (Faulkner, 1938: 4). The surfaces of these castings were cleaned by a rotary table 'Wheelabrator' patent shot blast machine (*ibid;*http://www.wheelabratorgroup.com/en/sites/wheelabrator/content/about_us1/wheelabrator_history.aspx).

5.5.4 The decision to build facilities for the manufacture of boilers and radiators opened up new opportunities to enter the field of fluid control (IES, 1974: 72). As early as November 1931 the Nacton Works was engaged in the manufacture of cast iron and gunmetal valves and fittings (White, 1931: 566-568). Within a few years a wide range of boiler, central heating and radiator valves were being manufactured at the works, as well as a large variety of specialist cast iron flanged fittings (Crane Ltd, 1938: 116-140).

5.5.5 Although bronze fittings had been produced at the works in small quantities since the early 1930s, in the mid-1930s it was decided to build a new foundry and machine shops for the manufacture and assembly of bronze valves (IES, 1974: 74; SRO HC477 Catalogue: Envelope 6A, 1935-7). Photographs of the bronze valve foundry and machine shop taken during the mid-1930s are held by the SRO Ipswich branch; unfortunately these were not available for inspection at the time of writing (SRO HC477 Catalogue Envelope 6A).

5.5.6 At around the same time that the new bronze foundry was established, a continuous galvanising plant of "unique character" was built in a stand-alone structure on the south-west side of the main factory complex (Faulkner, 1938: 4). This structure appears to have replaced an earlier galvanising facility at the works (SRO HC477 Building File 35). At the new plant malleable castings were washed, carried through the plant on a chain conveyor and processed through a 16' long galvanising bath (*ibid*).

5.5.7 1938 saw the construction of separate facilities for the company's research department. A purpose-built laboratory complex (Building 22 on **Figure 2**) was erected on the eastern side of the works immediately to the south of the power house (Building 21 on **Figure 2**) and electricity sub-station in order to accommodate laboratories for routine chemical analysis, sand testing and heat treatment (Faulkner, 1938: 1-3). The facility also incorporated a lecture theatre where instructional films were shown to members of the sales department, in order that the latter might "appreciate the fundamental properties of the materials used, and the work which is put into them in order to ensure a satisfactory and reliable product" (*ibid*: 4).

5.6 The Nacton Works during the Second World War

Air Raid Precautions (ARP), Air Raid Damage and the Crane's Works Platoon of the Home Guard

5.6.1 As international relations deteriorated in the mid-1930s, the British Government began to make preparations for the protection of the civilian population and infrastructure against attack from the air. In March 1935 an Air Raid Precautions (ARP) Department was set up at the Home Office in order to encourage local authorities and private employers to co-operate with central government in the establishment of local ARP schemes (Baker, 1978: 3; Meisel, 1994: 304). Following the Munich crisis of September 1938, which exposed serious shortcomings in Britain's preparedness for war, the Civil Defence Act 1939 compelled all employers to provide ARP services and shelters in the workplace (Meisel, 1994: 307). The Act was accompanied by the publication of new specifications for shelter design aimed both at building professionals and householders.

5.6.2 In 1939 Cranes established an internal ARP organisation to ensure that ARP measures sufficient to protect personnel, plant and property were in place in the event of war. Twenty-two underground air raid shelters, each designed to accommodate fifty persons, were built at locations around the Nacton Works by the end of November 1939 (SRO HC477 'Crane Ltd Ipswich' 22/02/1986; IES, 1974: 74). The works fire station, which stood on the east side of the main factory complex, was also built in association with the plant's ARP programme, while the adjacent works

surgery (which was standing by 1943) may also have been a product of the ARP scheme. Records of the Cranes ARP organisation are held by the Ipswich Branch of the SRO; unfortunately these were not available for public consultation at the time of writing (SRO HC477: Box File 128, Envelope 140).

5.6.3 Although Ipswich largely escaped the attentions of the Luftwaffe during the autumn and winter of 1940, the Nacton Works was bombed on at least two occasions during the Second World War. On the night of 9th May 1941 a force of German bombers dropped High Explosive (HE) and Incendiary Bombs (IBs) in the area of Ipswich Docks and on the west side of Ipswich Airport, then a satellite airfield of RAF Martlesham (TNA HO 199/93, 09/05/1941; TNA AIR 28/405). Four sticks of IBs were reported as having fallen near the airport, thirty to forty of which fell on Cranes, stopping production at the works for a period of five days (TNA HO 199/93: 09/05/1941; IES, 1974: 74). A little over a year later German bombers dropped a large number of IBs in the vicinity of the airport and Nacton, destroying the Nacton Road Junior School (TNA HO 199/99: 02/06/1942). The bombs ignited fires at both Cranes and Wrinch's works, though it was reported that "the fire at Cranes was confined to buildings near the road and away from the main works" and neither fire interfered with production (*ibid*). Although a number of V1 Flying Bombs landed in the vicinity of the airport (known as RAF Ipswich from March 1943) during the early autumn of 1944, causing numerous civilian casualties, none were reported to have fallen either on the airfield or on the Cranes works (TNA AIR 28/404).

5.6.4 Following the announcement of the formation of the Local Defence Volunteers in May 1940, a platoon was established at the Nacton Works under the command of Mr J.B. Webster (TNA WO 199/3366: 23). The unit, which was the first LDV works platoon to be formed in the city, was invited to join No. 6 Group LDV, which subsequently became 'D' Company of the 11th Suffolk Battalion Home Guard. Webster became Company Commander in late 1940 and was commissioned Major early the following year. With a defence area extending from Nacton and Felixstowe Roads as far as Ransome Road, 'D'Coy established its HQ at 354 Nacton Road and paraded every Sunday morning at Cranes Sport Field (*ibid*: 25). Rifle practice took place at a range in Kesteven Road, grenade practice was carried out at an improvised range on Nacton Heath, while the Company's award-winning Spigot Mortar Platoon trained at the Crane Sports Club (*ibid*: 25, 26, 38). Once it was apparent that the war in Western Europe was approaching a successful conclusion it was decided to disband the Home Guard, and the entire organisation was stood down at the beginning of November 1944.

The Ministry of Supply Iron and Steel Control

5.6.5 The Ministry of Supply was brought into being by Parliament in the summer of 1939 in order to control the manufacture and supply of equipment (excluding aircraft) to the armed forces. Shortly before the outbreak of hostilities with Germany that September, the 'Iron and Steel Control' was established as a department of the new Ministry in order to regulate the supply and distribution of iron and steel. The department was made responsible for the supply and distribution of iron and steel, the supervision of imports and exports, and the co-ordination of efforts to raise the rate of production across the iron and steel industry (http://www.nationalarchives.gov.uk/catalogue/displaycataloguedetails.asp?CATID=572&CATLN=2&accessmethod=5). The output of the Nacton Works was quickly geared towards the war effort, producing substantial quantities of parts for armoured fighting vehicles, motorized transport and automatic weapons for the Army, as well as a wide range of parts for munitions (IES, 1974: 74).

5.6.6 In order to meet increased demand for malleable iron castings a new factory building was erected to accommodate additional annealing ovens (*ibid*). Known as 'B' Building, the new facility was built in the previously undeveloped north-east corner of the site in May 1942 (Building 18 on **Figure 2**; Cranes DRG No. NWDR32017: 20/04/1951-09/1972; SRO HC477 Catalogue: Buildings File 33).

5.7 The Nacton Works during the late 1940s and early 1950s

5.7.1 By the end of the Second World War the company's workforce had risen to approximately 1,200 people (IES, 1974: 74). Following the end of hostilities the plant

quickly reverted to the manufacture of pipe fittings, radiators, boilers and valves for the civilian market.

5.7.2 In 1947 Cranes moved into the manufacture of steel valves for the petroleum and petrochemical industries, with the opening of a new purpose-built workshop at the northern end of the Nacton Works (*ibid*: 75; Cranes DRG No. NW/A1: n.d. **Figure 15**). Subsequently the steel valve department appears to have spread to 'B' Building to the north-east, the south end of which seems to have been converted into a steel valve machining, painting and shipping area; while a plan displaying the layout of the plant updated to 1972 described the whole 'B' Building complex as a 'Valve Servicing Area' (*ibid*).

5.7.3 Having already established a bronze foundry at the works more than a decade earlier, in 1948 the company built a discrete manufacturing unit for bronze valves and fittings in the south-east corner of the site (IES, 1974: 75; SRO HC477 'Crane Ltd Ipswich' 22/02/1986; Building 5 on **Figure 2**). Comprising a foundry, cleaning shop, core shop, machine shop and assembly and testing facilities, the new Bronze Department was depicted on a plan of the works dated to 1951 and also on the 1958 Ordnance Survey map (Cranes DRG No. NWDR32017: 20/04/1951-09/1972; **Figures 11** and **15**). Photographs of the new bronze foundry during the course of erection in 1948 are held by the SRO Ipswich branch (SRO HC477 Catalogue: Envelope 7).

5.7.4 The same year saw the construction of a substantial new malleable iron machine shop at the southern end of the main factory complex (Building 7 on **Figure 2**; IES, 1974: 75; Cranes DRG No. NW/A1: n.d.). The new facilities also included overhead offices, a food store, kitchen and canteen overlooking a grassed area beside Nacton Road (Cranes DRG No. NWDR32017: 20/04/1951-09/1972; **Figure 15**).

5.7.5 During the second half of 1954 a new building was erected adjacent to the steel valve workshop for the manufacturing of grey iron (GI) products (Building 16 on **Figure 2**). The facilities therein included equipment for the fettling and cleaning of GI castings (IES, 1974: 75; Cranes DRG No. NW/A1: n.d.). A set of photographs of the newly completed GI foundry sand system was taken in September 1954; these comprise part of the Cranes archive held by the SRO Ipswich branch (SRO HC477 Catalogue: Buildings File 33).

5.8 The Nacton Works from 1955 to 1974

5.8.1 By the mid-1950s advances in the technology of melting units led Cranes to replace one of the original 1920s cold-blast cupola melting units with a modern hot-blast recuperative system, which had a lower coke requirement and was able to take a wider range of steel scrap than its predecessor (IES, 1974: 76). Entering service on 2nd July 1955, the cupola was complemented five months later by a 'Birlec' direct arc electric holding furnace, which ensured a supply of metal at controlled temperatures, which was "vital to the economic production of valves and fittings which, because of their wide range of section thickness, demand highly controlled casting techniques" (*ibid*; SRO HC477 'Crane Ltd Ipswich' 22/02/1986).

5.8.2 In 1957 a third malleable iron foundry unit (No. 3 Malleable Foundry) was added for the production of larger and special iron castings; the foundry was built on the east side of the works north of the 1948 bronze foundry (IES, 1974: 75). Two years later the old annealing ovens beside No. 1 Malleable Foundry were replaced by elevator-type electric annealing ovens, also manufactured by 'Birlec', which enabled the annealing process to be completed in a third of the time (*ibid*: 76; SRO HC477 Catalogue: Envelope 5).

5.8.3 1959 also saw the company vacate its Leman Street head office, moving to Red Lion Court, Fleet Street, London EC4 (SRO HC477 'Crane Ltd Ipswich'). The move heralded a more expansionary phase in the company's history over the course of the following decade, during which it acquired Lumby's of Halifax, Rhodes, Brydon & Youatt of Stockport (both 1960), DEV Engineering of Stockport (1962), Heatinaire of Derby (1963) and Glenfield & Kennedy of Kilmarnock in 1966 (*ibid*). The company also established a new works for the manufacture of central heating boilers and

components at the Aycliffe Trading Estate, Darlington, County Durham in 1966, as well as a Centre of Research and Development at Burgess Hill, East Sussex in October 1965 (*ibid*; TNA BT 177/2689). In 1964 much-needed office accommodation was provided by the construction of the Engineering Department Office Block overlooking the main entrance at the southern end of the Nacton Works (Building 1 on **Figure 2**), while the 1948 canteen was replaced by a larger purpose-built block in 1974 (SRO HC477 Catalogue: Buildings File 39; **Figures 12** to **16**).

5.8.4 The late 1960s and early 1970s saw significant investment in new plant and machinery at the Nacton Works. In 1968 a new Recuperator and sand mills were acquired, while a Tripler Induction Furnace was installed in the Bronze Foundry (SRO HC477 'Crane Ltd Ipswich'). The following year a 'Disamatic' flaskless automatic moulding machine was purchased from its Danish manufacturers, improving the accuracy of moulds and the rate of production (*ibid*; IES, 1974: 77). A second 'Disamatic' machine was acquired in October of the following year; by 1974 four of these machines were in service at the Nacton Works (*ibid*).

5.8.5 Further investment continued to be made in the malleable iron and bronze foundries between 1971 and 1973, with the acquisition of an additional Tripler Induction Furnace for the latter, Millfield Weighing Machines for the former, a briquetting machine for swarf reclamation and a Quantovac 80 direct reading spectograph for rapid analysis of metallic and non-metallic materials (*ibid*; IES, 1974: 81).

5.9 The Nacton Works from 1975 to the present

5.9.1 While Cranes' ongoing investment in new plant ensured that production efficiency at Nacton continued to improve during the difficult years of the early 1970s, by 1974 it had become apparent that demand for the industrial and domestic boilers in which the company specialised was in decline (SRO HC477 'Crane Ltd Ipswich'). The company's problems were exacerbated by a comparable decline in popularity of cast iron radiators, as consumers and heating engineers increasingly turned to lightweight fabricated steel units. The Aycliffe site closed completely in November 1970, obliging the company to return more than £60,000 of government grant money to the Department of Trade and Industry (TNA BT 177/2689: 13/03/1972). Towards the end of September 1975 the company took the radical step of ceasing production of cast iron boilers and radiators at Ipswich (*ibid*). From December 1977 the old cast iron and boiler cupolas were demolished in order to make way for a single malleable iron production facility, superseding the three foundries that had previously performed the task (*ibid*; SRO HC477 Catalogue: Envelope 9i). Known as 'Central Melt', the new plant used two water-cooled cold blast cupolas with oxygen-enriched blast working complementarily with two coreless-type induction furnaces. 'Central Melt' commenced operations on 18th June 1979, before being formally opened by the Mayor of Ipswich on 10th October the same year (*ibid*; SRO HC477 Catalogue: Envelopes 1A, 1B and 1C; Building 11 on **Figure 2**).

5.9.2 The 1980s saw the continuation of the process of modernisation begun during the second half of the preceding decade. In 1983 a Kunkel-Wagner Moulding Machine was installed in No. 2 Malleable Iron Foundry, a second may have been added by the time of a second mayoral visit in 1986 (SRO HC477 Catalogue: Envelopes 1D and 21). In September 1986 a new overhead travelling gantry crane was erected in the Yard Department in order to serve the 'Central Melt' plant, whilst the company's rail rolling stock was replaced around the same time with a fleet of Allis Chalmers forklift trucks (*ibid*: Envelopes 14, 14A and 18).

5.9.3 The late 1980s and 1990s represented a period of rationalisation, as obsolete plant at the site was decommissioned and demolished. Demolition of No. 3 Malleable Foundry may have commenced as early as May 1988; the building appears to have been demolished by August 1991 and it had gone altogether by 2000 (*ibid*: Building File 33A).

5.9.4 By the time that the Crane Fluid Systems celebrated its 150th anniversary in 2005, the Nacton Works employed fewer than 300 people, cheaper labour and production costs having persuaded the company to shift much of the work previously carried out at the facility to its overseas plants. By the time that the company announced the

forthcoming closure and sale of the Ipswich site in December 2007, the workforce at Ipswich had fallen to around 210 (http://www.heatingandventilating.net/news/news.asp?id=4807). Although the company decided to keep its UK headquarters in Ipswich, the Nacton Works was progressively wound down over the course of the following eighteen months and the site is presently derelict awaiting redevelopment.

6 BUILDING DESCRIPTIONS

6.1 Introduction

6.1.1 The buildings were surveyed between 12th January 2012 and 2nd February 2012. Due to the lack of detailed building plans prior to the survey the buildings were arbitrarily numbered during the course of the survey. Where individual structures were identifiable they were given their own number, but particularly within the main group of buildings the numbering system relates more to the organisation of internal space, than a historic sequence of building development or phasing.

6.1.2 Several of the buildings were boarded up and inaccessible at this time and so internal descriptions of the construction, layout and function of these structures was not possible. The photographic record of these buildings was also limited to their exterior elevations and their setting.

6.1.3 Several of the buildings were in a state of considerable disrepair, with rainwater ingress and occasional areas of roof collapse. Along with these safety concerns, the widespread use of asbestos based components throughout the site meant the decay and fragmentation of these products limited access. In some instances, particularly in the centre of the main group of buildings the lack of any lighting and uneven floor surfaces also made access difficult.

6.2 Building 1: Main Administration Office

6.2.1 Building 1 was located at the south end of the site, directly opposite the main entrance on Nacton Road. This two-storey rectangular structure was approximately 25m x 9m, aligned east-west and was identified on plans as the 'Main Admin Building' (**Figure 2**; **Plate 1**). Other buildings on the site also contained offices, but these were probably to manage the day to day running of particular operations, rather than centralised company management and administration, such as sales or personnel. At the time of survey, the interior of this building was inaccessible as all of the ground floor doors and windows had been boarded over and sealed. The first floor windows were still visible and many panes had been broken.

6.2.2 The building was constructed in 1964 (5.8.3). It is first identified on a sequence of aerial photographs which show the building did not exist in 1962, but had been constructed by 1965 (**Figure 12**; **Plates 8** and **9**). The building was of a steel frame construction encased in concrete pillars with the two storey posts, painted white and still visible between infilling panels of yellow brick which were laid in a stretcher bond (**Plate 11**). On the ground floor in the centre of the south elevation facing Nacton Road and the main entrance to the site was the main entrance. These doors were not visible, but the boarded over opening was certainly wide enough to contain a pair of doors with glazed panels on either side. Narrow windows above were visible and probably helped to light an entrance lobby or reception area with daylight.

6.2.3 On the first floor the windows appeared to be formed of single glazed rectangular glass panes arranged 4x4, between each vertical post, set in metal frames that formed a continuous band around the building. These windows also included top hung, ventilator type openings consisting of two panes. The west elevation was similar in that all ground floor windows and a possible doorway were boarded over, but on the first floor the same style windows were visible. At the north end of the elevation several of these windows contained opaque glass, perhaps suggesting toilet facilities in the northwest corner of the building.

6.2.4 The north elevation was not so uniform, but continued in the same style, suggesting the building was a single phase of construction (**Plate 12**). A small single storey structure was found at the west end of the north elevation. This was constructed from yellow brick laid in stretcher bond, had a flat roof and appeared to be accessed from the exterior by a boarded over doorway. This was probably associated with an adjacent, tall yellow brick chimney against the north elevation of the Administration Office and a large cylindrical heating oil storage tank and probably housed a boiler. At the west end of the first floor, smaller opaque glazed windows and drainage pipes

confirmed the location of toilet facilities in this corner of the building. In the centre the elevation was a first floor fire escape, which originally had a flight of steel steps providing access, but these had been removed. The remaining east half of the north elevation and the east elevation were very similar to the other elevations in that they had the same continuous glazing on the ground and first floor, presumably to provide the maximum natural light for clerical staff.

6.2.5 Without access, the internal layout of the building was not possible to assess with any certainty, but presumably had a central entrance on the south side of the ground floor with ranges of offices for administrative use on either side. One may expect a central staircase to lead from the north side of the ground floor entrance that led to further offices on the first floor. These could well have included individual manager's offices, with perhaps conference room facilities and toilets in the northwest corner.

6.3 Building 2: Security Guard's Hut

6.3.1 Building 2 was found at the southern end of the site at the entrance to the site from Nacton Road (**Figure 2**; **Plate 1**). This small, rectangular single storey brick structure had a flat roof and was located between the inward and outward traffic lanes. It was designed to be used by security guards to monitor and control access (**Plates 11** and **12**). The south elevation was dominated by a wide timber framed window that continued onto the east and west elevations. In both of these side windows were sliding glass panes to allow for communication with vehicle drivers or pedestrians. The building was shown on an aerial photograph from 1985, although it had been standing for a number of years by this date.

6.4 Building 3: Training Centre

6.4.1 Building 3 was located at the southern end of the site between the Union Machine and Assembly Building (7) and the southern site boundary (**Figure 2**; **Plate 1**). The single storey rectangular structure was aligned east west and had a pitched roof with gable end walls at the east and west ends. At the east end of the south elevation was a small flat roofed extension that once acted as the main entrance to the building and on the wall adjacent to this was a sign stating 'Crane Fluid Systems Training Centre' (**Plate 13**).

6.4.2 The building was constructed from concrete pillars with between them infilling panels of yellow brick laid in a stretcher bond. Each panel also had a wide window. The gable end walls both had five equally spaced pillars and four bays, with the tallest central pillar extending to the apex of the roof. The west gable also had a boarded over doorway and four modern air conditioning units fixed to the exterior.

6.4.3 Along the north and south elevations there were seven bays and all of the window and door openings had been boarded over, so there was no access to the interior. However, one might expect each of the posts along the north and south elevations to correspond with a concrete roof truss. The roof was constructed from corrugated asbestos panels with a raised ridge and barge boards flush with the gable end elevations. Latterly used as a Training Centre, the interior layout probably included several large classrooms, smaller offices for administration, toilet facilities and perhaps a small kitchen or mess room.

6.4.4 The exterior elevations suggested that the building had been built in a single phase of construction. Aerial photographs show that it was erected between September 1947 (**Plate 5**) and October 1950 alongside the similar but pre-existing structure, Building 4.

6.5 Building 4: Black Hut

6.5.1 Building 4 was located immediately to the west of the Training Centre (Building 3) towards the southwest corner of the site (**Figure 2**; **Plate 1**). Historic maps show that the building did not exist in 1938 (**Figure 9**), but it had been built by May 1944 when it is shown on aerial photographs, predating the Union Machine and Assembly Building

(7) to the north. On documentation, the building is simply referred to as the Black Hut and with no indication of function or former use.

6.5.2 The single storey structure faced onto the site entrance road that joined the two entrances from Nacton Road, this was bordered on the south side by a line of mature tall trees (**Plate 14**). The building was rectangular in plan, aligned east west, and was only slightly smaller than Building 3. The doorways and windows were boarded over making access to the interior impossible. All four walls were clad with timber boards. The pitched, felt covered roof was supported at east and west ends by a gable wall, but the nature of the internal supporting structure was unclear. There were wide windows in all walls and there appeared to be entrances in both the south and west elevations.

6.6 Building 5: Old Bronze Foundry

6.6.1 Building 5 was located in the south east corner of the site, to the east of the main group of buildings on the site and bordering the eastern site boundary (**Figure 2**; **Plate 1**). To the south of the building was a large employee car park surrounding Building 10 and to the north was an area of hard standing and roadway with bicycle sheds.

6.6.2 A plan shows that the building had been built by 1951 (**Figure 15**), an aerial photograph dated September 1947 shows construction had begun (**Plate 5**) and a further image dated August 1948 shows the completed building (**Plate 6**). Aerial photos also show that between February 1955 and October 1962 the west end of the north elevation was extended (**Plates 7** and **8**).

6.6.3 The building was almost square in plan and had a stepped north elevation. The building was similar to other large factory structures on site in that it was formed of a series of double-pitched roofs supported by a steel frame. Five gables were found on the north and south elevations, all were the same size and pitch, except the easternmost one which was considerably smaller (**Plate 15**). The two west roof structures also coincided with the longer section of the building extending the north elevation (**Plate 16**). These roofs also had two glazed skylights running the length of the west roof slope and a single glazed skylight running the length of the eastern roof slope. On the east side of the building the two larger roofs each had a single skylight running the length of each slope. The smaller roof structure along the east side of the building did not have any skylights or vents. On the four main roofs numerous cylindrical vents were equally spaced along either side of the roof ridge.

6.6.4 The west elevation of the building was adjacent to a road that ran the north south length of the site and had two pedestrian entrances and one vehicle entrance at the south end. The elevation reflected the structure and layout of the building as it was divided into twenty bays by vertical steel posts. Between these the lower part of the wall was infilled with brick with a continuous horizontal band of metal-framed single glazed windows to illuminate the interior. At the north and south ends it was clear there was a first floor as a higher band of windows was found here. The section of elevation between the windows was covered by corrugated metal sheets. At the north end of the elevation these first floor windows ran for six bays, while at the south end only two. These windows consisted of two rows of rectangular panes which were repeated directly below them on the ground floor, but in the central section of the building where there was no first floor, the ground floor windows were four panes high.

6.6.5 The windows on the ground and first floor continued onto the extended two gable section of the north elevation. Each gable was six bays wide and projected northwards from the rest of the building by four bays. The two other large gables of the north elevation were also six bays wide and the smaller eastern gable was only two bays wide. These north elevation gables only had a continuous horizontal band of ground floor windows four panes high showing there was no interior first floor or

mezzanine level. Positioned adjacent to this elevation were two large cylindrical oil tanks (**Plate 17**).

