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THE FORMER THAMES PAPER BOARD MILLS PURFLEET, THURROCK ESSEX

HISTORIC BUILDING RECORDING

Level 1-3

Authors: Dr Lee Prosser BA PhD Lisa Smith BA Tansy Collins Bsc Kathren Henry Peter Thompson MA	
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ARCHAEOLOGICAL SOLUTIONS LTD

98-100 Fore Street, Hertford SG14 1AB
Tel 01992 558170

Unit 6, Brunel Business Court, Eastern Way,
Bury St Edmunds IP32 7AJ
Tel 01284 765210

e-mail info@ascontracts.co.uk
www.archaeologicalsolutions.co.uk

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Project dates (fieldwork)	*7th – 21st February 2012*		
Previous work (Y/N/?)	*Y*	Future work (Y/N/?)	*?*
P. number	*4529*	Site code	*THPP12*
Type of project	*Historic building recording*		
Site status			
Current land use	*Derelict factory complex*		
Planned development	*Demolition and redevelopment*		
Main features (+dates)	*19th/20th century paper/board mill*		
Significant finds (+dates)	-		
Project location			
County/ District/ Parish	*Essex*	*Thurrock*	*West Thurrock*
HER for area	*Essex HER (EHER)*		
Post code (if known)	-		
Area of site	-		
NGR	*TQ 5585 7781*		
Height AOD (max)	*Approximately 0-2.1m AOD*		
Project creators			
Brief issued by	*Essex County Council Environment Branch (ECC HEM) (Richard Havis)*		
Project supervisor/s (PO)	*Lisa Smith*		
Funded by	*British Gypsum*		
Full title	*The Former Thames Paper Board Mills, Purfleet, Thurrock Essex. Historic Building Recording*		
Authors	*Prosser, L. Smith, L. Thompson, P. Henry, K.*		
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THE FORMER THAMES PAPER BOARD MILLS
PURFLEET, THURROCK
ESSEX

HISTORIC BUILDING RECORDING

SUMMARY

In February 2012 Archaeological Solutions (AS) conducted a programme of historic building recording at the former Thames Board Mills, Purfleet, Essex. (NGR TQ 5585 7781). The work was commissioned by British Gypsum and was undertaken prior to the demolition of the remaining industrial buildings on the site.

The Thames Board Mills originated in around 1887 when Louis Cartiaux formed the St. Louis Park Mills Co on the southern, Thames side of the railway line. In 1902, an American, W. J. Alford took over the site, forming the Thames Paper Mill Company Ltd (TBM). From 1924 the mill expanded and a new converting factory was constructed to the north (Building 10). By 1939 many more buildings had been added, and in the early 1960s a major expansion resulted in the construction of the north mill (Building 4). In 1965 TBM became part of the Unilever Group, but by 1975 the company was in decline and South Mill closed, with many of the buildings being demolished in the following years. In 1986 Unilever sold TBM to Davidson Ltd. who renamed it Purfleet Board Mill. In 2004 production on the site ceased.

The principal surviving buildings include the converting factory, constructed in typical industrial style to the designs of James Lomax Simpson in 1924-26, which was expanded to the north in 1930 by the notable engineers L.G. Mouchel & Partners using the Hennebique system of fire-proof, reinforced concrete. Immediately opposite to the west, a second converting factory was constructed in 1936, with an attached warehouse following in 1939. The factory element was demolished in the 1990s but the warehouse survives as a typical late 1930s industrial building. A nearby building of note is a warehouse of 1937-8 at the western end of the site, which is constructed almost entirely of timber, spanned by enormous laminated Belfast trusses; a late occurrence of a type more normally associated with World War I aircraft hangars, and possibly relocated to the site from elsewhere. This building was partially truncated by the construction of the North Mill in the mid-1960s. This latterly formed the principal paper-making plant on the site, and was highly advanced at the time of its construction in 1964.

At the time of the survey, the buildings had been ransacked and looted after decommissioning, with some fire damage of the former converting factory. Several important components remained in situ, however with most buildings remaining structurally intact.

1 INTRODUCTION

1.1 In February 2012, Archaeological Solutions Ltd (AS) carried out a programme of historic building recording at BPB Board Mills, London Road, Purfleet (NGR TQ 5585 7781; Fig 1) in compliance with a planning condition in advance of the demolition of the existing industrial buildings (Thurrock Approval 11/50504/TTGDEM).