6.6.6 Slightly further north of this elevation were two long bicycle sheds aligned east west. These were constructed from central steel posts supporting a corrugated metal roof and a timber board in the roof space denoted a number for each bicycle position. Bicycle racks of a cast concrete design and a probably more modern steel frame design were found in the northern of the two sheds. Close by were two cylindrical storage tanks that had been used for coolant and mineral oil and were surrounded by a low brick wall. To the west of the sheds was an area of concrete hard standing that had formerly been used for vehicle maintenance and a single car garage still stood in this location.

6.6.7 The west elevation of the Old Bronze Foundry had a more complex fenestration which was dominated by a tall modern chimney, set apart from the building a short distance but connected to it with large circular pipes (**Plate 17**). This chimney was not contemporary with the buildings construction and historic plans and aerial photographs show it was either erected in the last years of the 20th century or the first few of the 21st. Next to this were two modern electricity sub stations.

6.6.8 The east elevation was constructed in the same fashion as the rest of the building with steel columns, low brick wall with horizontal band of windows above and the upper section covered by corrugated metal panels. At the north end of the east elevation were two metal sliding doors, with a similar apparently original opening in the centre of the elevation close to the chimney pipe work. North of these were a number of smaller openings and storage bays for the direct loading of sand into the building (**Plate 18**).

6.6.9 Internally the building was divided into three large open areas, with the east part of the structure beneath the two bay roof divided into a number of smaller areas. The main division was original and ran north south along the valley between the two west and two east roofs. This partition took the form of the exterior elevations and infilled the space between the supporting posts with a low brick wall, continuous horizontal band of window panes four rows high and panels above up to the roof. The building was therefore split into two halves and at the north end of the west side there was a first floor level, with the ground floor left open plan (**Plate 19**). The first floor level was accessed by a single steel staircase and was open plan apart from a small partially glazed office (**Plate 20**). A goods lift rose into the centre of the space from the ground floor.

6.6.10 The main open plan area had been stripped of any machinery and was well lit by skylights in both roof slopes. Additional electric lighting was suspended from the steel frame roof trusses. There were also several beams in the centre of the space to carry a hoist to manoeuvre heavy items. At the south end of the west side of the building was a second mezzanine type floor with the ground floor below partially used for the storage of templates. Due to the decay of the staircase access to the first floor was not possible, but was thought to include changing rooms and toilet facilities.

6.6.11 The east half of the building had been divided with an original partition to create a separate space at the south end the same north south width as the neighbouring first floor level (**Plate 21**). From the west side of this space steps rose to a first floor changing room and toilets. At the east end of the space a large oil-fired oven remained *in-situ* (**Plate 22**). Doorways connected this space with the rest of the building to the north.

6.6.12 The large open space of the east side of the building had also been largely stripped of machinery (**Plate 23**). Trenches in the concrete floor showed where cabling had passed and larger voids on the east side showed that several large pieces of machinery had once stood; vents and ducts above remained that led to the exterior chimney. At the north end of the space was a very large piece of equipment for the treatment of what appeared to be sand (**Plates 24** and **25**).

Along the east side of the building there was a series of partitioned spaces for workshops and at the south end several smaller timber lined loading bays accessible from both the exterior and interior that were probably designed to hold sand.

6.7 Building 6: I.T. Offices

6.7.1 Building 6 was located at the southern end of the site, immediately to the north of the Main Administration Offices (1) and between the Old Bronze Foundry (5) and the Union Machine and Assembly Building (7) (**Figure 2**; **Plate 1**). The single storey building was rectangular in plan with its longer axis aligned north-south. At the time of survey the building had been sealed as all of the window- and door- openings were completely boarded over and so the interior was therefore inaccessible.

6.7.2 The structure appeared to have previously been accessed at two points on its west elevation as here were found two small flat roofed extensions to the main structure that may well have contained entrance doorways. Indeed, the design of pedestrian pavements along this elevation and along no other elevations would suggest this to be the case (**Plates 26** and **27**). The structure was constructed from prefabricated concrete posts and where there were no windows seven concrete horizontal sections were fitted between them. The structure was covered by two pitched roof sections, aligned north south. These were of a very low pitch and were covered by corrugated panels.

6.7.3 Stylistically the building dates from the 1970s and cartographic evidence shows that it was constructed after 1973 (**Figure 13**). However, the first evidence to conclusively show the building is an aerial photograph dated 1985 (**Plate 9**). The IES (Ipswich Engineering Society) description of the Cranes operation dates the construction of the building to 1974, when it was described as representing a major improvement in employee facilities. It states that the new facility replaces the original factory canteen with "a modern restaurant... designed and built to provide all employees with a wide choice of good quality food at budget prices in attractive surroundings" (IES, 1974: 84). By the time the site closed in 2008, the building had ceased to be used as a restaurant and was being used as I.T. offices.

6.8 Building 7: Union Machine and Assembly Building

6.8.1 Building 7 was a very large rectangular structure in the southwest corner of the site (**Figure 2**; **Plate 1**). It was similar in appearance to Building 5 to the east and Building 17 at the north end of the site. The building was formed from a steel frame with a series of six pitched roofs aligned north south. These roofs each had strip skylights on their east and west slopes, six cylindrical vents along the ridge, and gables at the north and south end of the building. The south gables faced Nacton Road and the main site entrance and the opportunity had been taken to advertise the company, as two of the gables had been painted 'CRANE' (**Plate 28**).

6.8.2 An aerial photograph dated September 1947 shows the exact footprint of the building either as an area of hard standing or of excavated ground (**Plate 5**). By August 1948 a similar photograph shows the completed building in its present form (**Plate 6**), which would date the construction to late 1947 or early 1948. Documentary evidence (5.7.4) indicates that a new machine shop for malleable iron fittings was built in 1948 (*IES*, 1974).

6.8.3 The south elevation showed the internal structure with steel posts making each gable six bays wide. Between the posts was a low brick wall supporting a horizontal band of metal-framed windows four panes in height. These had ventilator-type hinged openings of four panes at regular intervals along the elevation. Above these the rest of each gable was clad with corrugated panels painted white. To the west side of each gable a ladder was fixed to the elevation to provide access to a roof walkway.

6.8.4 The west elevation had the same basic layout of low wall and ground floor windows with corrugated cladding above (**Plate 29**). Although at the north and south ends of the elevation there were also first floor windows. In the centre of the elevation was a ground floor extension covered by a cat slide roof. Aerial photographs show this was added to the building between 1965 and 1973. This extension had two vehicle access

doors and a central pedestrian doorway and was constructed in the same way as the main building with a steel frame, low wall, ground floor windows and cladding above.

6.8.5 At the north end of the elevation was a single-storey, flat roofed brick built building that continued against the north elevation of the building (**Plate 30**). This had several raised skylights and could only be accessed from the exterior north elevation. This would suggest that it was not used by staff employed within Building 7, but by those employed in the adjacent Building 33. The interior of this brick structure was used as a changing room, with benches, lockers, large circular communal sinks (which had been removed) and an adjoining communal shower room (**Plate 31**). The building may date from the 1950s and its irregular footprint may have been caused by it being built between pre-existing buildings, those to the north now having been demolished. The rest of the north elevation of Building 7 had been built against the previous south elevation of the main foundry complex and at the east end the original glazed exterior of this building may well have survived.

6.8.6 The interior of the Union Machine and Assembly Building (7) was undivided and had several mezzanine floor levels built within as part of the original design. There were several pedestrian entrances in the east elevation, including the main entrance which would have had an adjacent clocking in machine, but this had been removed leaving just the card slots for day and night shifts. In the centre of the east side was a mezzanine toilet and changing room (**Plate 32**). In the northeast corner a long thin room had been constructed in the late 20th century as a mess room. This may have coincided with the conversion of the dedicated site canteen to the east into an I.T. department (6).

6.8.7 At the north end of the building within the third gable from the east was a second mezzanine changing room and toilets (**Plate 33**). Below this had been left open, but had been fitted with racks for storage. Next to this were openings into the building to the north, including an opening at mezzanine level, where hoists could operate between the two spaces. In the northwest corner of the building was a third mezzanine level (**Plate 34**). The interior of this was similar to the other changing rooms and toilets, but it retained its large circular communal sinks (**Plate 35**). Aligned east west across the central and northern side of the open factory floor were two long raised concrete platforms (**Plate 36**). These had been the bases for large, heavy machinery and shallow trenches on either side would have carried electrical cabling.

6.9 Building 8: Garage

6.9.1 The single storey garage building was found in the very southwest corner of the site, directly to the west of the Union Machine and Assembly Building (7) (**Figure 2**; **Plate 1**). The structure was rectangular in plan, aligned north south along the western site boundary and was adjacent to the second vehicle entrance from Nacton Road.

6.9.2 Cartographic sources show that the building was constructed between 1938 and 1939 as it is first shown on a plan of the site of the latter date (**Figures 8** and **9**). Aerial photographs also show that by 1946 the building had been extended to the north to include an engine shed, to house the company's own railway engine. This structure no longer survives and stood on the site of the present weighbridge.

6.9.3 The surviving building had a steel frame with four pairs of posts supporting a mono pitch roof sloping down to the west (**Plate 37**). A low, probably brick wall infilled three sides of the structure with corrugated cladding above. The east side of the building appeared to originally have had sliding doors across three vehicle bays with two rows of metal framed, rectangular window panes above. The northernmost bay was the only one that retained sliding doors and internally a timber partition separated this area from the two open vehicle bays to the south. Just to the south of the garage was a small shelter protecting pipework from an underground fuel storage tank.

6.10 Building 9: Weighbridge

6.10.1 The Weighbridge was located toward the southwest corner of the site, just to the north of the garage (**Figure 2**; **Plate 1**). The weighbridge would originally have consisted of two structures, namely the large rectangular area of measuring roadway

buried beneath the ground surface and a small timber hut for the operator. The weighbridge would have measured the empty weight of the vehicle and its loaded weight prior to dispatch. The weight of the load could therefore have been established to check it did not exceed the legal safe limit for this vehicle.

6.10.2 The roadway of the weighbridge had been removed so all that remained was a shallow rectangular pit approximately 1m deep, with smooth rendered concrete sides and an L shaped steel plate to protect the concrete where it met the ground surface. Desks and workbenches from the adjacent Union Machine and Assembly Building (7) had been placed around the pit to prevent vehicles or pedestrians from accidentally falling in. The small operators hut was found just to the northwest of the weighbridge and was a single space, with a flat roof that extended slightly over the doorway in the south elevation. The upper half of the east elevation was completely glazed with timber-framed windows that also continued onto the north and south elevations for a short distance. This enabled the operator inside to clearly see the movement of vehicles from both directions.

6.10.3 According to cartographic evidence the railway engine shed that had previously stood in this location was still in existence in 1973. The Peckett 0-4-0 Saddle Tank Steam Locomotive that served as the works engine was retired three years earlier after twenty years service and is now with the Stour Valley Railway Preservation Society. Aerial photographs show that the engine shed had been removed by 1985 and the weighbridge and hut had replaced it.

6.11 Building 10: Works Pavilion

6.11.1 Building 10 was located towards the southeast corner of the site, surrounded by a large employee car park between Nacton Road and the Old Bronze Foundry (5) to the north (**Figure 2**; **Plate 1**). The building was a single storey brick built rectangular structure with a pitched roof and gable end walls at the east and west elevations. The exterior walls were thickened at regular intervals to create squared piers that carried timber trusses and the roof load. These created a building eight bays long and three bays wide.

6.11.2 The building is first shown on an Ordnance Survey map dated 1938 (**Figure 9**) and with a football pitch shown just to the north in the same year it is possible that it was built for sports related use. Indeed, a slightly later plan shows tennis courts immediately to the east, which aerial photographs suggest were removed in the mid 1960s for additional car parking.

6.11.3 The south elevation had a central doorway with a small open porch and four wide Crittall windows on either side (**Plate 38**). The east elevation had a lean-to type addition to create a covered area along the length of the elevation and at the north end was a doorway used as the main entrance. The north elevation had a narrow brick built extension to the main building built with a shallow sloping roof and the same arrangement of brick piers. There were numerous small, metal-framed single glazed windows and two doorways. The west gable end had four brick piers, two wide Crittall windows and a narrow fire escape doorway at the south end. The corrugated asbestos roofing was the same across the main structure and the north side extension. Along the apex of the roof were three square vents.

6.11.4 The interior of the Works Pavilion was simply arranged around a corridor that ran the length of the interior along the north side of the main part of the building (**Plate 39**). A number of narrow rooms, including toilets and storerooms, were positioned on the north side of this and on the south side were several large offices or committee rooms (**Plate 40**). The glazed partitions between offices in the main building were original, but several false ceilings had been inserted. The timber roof trusses that remained visible had a low collar beam, short diagonal braces and strengthening metal rods between the apex and collar beam below and between the centre of the collar beam and each truss foot.

6.11.5 Beneath the west end of the building was a small brick-built basement. This rectangular space was approximately two thirds the north south width of the building and slightly narrower east west. It was accessible via very steep steps at two points

at the north and south ends. The southern steps were concrete and accessed from the exterior below a wooden hatch just to the south of the south elevation and the northern steps were timber and accessed via a hatch in the floor of the western most office space. In the basement the north-south aligned timber floor joists that formed the ceiling were left exposed, the brick walls had been painted white and the floor was concrete. At the north end of the space there was a small boiler and several steel shelving units suggested the space had been used for storage.

6.12 Building 11: Ex Piddling Building

6.12.1 This building was located on the west side of the site and was a rectangular building aligned east west (**Figure 2**; **Plate 1**). The pitched roof sloped down to north and south with gables at the east and west ends. The building was constructed from a steel frame and the lower part of the wall was constructed from brick with the upper part covered by corrugated metal sheet cladding. The roof was also covered by corrugated panels, these may have been asbestos cement, with opaque panels to illuminate the interior.

6.12.2 The interior had been stripped of any machinery, leaving no evidence of its previous function. There were two wide entrances in the east elevation, covered by heavy plastic strips, and between then a narrow room had been built in brick (**Plate 41**). At the west end of the north elevation was another opening connecting the space with the building to the north. An aerial photograph first shows this building in existence in 1985 (**Plate 9**); documentary evidence suggests that this was part of the 'Central Melt' plant constructed in the late 1970s (5.9.1).

6.13 Building 12: Shotblast Building

6.13.1 The Shotblast Building was found on the west side of the site abutting the north elevation of Building 11 and the south elevation of Building 13 (**Figure 2**; **Plate 1**). The structure was rectangular in plan, aligned north south, with a short section extending east from the south end of the east elevation, this was the main building entrance from the exterior.

6.13.2 Like Building 11 this building was simply constructed with a steel frame, clad with corrugated metal panels and regularly spaced opaque panels in the roof and walls for illumination. The lower halves of the walls were constructed from concrete block with openings in the north and south elevations to connect with other buildings. The interior of the building was a single space, all machinery had been removed leaving two brick plinths close to the east and west walls (**Plate 42**). Aerial photographs show that the building was constructed between 1973 and 1985 (**Plate 9**); documentary evidence suggests that this was part of the 'Central Melt' plant constructed in the late 1970s (5.9.1).

6.14 Building 13: Electric Melt Building

6.14.1 The Electric Melt building was found on the west side of the site, abutting the Shotblast Building (12) to the south and the Malleable Core Shop (14) to the east (**Figure 2**; **Plate 1**). The building was rectangular in plan, aligned north south, and at its south end had wide openings into Buildings 12 and 14 and was covered by a shallow pitched roof sloping down to east and west.

6.14.2 Aerial photographs suggest that the building was constructed between 1992 (**Plate 10**) and 1999 abutting two pre-existing buildings. The building was constructed from a steel frame, taller than most other buildings on site, with the ground floor walls of concrete blocks. The upper section of the walls was covered with corrugated metal panels painted blue. The north elevation had a pedestrian entrance and also a wide sliding door almost the height of the building.

6.14.3 At the time of survey the interior of the building was not lit by any skylights or windows only the open pedestrian entrance at the north end letting in a small amount of daylight. In the centre of the space was a wide, shallow depression in the floor where it was obvious that large pieces of machinery, probably furnaces, had been removed (**Plate 43**). Two outer bays running down the east and west sides of the building were formed by two rows of columns and both of these areas had been

infilled with ground floor rooms constructed from concrete block. Above these were further rooms with glazed windows facing into the central space.

6.15 Building 14: Malleable Core Shop

6.15.1 The Malleable Core Shop was a long narrow rectangular building found on the west side of the site (**Figure 2**; **Plate 1**). The building was first shown on an Ordnance Survey map dated 1926 (**Figure 7**) and so presumably dated to the original phase of building construction in the early 1920s. Illustrations from 1938 (**Plates 2** and **3**) show the building to have been extended slightly at the north end which correlates with documentary references to an additional foundry and machine shop for the cast iron radiators and central heating boilers in the early 1930s (IES, 1974: 74). At the time of survey the 1937 extension had been removed leaving the north elevation partially open (**Plate 44**).

6.15.2 The building was constructed from a tall metal frame with brick at the ground floor level and the upper section clad with corrugated metal panels. The asymmetrical pitched roof had a north facing vertical section at the apex, was covered by corrugated panels and was supported by metal trusses. The interior of the building had several wide openings to connect it to abutting buildings and had been stripped of any machinery (**Plate 45**). Along the west elevation of the building and partially masked by the construction of Building 13, was a long narrow single-storey space constructed in concrete. The concrete covered walls, piers, ceiling and roof supporters also included the encasing of metal buttresses that supported the main west wall of the building that had been left exposed at a higher level. At the northern end this space had been used as several workshops, but for most of its length the space was undivided (**Plate 46**). The purpose of such a solidly built space with very few windows was not immediately apparent, but may possibly have been constructed as a surface air raid shelter; indeed, aerial photographs show that it had been built by 1944.

6.16 Building 15: Old Sludge Farm

6.16.1 The Old Sludge Farm was found on the west side of the site abutting the west elevation of the much larger Building 35 (**Figure 2**; **Plate 1**). Aerial photographs show that the building was constructed between August 1946 (**Plate 4**) and September 1947 (**Plate 5**) and then extended further north by 1955 (**Plate 7**) to its present form. The building was rectangular in plan, aligned north south, with a pitched roof and gables at the north and south ends.

6.16.2 The building was constructed in the same style as other buildings of this period, with a steel frame of posts and trusses, with a low brick wall on the ground floor. Above this brick wall the exterior of the frame was clad with corrugated metal sheets, most of which appeared to date from the late 20th century and had several tall opaque panels to help illuminate the interior with natural light (**Plate 47**). The roof covering was also of corrugated panels, probably asbestos cement, with smaller opaque panels. The interior of the building was a single space with a wide access in the north elevation and a single doorway in the west elevation. Six large cylindrical water tanks occupied the southern two-thirds of the building (**Plate 48**). Like some of the exterior cladding these tanks were late 20th century in date.

6.17 Building 16: Old Grey Iron Test and Paint Shop

6.17.1 The Old Grey Iron Test and Paint Building was located at the north end of the main group of buildings, separated from Building 35 to the south by a roadway and joined to Building 17 to the east by a short inserted section (**Figure 2**; **Plate 1**). Aerial photographs show that the building was constructed between 1951 and 1955 (**Plate 7**) and was constructed in a single phase, very similar in style to Building 17, which was built a few years earlier.

6.17.2 The building was rectangular in plan and was built with a steel frame to cover a single, undivided factory space. The lower section of the walls at ground floor level was built of brick between steel posts, with a horizontal band of metal-framed single glazed windows four panes high. Above these, the walls were clad with corrugated

metal sheets and the roof was covered by corrugated asbestos cement panels with a row of opaque panels on each slope creating skylights. There were also several large vents of different ages and design at the north end of the west side of the roof. The building had three gables at its north and south ends, the centre one being significantly smaller than the outer two (**Plate 47**). The north elevation also had a small extension in the centre for loading vehicles, which was probably erected in the late 20th century, and had a steel roller shutter separating it with the main building.

6.17.3 The interior of the building had been stripped of any machinery and was a single open space with two rows of steel I beam columns aligned north south (**Plate 49**). These supported a steel beam wall plate that ran the width of the building below the two valley gutters. These in turn supported the seven steel roof trusses that were equally spaced along each double-pitched roof. Several pedestrian doorways were found in the north and east elevations and at the south end of the east elevation was a wide opening leading to a loading area and Building 17 beyond. In the centre and toward the east side of the building a number of short concrete posts had been added and painted yellow, presumably to protect employees and work areas from vehicles moving goods.

6.18 Building 17: Old MIV and Air Raid Shelters 2 – 4

6.18.1 This building was found at the north end of the main group of buildings on the site (**Figure 2**; **Plate 1**). The very large structure was rectangular in plan and was aligned north south, with a roadway separating it from Building 24 to the south and it had been connected with Building 16 at the south end of its west elevation (**Plate 50**). Aerial photographs show it was built between August 1946 (**Plate 4**) and September 1947 (**Plate 5**), with one dated January 1947 apparently showing the building under construction with only one pitched roof built. This was very slightly earlier than similar Buildings 5 and 7 at the south end of the site. Indeed, it may be that all three were built as a planned sequence of expansion, with this building being designed as a new workshop for steel valves for the petroleum and petrochemical industries.

6.18.2 Like Building 16, Building 17 was constructed on a slightly raised concrete platform. The floor levels were the same as buildings to the south but were almost a metre higher than the natural ground level to the east and west. The raised concrete plinth also meant that a number of air raid shelters that had been built on vacant ground during the Second World War were able to be kept and incorporated into the foundations.

6.18.3 Air Raid Shelter 4 was one of four built upon along the east elevation on the building and the second southernmost of a north-south aligned row of seven (**Figure 2**). The entrance to the shelter had been modified when the building was constructed over the top as where originally the concrete entrance steps down into the shelter would have been partially open, the new floor level had truncated much of the headroom (**Plate 52**). The imprint of the timber shuttering that once retained the poured concrete of the entrance was visible in the walls and ceiling of this space. At the foot of the steps a concrete doorway led at a right angle to the right (north) and into a narrow, but long arched chamber (**Plate 53**).

6.18.4 This chamber was built of concrete, with a concrete floor and a shallow central gutter running the length of the shelter, with a soak away at far end. Here there was a recess in the wall with a fixed steel ladder. A timber batten fixed to the wall above this recess showed traces of fabric, perhaps the remains of an anti-gas curtain. The ladder would have led up to an emergency escape hatch, but none could be found in the interior of the building. The shelter had latterly been used for storage with metal components being stacked in metal trays on simple timber benches running along either side. These had decayed and collapsed leaving a paint scar on the wall to show their original position. Of the next air raid shelter in the row there was no trace.

6.18.5 Another chamber, Air Raid Shelter 3, was found beneath the northeast corner of the building and had the same layout. The shelter had previously been blocked by a flight of concrete steps providing access into the building, but had similarly been used for storage with boxes of paper records being stacked upon the original timber benches, which had no doubt contributed to their collapse. Two further air raid shelter

entrances that also descended westwards were visible just north of the building where the concrete base of the building floor level continued. These had both been deliberately collapsed, but a third further north remained accessible.

6.18.6 This shelter, Air Raid Shelter 2, had similarly had its entrance constricted with the construction of a concrete hard standing above (**Plate 54**). Concrete steps descended down to the west and led to the same sized arched chamber aligned north south as seen previously (**Plate 55**). Here timber benches/bunks along both side walls had decayed and collapsed, but still clearly visible on the walls was black painted stencilled signage. Approximately half way down the shelter was a sign that read 'FIRST AID, BLANKETS' above where there had clearly been some shelving fixed to the wall, of which only one bracket survived. At the entrance end, there was a second black painted stencilled sign that read 'FIRE RESCUE MEN THIS END', suggesting that this shelter, the furthest from the foundry buildings, had been reserved for specialist personnel and equipment. A second row of seven north south aligned shelters that is known to have existed parallel to the east of this first row is believed to have been removed as no trace of any entrances could be found except for a slight rise in ground level, but it could be that just the entrances were completely removed and the shelters themselves remain.

6.18.7 Building 17 constructed over the shelters was constructed from a steel frame with two rows of columns aligned north south supporting the three pitched roofs above. The building was the same width as Building 24 to the south and the roofs were of the same design and proportion. There were three gables at the north and south end and the east roof had a raised apex to allow for a vertical glazed section (**Plate 51**). The walls were the same as other buildings of this date with a low brick wall and a band of ground floor glazing above. The walls above were clad with corrugated metal sheets and the roof was covered by corrugated asbestos cement panels. At the east end of the north elevation was a small single storey brick extension to the building with a flat roof and metal framed single glazed windows, probably dating to the late 1950s or early 1960s. This space consisted of a single room with a doorway to the exterior and a doorway and glazed hatch connecting it with the main building. Devoid of any internal fittings the function of this room was not obvious, but it certainly had a non-industrial use, perhaps as a mess room or for office space.

6.18.8 The interior of the main building was a single open expanse with a mezzanine changing room and toilet facility on the east side (**Plate 56**). Below this the space had been divided for storage. Three rows of steel I beam columns were aligned north south across the space and all of these had either been strengthened with a second abutting column or modified with a pair of columns. This reinforcement had been undertaken so as to allow for two gantry hoists to run on rails between these columns the north south length of the building, just below the height of the roof trusses.

6.19 Building 18: Old Crane Industrial Building

6.19.1 This building was located to the northeast of the main group of buildings, close to the eastern boundary of the site (**Figure 2**; **Plate 1**). Photographic and cartographic evidence suggests that the building was erected between 1938 (**Plates 2** and **3**) and 1944 and remained with an unaltered footprint until the 1990s when a small single storey suite of offices was built against the west elevation. Documentary and cartographic evidence indicates that the structure was 'B' Building, erected *c.*1942 (**Figure 15**; 5.6.6).

6.19.2 The building was rectangular in plan, aligned north-south, with a stepped north elevation of three different sections (**Plate 57**). These corresponded to the three pitched roofs and three gables at the north and south ends. Like other buildings of this age from the site the building was formed from a steel frame and trusses. Between the posts of the exterior walls the lower section of the walls had a low brick wall and above this were metal-framed windows. The upper section of the walls was clad with corrugated panels as was the roof which had equally spaced opaque panels on all roof slopes to light the interior.

6.19.3 The interior was divided into three main areas. The largest space was at the north end where the full width of the building was undivided with a wide opening at the west

end of the north elevation. Here against the west wall was a storage area with a glazed office above accessed by a flight of steel steps (**Plate 58**). Adjacent to this, a gantry hoist ran on rails aligned north-south. At the south end, the width of the building had been partitioned off and a brick built toilet block in the southeast corner (**Plate 59**). The partition appeared to be original with a brick-built lower section. In the central section of the building the east side was also partitioned to create a large rectangular space. All interiors had been stripped of machinery providing no immediate clue as to the function of the building.

6.19.4 The single storey office extension, located half way along the west elevation was almost square in plan with a flat roof. Constructed from timber the offices had a number of windows in all elevations and a wide fascia running around the top of the building. The interior was inaccessible but had been used for offices.

6.20 Building 19: Test Room

6.20.1 Building 19 was located on the northeast side of the main group of buildings, between Building 24 to the west and the north-south road that ran along the east side of the site (**Figure 2**; **Plate 1**). The small rectangular building was aligned east-west and had a pitched roof with east and west gables (**Plate 60**). Aerial photographs show that it was built between 1955 and 1962 (**Plates 7** and **8**).

6.20.2 Like a miniature version of many other post-war buildings the Test Room had a steel frame, in this instance of six posts along the north and south sides, each joined by a steel roof truss. Between the posts, the lower part of the wall was brick and the upper part a band of metal-framed windows three panes high. Each gable end wall also had a central doorway; in the east elevation this had a heavy metal sliding door. The gable above the doors were clad with corrugated panels and the roof was similarly clad.

6.20.3 The interior of the building was a single open space with a concrete floor, well lit by the windows in all elevations (**Plate 61**). Additional electric lighting was provided by two rows of fluorescent strip lights down either side of the building. Fresh air was provided by a centrally pivoted ventilator of six panes, positioned between the columns. A timber deck had been inserted between the tie beams of three roof trusses, presumably for storage. The interior had been stripped and only fuse boxes and cable trunking remained.

6.21 Building 20: Skip Storage Area

6.21.1 The Skip Storage Area was located just to the south of the Test Room and north of the Power House (**Figure 2**; **Plate 1**). The structure consisted of a partially clad rectangular steel frame and an area of concrete hard standing (**Plate 60**). The structure was aligned east-west with the north elevation left completely open, below a single pitch roof sloping down to the south. The other elevations were only clad by corrugated panels above ground level. Although not shown on historic maps, aerial photographs suggest it was built between 1973 and 1985 (**Plate 9**).

6.22 Building 21: Power House

6.22.1 The Power House is one of the original buildings built on the site in the 1920s. It is shown on a map dated 1926 as a narrow rectangular structure aligned north south, to the northeast of the main building block (**Figure 7**). As the main group of buildings has been extended to the north the Power House is now located between these buildings and the north south road along the east side of the site (**Figure 2**; **Plate 1**). Above the centre of the building was a square water tower with a large water tank upon each side of which had been painted in large letters CRANE (**Plate 62**).

6.22.2 The building had a steel frame with the lower section of walls constructed of brick. The upper sections of the walls had been reclad with opaque window panels and corrugated metal panels. The southern third of the building did not have any windows and the north end had a raised section of with a pitched roof. The rest of the roof was

flat with several vents toward the south end. On the east side of the building was a gas oil storage tank and on the west side an oil storage tank.

6.22.3 The interior of the building was divided in two, with the northern two thirds being lit by natural light. Two doorways in the partition wall to the southern third showed that this had been divided in half with a north south partition wall. Both of the southern rooms contained electrical equipment of substation No.1. The northern room had been stripped of machinery but a complex arrangement of pipes showed where it had stood (**Plate 63**).

6.23 Building 22: Laboratory

6.23.1 The Laboratory was located on the east side of the main group of buildings (**Figure 2**; **Plate 1**). The building was erected in 1938 and was the subject of a short article published in the Foundry Trade Journal the same year. The article stated that the building housed the Chief Metallurgist's office, library, stores, reception, routine chemical analysis, samples reception and preparation, physical and mechanical testing room, thermal treatment, balance room, chemical research and general utility room, physical research room, lecture theatre and dark room. When the site closed the building was still in operation as a laboratory and retained many pieces of scientific equipment.

6.23.2 The single storey building was rectangular in plan; aligned north south, with a pitched roof and gables at the north and south ends (**Plate 64**). There were two doorways in the west elevation but the main entrance was found in the centre of the south elevation and consisted of a pair of double doors. These were modern double glazed units. Original single glazed metal-framed windows survived on the rest of the building. The gables were clad with corrugated panels and the roof was covered by corrugated asbestos cement panels.

6.23.3 The interior of the building was arranged around a central corridor with rooms on either side. The partitions were original and were metal-framed walls with a sheet metal panel in the lower section and glazing in the upper section, up to a suspended ceiling (**Plate 65**). On the east side of the building a small brick extension with a flat roof had been added probably in the 1950s or 1960s and housed enlarged toilet facilities.

6.24 Building 23: Surgery and Fire Station

6.24.1 The Surgery was a small, square structure on the east side of the site found just to the south of the Laboratory (**Figure 2**; **Plate 1**). Cartographic and aerial photographic evidence suggests that the building was erected between 1938 and 1944 to cater to the medical needs of the growing site workforce. The Fire Station was a very simple lean to type structure with corrugated metal doors, designed to house a small vehicle and abutted the south elevation of the surgery.

6.24.2 The Surgery was brick built and had a double pitch corrugated asbestos cement roof and gables at the north and south ends (**Plate 66**). The windows were original metal frames with single glazed rectangular panes. The main entrance was in the east elevation with a short waiting room extension on this side. The north side of the interior had a workroom with a central island table unit and a Belfast-type sink against the east wall. From this to the south led two small consulting or treatment rooms.

6.25 Building 24: Bronze Cells/MIV and Large Bronze

6.25.1 This large factory building was located at the northeast side of the main group of buildings, between Building 17 to the north and Building 25 to the south (**Figure 2**; **Plate 1**). The building was probably built as part of the same phase of construction and expansion as the abutting Building 35 to the west. This is thought to have taken place *c.*1938 for the installation of continuous galvanising plant for the treatment of iron fittings and other items and directly abutted the north elevation of buildings shown in **Plate 3**.

6.25.2 The building was almost square in plan with exterior elevations on its north and east sides. It was constructed from a steel frame upon a slightly raised concrete base.

Three pitched roofs were aligned north south and covered a single open factory space with two rows of I beam posts. The easternmost roof had a raised section at the apex with vertical glazed sides to further illuminate the interior, this design was repeated on the later Building 17 to the north. The east elevation had a low corrugated section covering a brick wall, before double height single glazed metal-framed windows completed the rest of the elevation (**Plate 67**). At the north end of this elevation was a loading bay with a projecting beaming for a travelling hoist (**Plate 51**). The north elevation was similar with a low brick wall, tall windows, corrugated panels cladding the three gables and a wide central opening for vehicle access.

6.25.3 The interior of the building had been stripped of any plant, but the eastern third of the space still had several very large steel framed shelving units for storage (**Plate 68**). In the northwest corner of the building was a mezzanine level containing changing and toilet facilities. The west side of the interior was partitioned off from Building 35 to the west, but to the south the ground floor was open with easy access to Buildings 25 and Building 32 which projected further north as shown in **Plate 3**, dating from 1938.

6.26 Building 25: WAGK Warehouse

6.26.1 Building 25 was located on the east side of the main group of buildings and to the west of the Power House (21) and water tower (**Figure 2**; **Plate 1**). The building is related to the first phase of expansion of the foundry buildings in 1930. This also included Buildings 32, 34, the south section of Building 35 and the north extension of Building 14. This expansion created additional foundry capacity and a machine shop for cast iron radiators, central heating boilers and fluid control products such as cast iron valves and flanged fittings. The building was illustrated for two publications in 1938 which show how it had been slightly extended in the previous year in a northward extension of the building complex that included a new foundry and machine shop for the manufacture of bronze valves and fittings (**Plates 2** and **3**).

6.26.2 The building was rectangular in plan, aligned north south and had three pitched roofs aligned north south. The east roof had a raised section at the apex with two vertical glazed sections for added illumination (repeated on the later adjoining Buildings 17 and 24 to the north), while the other two roofs were asymmetrical with a higher pitch on the east side and a single vertical glazed section facing west at the apex. These roofs had been reclad with corrugated metal panels at the same time as the exterior elevations in the late 20th or early 21st century, while the steel frame remained unaltered. The removed of part of an adjoining building against the south elevation in the 1990s meant this cladding could here be fitted with tall opaque panels to illuminate the interior, as it had on the east elevation (**Plate 69**).

6.26.3 The interior of Building 25 was an open space with two rows of posts supporting the steel roof trusses (**Plate 70**). The partition with the building to the west was original with a low brick wall, a band of metal framed glazing five panes high and cladding above and a wide opening at the south end. On the east side of the building a narrow area against the east wall had been partitioned off in the late 20th century to create a mess room. Although the space had been emptied of equipment, at the south end of the space were large steel shelving units showing the space had at least in part been used for storage. The ground floor of the north end was open into Building 24, but had cladding above which would indicate that it may have previously been closed.

6.27 Building 26: Maintenance

6.27.1 Building 26 was located on the east side of the main group of buildings, adjacent to Building 29, the two storey section of the original 1920s foundry block (**Figure 2**; **Plate 1**). The building is first shown on an illustration dated February 1938 and so was probably built in the previous year, as an illustration also published in 1938 does not show the building (**Plates 2** and **3**). The single storey structure was rectangular in plan, aligned north south, with a pitched roof supported by steel posts and trusses.

6.27.2 The south elevation had been rebuilt in yellow brick with two rows of windows (**Plate 71**). The east elevation retained its original largely glazed exterior with two wide openings being inserted for vehicle access. The northern third of the building did not abut the building to the west and so here the west elevation was also glazed. This

part of the building was partitioned and was latterly used as a workshop. The southern part of the building was fully connected with the building to the west with no dividing wall and had been used for the packing and dispatch of goods (**Plate 72**). At the very south end there were several offices on the ground floor and above on a mezzanine level.

6.28 Building 27: Offices and Air Raid Shelter 1

6.28.1 Building 27 was located toward the southeast side of the main group of foundry buildings (**Figure 2**; **Plate 1**). The building was almost square in plan with a steel frame, three roof sections aligned north-south and offices on the ground floor and on a first floor only at the north end. This division may reflect the original size of the building which was smaller, possibly consisting only of this two storey north end, although the first floor may have been inserted when the building was extended. This can be seen in changes to the glazing pattern of the east elevation (**Plate 73**).

6.28.2 This part of the present building dates to the original 1920s foundry and is shown in photographs published in 1938 (**Plates 2** and **3**). Between 1938 and 1944 the building was extended southwards as part of a programme of southerly expansion which included Buildings 28 and 33, before Building 7 was constructed across the width of the south elevation. The southwards extension of Building 27 is more likely to have occurred earlier in the known date range, as below ground level was constructed a two chambered air raid shelter (**Figure 3**; **Plate 74,**). This had concrete steps descending southward from the centre of the building with mirrored, barrel vaulted chambers to east and west. Both of these had an emergency exit at the far end consisting of a fixed steel ladder and hatch. Both chambers had originally been equipped with electric lighting. In the west chamber this row of bulbs was off centre on the north side of the ceiling, perhaps respecting a scar on the north wall that showed a bench had probably been fixed to this wall. In the east chamber the lighting was aligned down the centre and no bench scars were visible.

6.28.3 The ground floor of this building was divided between many small offices, most of which had the metal-framed partially glazed partitions commonly seen elsewhere. An open plan area in the centre of the building had a timber hatch in the centre which led down to the air raid shelter (**Plate 75**). The northern boundary of this open plan office may mark the original end of the building. Two narrow flights of stairs at the north end of the building led up to the first floor.

6.28.4 The majority of the first floor office space was on the east side of the building and lit by windows in the east elevation (**Plate 76**). This was largely open plan with several much smaller offices and the only piece of furniture to be left was a draughtsman's table, suggesting this was a drawing or design office. A single much smaller first floor office was found in the centre of the building at the north end and was lit purely from skylights.

6.29 Building 28: Rough Stores/Large MI Cell

6.29.1 Building 28 was a partitioned space at the south end of the main foundry block (**Figure 2**; **Plate 1**). To the south of this space was Building 7 which had a wide opening connecting the two on the ground floor and also at mezzanine level where a hoist could be traversed between the two buildings. To the west an inserted partition separated it from Building 33 and to the east was an exterior elevation. This small open air space may have been left when the buildings expanded to the south as a light well, or perhaps for access as here was located the only entrance to the building in the south elevation during the 1930s (**Plate 3**). However, the space had almost entirely been filled with the construction of a toilet block, stopping any natural light entering Building 28 from the east elevation. The interior of the space was therefore very poorly lit.

6.29.2 The northern part of the space was originally part of the 1920s foundry block, which had been extended to the south between 1938 and 1944. The space was covered by three replacement double pitch roofs aligned north-south, the apex of which was asymmetrical with a vertical section. The space was constructed from a steel frame

that had two rows of posts. At the north end of the space were large shelves indicates some of the space had been used for storage.

6.30 Building 29: Packing/Dispatch

6.30.1 Building 29 was found toward the southeast side of the main foundry block and was easily identifiable from the stepped flat roof of the first floor (**Figure 2**; **Plate 1**). This building dated from the original 1920s foundry and had a largely open ground floor with an open first floor above.

6.30.2 The original east elevation had been modified with the addition of Building 26 but a short section north of this was original. Here the building was timber framed, with a low brick wall and glazing built against the main steel framed structure (**Plate 77**). It may be that the first depiction of the foundry from 1926 shows this part of the building continuing along the entire east elevation with a glazed roof at the south end (**Figure 7**). The ground floor of the building was undivided and striped paintwork on the steel posts showed that the movement of vehicles in this area was common.

6.30.3 The first floor was accessed by a narrow flight of steel steps and an adjacent lift at the north end of the building. At the north end of the first floor were several small offices with original partitions of steel framed walls with glazed upper sections. The rest of the large rectangular space was undivided apart from a small office in the southwest corner and had large windows along the length of both east and west elevations. Three rows of steel posts aligned north south supported the ceiling which was higher in the central section and had a second row of windows along either side (**Plate 78**). This floor had formerly been the pattern shop.

6.30.4 At the north and south end of the first floor was a mezzanine level. At the south end this was left open with a flight of steel stairs against the southern wall. At the north end the mezzanine had been enclosed. The space had originally provided separate toilet and changing room facilities on this level with four large round communal sinks along the west side (**Plate 79**). However, several rows of steel shelves had been installed and the spaced had latterly been used for the storage of moulds.

6.31 Building 30: WASK Flexgrip

6.31.1 Building 30 was not so much a structure in its own right, but a space within a larger complex, that included Buildings 27, 28, 29, 31, 33 and foundry Building 14, all constructed at the same time in the 1920s. The building was located on the east side of the main building group, just north of Building 29 (**Figure 2**; **Plate 1**). Built from a steel frame the structure had three double pitch roofs aligned north south with an asymmetrical apex and vertical west facing glazed section.

6.31.2 Internally, the space had rows of posts supporting the roof, but was undivided. The main entrance to the space from the exterior was through a wide opening in the east side that led to a north-south aligned corridor. This corridor continued along the south side of the space providing access into the centre of the foundry complex. From this corridor the stairs led south to the first floor of Building 29 and also a staircase to a mezzanine level toilet and changing room facility. This extended from the corridor northwards above the open ground floor of Building 30. The west side of Building 30 led into Building 33 to the west and a wide door way led into Building 32 to the north. Rows of large steel shelving units were found within the building showing that it had last been used for storage and warehousing.

6.32 Building 31: WASK RMF

6.32.1 Building 31 was located in the centre and to the east side of the main group of buildings (**Figure 2**; **Plate 1**). The building was abutted by Building 32 to the north, Building 30 to the south and had a narrow exterior space between it and Building 33 to the west. Originally, the building would also have had structures against its east elevation that were also part of the 1920s phase of construction, but these had been demolished down to floor level, leaving *in-situ* a slightly raised concrete base. This foundation was not visible on the west side of the site and so may have been built to

compensate for a fall in the natural ground level to the east and allow for a continuous single floor level within all buildings.

6.32.2 The building was rectangular in plan aligned north-south and for a building with a single pitched roof it was unusually wide. The roof covering had been renewed with frequent narrow opaque panel skylights that flooded the space with natural light. The steel frame of the building appeared to be original with a low brick wall along the east side and a modern low block wall along the west side. The south wall had a wide central doorway, but the north wall had largely been removed at ground level with a short section of low brick wall and metal framed single glazed windows left *in-situ* at the west end. This would seem to suggest that this wall had once been an exterior elevation and Building 32 to the north had been built against it.

6.32.3 The interior space was only disrupted by a single row of posts along the east side, otherwise the steel roof trusses spanned the building east west and supported the roof unaided (**Plate 80**). Attached to the underside of the trusses were a large number of horizontal steel beams. These were either aligned north-south or east-west and were presumably designed for individual hoists to traverse heavy items between various workstations.

6.33 Building 32: WASK

6.33.1 Building 32 was found in the centre of the main group of foundry buildings and was rectangular in plan aligned north-south (**Figure 2**; **Plate 1**). The northern end of the building extended further north than neighbouring buildings which suggests that this building is the one shown projecting from the then north elevation of the foundry complex on a photograph published in 1938 (**Plate 3**). The majority of the building like those to the east and west was therefore probably built as part of the 1930 expansion of the site. Differences between **Plates 2** and **3** suggest that this building was then extended slightly northwards *c.*1937 in order to accommodate facilities for the manufacture of bronze valves and fittings.

6.33.2 The interior of the building was open plan with four rows of posts supporting the roof trusses (**Plate 81**). In the southeast corner of the building was a mezzanine level with a changing room and toilet facilities. In the late 20th century a mess room had been built against the east side of the space, where the north end opened out into Building 24 without partition. Like Building 31 to the south, a number of steel beams had been attached to the underside of the roof trusses to accommodate overhead travelling cranes to move heavy items.

6.34 Building 33: Shotblast Fettling/Malleable Foundry

6.34.1 Building 33 was located on the west side and in the centre of the main group of foundry buildings aligned north south (**Figure 2**; **Plate 1**). This large space formed much of the original foundry complex built in the 1920s, with the south elevation being extended in the late 1930s or early 1940s to the same degree as adjacent Buildings 28 and 27.

6.34.2 The building was constructed from a steel frame and trusses aligned east west which were covered by double pitch asymmetrical roofs with a west facing vertical section. These had been renewed in the late 20th century and several raised sections with vents showed where industrial foundry operations had taken place. The building had a vehicle entrance in the west elevation and internally several wide openings connected the space with adjacent buildings.

6.34.3 The interior had been stripped of all foundry machinery and an electrical substation that had once been located here, but wide and deep depressions in the concrete floor showed where equipment had stood (**Plate 82**). The space was extremely poorly lit by natural light and with an unpredictable and uneven floor surface a thorough survey of the interior was not possible.

6.35 Building 34: WASK

6.35.1 Building 34 was located at the north end of Building 33 in the centre of the building complex (**Figure 2**; **Plate 1**). Almost rectangular in plan the building was formed of

two areas with a southern slightly wider east west part. The space was not necessarily designed as a single unit but one part of a larger steel frame group. This was constructed in 1930 to extend the foundry site to the north and included Buildings 25, 32 and parts of 14 and 35.

6.35.2 Surrounded by other structures the building was poorly lit by natural light from skylights in its pitched roof. At the south end of the building was a mezzanine level with changing room and toilet facilities and adjacent to this a large piece of machinery remained in situ (**Plate 83**). The northern section of the space had been stripped of all equipment (**Plate 84**). Structural steel posts ran down the centre of the space and late 20th century corrugated metal panels had been used to partition this space from adjacent buildings.

6.36 Building 35: Old Grey Iron Foundry

6.36.1 Building 35 was located towards the northwest side of the main group of foundry buildings and consisted of two distinct areas both constructed from a clad steel frame with pitched roofs (**Figure 2**; **Plate 1**). The southern part of the building was in a severe state of disrepair and had previously contained melt furnaces (**Plate 85**). Foundry buildings that had previously abutted the west elevation of this building had been demolished creating large holes in the elevation. The removal of all the foundry equipment had also no doubt contributed to the areas of missing roof. This part of the building was constructed in 1930 and the demolished parts to the west may relate to expansion in 1937.

6.36.2 The southern section of the building was a much larger space and probably dated from 1938 with the installation of continuous galvanising plant. The north elevation consisted of a low brick wall between the posts of the steel frame and corrugated cladding of the wall and gables above. Two wide vehicle entrances were located in this elevation. The space was largely lit from above from the vertical glazed sections of the asymmetrical roof and was undivided (**Plate 86**).

7 DISCUSSION AND CONCLUSIONS

7.1 Crane's Foundry was originally built in the early 1920s and periodically enlarged in a series of phases from the late 1920s until the late 20th century, before closing in 2008.

7.2 The earliest phase of construction on the site was a rectangular block consisting of Buildings 14, 27, 28, 29, 30, 31 and 33. The power house and water tower (Building 21) were built to the northeast of this group at around the same time. The works were enlarged in 1927 with the construction of the plant's first malleable iron foundry. In 1930 the works were extended northwards with the construction of Buildings 25, 32, 34, 35 and the enlargement of foundry Building 14. Documentary evidence indicates that the enlargement of the works was a consequence of the company's decision to manufacture boilers and radiators for the lucrative domestic, industrial and institutional heating markets. Photographic and documentary evidence indicates that a new foundry and machine shop were built in 1937, when the width of the north elevation was extended again on Buildings 25, 32, 34 and 35.

7.3 1938 saw the construction of the Laboratory Building 22 and Building 26 to the east elevation. The north elevation was also extended in this year with the development of Buildings 24 and 35. The south elevation was also extended at this time across its width with Buildings 27, 28 and 33 being enlarged. As part of this work Air Raid Shelter 1 was also constructed along with others at the north end of the site.

7.4 During the war years Building 18 and the Surgery Building 23 were built. Two years after the war ended a programme of large-scale expansion saw the construction of the Old Bronze Foundry (Building 5) and Buildings 7, 15 and 17. The pace of development slowed slightly during the 1950s and 1960s, during which Buildings 1, 16 and 19 were built.

7.5 Economic stagnation and changing consumer demand in the 1970s prompted Cranes to abandon the manufacture of boilers and radiators, following which the foundry complex was modernised towards the end of that decade when the old cast iron and boiler cupolas were demolished in order to make way for a single centralised malleable iron production facility known as 'Central Melt'; this comprised Buildings 11 and 12. Other buildings erected at this time included the 1974 Canteen (Building 6) as well as Buildings 2 and 9. The 1980s and early 1990s saw further consolidation and the demolition of No. 3 Malleable Foundry. Technical advances may have been behind the construction of 'Electric Melt' (Building 13) in the 1990s; similarly advances in Information Technology and reductions in the size of the workforce saw the conversion of the Canteen into an IT Centre (Building 6) during this period.

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8.2 Thanks are given to the staff of the Suffolk Record Office Ipswich Branch for their help and assistance.

8.3 The project was managed for Pre-Construct Archaeology Limited by Charlotte Matthews. The photographic record was carried out by Malcolm Gould and the limited building recording of an air raid shelter was undertaken by Malcolm Gould and Paul McGarrity. Guy Thompson carried out the documentary research. Guy Thompson (historical background) and Malcolm Gould (building descriptions) wrote this report. Jenny Simonson and Mark Roughley prepared the illustrations.