1.2 The historic building recording was carried out in accordance with a brief issued by Essex County Council Historic Environment Branch (ECC HEM, Richard Havis, dated 02/2012) and a specification by Archaeological Solutions (03/02/2012), approved by ECC HEM. The historic building recording followed procedures set out in English Heritage's '*Understanding historic buildings: a guide to good recording practice* '(2006), and also conformed to the Institute for Archaeologists' *Standard and guidance for the archaeological investigation and recording of standing buildings or structures* (IFA 2008). The level of recording varied between **Level 1- 3** as defined in the EH document. The buildings are not listed.

1.3 The objectives of the historic building recording were to compile a general record of the structures associated with the mill site, in order to understand the form, function, evolution, and record any remaining architectural/technological embellishment of the buildings and the site itself.

The level of recording to each building is summarised below:

Those buildings directly affected by the proposals (Fig 2):

Building 1 Photographic Level 1
Building 2 Photographic Level 1
Building 3 Photographic Level 1
Building 4 Photographic Level 1
Building 5 Photographic Level 1
Building 8 Photographic Level 1
Building 13 Photographic Level 1
Building 14 Photographic Level 1
Building 15 Photographic Level 1
Building 16 Photographic Level 1
Building 17 Photographic Level 1
Building 18 Photographic Level 1
Building 19 Photographic Level 1

Building 10 Drawn and photographic Level 3
Building 11 Drawn and photographic Level 3
Building 12 Drawn and photographic Level 3

Buildings outside the present proposals:

Building 6 Drawn and photographic Level 3
Building 7 Photographic Level 1
Building 9 Photographic Level 1

Planning policy context

1.4 The National Planning Policy Framework (NPPF 2012) states that those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest are heritage assets. The NPPF aims to deliver sustainable development by ensuring that policies and decisions that concern the historic environment recognise that heritage assets are a non-renewable resource, take account of the wider social, cultural, economic and environmental benefits of heritage conservation, and recognise that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. The NPPF requires applications to describe the significance of any heritage asset, including its setting that may be affected in proportion to the asset's importance and the potential impact of the proposal.

1.5 The NPPF aims to conserve England's heritage assets in a manner appropriate to their significance with substantial harm to designated heritage assets (i.e. listed buildings and scheduled monuments) only permitted in exceptional circumstances when the public benefit of a proposal outweighs the conservation of the asset. The effect of proposals on non-designated heritage assets must be balanced against the scale of loss and significance of the asset, but non-designated heritage assets of demonstrably equivalent significance may be considered subject to the same policies as those that are designated. The NPPF states that opportunities to capture evidence from the historic environment, to record and advance the understanding of heritage assets and to make this publicly available is a requirement of development management. This opportunity should be taken in a manner proportionate to the significance of a heritage asset and to impact of the proposal, particularly where a heritage asset is to be lost.

2 DESCRIPTION OF THE SITE (Figs. 1 & 2)

2.1 The BPB Boardmill is located on the north bank of the river Thames, south-west of the centre of Purfleet and just inside the boundary of modern Essex. The property is divided into distinct southern and northern areas by the railway line, which formerly served the plant with a siding. Most of the southern site, formerly clustered with industrial buildings including the various machine houses, warehousing, bunkers, workshops and a powerhouse, was progressively cleared in the last three decades and replaced by an effluent treatment plant, which has in turn been demolished. The northern site, housing converting factories, warehousing and originally terraces of workers'

housing, is bounded by the London road (A1090) and encompasses most of the surviving buildings, of 1920s to 1980s date.

3 METHODOLOGY

3.1 Archaeological databases and documentary archives

3.1.1 The Essex Historic Environment Record (EHER) was consulted in order to identify any local archaeological finds or remains in the area that might be affected by the development. Those sites of relevance are described below (4.2). A useful point of contact for historic records, photographs and oral history is located at the Purfleet Heritage and Military Centre. On site records which were also consulted included a useful archive of original drawings and blueprints, dating from the 1920s onwards, though this is extensive and remains unquantified.