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APPENDIX 1. PHOTOGRAPHIC REGISTER

CRANE'S FOUNDRY, IPSWICH, SUFFOLK.				SITE CODE : IPS 662		PHOTOGRAPHER : M. Gould
DATE	**FILM TYPE FILM & FRAME NUMBER**		**DIRECTION**	**IDENTIFIER**	**BUILDING**	**COMMENTS**
	Black & White	Digital				
12/01/2012	F101 1-3	D100 1	NE	caravan	1	South elevation of admin office facing Nacton Rd
12/01/2012	F101 4-6	D100 2	N	car	2	East elevation of gatehouse and vehicle entrance
12/01/2012	F101 7-9	D100 3	N	gates	2	General view of entrance gates on Nacton Rd
12/01/2012	F101 10-12	D100 4	NE	road	5	South elevation of Old Bronze Foundry from Nacton Rd
12/01/2012	F101 13-15	D100 5a&b	N	gables	7	South elevation facing Nacton Rd and road on east side
12/01/2012	F103 1-3	D100 6	E	car	1 & 2	South and west elevations of gatehouse and Admin Block
12/01/2012	F103 4-6	D100 7	NW	K9 phone box	3 & 7	K9 phone box, entrance parking and south and east elevations
12/01/2012	~	D100 8	N	gable	3	South and east elevations of Training Centre
12/01/2012	~	D100 9	NW	road	4	South and east elevations of Black Hut prefab
12/01/2012	F103 7-9	D100 10	E	road	3, 7, 1	South and west elevations and view to entrance gates
12/01/2012	F103 10-12	D100 11	E	black hut	4 & 3	South and west elevations and view to entrance gates
12/01/2012	F103 13-15	D100 12	NE	road	7	West elevation of black hut and road along west side of site
12/01/2012	F105 2-3	D100 13	NNW	garage	8	East elevation of garage, southwest corner of site
12/01/2012	F105 4-6	D100 14	E	garage	7	West elevation of garage, southwest corner of site
12/01/2012	F105 7-9	D100 15	E	hut	8 & 9	Garage and weighbridge
12/01/2012	F105 10-12	D100 16	E	chimney	11	South elevation of ex piddling building
12/01/2012	F105 13-15	D100 17	NE	chimney	12	West elevation of shotblast building and road west side of site
12/01/2012	F107 1-3	D100 18	E	concrete	11 & 33	Yard area south of piddling building
12/01/2012	F107 4-6	D100 19	NNE	post	11	View from loading bay (33) of area between 11 & 33
12/01/2012	F107 7-9	D100 20	NNE	loading bay	12, 14, 33	Narrow area between 12 & 33, doorway into 14
12/01/2012	~	D100 21	SSW	gable	11 & 12	East elevations of ex piddling and shotblast buildings
12/01/2012	F107 10-12	D100 22	NW	skylights	11	Open factory space, west side of building
12/01/2012	F107 13-15	D100 23	E	skylights	11	Open factory space, east side of building
12/01/2012	F109 1-3	D100 24	NE	skylights	12	North end of interior, shotblast building
12/01/2012	F109 4-6	D100 25	S	brick base	12	Brick machine base north end interior
12/01/2012	F109 7-9	D100 26	NE	steel frame	13	East side, north end interior

12/01/2012	~	D100 27	NE	steel frame	13	North end of interior, electric melt building
12/01/2012	F109 10-12	D100 28	N	steel frame	13	North end west side of interior of electric melt building
12/01/2012	F109 13-15	D100 29	NNW	concrete floor	13	North end west side of interior of electric melt building
16/01/2012	F111 1-3	D100 30	S	roof vents	7	East and south east elevations
16/01/2012	F111 4-6	D100 31	NE	road	14	West elevation
16/01/2012	F111 7-9	D100 32	NE	barrels	15	West elevation
16/01/2012	F111 10-12	D100 33	SSE	chimney	13 & 14	North elevation of 13 and west side 14 with road
16/01/2012	F111 13-15	D100 34	S	gable	14	North and west elevations
16/01/2012	F113 1-3	D101 1	SSW	concrete base	14	North and west elevations
16/01/2012	F113 4-6	D101 2	ESE	passage	16	West elevation
16/01/2012	F113 7-9	D101 3	E	gable	16	South elevation west end
16/01/2012	F113 10-12	D101 4	NE	windows	16	West elevation, view to north end of site, top of A.R. Shelters
16/01/2012	F113 13-15	D101 5	ESE	posts	35	North end east side open factory space
16/01/2012	F115 1-3	D101 6	SSE	truss	35	North end west side of open factory space
16/01/2012	F115 4-6	D101 7	SSE	tanks	15	Modern water tanks x2 at north end
16/01/2012	F115 7-9	D101 8	NW	skylights	16	West side open factory space
16/01/2012	F115 10-12	D101 9	NE	skylights	16	East side open factory space
16/01/2012	~	D101 10	NNE	truss	16	west side detail of roof truss
16/01/2012	F115 13-15	D101 11	NE	cables	17	west side open factory space
16/01/2012	~	D101 12	N	post	16 & 17	Modern infill, partition, entrance between 16 and 17
16/01/2012	~	D101 13	W	windows	17	1.6 tonne hoist at north end of 17
16/01/2012	F117 1-3	D101 14	SW	lattice posts	17	East side of 17 2 tonne hoist
16/01/2012	F117 4-6	D101 15	S	mezzanine	17	Offices on east side of open factory space
16/01/2012	~	D101 16	E	hatch	17	Office in north east corner
16/01/2012	F117 7-9	D101 17	NW	ramp	17	Southeast corner and concrete ramp
16/01/2012	F117 10-12	D101 18	SW	gables	17	North elevations and top of WWII air raid shelters
16/01/2012	~	D101 19	SSW	brick wall	17	Northeast corner with concrete building platform of WWII shelters
16/01/2012	F117 13-15	D101 20	SSW	gables x3	18	North elevation
16/01/2012	F119 1-3	D101 21	N	trees	18	South and east elevations
16/01/2012	F119 4-6	D101 22	E	chimney	18	West and south elevations
16/01/2012	F119 7-9	D101 23	SE	trees	18	West elevation and prefab extension
16/01/2012	F119 10-12	D101 24	SSW	red doors	18	North end of open factory space
16/01/2012	F119 13-15	D101 25	N	doorway	18	North end of open factory space and mezzanine
16/01/2012	~	D101 26	S	partition	18	Central area and toilet block in southeast corner
16/01/2012	~	D101 27	SW	partition	18	West side of central area

16/01/2012	~	D101 28	WNW	windows	18	Workshop at south end
16/01/2012	~	D101 29	N	truss	18	South end east side toilet block and open factory space
16/01/2012	~	D101 30	NE	post	18	North end east side open factory space and mezzanine
16/01/2012	~	D101 31	S	extension	18	North elevation of west extension prefab
16/01/2012	F121 1-3	D101 32a&b	NNW	ramp	17 & 24	East elevations and concrete ramp
16/01/2012	F121 4-6	D101 33	SW	water tower	19 & 24	East elevations and 'Crane' water tower
17/01/2012	F121 7-9	D101 34	NE	gable	10	South and west elevations of works pavilion facing Nacton Rd
17/01/2012	F121 10-12	D101 35	N	Lean-to	10	South and east elevations of works pavilions
17/01/2012	F121 13-15	D101 36	NW	car park	10 & 5	View from southeast corner of site on Nacton Rd
17/01/2012	F123 1-3	D101 37	SW	Lean-to	10	North and east elevations
17/01/2012	F123 4-6	D101 38	WSW	doorway	10	Internal view along east-west corridor
17/01/2012	F123 7-9	D101 39	S	truss	10	South side of conference room
17/01/2012	F123 10-12	D101 40	N	windows	10	Office at west end of building
17/01/2012	F123 13-15	D101 41	SE	corridor	10	East-west corridor with offices on south side
17/01/2012	~	D101 42	S	truss	10	Office at east end of building
17/01/2012	~	D101 43	NE	doors x 2	10	Secure rooms x2 on north side, east end of e-w corridor
17/01/2012	~	D101 44	E	doorway	10	Office and hatch north side of e-w corridor
17/01/2012	~	D101 45	S	shelves	10	Basement south side
17/01/2012	~	D101 46	S	steps	10	basement steps south side
17/01/2012	~	D101 47	NNE	ladder	10	Basements timber steps internal entrance north side
17/01/2012	~	D101 48	WNW	hatch	10	Basement external entrance south side
17/01/2012	F125 1-3	D102 1	N	garage	19	South elevation of Test Room and vehicle shelter to south
17/01/2012	F125 4-6	D102 2	WSW	windows	19	Interior of Test Room east side of site
17/01/2012	F125 7-9	D102 3	SW	water tower	20 & 21	East elevation and 'Crane ' water tower
17/01/2012	F125 10-12	D102 4	SSW	windows	24 & 25	East elevations and raised concrete platform
17/01/2012	F125 13-15	D102 5	S	water tower	21	West elevation, water tower and concrete platform
17/01/2012	~	D102 6	NE	trees	18 & 19	Setting view and across east side of site
17/01/2012	F127 1-3	D102 7	S	windows	21	Power House interior
17/01/2012	F127 4-6	D102 8	NNE	windows	21	Power House interior
17/01/2012	~	D102 9	SSW	cables	21	Electric room southwest corner
17/01/2012	~	D102 10	SSW	windows	21	High voltage room southwest corner
17/01/2012	F127 7-9	D102 11	NW	water tower	21	East elevation and water tower
17/01/2012	F127 10-12	D102 12	SW	brick extension	22	North and east elevations of Laboratory
17/01/2012	~	D102 13	SW	water tower	21 & 22	Water tower east elevations and setting view
17/01/2012	F127 13-15	D102 14	N	entrance doors	22	South and east elevations

17/01/2012	F129 1-3	D102 15	NE	sloping road	22	South and west elevations
17/01/2012	F129 4-6	D102 16	NE	office	22	Laboratory office, Gauge Room, in southwest corner
17/01/2012	F129 7-9	D102 17	NNE	corridor	22	Central corridor from entrance doorway
17/01/2012	~	D102 18	SSE	drawers	22	Laboratory office, Gauge Room, in southwest corner
17/01/2012	~	D102 19	SE	desk	22	Laboratory room, west side, desk and bottles
17/01/2012	~	D102 20	S	table	22	Laboratory room with test rig in northwest corner
17/01/2012	~	D102 21	SW	lab equipment	22	Laboratory room in northeast corner
17/01/2012	~	D102 22	N	bookcase	22	Laboratory room with bookcases, east side
17/01/2012	F129 10-12	D102 23	W	road	23	Surgery north and east elevations
17/01/2012	F129 13-15	D102 24	SE	doors	23	Surgery entrance and west elevation
17/01/2012	~	D102 25	E	draws	23	Surgery interior main room
17/01/2012	~	D102 26	W	table	23	Surgery interior main room
18/01/2012	F131 1-3	D102 27	N	gables	25	South gable end and sloping road
18/01/2012	F131 4-6	D102 28	S	gable	22	North and west elevations
18/01/2012	F131 7-9	D102 29	SW	railing	26	Sunken road and loading bay area
18/01/2012	F131 10-12	D102 30	S	Asphalt	23	Surgery and loading bay area
18/01/2012	F131 13-15	D102 31	WSW	pipe	26	Sunken roadway and blue 'sand' hopper machinery
18/01/2012	F133 1-3	D102 32	WSW	sliding door	26	North elevation with gable end
18/01/2012	F133 4-6	D102 33	SW	windows	26	North and east elevations
18/01/2012	F133 7-9	D102 34a&b	N	road	26	East and south elevations and n-s road east side of site
18/01/2012	F133 10-12	D102 35	SW	roof vents	27	Vacant office east elevation, southeast corner main buildings
18/01/2012	F133 13-15	D102 36	S	blocked windows	6	North and west elevations single storey I.T. Offices
18/01/2012	F135 1-3	D103 1	N	trees	6	I.T. Office south and east elevations and road east side of site
18/01/2012	F135 4-6	D103 2	ENE	trees	6	South and east elevations
18/01/2012	F135 7-9	D103 3	S	trees	1	Admin Block north and west elevations
18/01/2012	F135 10-12	D103 4	SW	road	1	Admin Block north and east elevations
18/01/2012	F135 13-15	D103 5	S	gables	5	Old Bronze Foundry north elevation
18/01/2012	F137 1-3	D103 6	SW	gables	5	North elevation stepped, with cylindrical tanks
18/01/2012	F137 4-6	D103 7	W	chimney	5	East elevation and end of north elevation
18/01/2012	F137 7-9	D103 8	N	chimney	5	South and east elevations with car park on south side
18/01/2012	F137 10-12	D103 9	NE	gables	5	South and west elevations and car park on south side
18/01/2012	F137 13-15	D103 10	NE	tree	5	Southwest corner and west elevation along road
19/01/2012	F139 1-3	D103 11	WSW	tanks	5	East elevation south end, tanks and storage bays
19/01/2012	F139 4-6	D103 12	SW	gables x2	5	North elevation east end, gas oil tanks nos. 16 & 17
19/01/2012	F139 7-9	D103 13	SE	posts	5	Interior, southwest corner area below mezzanine

19/01/2012	F139 10-12	D103 14	SW	pipes	5	Southwest corner area below mezzanine
19/01/2012	F139 13-15	D103 15	N	shelves	5	South end, west side of building, store room below mezzanine
19/01/2012	~	D103 16	SSE	shelves	5	South end, west side of building, store room below mezzanine
19/01/2012	~	D103 17	SW	doorway	5	Store room entrance below mezzanine
19/01/2012	F141 1-3	D103 18	N	trusses	5	West side, open factory floor and mezzanine at north end
19/01/2012	F141 4-6	D103 19	NE	skylights	5	West side, open factory floor and mezzanine at north end
19/01/2012	F141 7-9	D103 20	S	steps	5	West side, open factory floor and mezzanine at south end
19/01/2012	~	D103 21	N	windows	5	Small office north end of west side below mezzanine
19/01/2012	F141 10-12	D103 22	SE	pillars	5	Area below mezzanine in northwest corner
19/01/2012	F141 13-15	D103 23	S	office	5	Area below mezzanine in northwest corner
19/01/2012	~	D103 24	E	hoist	5	Mezzanine office northwest corner of Old Bronze Foundry
19/01/2012	~	D103 25	NNE	truss	5	Mezzanine office northwest corner showing roof truss
19/01/2012	~	D103 26	NE	windows	5	Mezzanine office northwest corner showing roof truss
19/01/2012	F143 1-3	D103 27	SE	windows	5	Narrow room southeast corner of building
19/01/2012	F143 4-6	D103 28	E	skylights	5	Narrow room southeast corner of building
19/01/2012	F143 7-9	D103 29	SW	shelves	5	Pattern Store, west side of narrow room below mezzanine
19/01/2012	F143 10-12	D103 30	ENE	machine	5	Narrow room southeast corner of building with tall machine
19/01/2012	F143 13-15	D103 31	N	machine	5	Narrow room southeast corner of building with tall machine
19/01/2012	~	D103 32	N	conveyor	5	Detail of big machine conveyor and dipper belt
19/01/2012	~	D103 33	WSW	controls	5	Detail of big machine control panel
19/01/2012	~	D103 34	N	benches	5	Mezzanine changing room with wire lockers
19/01/2012	~	D103 35	WSW	cubicles	5	Mezzanine toilet cubicles next to changing room
19/01/2012	~	D103 36	E	light	5	View of narrow room in southeast corner from mezzanine steps
19/01/2012	F145 1-3	D104 1	NNW	stairs	5	Narrow room southeast corner with stairs to mezzanine toilets
19/01/2012	~	D104 2	NNE	pillar	5	Detail of makers stamp steel post, narrow room 1st bay se corner
19/01/2012	F145 4-6	D104 3	NNE	fridges	5	East half of building, west side
19/01/2012	F145 7-9	D104 4	E	post	5	East half of building, east side doors to narrow room to south
19/01/2012	F145 10-12	D104 5	NNE	holes in floor	5	East half of building, north side, open factory floor
19/01/2012	F145 13-15	D104 6	N	vent	5	East half, east side, storage bay doors, huge extractor vents
19/01/2012	F147 1-3	D104 7	NW	trench	5	East half, central area of open factory floor
19/01/2012	F147 4-6	D104 8	NE	partition	5	Workshop area east side
19/01/2012	F147 7-9	D104 9	ENE	extractor vents	5	Huge extractor vents east side of building north end
19/01/2012	F147 10-12	D104 10	SSE	extractor vents	5	Huge extractor vents east side of building south end
19/01/2012	F147 13-15	D104 11	W	wheelie bin	5	East half of building, north end east side
19/01/2012	F149 1-3	D104 12	SW	trench	5	East half, east side, extractor vents at north end

19/01/2012	F149 4-6	D104 13	S	skylight	5	East half, west side of open factory space
19/01/2012	F149 7-9	D104 14	SE	post	5	East half, north end of central area, 'sand grinding' machinery
19/01/2012	F149 10-12	D104 15	NE	puddle	5	East half, northwest corner, workshop area extension
19/01/2012	~	D104 16	NNE	handrail	5	East half, central area, west side of 'sand grinding' machinery
19/01/2012	~	D104 17	NNE	machinery	5	East half, west side of 'sand grinding' machinery below ground
19/01/2012	F149 13-15	D104 18	N	grind wheels	5	Detail of east side of 'sand grinding' machinery
20/01/2012	F151 1-3	D104 19	WNW	super's booth	7	Interior long view across south end of open factory floor
20/01/2012	F151 4-6	D104 20	N	doorway	7	East side of building with mezzanine and entrance doorway
20/01/2012	F151 7-9	D104 21	E	booth	7	East side of building, south end, Union Machine & Assembly Area
20/01/2012	F151 10-12	D104 22	NNE	truss	7	Central area, north side mezzanine and roof truss
20/01/2012	F151 13-15	D104 23	NW	booth	7	West side of building, south end, Inspection and Test Area
20/01/2012	F153 1-3	D104 24	NNW	mezzanine	7	Northwest corner with mezzanine and concrete machine bases
20/01/2012	F153 4-6	D104 25	ESE	posts	7	West side of building, south end, Inspection and Test Area
20/01/2012	F153 7-9	D104 26	NE	concrete base	7	West side north end, concrete machine base and n. mezzanines
20/01/2012	~	D104 27	N	steps	7	Detail view of mezzanine in northwest corner
20/01/2012	~	D104 28	N	window	7	Area below mezzanine in northwest corner
20/01/2012	~	D104 29	S	doorway	7	Area below mezzanine in northwest corner
20/01/2012	F153 10-12	D104 30	SE	light	7	General view west side with machine bases from mezzanine
20/01/2012	F153 13-15	D104 31	NE	lockers	7	Northwest corner mezzanine changing rooms, lockers and sinks
20/01/2012	~	D104 32	SW	sinks	7	Northwest corner mezzanine changing rooms, lockers and sinks
20/01/2012	~	D104 33	N	urinal	7	Northwest corner mezzanine gents toilets
20/01/2012	~	D104 34	S	light	7	Detail of roof truss construction, west side
20/01/2012	F155 1-4	D105 1	SW	sinks	7	Northwest corner, mezzanine ladies changing room, lockers
20/01/2012	~	D105 2	NW	cubicles	7	Northwest corner, mezzanine ladies toilets
20/01/2012	~	D105 3	N	roof lights	7	View from mezzanine window northward, over roofs & skylights
20/01/2012	~	D105 4	W	post	7	Northwest corner, storage area & tanks below mezzanine
20/01/2012	F155 6-8	D105 5	SW	trench	7	West side of building, north end, concrete machine bases
20/01/2012	F155 10-12	D105 6	E	concrete base	7	West side, north end, machine bases and central mezzanine
20/01/2012	~	D105 7	NE	steps	7	North side, central mezzanine and storage racks below
20/01/2012	F155 13-15	D105 8	SW	concrete base	7	Central and west side, north end, concrete machine bases
20/01/2012	F157 2-4	D105 9	SE	mezzanine	7	Central area of building, north end
20/01/2012	F157 5-7	D105 10	S	booth	7	East side, south end, supervisors booth and entrance doorway
23/01/2012	F157 8-9	D105 11	SW	concrete base	7	Central area, concrete machine bases
23/01/2012	F157 10-12	D105 12	ENE	notice board	7	Canteen/mess room, northeast corner of building
23/01/2012	F157 13-15	D105 13	SE	mezzanine	7	East side of building with mezzanine and entrance doorway

23/01/2012	F159 1-3	D105 14	ESE	doors	7	Corridor in northeast corner between canteen/mess and n wall
23/01/2012	~	D105 15	W	chairs	7	Interior of canteen/mess in northeast corner
23/01/2012	~	D105 16	E	chairs	7	Interior of canteen/mess in northeast corner
23/01/2012	~	D105 17	NE	windows	7	View of canteen/mess from east side mezzanine steps
23/01/2012	~	D105 18	SW	sinks	7	East side mezzanine changing room, stone sink
23/01/2012	~	D105 19	NE	truss	7	East side mezzanine changing room, stone sink
23/01/2012	~	D105 20	S	urinal	7	East side mezzanine changing room toilets
23/01/2012	F159 4-6	D105 21	WNW	pillars	7	East side, north end of factory floor with canteen on right
23/01/2012	~	D105 22	S	brick wall	7	Below east side mezzanine, detail of clocking in/out board
23/01/2012	F159 7-9	D105 23	NNE	windows	27 & 28	Enclosed exterior space north of 7, w elev. of 27, e. elev. of 28
23/01/2012	F159 10-12	D105 24	SSW	windows	27 & 28	Enclosed exterior space north of 7, w elev. of 27, e. elev. of 28
23/01/2012	F159 13-15	D105 25	SE	sinks	7	North side, central mezzanine changing rooms
23/01/2012	~	D105 26	WNW	lockers	7	North side, central mezzanine changing rooms
23/01/2012	~	D105 27	E	cubicles	7	North side, central mezzanine gents toilets
23/01/2012	~	D105 28	SE	handrail	7	View from central mezzanine of central area and machine bases
23/01/2012	F161 1-3	29	N	large shelves	28	North of 7, Rough Stores open space
23/01/2012	F161 4-6	D105 30	SSW	posts	28	South side of building, Rough Stores from MI Cell area
23/01/2012	F161 7-9	D105 31	S	doorway	28	NE corner with doorway in 29
23/01/2012	F161 10-12	D105 32	NE	small office	28	NE corner with doorway in 29
23/01/2012	F161 13-15	D105 33	SW	post	28	Gantry hoist in SW corner and doorway to west
23/01/2012	~	D105 34	NNE	hand rail	28	Gantry hoist in SW corner
23/01/2012	~	D105 35	NE	hoist	28	Detail view of hoist on gantry SW corner
23/01/2012	~	D105 36	S	hoist	28	Gantry hoist from 28 extending south into 7
23/01/2012	~	D105 37	E	walls	28	South side, southeast corner and doorway into 7
23/01/2012	~	D105 38	NE	sunspot	28	Central factory floor area viewed from SW gantry hoist
23/01/2012	~	D105 39	NW	gantry	28	Raised gantry with hoists in SW corner, view west into 33
23/01/2012	F163 1-3	D106 1	S	water	~	Square pond north end of site, gables of buildings 16 & 17
23/01/2012	F163 4-6	D106 2	NW	lagoon	~	Circular lagoon northwest corner of site
23/01/2012	F163 7-9	D106 3	ESE	fence	~	Large circular pits x2 northeast corner of site, former ponds
23/01/2012	F163 10-12	D106 4	NW	pit	~	Large circular pits x2 northeast corner of site, former ponds
23/01/2012	F163 13-15	D106 5	NE	trees	~	Northeast corner of site with view to Retail Park to east
23/01/2012	F165 1-3	D106 6	NW	road	A.R.Shelters	E-w road between air raid shelters at north end of site
23/01/2012	F165 4-6	D106 7	S	gables	17	North elevation and top of concrete air raid shelter platform
23/01/2012	F165 7-9	D106 8	S	roof vents	17	North and west elevations
23/01/2012	F165 10-12	D106 9	SSW	gables x3	16	North elevation

23/01/2012	F165 13-15	D106 10	SSE	concrete	16 & 15	West and north elevations
23/01/2012	~	D106 11a&b	SSE	grass	16	Detail of west elevation
23/01/2012	~	D106 12a&b	SSE	rubble	14	Detail of west elevation
24/01/2012	F167 1-3	D106 13	S	offices	26	Interior southeast corner, Site Offices and Packing/Dispatch area
24/01/2012	F167 4-6	D106 14	NNE	truss	26	North end of Packing/Dispatch, Electrical Store
24/01/2012	F167 7-9	D106 15	SE	drawers	26	Drawing Store at north end of Packing/Dispatch
24/01/2012	~	D106 16	E	shelves	26	Interior of ground floor site office
24/01/2012	~	D106 17	SW	doors	26	Interior of first floor site office, south side of Packing/Dispatch
24/01/2012	F167 10-12	D106 18	N	windows	26	North end of building, Workshop/Maintenance area
24/01/2012	F167 13-15	D106 19	S	partition wall	26	Southern end of building, Workshop/Maintenance area
24/01/2012	F169 1-3	D106 20	SW	posts	26 & 29	Packing/Dispatch area, south side
24/01/2012	F169 4-6	D106 21	NNW	posts	26 & 29	Packing/Dispatch area, north side
24/01/2012	F169 7-9	D106 22	N	corridor	30	Corridor, timber and steel frame and glazed partition
24/01/2012	F169 10-12	D106 23	W	big shelves	30	WASK FLEXGRIP area with large storage shelves
24/01/2012	F169 13-15	D106 24	S	window	30	Corridor, timber and steel frame and doorway to WASK FLEXGRIP
24/01/2012	F171 1-3	D106 25	NNE	truss beams	31	WASK RMF, open factory floor with roof beams for lifting
24/01/2012	F171 4-6	D106 26	S	posts	31	WASK RMF, open factory floor with roof beams for lifting
24/01/2012	F171 7-9	D106 27	SE	trench	32	WASK area, open factory floor with mezzanine in SE corner
24/01/2012	F171 10-12	D106 28	NE	lights	32	Bronze Cells area with Bronze Office on east side
24/01/2012	F171 13-15	D106 29	E	office	32	Office at north end of building
24/01/2012	F173 1-3	D106 30	S	lights	32	East side Bronze cells area, doorway to west and view into 31
24/01/2012	~	D106 31	SSW	desks	32	Bronze Office
24/01/2012	F173 4-6	D106 32	N	partition	25	Southwest side, WASK warehouse, glazed partition on west side
24/01/2012	F173 7-9	D106 33	NE	railing	25	East side, office, exterior cladding and roof replaced
24/01/2012	~	D106 34	E	pipes	25	Machinery in small room on east side
24/01/2012	~	D106 35	N	chairs	25	Office and mess room on east side
24/01/2012	~	D106 36	S	chairs	25	Office and mess room on east side
24/01/2012	F173 10-12	D106 37	S	tall windows	25	Office and mess room on left and south end of building
24/01/2012	F173 13-15	D106 38	NE	post	24	MIV & Large Bronze open factory floor south end
24/01/2012	F175 1-3	D107 1	N	big shelves	24	South end east side, large shelves and steel frame
24/01/2012	F175 4-6	D107 2	W	partition	24	South end of building and south partition wall
24/01/2012	F175 7-9	D107 3	S	windows	24	East side north end, large storage shelves and big windows
24/01/2012	F175 10-12	D107 4	SW	skylights	24	Centre of building at the north end
24/01/2012	F175 3-15	D107 5	W	post	24	At the north end, centre and west side of the building
25/01/2012	F177 1-3	D107 5	W	post	24	At the north end, centre and west side of the building

25/01/2012	F177 4-6	D107 6	S	hanging tarp	24	From northwest corner of 24, south, view of Bronze Office
25/01/2012	~	D107 7	S	windows	32	Bronze Office, north and west elevations, northeast side of 32
25/01/2012	F177 7-9	D107 8	SSW	roof	32	Central area 32 with roof truss, view south into 31
25/01/2012	F177 10-12	D107 9	NNE	buttress	14	West side, Malleable Core Shop, narrow space concrete buttress
25/01/2012	F177 13-15	D107 10	NNE	doorway	14	West side, Malleable Core Shop, narrow space concrete buttress
25/01/2012	F179 1-3	D107 11	NNE	small window	14	West side, north end, narrow space concrete buttress
25/01/2012	~	D107 12	S	buttress	14	West side, narrow space, large buttress, doorway to factory
25/01/2012	F179 4-6	D107 13	NE	roof pipes	14	Large n-s space also showing roof trusses
25/01/2012	F179 7-9	D107 14	N	skylight	14	Large n-s space also showing roof trusses
25/01/2012	F179 10-12	D107 15	NE	gable	14	North end of 14, partition gable and trusses shown
25/01/2012	F179 13-15	D107 16	S	truss	14	Open factory floor with doorways in east wall
25/01/2012	F181 1-3	D107 17	S	machinery	34	South end of Malleable Foundry with mezzanine and machinery
25/01/2012	F181 4-6	D107 18	NE	partition	34	Central open area with upper partition to north end
25/01/2012	~	D107 19	W	lockers	34	Mezzanine changing rooms with large communal sink bases
25/01/2012	F181 7-9	D107 20	N	posts	34	North end of open factory floor with doorway on west side
25/01/2012	F181 10-12	D107 21	SW	machinery	34	South end with 'sand hopper' machinery and mezzanine behind
25/01/2012	F181 13-15	D107 22	S	gable	34	North end with upper partition to south end
25/01/2012	F183 1-3	D107 23	SW	brick wall	7	North elevation of changing room extension NW corner
25/01/2012	F183 4-7	D107 24	WNW	sink	7	Changing room, sink bases, lockers, extension NW corner
25/01/2012	~	D107 25	SE	wall tiles	7	Changing room, communal showers
25/01/2012	~	D107 26	W	urinals	7	Toilets north side changing rooms
25/01/2012	F183 8-10	D107 27	NE	post	35	South end of Old Grey Iron Foundry
25/01/2012	F183 11-13	D107 28	N	puddle	35	North and west side of Old Grey Iron Foundry
25/01/2012	F183 14-15	D107 29	WNW	doorway	35	South end, west side of Old Grey Iron Foundry
25/01/2012	F185 1-3	D107 30	SW	open wall	35	South end of Old Grey Iron Foundry
25/01/2012	F185 4-6	D107 31a&b	NW	skylights	35	North end west side of Old Grey Iron Foundry
25/01/2012	F185 7-9	D107 32	NE	truss	35	North end east side of Old Grey Iron Foundry
26/01/2012	F185 10-12	D107 33	NNE	sign	35	East side location of Central Melt Furnaces, view to north end
26/01/2012	F185 13-15	D107 34	S	oven	35	South end east side oven and location of Melt Furnaces
26/01/2012	~	D107 35	SE	oven	35	South end east side, oven
26/01/2012	~	D108 1	W	passage	30	E-W corridor and step up to 29 1st floor and mezzanine changing room
26/01/2012	~	D108 2	E	shower	30	Showers in mezzanine changing rooms
26/01/2012	~	D108 3	N	sinks	30	Mezzanine changing room with communal sinks and lockers
26/01/2012	~	D108 4	SW	toilets	30	Mezzanine changing rooms, toilet cubicles
26/01/2012	~	D108 5	E	passage	30	E-W corridor from mezzanine and steps to 1st floor 29

26/01/2012	~	D108 6	SE	office	29 1st floor	Entrance corridor and offices at north end of 1st floor Pattern Shop
26/01/2012	~	D108 7	S	offices	29 1st floor	Entrance and offices at north end of 1st Floor Pattern Shop
26/01/2012	~	D108 8	SW	windows	29 1st floor	West side open workshop area of Pattern Shop
26/01/2012	~	D108 9	S	posts	29 1st floor	Central space with mezzanine at south end
26/01/2012	~	D108 10	SE	electric boxes	29 1st floor	Northwest corner and central area, large windows east side
26/01/2012	~	D108 11	S	posts	29 1st floor	West side of open workshop area
26/01/2012	~	D108 12	NE	posts	29 1st floor	West side, north end offices and 2nd floor
26/01/2012	~	D108 13	NNE	air con vents	29 1st floor	South end, central workshop area with air con vents
26/01/2012	~	D108 14	N	posts	29 1st floor	South end, central and east side open workshop area
26/01/2012	~	D108 15	SW	mezzanine	29 1st floor	Mezzanine and small office in southwest corner
26/01/2012	~	D108 16	N	offices	29 1st floor	Offices at north end and enclosed 2nd floor above
26/01/2012	~	D108 17	NE	posts	29 1st floor	View from mezzanine at south end of central open space
26/01/2012	~	D108 18	SE	office	29 1st floor	Office on east side of mezzanine at south end
26/01/2012	~	D108 19	N	office	29 1st floor	Offices in northeast corner, fire damaged
26/01/2012	~	D108 20	SE	doorway	29 2nd floor	Entrance doorway and storage shelves in old changing room
26/01/2012	~	D108 21	S	sinks x4	29 2nd floor	Communal sinks and storage shelves in old changing rooms
26/01/2012	~	D108 22	NNE	toilets	29 2nd floor	Urinal and toilet cubicles north side next to stairs
26/01/2012	~	D108 23	SE	chimney	5 & 26	View from 2nd floor of SE corner of site, Old Bronze Foundry
26/01/2012	~	D108 24	ENE	flat roof	26	View from 2nd floor of east side of site, with building platform
26/01/2012	~	D108 25	NE	flat roof	26	View from 2nd floor of northeast side of site
26/01/2012	~	D108 26	W	shelves	29 2nd floor	Pattern Shop store in old changing room, north end of 29
26/01/2012	F187 1-3	D109 1	N	tanks	15	Water tanks, west side of Old Sludge Farm
26/01/2012	F187 4-6	D109 2	WNW	gables	16	South elevation and passage between buildings
26/01/2012	F187 7-9	D109 3	E	pipes	24	North elevation and passage between buildings
26/01/2012	F187 10-12	D109 4	W	gables	17	South elevation and passage between buildings
26/01/2012	F187 13-15	D109 5	N	wall	17	East elevation south end
26/01/2012	F189 1-3	D109 6	E	road	5	North elevation and area to north with bicycle sheds
26/01/2012	F189 4-6	D109 7	NNW	tanks	~	South elevation of bicycle sheds found to north of 5
26/01/2012	F189 7-9	D109 8	WNW	sheds	~	Bicycle sheds found to north of 5
26/01/2012	F189 10-12	D109 9	SW	racks	~	North side of bicycle sheds to north of Old Bronze Foundry
26/01/2012	F189 13-15	09 10	SSW	chimney	5	North elevation east side and chimney
26/01/2012	~	D109 11	SW	gables	5	West side of north elevation
26/01/2012	~	D109 12	SW	chimney	5	East side of north elevation and east elevation
26/01/2012	~	D109 13	WNW	car park	5	Car park area north of Old Bronze Foundry
26/01/2012	~	D109 14	S	sheds	5	East side of north elevation of bicycle sheds

26/01/2012	~	D109 15	SW	sheds	5	West side of north elevation of bicycle sheds
26/01/2012	~	D109 16	WNW	racks	~	Detail of concrete bicycle racks in two sheds north of 5
26/01/2012	~	D109 17	W	racks	~	Detail of concrete bicycle racks in two sheds north of 5
30/01/2012	F191 1-3	D110 1	SSW	staircase	27 Shelter 1	View down concrete steps to dual chamber Air Raid Shelter
30/01/2012	F191 4-6	D110 2	W	doorway	27 Shelter 1	West chamber viewed through doorway from foot of steps
30/01/2012	F191 7-9	D110 3	W	escape ladder	27 Shelter 1	Escape ladder, west end of west chamber, shelves & archives
30/01/2012	F191 10-12	D110 2	W	doorway	27 Shelter 1	West chamber viewed through doorway from foot of steps
30/01/2012	F191 13-15	D110 4	NE	arched roof	27 Shelter 1	East end of west chamber, entrance and bench scar on walls
30/01/2012	F193 1-3	D110 5	NE	doorway	27 Shelter 1	East end and entrance into west chamber
30/01/2012	F193 4-6	D110 6	ESE	steel door	27 Shelter 1	Entrance into east chamber with steel door
30/01/2012	F193 7-9	D110 7a&b	WSW	shelves	27 Shelter 1	View from east end of east chamber with shelving
30/01/2012	F193 10-12	D110 8	ESE	shelves	27 Shelter 1	View from entrance into east chamber, ladder at east end
30/01/2012	~	D110 9	SSE	stairwell	27 Shelter 1	Detail of two steel entrance doors to east chamber
30/01/2012	F193 13-15	D110 10	S	office	27 Shelter 1	Central office space with hatch to Air Raid Shelter
30/01/2012	F195 1-3	D110 11	SW	entrance	Shelter 2	North of 17, exterior view of entrance to Air Raid Shelter
30/01/2012	F195 4-6	D110 12	WNW	shaft	Shelter 2	Entrance shaft (steps covered) into air raid shelter
30/01/2012	~	D110 13	WNW	signage	Shelter 2	Detail of 'No Smoking' sign in entrance to air raid shelter
30/01/2012	F195 7-9	D110 14	NNE	archive	Shelter 2	Interior of shelter with document archive and collapsed benches
30/01/2012	~	D110 15	SE	doorway	Shelter 2	Detail of concrete entrance doorway and slatted timber door
31/01/2012	F195 10-12	D110 16	NE	ladder	17 Shelter 3	North end of Air Raid Shelter east side
31/01/2012	F195 13-15	D110 17	NW	wall fittings	17 Shelter 3	North end of Air Raid Shelter west side
31/01/2012	F197 1-3	D110 18&19	SSW	box	17 Shelter 3	South end of Air Raid Shelter
31/01/2012	F197 4-6	D110 20	SE	soil	17 Shelter 3	Entrance doorway with soil infill, decayed benches
31/01/2012	~	D110 21	SE	signage	17 Shelter 3	Detail of signage on east wall 'Fire and Rescue Men - this end'
31/01/2012	~	D110 22	NE	signage	17 Shelter 3	Detail of signage on east wall 'First Aid - Blankets'
31/01/2012	F197 7-9	D110 23	N	steps	17	East elevation showing entrance to shelter
31/01/2012	F197 10-12	D110 24&25	NNE	boxes	17 Shelter 4	North end of shelter with escape ladder and storage
31/01/2012	F197 13-15	D110 26	NNE	ladder	17 Shelter 4	North end of shelter with escape ladder and remains of curtain
31/01/2012	F199 1-3	D110 27	SSW	doorway	17 Shelter 4	South end of shelter with doorway and storage boxes
31/01/2012	~	D110 28	SE	concrete	17 Shelter 4	View up entrance shaft (steps covered), shuttered concrete walls
31/01/2012	~	D110 29	E	concrete	17 Shelter 4	View up entrance shaft (steps covered), shuttered concrete walls
31/01/2012	~	D110 30	ESE	concrete	17 Shelter 4	View up entrance shaft (steps covered), shuttered concrete walls
31/01/2012	F199 4-6	D110 31	SW	graffiti	17	East elevation showing entrance to Air Raid Shelter 4
01/02/2012	F199 7-9	D110 32	N	shelves	27	East side of Admin Building storage area
01/02/2012	F199 10-12	D110 33	S	office	27	Typical office at south end of building

01/02/2012	~	D110 34	SSW	corridor	27	N-S corridor between original offices
01/02/2012	F199 13-15	D110 35	SSW	corridor	27	N-S corridor between original offices
01/02/2012	F201 1-3	D111 1	S	glass partition	27	Office area on west side with glazed partition
01/02/2012	F201 4-6	D111 2	NE	post on left	27	Central open plan office area and hatch to air raid shelter
01/02/2012	F201 7-9	D111 3	NW	small offices	27	Central open area, air raid shelter hatch, offices on w. side
01/02/2012	F201 10-12	D111 4	SW	posts	27	Central open office area, view to store on north side
01/02/2012	F201 13-15	D111 5	E	shelves	27	Maintenance store south side of building
01/02/2012	F203 2-4	D111 6	N	doorway	27	Offices and suspended ceiling east side
01/02/2012	F203 5-7	D111 7	S	desks	27	Offices south side with original gazed partitions
02/02/2012	F203 8-10	D111 8	SE	rubbish	27 1st floor	1st floor office at north end
02/02/2012	F203 11-13	D111 9	WSW	desks	27 1st floor	1st floor office at north end
02/02/2012	~	D111 10	WSW	desks	27 1st floor	Mezzanine office north end and exposed roof structure
02/02/2012	F205 1-3	D111 11	E	window	27 1st floor	North end, 1st floor office
02/02/2012	F205 4-6	D111 12	SSE	drawing table	27 1st floor	North end east side 1st floor open plan office
02/02/2012	F205 7-9	D111 13	SSW	truss	27 1st floor	South end of 1st floor office west side
02/02/2012	F205 10-12	D111 14	SSE	drawing table	27 1st floor	Office in southeast corner of 1st floor office
02/02/2012	F205 13-15	D111 15	NW	windows	27 1st floor	Small office and skylight 1st floor central space next to stairs
02/02/2012	F207 1-3	D111 16	SW	lockers	28	Ladies changing room and skylight
02/02/2012	F207 4-6	D111 17a&b	SW	skylight	28	Ladies toilet cubicles and sinks
02/02/2012	~	D111 18	E	toilets	28	Ladies toilet cubicles on east side
02/02/2012	F207 7-9	D111 19	NE	cubicles	28	Ladies toilet and skylight
02/02/2012	F07 10-12	D111 20	NE	lockers	28	Ladies changing room
02/02/2012	F207 13-15	D111 21	SSW	lockers	28	Ladies changing room and wire lockers
02/02/2012	F209 1-3	D111 22	N	truss	33	South end east side of Malleable Foundry
02/02/2012	F209 4-6	D111 23	NE	wall	33	Southeast corner and doorway to east
02/02/2012	F209 7-9	D111 24	NNE	post	33	South end west side with doorway to west
02/02/2012	F209 10-12	D111 25	NNE	roof	33	Central area east side open factory floor
02/02/2012	F209 13-15	D111 26	NW	posts	33	Central area open factory floor
02/02/2012	F211 1-3	D111 27	NNE	posts	33	Central area with floor recess for machinery
02/02/2012	F211 4-6	D111 28	NNE	trench	33	Central area west side with floor recesses for machinery
02/02/2012	F211 7-10	D111 29	NW	machinery	33	Central area west side , machinery
02/02/2012	F211 11-15	D111 30	SSE	wall	33	Southeast corner and doors to east
02/02/2012	~	D111 31	NNE	water	33	Machinery on west side central area above hole in ground

Building Identification Key

1	Main Administration Office	18	Old Crane Industrial
2	Gate House	19	Test Room
3	Training Centre	20	Skip Storage Area
4	Black Hut (pre-fab)	21	Power House
5	Old Bronze Foundry	22	Laboratory
6	IT Offices (formerly canteen)	23	Surgery and Fire Station
7	Union Machine and Assembly	24	Bronze Cells/MIV and Large Bronze
8	Garage	25	WAGK Warehouse
9	Weighbridge	26	Maintenance
10	Works Pavilion	27	Offices
11	Ex Piddling	28	Rough Stores/Large MI Cell
12	Shotblast	29	Packing/Dispatch
13	Electric Melt	30	WASK Flexgrip
14	Malleable Core Shop	31	WasK RMF
15	Old Sludge Farm	32	WASK
16	Old Grey Iron Test and Paint	33	Shotblast Fettling/Malleable Foundry
17	Old MIV	34	WASK Shotblast and Shell Coreshop
		35	Old Grey Iron Foundry

APPENDIX 2: OASIS FORM

OASIS ID: preconst1-121122

Project details

Project name	Building Recording at Crane's Foundry, Ipswich
Short description of the project	Pre-Construct Archaeology Limited was commissioned by CgMs Consulting on behalf of AquiGen (Nacton) LLP to undertake building recording at the former Crane's Foundry, Nacton Road, Ipswich, centred on OS NGR TM 19712 42169. The work was required by the Local Planning Authority as a condition of planning permission in advance of demolition of all of the buildings and the redevelopment of the land. The building recording was carried out broadly in accordance with that defined by English Heritage's Level 2. The former Crane's Foundry (Nacton Works) manufactured pipe fittings and allied products from the mid-1920s until its closure in 2008. The first buildings were erected in 1921 and in 1927 the works were extended. The works were further enlarged in the early 1930s, when the company started manufacturing radiators, boilers and valves. During the Second World War the works produced large quantities of materials for the war effort, including parts for trucks, tanks, machine guns and munitions. A number of air raid shelters were built on the site to protect the workforce from air raids. After the end of the war the works continued to expand, with substantial new units built on the site in the 1940s and 1950s. During the 1970s the works were reorganised and redundant units were demolished in the 1980s and 1990s.
Project dates	Start: 12-01-2012 End: 15-03-2012
Previous/future work	Yes / Yes
Any associated project reference codes	IPS 662 - Sitecode
Any associated project reference codes	K2698 - Contracting Unit No.
Type of project	Building Recording
Site status	None
Current Land use	Industry and Commerce 1 - Industrial
Monument type	FOUNDRY Modern
Significant Finds	NONE None
Methods & techniques	'Measured Survey','Photographic Survey','Survey/Recording Of Fabric/Structure'
Prompt	Planning condition

Project location

Country	England
Site location	SUFFOLK IPSWICH IPSWICH Crane’s Foundry, Nacton Road, Ipswich, Suffolk

Postcode	IP3 9HQ
Study area	17.68 Hectares
Site coordinates	TM 19712 42169 52.0337765301 1.203576309220 52 02 01 N 001 12 12 E Point

Project creators

Name of Organisation	Pre-Construct Archaeology Limited
Project brief originator	Suffolk County Council's Archaeological Officer
Project design originator	Charlotte Matthews
Project director/manager	Charlotte Matthews
Project supervisor	Malcolm Gould
Type of sponsor/funding body	Developer
Name of sponsor/funding body	AquiGen (Nacton) LLP

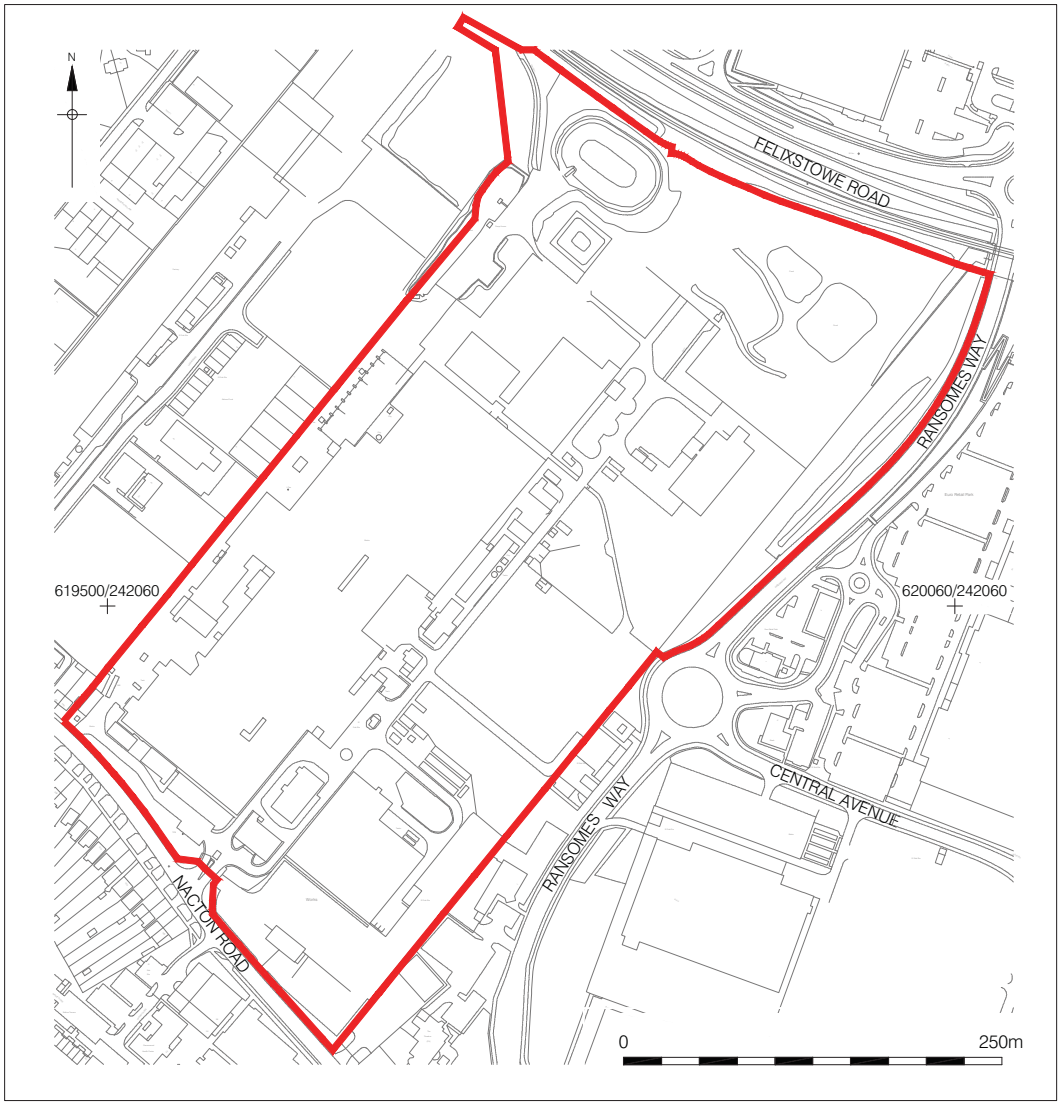
Project archives

Physical Archive Exists?	No
Digital Archive recipient	Local museum
Digital Archive ID	IPS 662
Digital Contents	'Survey'
Digital Media available	'Images raster / digital photography','Survey','Text'
Paper Archive recipient	Local Museum
Paper Archive ID	IPS 662
Paper Contents	'Survey'
Paper Media available	'Plan','Report','Survey '