3.2 The buildings

3.2.2 The site was visited between the 7th & 21st February 2012 in order to undertake the technical and archaeological analysis, the drawing and photographic work. The written description and photographic recording was carried out by Lee Prosser, Tansy Collins and Lisa Smith while the drawing work was completed by Kathren Henry. Floor plans, sections and elevations based upon drawings provided by the client are included with annotations (Figs. 12-20).

3.2.3 The photographic recording was conducted using medium format (4.5 x 6cm) black and white film for long-term archival storage and included all external views and general internal shots. This utilised a Zenza Bronica ETRS camera with 62mm lens and Ilford HP5 IOS 400 film. Finer architectural detail was captured using 35mm black and white film. Colour photographs were taken using a Canon 1000D digital SLR camera (10 megapixels), duplicating the black and white photography. Supplementary colour photography was captured on 35mm Ektachrome colour transparency film. External lighting and weather conditions were good at the time of the survey. A scale was used wherever possible, and a flash was employed for internal shots. A pictorial index of the digital photography and selected colour plates are included below together with location plots (Fig. 12-16, 18 &19).

4 THE EVIDENCE

4.1 Topography, geology and soils

4.1.1 The site is located at 0-2.1m AOD on the north bank of the Thames Estuary. The underlying geology comprises alluvial deposits approximately 3-9m thick overlying Terrace deposits of sand and gravel and chalk bedrock (May and Dawson 2009). Local conditions now include a great deal of made ground and concrete overburden, reflecting the extensive and continuous use

of the site for industrial purposes.

4.2 Archaeological and historical background

4.2.1 The Thames margin is an area of major prehistoric significance with a number of sites located within 500m (May & Dawson 2009, 29-32). Purfleet is particularly important because three separate early Stone Age or Palaeolithic industries have been identified just to the north-east of the site beyond the Purfleet bypass, in stratigraphic superposition comprising Clactonian, Acheulean and Levalloisian technologies (EHER 15440). This makes it a key locality for understanding early human occupation and exploitation in southern Britain (Schreve, D., Bridgeland, D. et al 2002).

4.2.2 Roman activity within 500m of the site is confined to a possible quarry pit on land at London Road (EHER 45478). In medieval times the site belonged to the manor of Purfleet and was tidal marshland, probably exploited for seasonal pasture throughout the period (May & Dawson 2009).

4.2.3 Much land around Purfleet was reclaimed between the 17th and 19th centuries and in the 18th century mineral extraction took place around Beacon Hill. There was a wharf at Purfleet in 1665 but extensive modern growth only began in 1760, when the government built powder magazines at the mouth of the Mardyke (Powell, 1983). Purfleet station opened in 1854 as part of the London, Tilbury, Southend Railway, eventually serving Tilbury Docks, which were built in the 1880s.

4.2.4 The Thames Board Mills originated at Purfleet in around 1887 when Louis Cartiaux formed the St. Louis Park Mills Co., setting up two Foudringer machines to make straw boards from stable manure (Powell et al 1983 & Chambon Review). In 1894, the mills were bought by Charles Anderson, who was listed at the site in the trade directory of the same year as 'paper manufacturer' (Kelly 1894, 345). In 1902, an American, W. J. Alford took over, forming the Thames Paper Mill Company Ltd., planning to switch production from paper to corrugated board. The first board machine started in 1904 at a cost of £100,000, producing 7,000 tons per annum, and a second machine was installed in 1907. In 1909, W.G. Friske joined the mill as a partner to launch the manufacture of solid fibreboard cases. Just before the First World War, a third board machine was added, raising capacity to over 50,000 tons a year (Chambon Review & Thames Board Mill, Purfleet 20th century - Purfleet Heritage and Military Centre). Most of the early buildings were located on the south site, and none survives today.

4.2.5 Prior to 1926 the mill was powered by ten Lancashire boilers whose fumes were taken away by a large concrete chimney which was a landmark in the neighbourhood. This was demolished in 1928 when the steam engines were replaced by electricity turbo-generators. That year, the building housing No. 4 machine was constructed on the south site following the erection of the new Converting Factory (building 10), which was given over to the production of 'fibreite' cases. In the 1930s plans were drawn up for a new machine – the largest in the world – at a cost of £750,000. The project required all-round

expansion including a vast new machine house to accommodate the 300 foot long and 50 foot high machine weighing 2,000 tons. No. 5 board machine, constructed on the south site, started up in 1933, and there were also further additions to the power house.

4.2.6 Two further machines were built at a new factory in Warrington before No. 8 machine was installed at Purfleet in 1941. During the Second World War, 80% of the output was turned over to munitions production and priority food packaging. The mill operated around the clock, but production fell due to a lack of raw materials. During this period the factory was struck by 38 bombs resulting in one fatality and 42 injuries, with No. 4 machine put out of action for four months. Between 1952-3 a new head office block was built on the opposite side of London Road (Fig. 7). This was latterly demolished to make way for a housing estate. In 1953 the Thames burst its banks and the mill flooded, causing a significant amount of damage (Figs. 8-11).

4.2.7 In 1962-5 the north mill (Building 4) was built at a cost of £6 million with an Inverform machine (Machine No. 11) installed to make Jute liner to line corrugated cores. This was a prestigious project, opened officially by future Prime Minister Edward Heath, then Secretary of State for Industry, in 1964. Thames Board Mill thereby became the largest factory of its kind in the country, occupying over 18 hectares, with over 3,400 employees producing both cardboard and fibreboard for packing. In 1965 Thames Board Mill (TBM) became part of Unilever, but by 1975 Nos 1, 2, and 5 machines had shut down, and in 1980 the South Mill closed altogether (EHER 40448). Photographs in the archive on site show that by the mid-1980s most of the buildings had been demolished, with only the railway facade of No. 5 machine and the powerhouse remaining. In 1981 TBM became Thames Board Ltd. Despite the perceived decline, even as late as 1984, No. 11 machine sold 100,000 tonnes of board and the following year £1.5 million was invested to further boost its output.

4.2.8 In 1986 Unilever sold TBM to Davidson Ltd. who renamed it Purfleet Board Mill and the next year £25 million was spent refurbishing No. 11 machine. However, in 2004 north mill closed down and most of the machinery was dismantled and sold to a company based in Saudi Arabia.

4.3 Cartographic Information

4.3.1 The Chapman and Andre map of 1777 (not illustrated) shows the site on West Thurrock Marshes with London Road bordering the north side. A single building is shown in the north-east corner, referred to in a plan of 1767 as ‘Forty Acres Barn’. The barn survived at least until the production of the 1867 First Edition OS Map (Fig. 3), although by this time the railway line had bisected the area. By the 1897 Second Edition OS Map new buildings to the south had been constructed, with two terraces of housing on the northern site, one section fronting onto what was later to be known as Mill Road (Fig. 4). The 1920 map illustrates the expansion of the south site, with new development to the east by the Anglo-American Oil Works, probably built soon after 1897 (Fig. 5). To the north more terraced houses had been constructed

while the barn to the north-east had been replaced by a small reservoir by that date.

4.3.2 The 1939 OS map shows many of the later buildings in situ (Fig. 6). Much of the later expansion was at the cost of the earlier terraced housing, which was demolished, progressively into the early 1970s.

5 THE BUILDINGS (Figs. 12-22)

5.1 Eighteen distinct structures survive across the two sites, dating from the early to late 20th century, representing gradual enlargement and replacement (Plates 1 & 2). A small pump house and fragment of the on-loading platform (Building 19) and a short section of the original railway siding form the only meaningful remains of the southern site. The buildings are enumerated as Figure 12 and described below.

Building 1 – Offices – c.1989

5.2 Building 1 is a recent addition, housing offices, an archive and security personnel. It was built in the late 1980s, and replaced an earlier gatehouse. It is of limited interest, being a single storey structure of yellow brick, with a pitched roof, extending as a columned porch over the entrance.

5.3 Internally the décor is typical of modern offices and undistinguished. At its western end, it is linked to Building 2.

Building 2 – IT Department – c.1970

5.4 Building 2 is L-shaped on plan, and constructed with typical 1960s or 70s modular, pre-fabricated aluminium panelling components, with blank brick end-walls and a flat asphalt roof, framed by wide fascia boarding. The windows are single-glazed and aluminium-framed. Internally the fixtures and fittings are contemporary in date, with fibreboard internal walling. This type of building was typically used for schools, clinics and other institutional buildings and remains common.