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Historic Building Recording at Crane's Foundry, Nacton Road, Ipswich, Suffolk. IP3 9HQ
Author(s)/Editor(s)	Thompson, G. and Gould, M.
Other bibliographic details	PCA Report Number: R11180
Date	2012
Issuer or publisher	Pre-Construct Archaeology Limited

Place of issue or publication	London
Description	A4 document
Entered by	Charlotte Matthews (cmatthews@pre-construct.com)
Entered on	16 March 2012



09/03/12 JS

Figure 1
Site Location
1:100,000 and 1:5,000 at A4

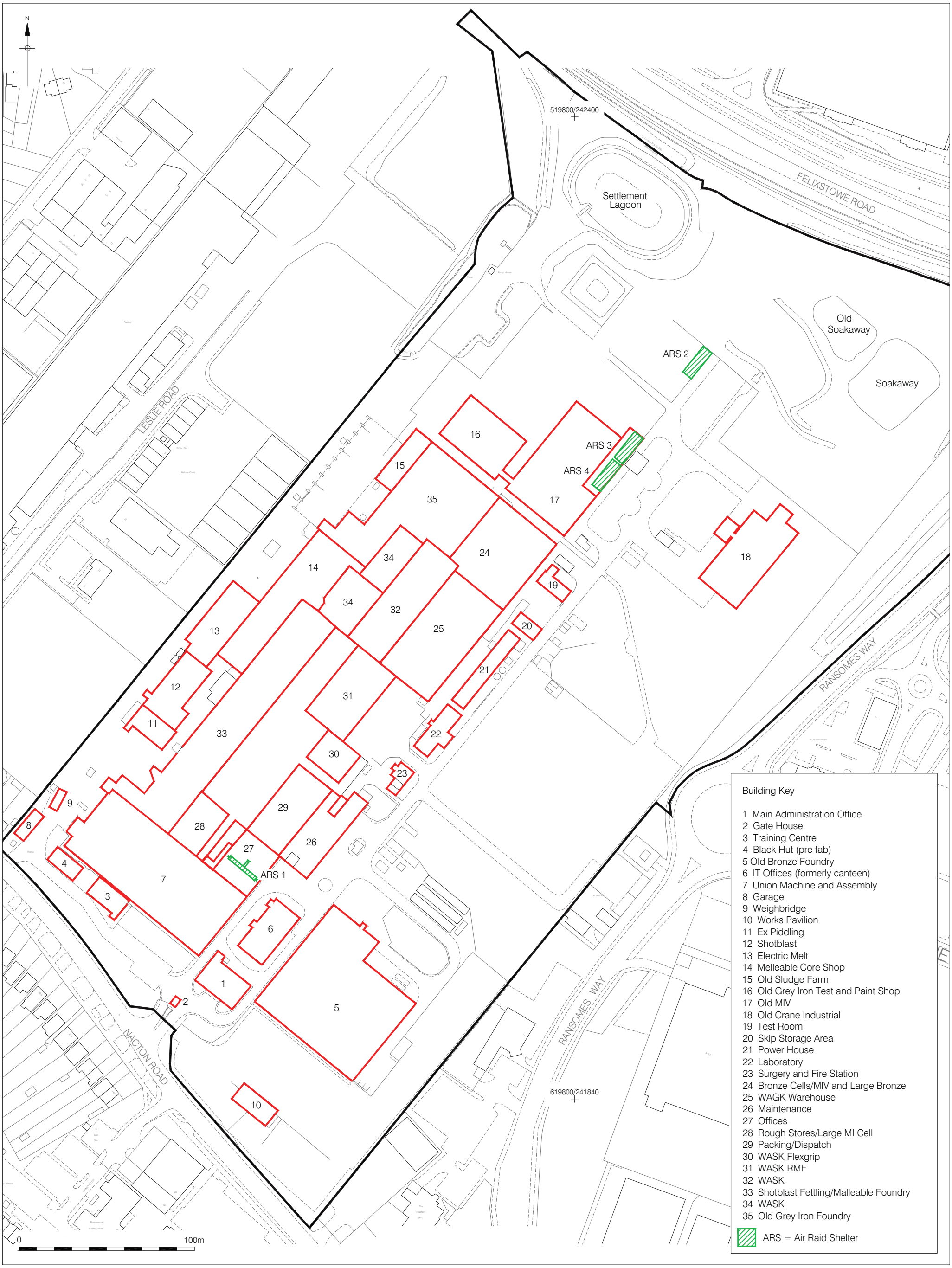


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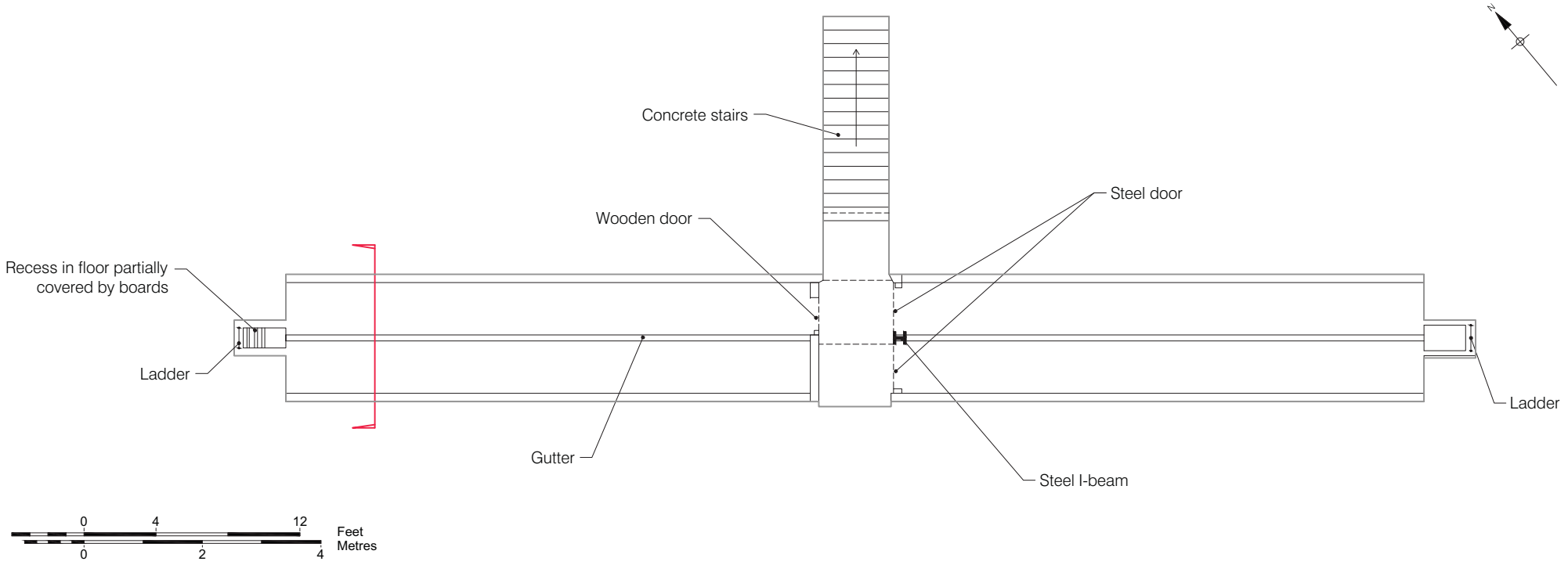
Figure 2
Building and Air Raid Shelter Location
1:2,000 at A3



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South North

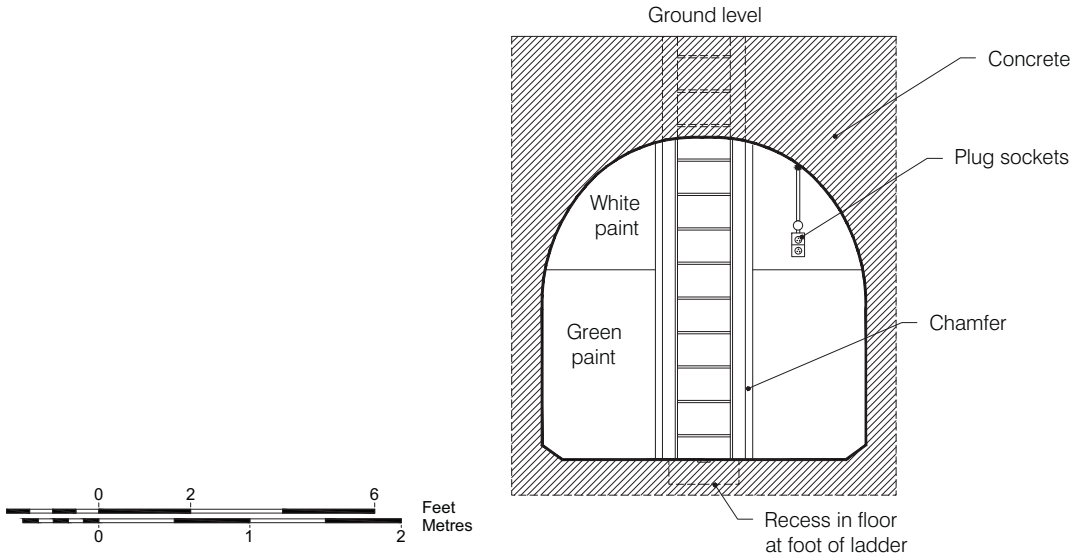

Figure 3
Plan and Section of Air Raid Shelter 1, Building 27
Plan 1:100, Section 1:50 at A4

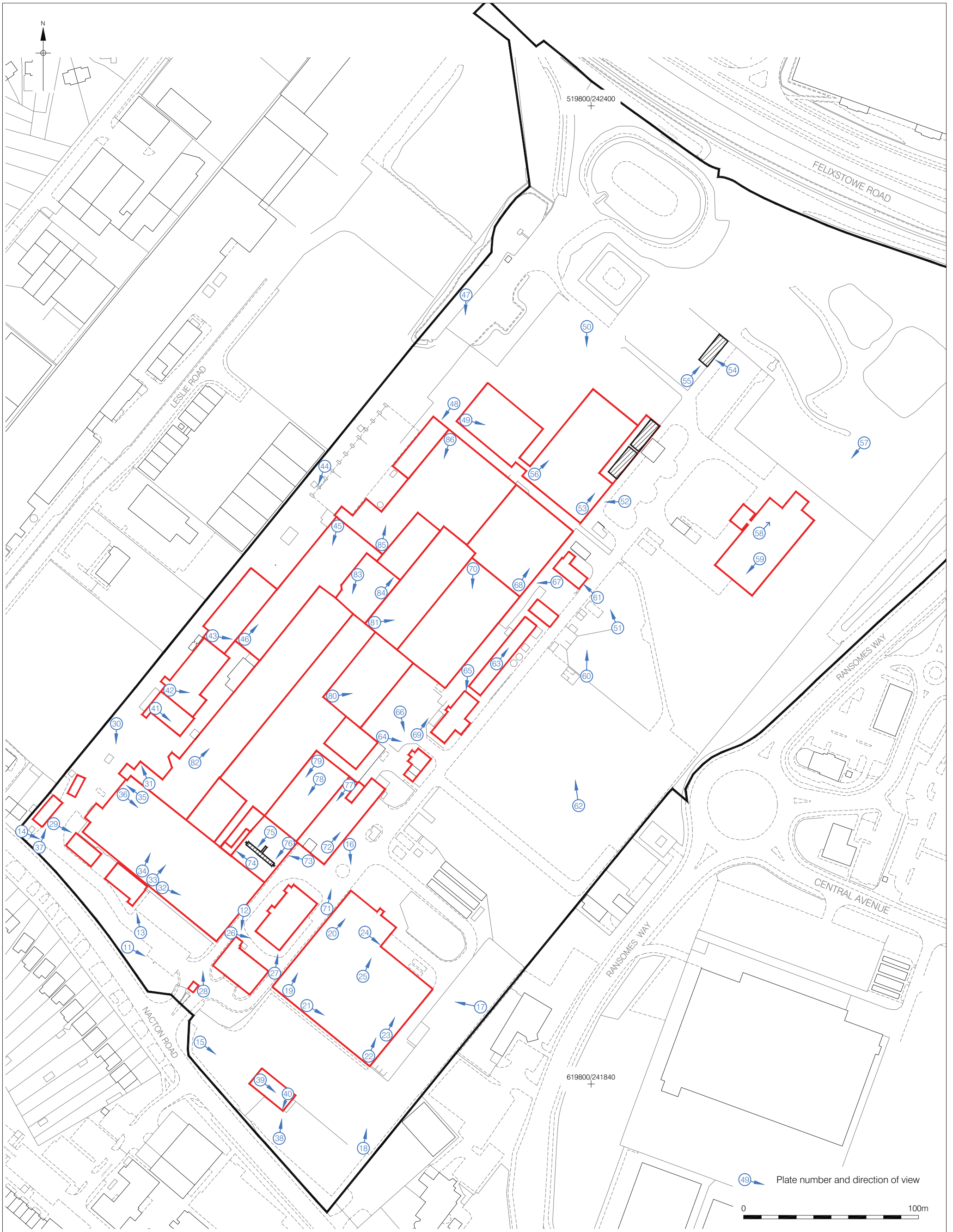

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Figure 4
Plate Location Plan
1:2,000 at A3

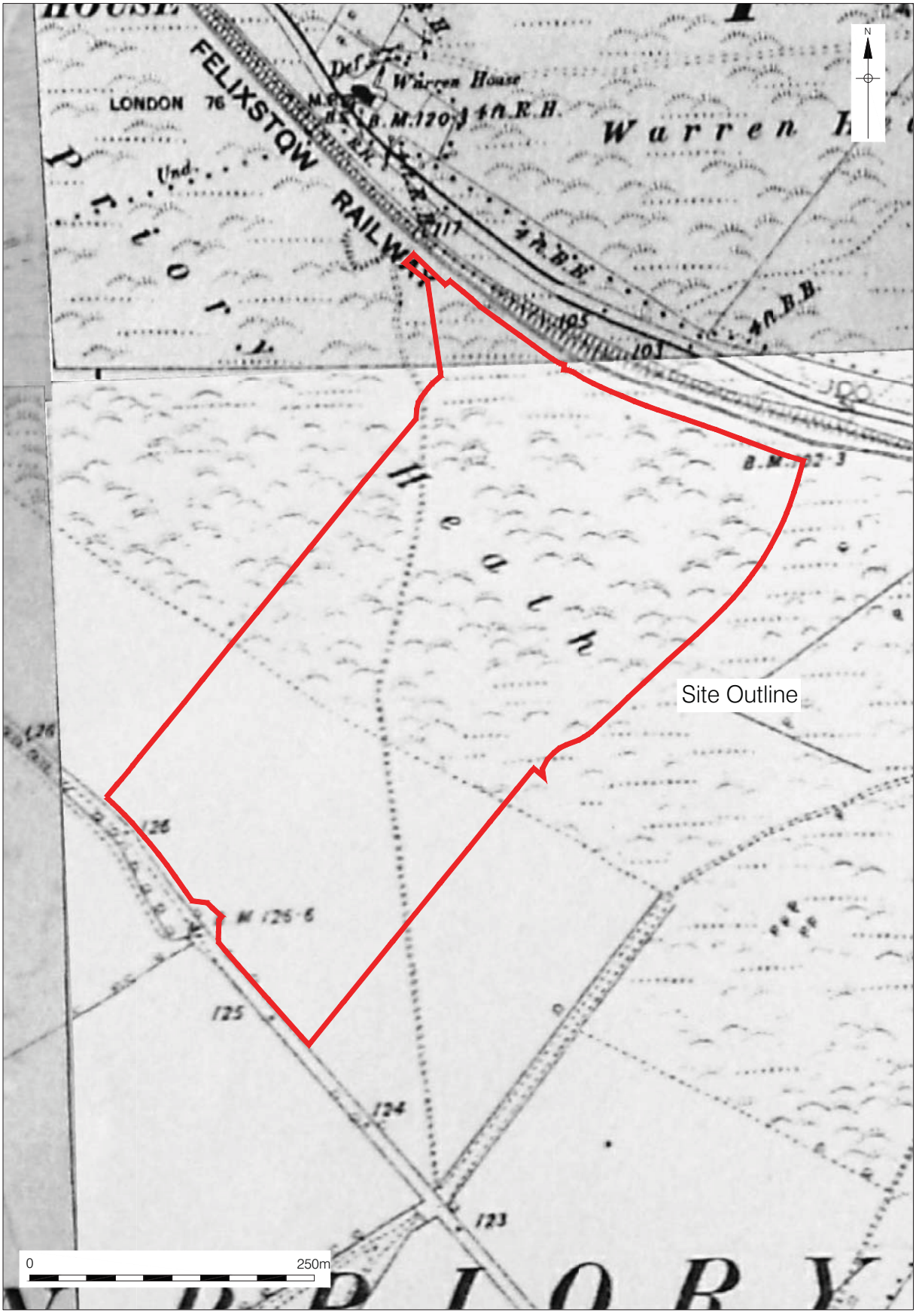

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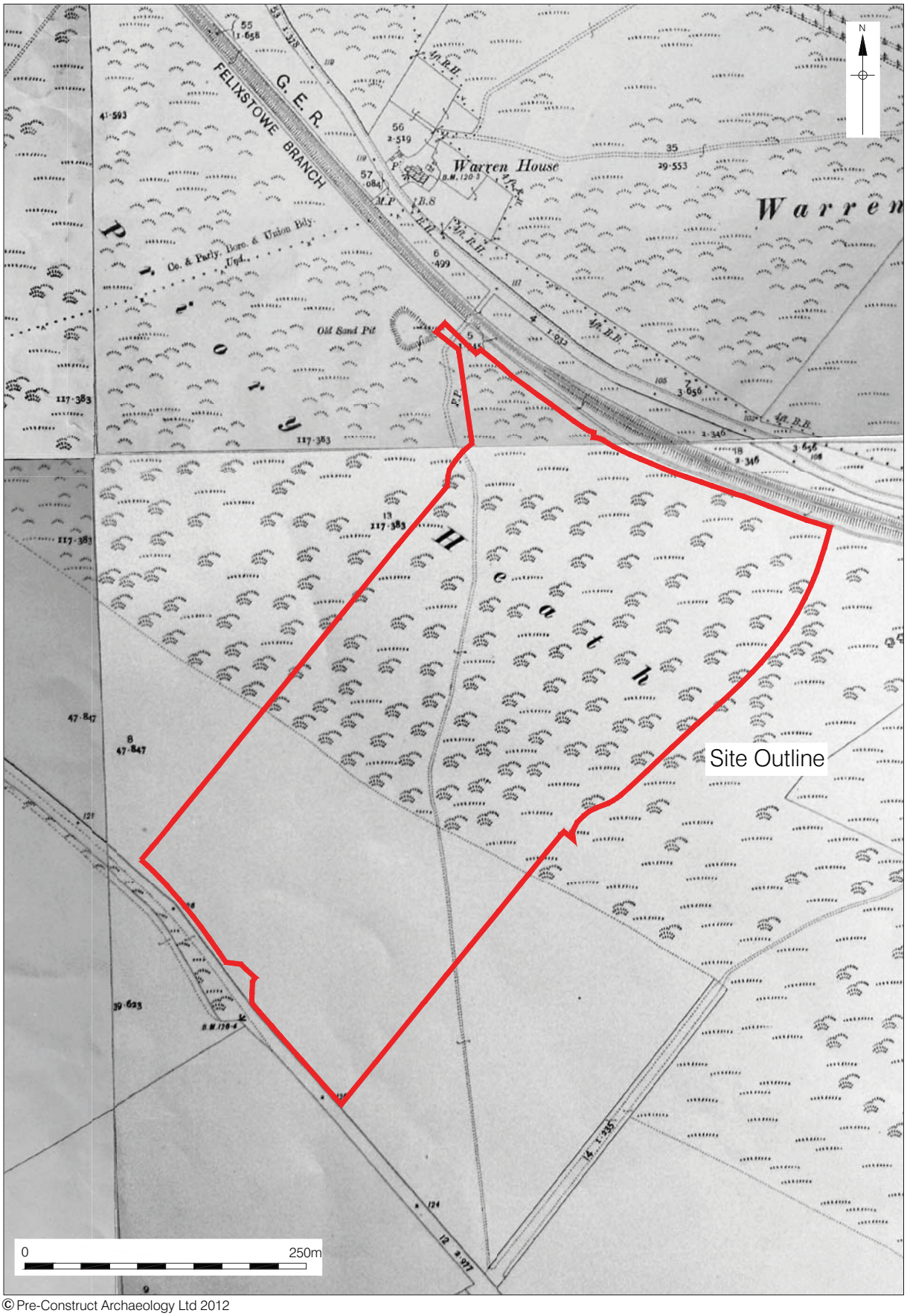
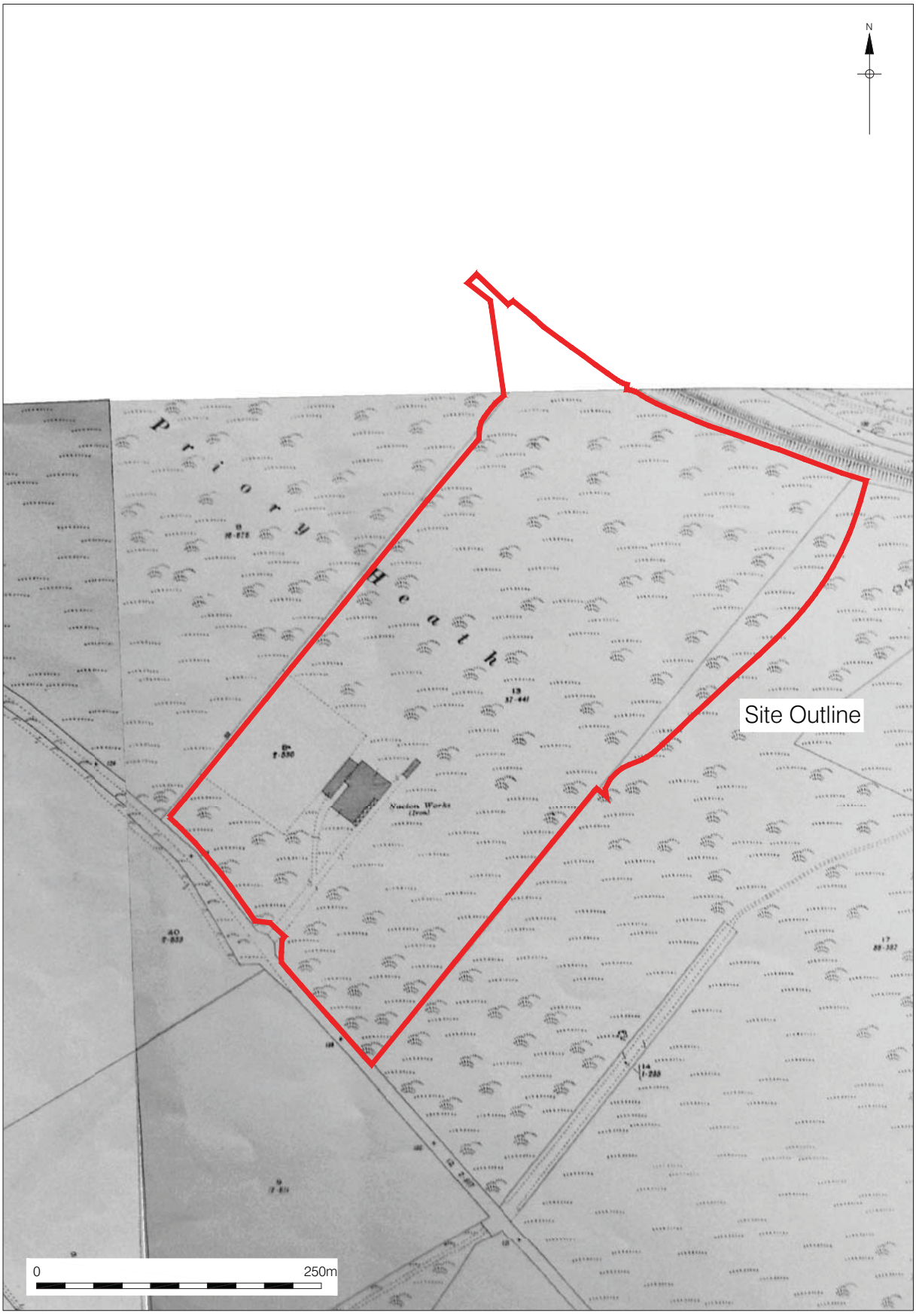
Figure 5
First Edition Ordnance Survey, 1880
1:5,000 at A4