Building 3 – Electricity Sub-station – c.1964

5.5 To the west of Building 2, an electricity sub-station appears to be contemporary with Building 4. It is unremarkable in style and purely functional in form, of concrete post-and-beam construction with a facing of brick and a flat roof. A series of transformer cages is set at a lower level along the elevation. All the machinery has been removed. Likewise, nothing remains inside, though the position of plant is indicated by scarring within the concrete floor.

Building 4 – No. 11 Machine Mill Building – 1962-4 (Figs 14 & 15)

Exterior

5.6 Building 4 is of vast, almost cathedral-like construction, extending along much of the northern boundary and when built to house No. 11 machine, was one of the most advanced in the country (Plate 3). In form, it is of fairly uniform post-and-beam construction with brick infill and continuous glazing to two floors, though many subsequent modifications are in evidence. The south was the working side, and has various projecting wings, partially clad in steel sheeting, together with a colossal concrete water tower and other smaller ephemeral buildings nearby (Plate 4).

5.7 The form of the building reflects the process of paper-making, as it moved from the east, where the raw material was taken into the building via a large open hall, along its length to despatch at loading bays and warehousing to the west.

5.8 The north side retains its monumental appearance, in a repetitive rhythm of concrete pillars and beams infilled with textured brickwork, glass-brick glazing at ground floor level and frosted, aluminium-framed glazing above. A few first-floor projections on pillars break up the monotony. The main entrance for the workers lay on this facade, via recessed doors approached by steps beneath a timber canopy.

5.9 Some damage to the brickwork has exposed the construction method, which consists of an apron of concrete in each bay, with slender facing-bricks or tiles to the external skin, and more robust blue engineering brick to the internal face.

5.10 The southern, working façade preserves a central section of the same basic appearance as the north, but the projecting wings are clad with steel sheeting over a Fletton brick core, with continuous glazing at upper level. A bridge extends across the yard from the eastern projection to the now-demolished west converting house, while the western end includes a loading bay platform and deep steel canopy.

5.11 Advances in technology and the growth in production can be seen in various accretions added over time. Stock chests, chemical stores and other ephemeral buildings were added piecemeal, while the area to the south of the machine hall was gradually requisitioned for a number of associated buildings including a low flat-roofed electricity sub-station and a warehouse for stores (Building 5). The five-storey water tower remains an impressive sight, with its later concrete protective walling or bund enclosing the south side. The structure is circular in profile with long supporting ribs extending to form lower legs where the tank tapers. A mezzanine at upper level is enclosed by a steel balustrade.

Interior

5.12 Internally, the building rises through several floors. The lower floor, unlit and now without any source of light presents an almost apocalyptic scene of destruction and dereliction, after years of attack by opportunistic metal thieves and wanton vandalism, together with the rusting vestiges of machinery and mounds of decaying residual paper pulp which combine to create a scene of desolation. At upper level the machine hall is vast and impressive in oily emptiness, while the former side wings, now mostly stripped out, with smashed windows and debris blowing in the wind, project an eerie calm. Throughout however, the process of paper or board construction remains fairly clear in outline.

5.13 At the eastern or 'wet' end, the raw material was taken into a large, full-height warehouse or hall before being loaded onto conveyer belts and taken up into the main building for pulping. After passing through a series of refiners to remove any unwanted matter it was then pumped onto the mill machine itself, which extended as a series of heated rollers through the length of the building, transforming the raw material into paper. The western end of the building or 'dry end' dealt with the finished product including the winding of the paper onto large reels for distribution.

5.14 Lorries entered the eastern end via large steel roll-shutter doors on the north side. Here the building is mostly of composite steel-girder form, with a shallow pitched roof. Various elements of machinery survive including two small crane gantries and, as noted the conveyer belts which took paper up into the mill.

Ground floor

5.15 Workers entered the building on the north side via a small lobby where a carved stone frieze was once recessed into the opposing wall. Photographs show that it depicted the unloading and processing of paper bales, and was carved in the Art Deco style, which might suggest that it was recycled from an earlier building. It has been removed, and its current location is not known. To one side is a large open hall, with a concrete and steel-railed stair rising through the building, past the original timber and glass clocking-in office, which has been extensively ransacked. On the western side of the stair hall, a small self-contained electrical sub-station remains identifiable, but has been looted.