09/03/12 JS

Figure 6
Second Edition Ordnance Survey, 1904/5
1:5,000 at A4



09/03/12 JS

Figure 7
Ordnance Survey 25" - 1 mile, 1926
1:5,000 at A4

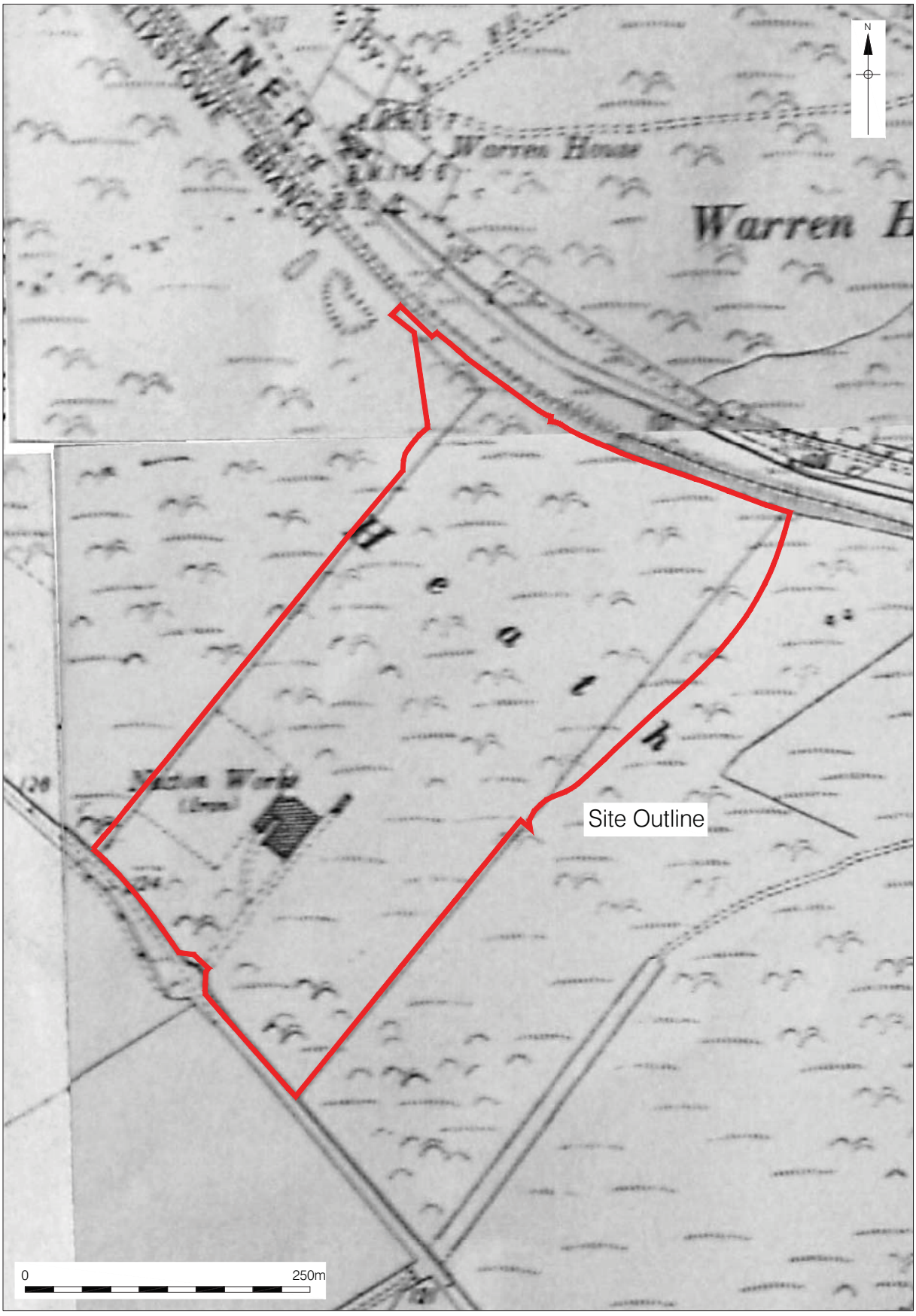


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Figure 8
Third Edition Ordnance Survey, 1927/8
1:5,000 at A4

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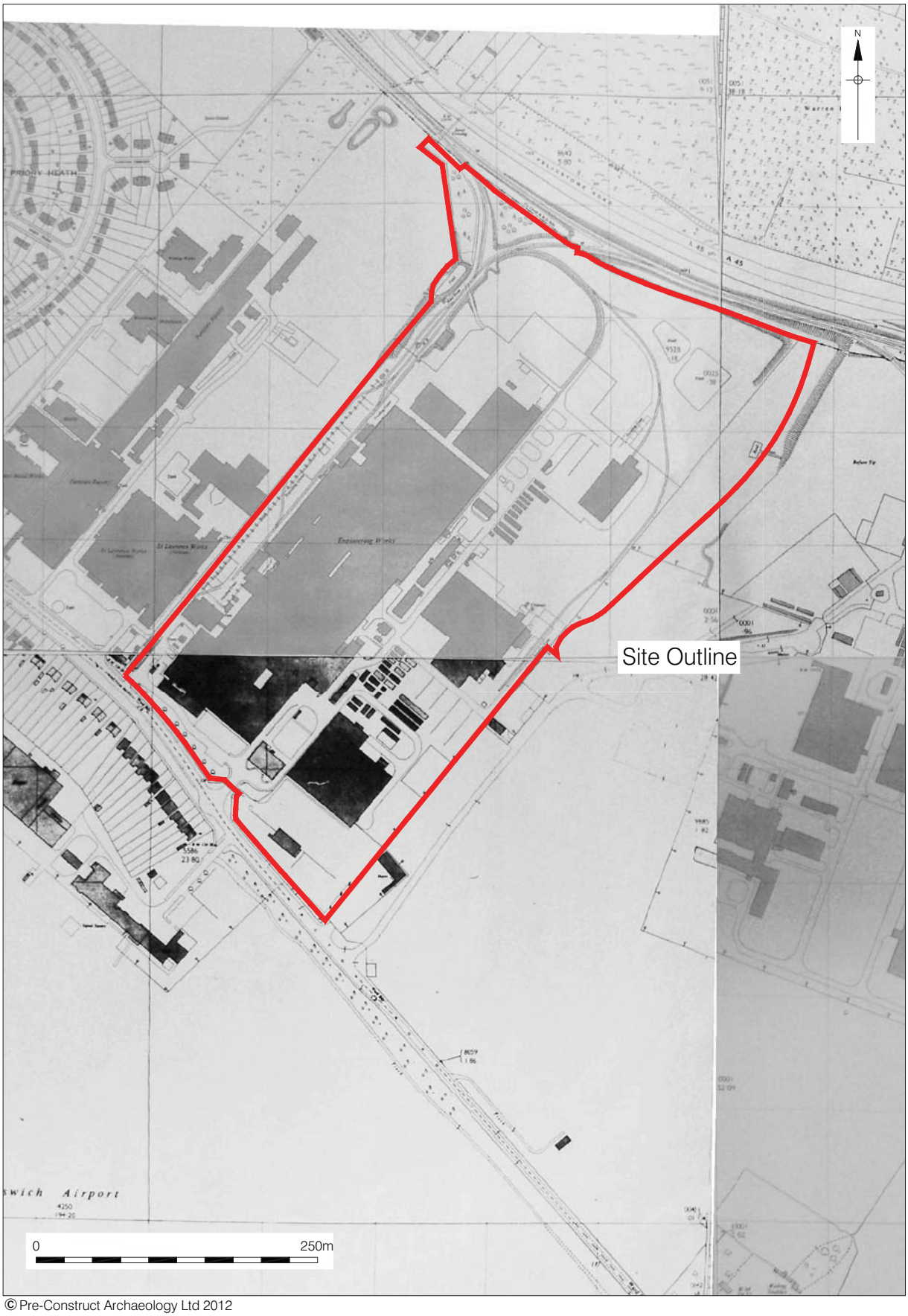
Figure 9
Provisional Edition Ordnance Survey, 1938
1:5,000 at A4

09/03/12 JS

Figure 10
Ordnance Survey, 1939
1:4,000 at A4

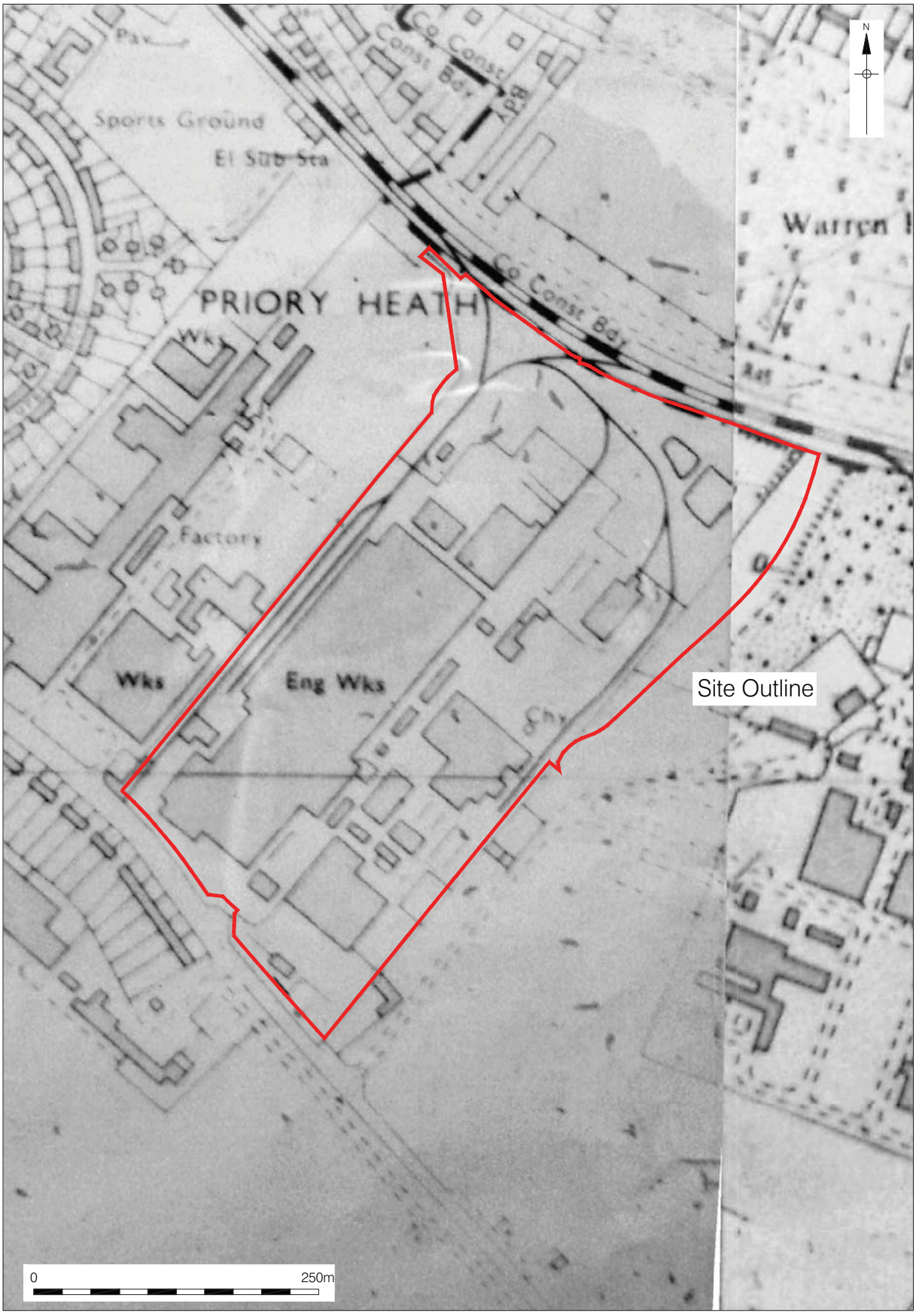
09/03/12 JS

Figure 11
Ordnance Survey, 1958
1:5,000 at A4



09/03/12 JS

Figure 12
Ordnance Survey 1:2500, 1968/9
1:5,000 at A4



06/03/12 JS

Figure 13
Ordnance Survey, 1971/3
1:5,000 at A4

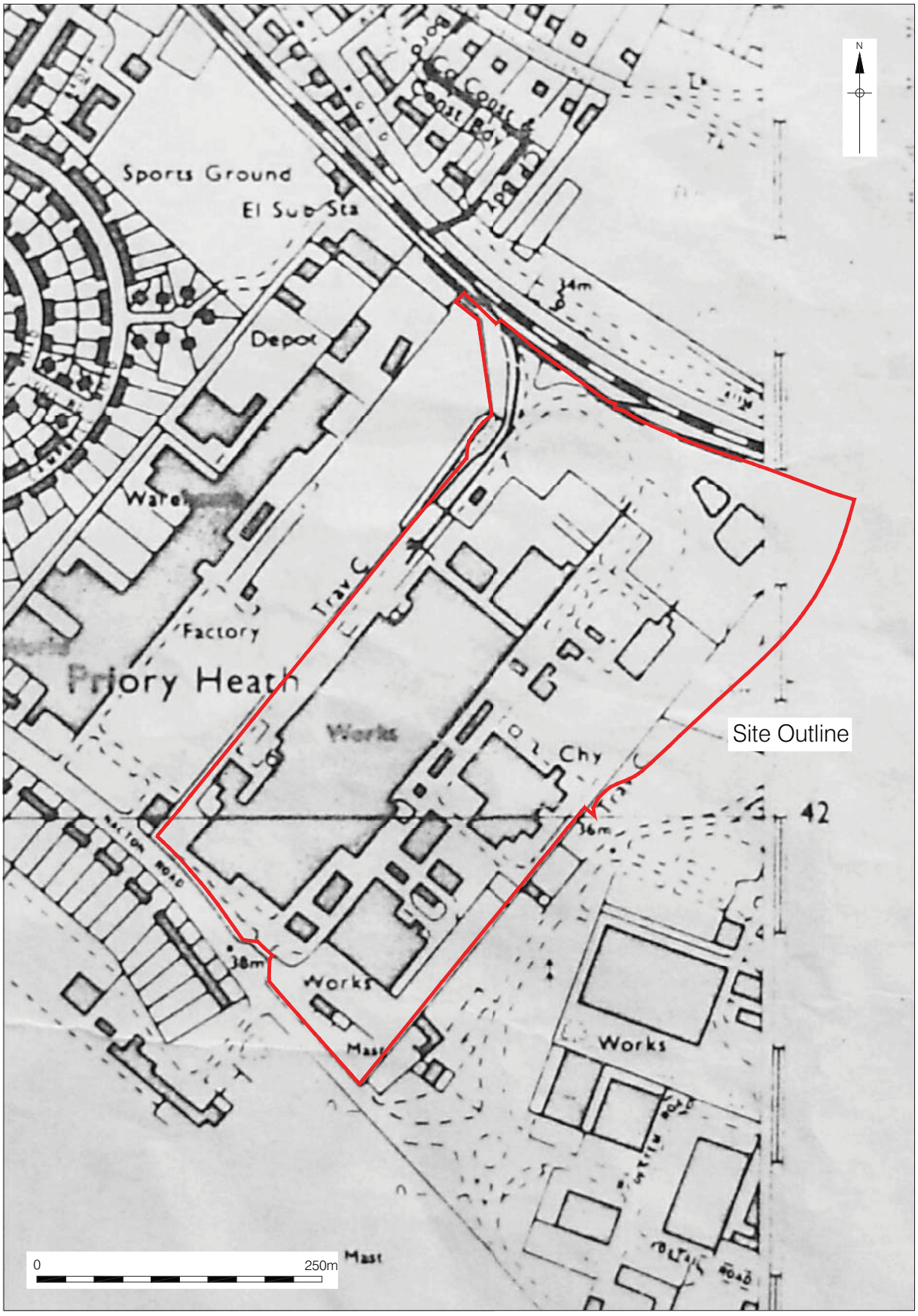


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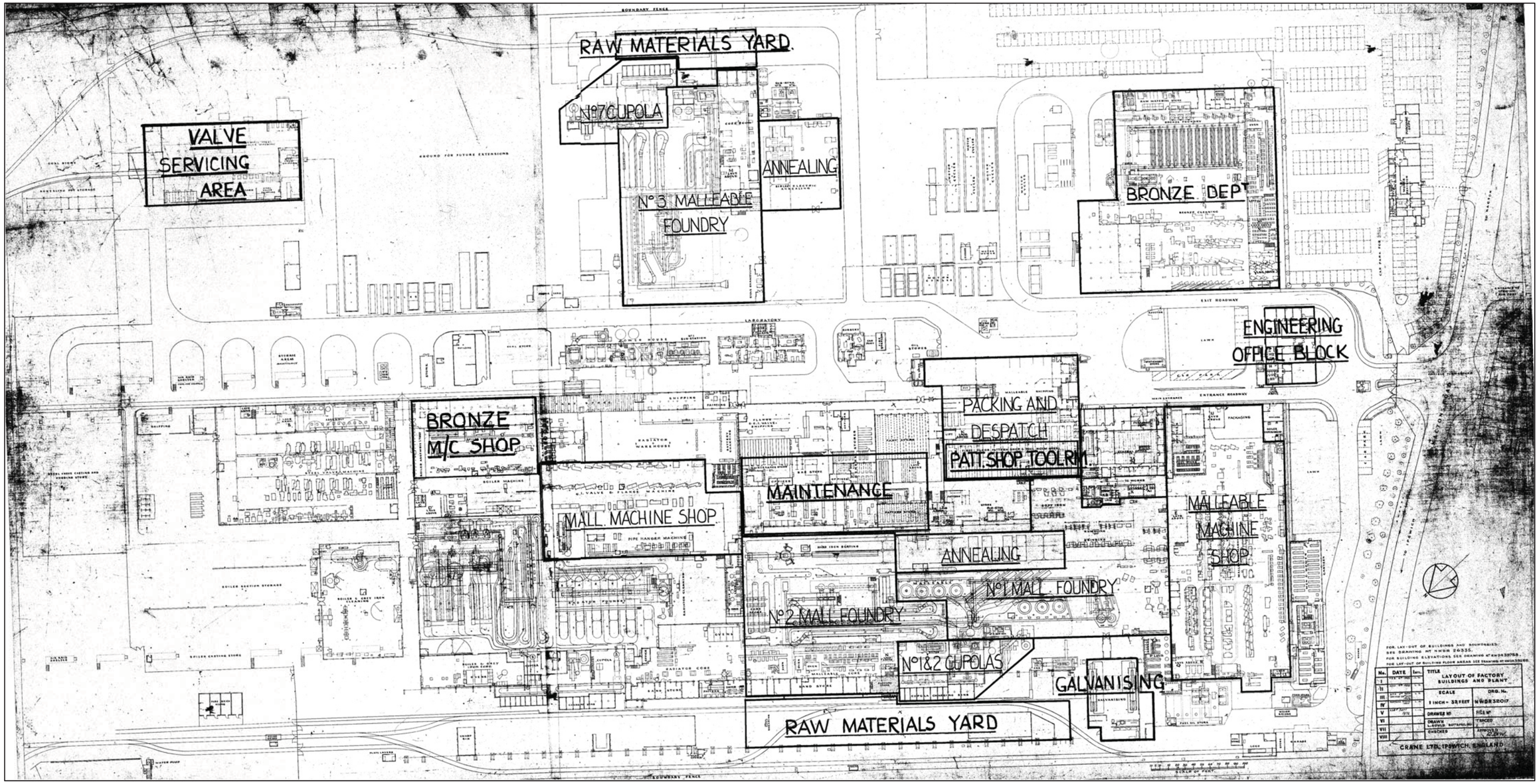
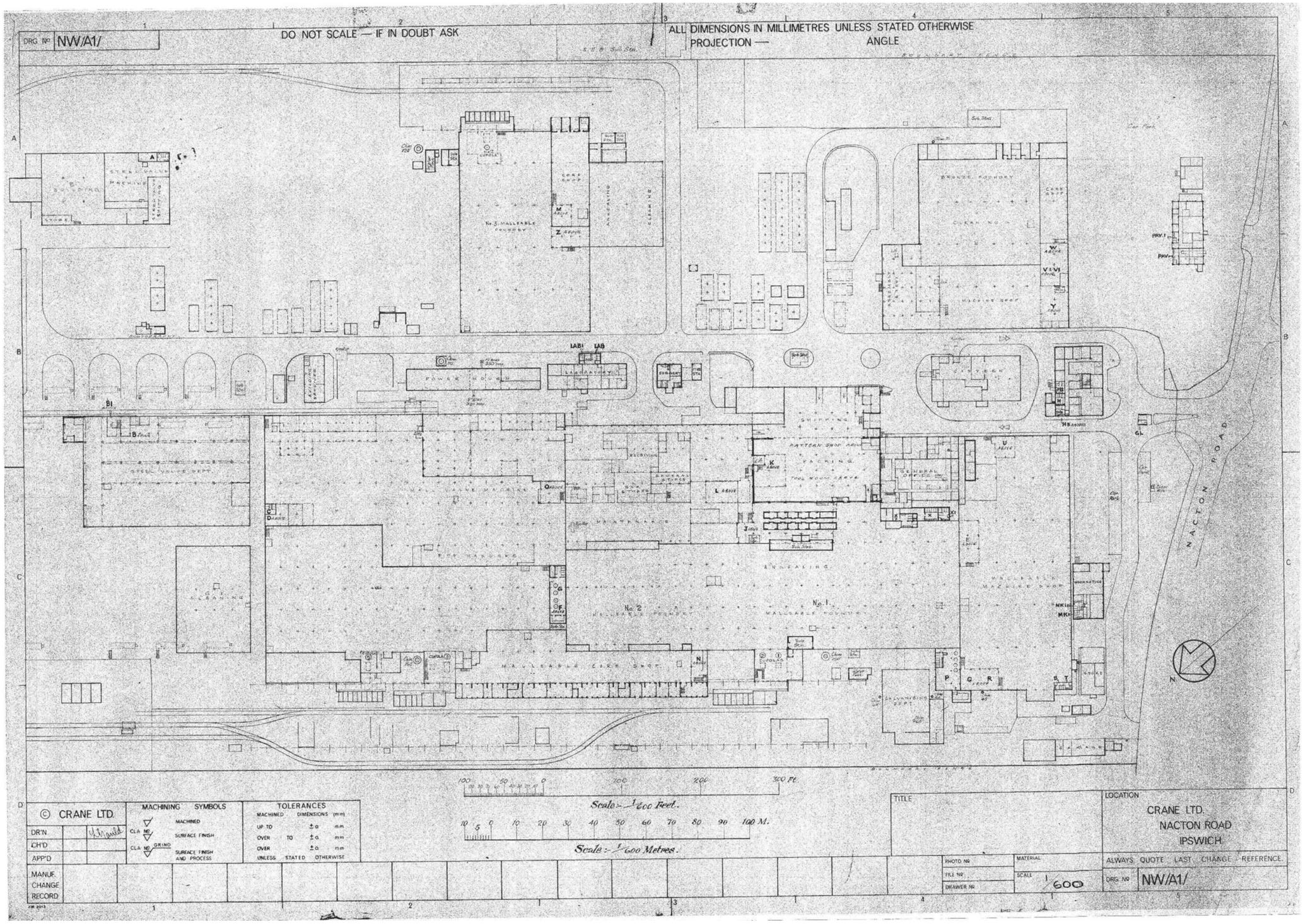
Figure 14
Ordnance Survey, 1986
1:5,000 at A4



09/03/12 JS

Figure 15
Crane Ltd Nacton Works, 1951-1972
Not to Scale



09/03/12 JS

Figure 16
Crane Ltd Nacton Works, c.1974- c.1979
Not to Scale

PLATES

Plate 1. Aerial view of the Crane's Foundry site looking north, *c*.2005 when still in operation.