5.16 The factory floor is almost entirely of concrete, with a series of robust columns supporting the upper floor. Everywhere, the floor is strewn with stripped-out wiring, all once supported on metal hangers suspended from the ceiling. Major surviving components surviving behind the stairs comprise a line of hydro-pulpers against the eastern wall. These form vast spherical bowls which rise through the upper floor, but the lower bowl and supporting legs are visible here, encrusted with paper pulp (Plate 5). To the west, large circular tanks and the bases for machinery survive. Supporting equipment

such as hoppers, galvanised steel chutes, pipework gantries and access stairs also remain in places, but now make little coherent sense.

5.17 The main machine spanned all levels of the building. At the western end, the remains of a cydro-pulper survives, which dealt with broken or spoilt paper products before being returned as raw material through a series of pipes back to the beginning of the process. On this level, the western projection was used as a warehouse for finished goods which were then distributed to the loading bay beyond. There are some offices on the southern elevation but these are of no interest.

First Floor

5.18 The vast machine hall housed the operational elements of the mill machine. As elsewhere a simple post-and-beam construction is evident throughout, with canted I-beams forming a shallow roof (Plate 6). A large girder supported on the north wall by a series of corbels possibly formed the runner for a large crane.

5.19 As below, the eastern end of the building dealt with the wet elements of the process, with machinery extending from the floor below. Only one of the original pulpers survives at this level: elsewhere the internal structures are exposed, and appear as enormous mixing bowls lined with ceramic or rubber tiles (Plate 7).

5.20 The south-western area was formerly occupied by offices and workshops, with a footbridge leading across to the converting factory. The door retains a date-plate of 1962. The adjacent rooms formed workshops with timber benches, mostly now wrecked, but they appear early 20th century and were probably reused.

5.21 In addition to housing the central plant, the machine hall also supported other machinery. Concrete pads with supporting gantries and electrical boxes indicate their position, while at the western end; some surviving machinery was probably used to roll the finished paper onto reels. At this level, one of the northern projections housed computer equipment.

Second Floor

5.22 The upper area of the machine hall is broken up with a continuous mezzanine along the south side, which connected to open spaces in the southern wings. The mezzanine is floored in steel mesh, and retains a series of extraction ducts and fans previously serving the machine.

5.23 Numerous pieces of machinery survive but much has been stripped out, leaving a fairly incoherent arrangement at the eastern end of the building. A large tank with upper gantries and pipework remains but only the concrete pads illustrate the layout of the rest. The north-eastern corner of this area was given over to offices and staff locker rooms, probably inserted later with concrete blockwork and I-section girders.

5.24 The western end was sub-divided into a series of offices but everything has been stripped out since. A single winding roller machine survives.

Building 5 – Warehouse – Stores – c.1983

5.25 Photographs in the archive show that Building 5 is a recent addition, dating from the 1980s or '90s. It is a six-bay 'clear span' steel-framed building in the manner of a Dutch barn, previously used as an equipment store. Principals rise from a rectangular concrete pad and carry a number of purlins and horizontal rails supporting corrugated sheet metal cladding. The roof is pierced by a series of regular roof-lights in each pitch, while internally the walls are lined with ephemeral foam boarding. There are large roller doors on the south and west. At the eastern end, a steel-framed mezzanine floor is given access from a stair in the north-eastern corner, where the lower area has partly been enclosed with cement blockwork to create offices. Numerous metal cages survive for the storage of equipment.

Building 6 – Warehouse 1937-8 (Figs 16-17)

5.26 Building 6 is an unusual survival in being, for its date, constructed almost entirely of timber, with Belfast trusses of impressive span in the manner of a First World War aircraft hangar (Plate 8). Originally the building comprised four identical units, but the north-eastern quadrant was demolished in the 1960s to make way for the north mill. From its original concept the building has been modified slightly on several occasions with low blockwork sub-divisions and some brick replacement of the plinth, but its simple structural form remains intact.

5.27 The timber is all softwood and circular-sawn, relying on the ingenious combination of bracing and lamination to create structural stability and strength. The principal supporting posts are robust and formed as a composite sandwich, with a large square core of timber which does not extend the full height of the post but is instead suspended approximately 2.0m above ground level, where the support is taken up by outer members of 12 x 6 inches, clamped to it with threaded bolts and nuts, and standing on concrete stylobates. Straight braces extend from the central core to the wall-plate which is a single timber. The external walls are supported by intermediate uprights (of identical scantling to the posts) fixed in pocket-plates rising from a slender horizontal bearer at low level. The horizontal bearer or sole-plate rests on a dwarf wall of salmon pink London Brick Company 'phorpres' Flettons, but does not survive continuously. The Flettons do not have the conventional frog, but instead three large indents. All external cladding is supported by further horizontal members which rest on small fillets nailed to the intermediates.

5.28 Where the individual components of the building meet, the principal-posts are more robust and given extra support from similar sized braced buttresses (Plate 9). As elsewhere the principal members are clamped by a

cast concrete core at the base (20 square inches) which sits on a square stylobate. Timber buttressing to the principal posts survive on the exterior of building in the north-eastern corner where the now-demolished fourth quadrant once stood. Despite almost fifty years of exposure to the elements, the timber remains in good condition.

5.29 The gable end wall-panels and the enclosed wall to the once open north-eastern quadrant are given extra support from long straight bracing extending from the intermediates to the base of the principal posts, where they are bolted with L-section metal plates. Extra support is given to the corner bays where diagonal bracing spans the principals between two horizontal members at mid-level.

5.30 A total of 29 Belfast roof trusses survive, including the gables (Plate 10). These are of entirely laminated construction, with the tie-beams built-up in five layers, together with short, bolted-on additional sections, and the outer rafter similarly formed. The usual lattice infill provides extra stiffening. The roof rests on a series of slender purlins and is clad in corrugated asbestos, pierced by skylights. Lateral stability is given by bracing set diagonally between the trusses at the highest point and to the underside of the tie-beams. At the junction between the ranges, soffit pieces laid in a zig-zag form, span the wall-plate and bracing to prevent deflection.

5.31 The interior is now plain: a concrete floor survives, and some modern blockwork divides the building into shared ownership. To the north-east, the frame for a conveyor belt survives.

Building 7 – Smurfit Kappa Building - c1960s

5.32 Building 7 is a modern addition, but has an interesting construction form of great elegance, with its hyperbolic roof truss system employed as an advance on the conventional northern lights factory form (Plate 11). It is designed on the Silberkühl system with a shell roof of pre-stressed concrete forming eight bays of lightweight glazed trusses. These are supported by a framework of external brick walls which is otherwise fairly conventional. The walls are solid all round except on the north where the upper sections are glazed with ordinary, rectangular lights, detracting from the sweep of the roof. The interior is a single open space partly occupied by offices to the south. A brickwork corridor provides a link to Building 6.

Building 8 – Warehouse – 1960s

5.33 This small warehouse is located adjacent to the western side of Building 9 and has been most recently used for storage. It is system-built in steel over six bays, comprising I-section girder principals set on stylobates, rising from a concrete floor to L-section tie-beams where a series of bolted-on struts carry principal rafters of the same form. Horizontal members and a number of purlins support the corrugated asbestos walls and roof. To the north a robust frame for a loading hoist stands proud of the building.

Building 9 – Warehouse - 1939

5.34 Building 9 was once the western extension to the former west converting factory of 1936, which was demolished in the 1980s. Old photographs, showing oblique views of its Mill Road frontage show a fairly conventional 1930s factory facade with continuous glazing, similar to No. 5 machine. As it continued to be useful, the warehouse element was retained, and now stands alone, though refurbished and re-clad in modern materials. Like other buildings on the site, it is a trussed building of great ingenuity with minimal use of steel for maximum span and size (Plate 12). Four contiguous structures are united by a flush southern facade, though to the north, the elevation is staggered. Internally, the building is unified; the ranges from east to west comprising 12, 14, 16 and a narrow, 17-bay range to the west.

5.35 The roof is supported by composite trusses of L-section girders; they conform to the 'fink' truss variety recommended in early 20th century building manuals as a standard. The walls are, encased in cement at lower level, with the principal supports on the south and west covered almost to full height. The posts are spanned by a series of lateral girders fixed to plates supporting intermediate trusses. A sheet steel roof is supported by ten purlins in each pitch. This is pierced by vents.