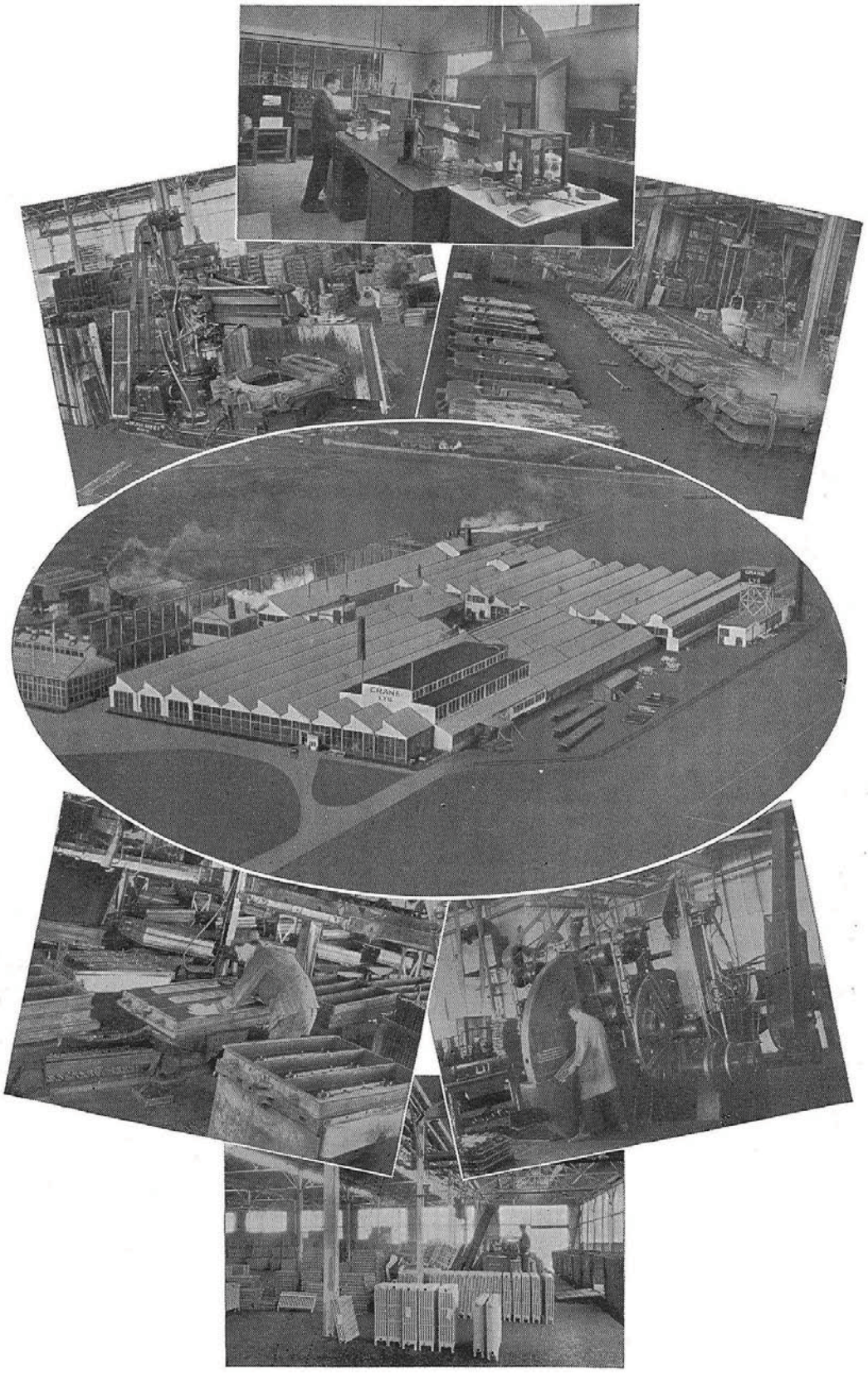


Plate 2. Aerial view of Crane's site and workshops, published in '*Crane Radiators, Boilers and Radiator Accessories Catalogue No.33',* July 1938.

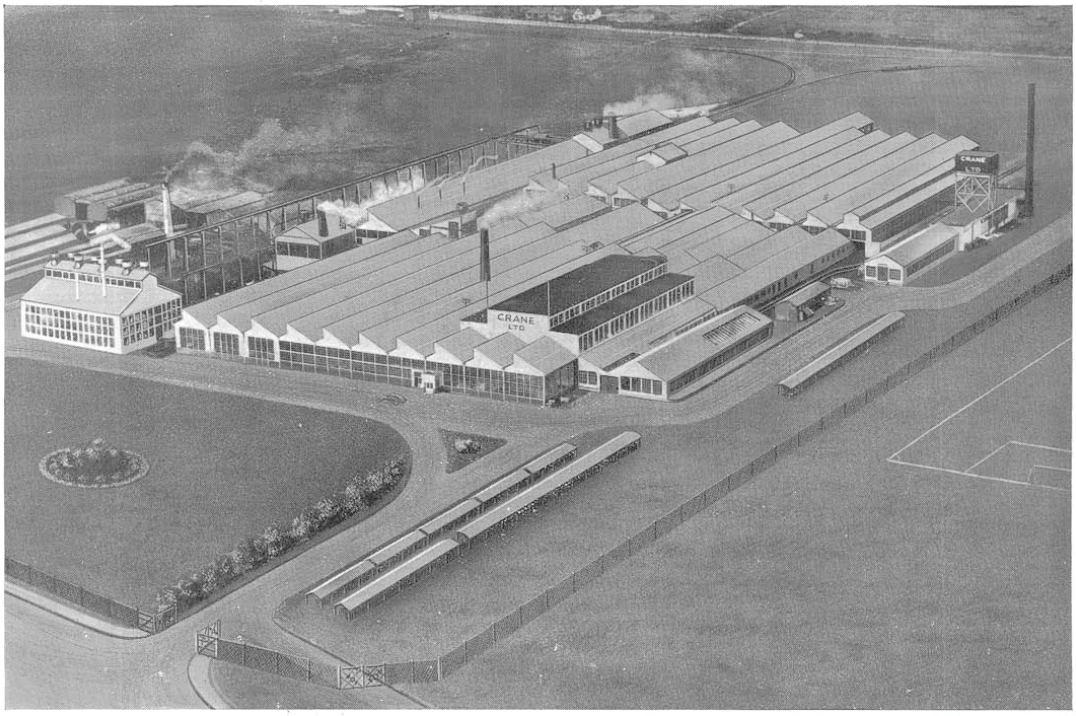


Plate 3. Aerial view of Crane's site, published in '*Foundry Trade Journal'* February 1938, looking north. Since the previous image was produced, the factory has been extended north and two new buildings erected along its east side.

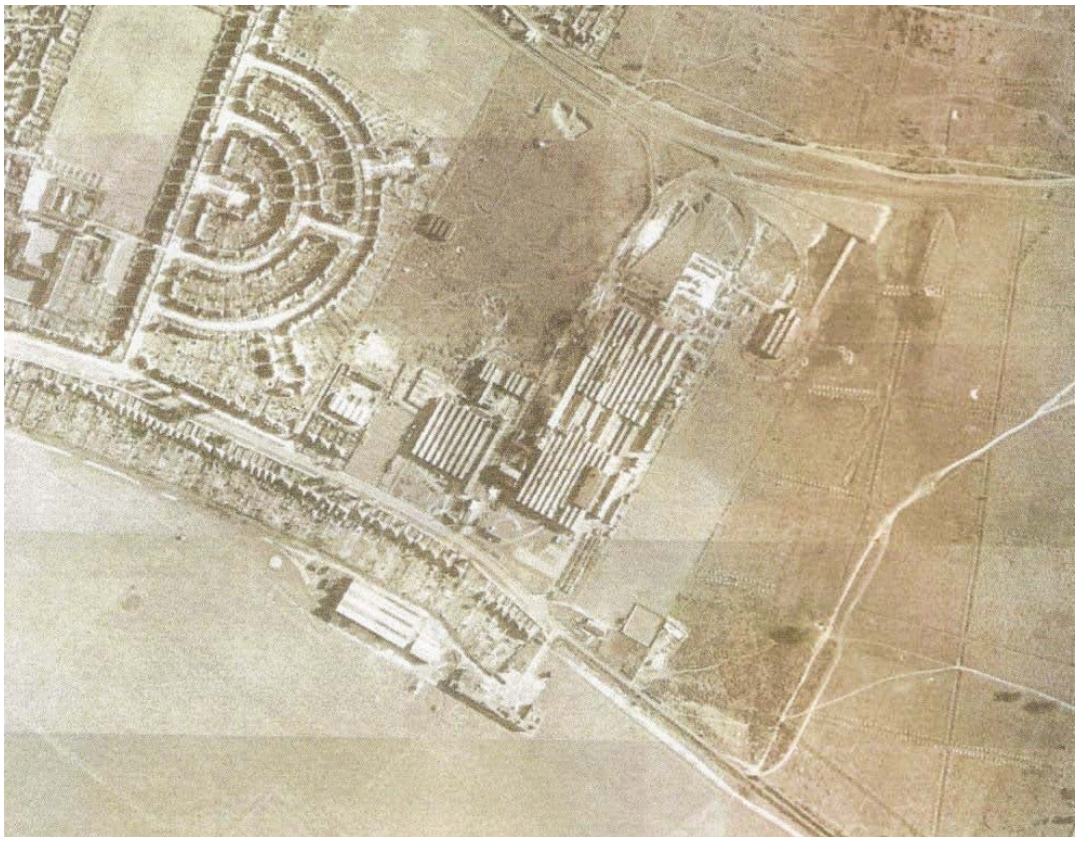


Plate 4. Aerial photograph dated August 1946.

Plate 5. Aerial photograph dated September 1947.

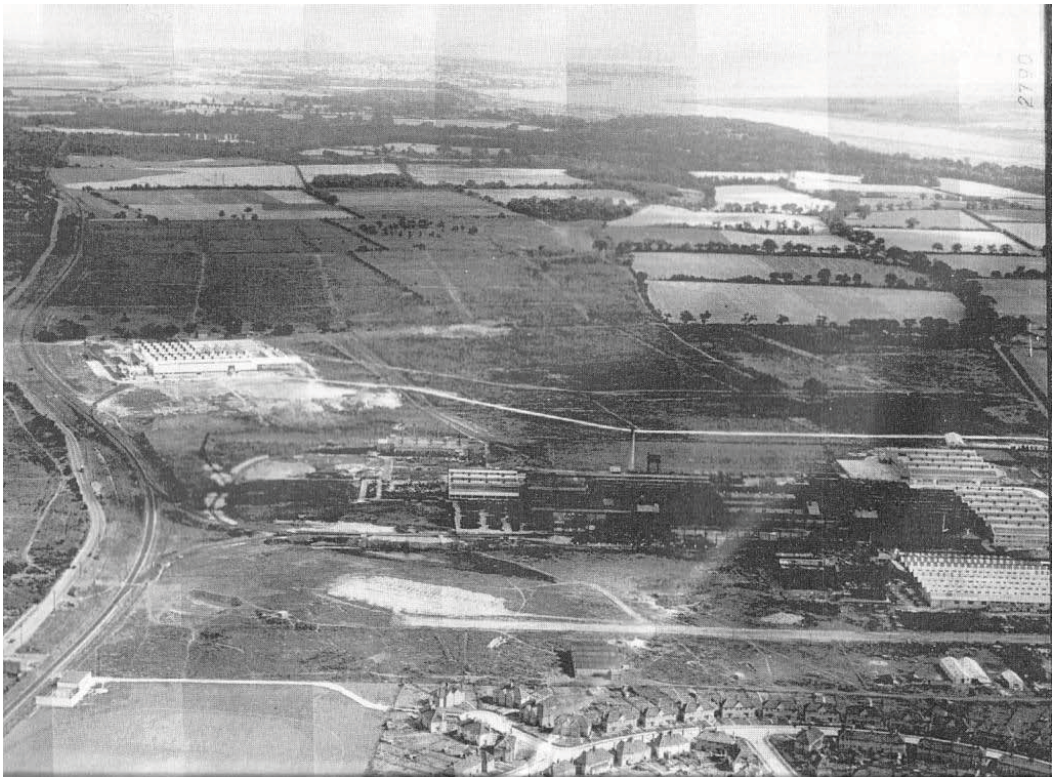


Plate 6. Aerial photograph dated August 1948.

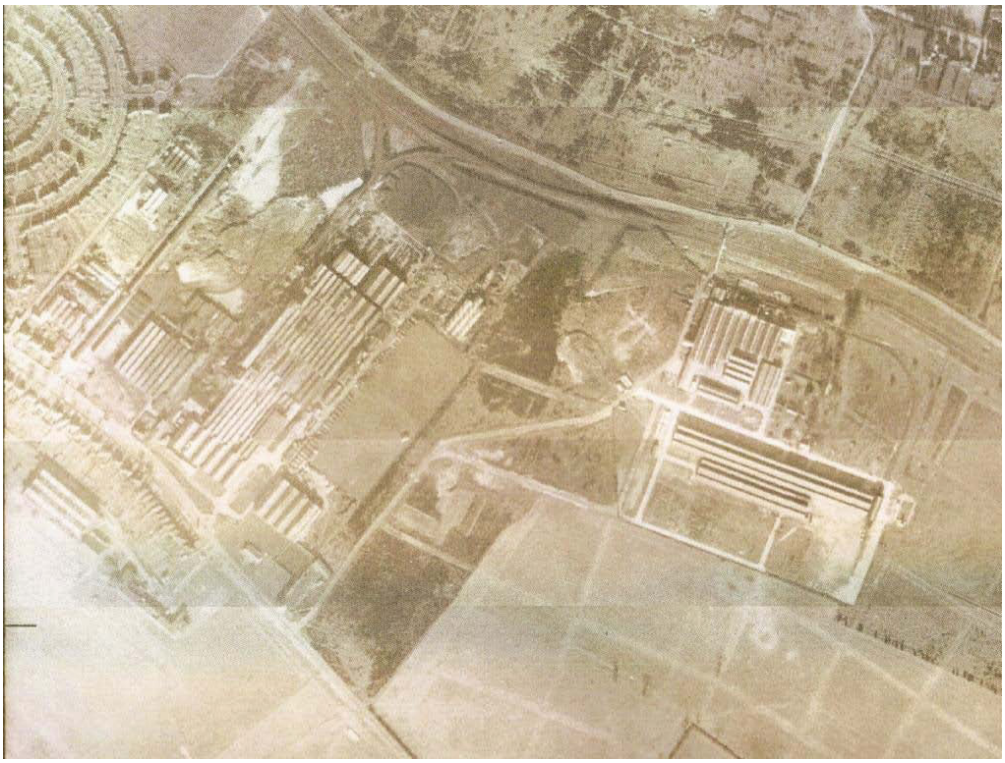


Plate 7. Aerial photograph dated February 1955.

Plate 8. Aerial photograph dated October 1962.

Plate 9. Aerial photograph dated October 1985.

Plate 10. Aerial photograph dated June 1992.

Plate 11. South and west elevations of Main Admin Building (1) with main site entrance and Security Guards hut seen on the right (2).

Plate 12. North and west elevations of Main Admin Building (1) with Security Guards hut (2) seen on the right.

Plate 13. South elevation and east gable of Training Centre (3).

Plate 14. South elevation and west gable of Black Hut (4) with south gables of Union Machine and Assembly Building (7) beyond and on the right trees and boundary fence along Nacton Road.

Plate 15. South and west elevations of Old Bronze Foundry (5).

Plate 16. North gables and west elevation of Old Bronze Foundry (5).

Plate 17. East elevation and north gables of Old Bronze Foundry (5).

Plate 18. South and east elevations of Old Bronze Foundry (5) with employee car park in the foreground.

Plate 19. West side of Old Bronze Foundry (5) looking north, with mezzanine open plan office at the north end.

Plate 20. Open plan mezzanine office space in northwest corner of Old Bronze Foundry (5).

Plate 21. Southeast corner of Old Bronze Foundry (5) with oil fired oven.

Plate 22. Oil fired oven in large space at south end of eastern half of Old Bronze Foundry (5).

Plate 23. Eastern half of Old Bronze Foundry (5) looking northwest.

Plate 24. North end of eastern side of the Old Bronze Foundry (5).

Plate 25. Detail view sand treatment machinery found at the north end of the eastern half of the Old Bronze Foundry (5).

Plate 26. West and south elevations of I.T. Offices (6), formerly canteen buildings.

Plate 27. South and east elevations of I.T. Offices (6), formerly canteen buildings.

Plate 28. South and east elevations of Union Machine and Assembly Building (7), looking north.

Plate 29. West elevation of Union Machine and Assembly Building (7).

Plate 30. West and north elevations of Union Machine and Assembly Building (7).

Plate 31. Changing Room built against northwest corner of Union Machine and Assembly Building (7) seen in previous photo.

Plate 32. East side of the interior of the Union Machine and Assembly Building (7).

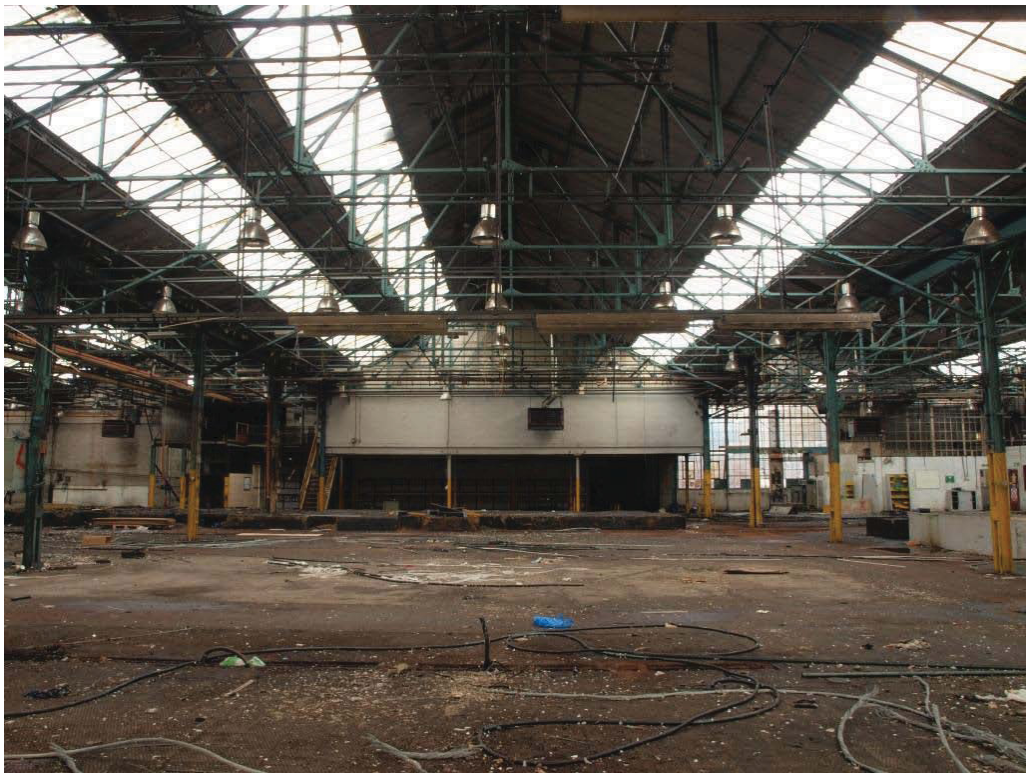


Plate 33. North side of the third bay from the east showing mezzanine (Building 7).

Plate 34. West side of the interior of the Union Machine and Assembly Building (7).

Plate 35. Mezzanine changing room in northwest corner of Building 7.

Plate 36. View of raised machine bases in the Union Machine and Assembly Building (7).

Plate 37. Garage (8) in the southwest corner of the site with the Weighbridge (9) seen on the right.

Plate 38. South elevation of Works Pavilion (10).

Plate 39. Interior corridor of Works Pavilion (10) looking east.

Plate 40. Large interior space at the east end of the Works Pavilion, showing the timber roof truss construction with metal tie rods for additional strength.

Plate 41. Interior of Ex Piddling Building (11) looking east.

Plate 42. Interior of the Shotblast Building (12) looking northeast.

Plate 43. Electric Melt Building (13) looking northeast.

Plate 44. West elevation of Malleable Core Shop (14), looking southeast.

Plate 45. Interior view of Malleable Core Shop (14) looking southeast.

Plate 46. Interior space on west side of Malleable Core Shop (14), showing concrete casing of steel buttresses to main building on right.

Plate 47. West and north elevations of Buildings 15 (right) and 16 (left), looking southeast.

Plate 48. Interior view of the Old Sludge Farm (15) showing large modern water tanks.

Plate 49. Interior view of Building 16 looking east.

Plate 50. North and west elevations of Building 17, looking southeast.

Plate 51. East elevations of Building 17 (right) and Building 24 (left), looking west.

Plate 52. East elevation of Building 17 showing modified entrance to Air Raid Shelter 4 visible below graffiti in concrete building plinth.

Plate 53. Air Raid Shelter 4 looking north, containing stored metal components on collapsed original wooden benches. At the far end is an emergency escape ladder.

Plate 54. Entrance to Air Raid Shelter 2, looking southwest, two further collapsed air raid shelter entrances are just visible on the left. The vertical concrete face and hard standing above that constrict the shelter entrance were built sometime after the shelters.

Plate 55. Interior of Air Raid Shelter 2, looking north, showing remains of original timber benches and signage.

Plate 56. Interior view of Building 17, looking northeast.

Plate 57. North elevation of Building 18 with office extension shown on the right.

Plate 58. Interior of Building 18, looking north with storage and office.

Plate 59. Interior of Building 18 looking south.

Plate 60. Building 19 Test Room on right and Building 20 Skip Storage Area on left, looking northwest.

Plate 61. Interior of Test Room (Building 19) looking west.

Plate 62. East elevation of the Power House and Water Tower (21). In the foreground is the concrete hard standing where a now demolished foundry building once stood.

Plate 63. Interior of the Power House looking northeast.

Plate 64. South and west elevations of the Laboratory (22).

Plate 65. Interior northwest corner of Laboratory (22).

Plate 66. West elevation of the Surgery Building (23).

Plate 67. East elevation of Building 24 (also see Plate 51) and reclad Building 25 to the south.

Plate 68. Interior of Building 24 looking north.

Plate 69. South and east elevation of Building 25.

Plate 70. Interior of Building 25 looking south, with mess room on left.

Plate 71. South and east elevations of Building 26, looking north.

Plate 72. Interior of southern section Building 26, looking north. The building extended northward beyond the gable.

Plate 73. Glazed east elevation of Building 27.

Plate 74. Air Raid Shelter 1 beneath Building 27, looking west. On the right are the concrete entrance steps and behind the camera is a same sized second chamber.

Plate 75. Central open plan office area in Building 27, looking south. Seen just in front of the toppled ladder is a timber hatch in the floor leading to Air Raid Shelter 1.

Plate 76. First floor office in Building 27 looking south.

Plate 77. Timber framed corridor space on the east side of Building 29, looking south.

Plate 78. First floor of Building 29 looking south, with offices on the left, closed mezzanine level above and open mezzanine at the far end.

Plate 79. Mezzanine at the north end of the first floor of Building 29. Formerly a changing room with large communal sinks, the room had latterly been used for storage.

Plate 80. Interior of Building 31 looking northeast.

Plate 81. Interior of Building 32 looking northeast.

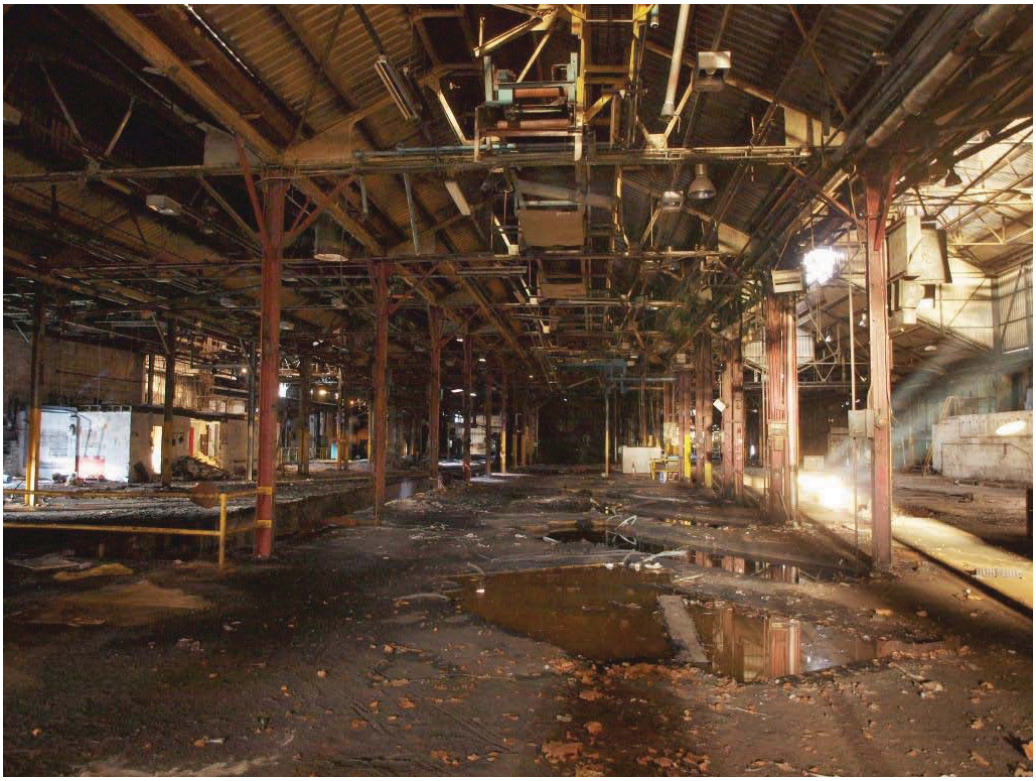


Plate 82. Interior of Shotblast Fettling/Malleable Foundry Building 33, looking south.

Plate 83. Interior of Building 34 looking south.

Plate 84. Interior of Building 34 looking south.

Plate 85. Interior of Old Grey Iron Foundry Building 35 looking north.

Plate 86. Interior of Old Grey Iron Foundry Building 35 looking southeast.

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