5.36 The external walls rise on painted brick, while slender steel vertical and horizontal intermediates carry the external cladding between the principal posts. The brickwork to the eastern ranges extends approximately 2m between the principals. The eastern wall is the most substantial with large uprights at the bay divisions standing on massive stylobates of cement with composite members supporting I-section girders at door level for two long roll shutter doors. Other doorways formerly existed but have now been infilled with brickwork. The western range is taller and narrower but built in the same manner as the rest of the building. The outer trusses to the gables are given additional support with diagonal bracing, while a horizontal member in the form of a mid-rail extends between the principal uprights of the outer walls. In addition lightweight bars span the posts carrying the external cladding.

Building 10 - Fiberite Building (Converting Factory) – 1924-30

(Figs. 18-21)

Exterior

5.37 The Fiberite building remains the most substantial on the site and is the sole survivor of the great expansion of the plant in the 1920s. It has a fine, 'moderne' frontage to Mill Road (Plate 13) of purple facing-brick and spartan embellishments in cement render which would sit comfortably alongside similar industrial structures lining London's North Circular. With the expansion of production, various extensions, most substantially Building 11 and other ancillary structures were added in 1930, while the southern elevation incorporates a platform for the original railway siding.

5.38 The main frontage, and much of the south elevation overlooking the railway and machine houses accommodated administration in the upper floors skirting the main factory floor, which lies concealed to the rear. To Mill Road, its fifteen bays are defined by large brick piers framing upper and lower steel casement windows, incorporating a three-bay shallow central frontispiece framing the main door. The outer bays are slightly narrower in proportion but embellished with rusticated quoins framing the doors. Despite the ransacking of the building, the north door preserves a little scrolled iron bracket supporting an overdoor lamp, while the original south doors of panelled oak survive. The main entrance formed an impressive introduction, with reconstituted stone laid as ashlar blocks to the door mouldings, reached by a flight of enclosed steps (Plate 14). Flush panels below the upper windows once proclaimed, in high letters: Thames Board Mills Ltd, but these have long been painted out and are only now re-emerging through the decay of the overlying paint. The centrepiece is topped by a slightly raised parapet in two stages with curved stone capping, with the raised dates of 1903 and 1924 in the flush panels, commemorating the major dates in the mill's history.

5.39 The lower windows, once giving light straight onto the factory floor retain iron casements of 16 panes, most with telescopic mechanisms for opening the upper four lights. The upper windows have all been replaced with modern uPVC but probably mimic the earlier form of eight lights.

5.40 The building is essentially iron or steel-framed with a brick skin, set on a high, slightly stepped plinth on the main frontage. Where the wall has been pierced, the underlying fabric shows a fine, unfrogged gault brick forming the core matrix, with an interesting purple brick with high quartz inclusions as the facing, though now dulled with age and smog. This is frogged, and stamped with the maker's name 'Westlake'. The brickwork rises to a high, rendered fascia, and deep overhanging solid eaves cornice with typical angular mouldings of the period.

5.41 The interior is much more functional in form, extending to the east in a series of stepped, but contiguous ranges of diminishing size (Plate 15). Along the north side, the purple brickwork continues, though more utilitarian in style, but the whole structure can be seen to sit on a raised frame of post-and-beam construction, leaving a low, open expanse beneath the building, now much blocked off with firebrick and cementitious render and filled with the collected debris of many years.

5.42 The visible gables along the north are defined by regularly-spaced pilasters in a gesture to the form of the main frontage. This area housed recreation rooms, later a canteen and staff lavatories. Various windows and doorways reflect this use, together with blocking and later modification.

5.43 The south return along the railway, extends for a further four wide bays in the decorative style of the frontage. The upper floor at this level, which once housed the 1920s company offices and the director's suite was devastated in 2005 by a fire. The lower, rear section of the facade to the east is occupied by a long concrete platform sheltered by a canopy servicing the siding.

Latterly, the area was put to use to accommodate a ramshackle arrangement of modern Fletton brick and Portacabin extensions. A large bridge once provided access across the railway to No. 4 machine on the south side. This survives, now truncated.

5.44 The roof above the administration block is flat and concealed behind a parapet, while the rest of the factory has northern-lights typical of industrial buildings.

Interior

5.45 Decommissioning has left the factory as an open space, but with the offices and administrative spaces on the south and west at upper level, and much of the north side separated into distinct units for staff facilities. Many of these elements, including lift shafts, are constructed of pink Fletton brick, differing from the primary construction material and possibly indicating later modification.

5.46 The general construction of the inner elements of the factory is uniform and systematic throughout, comprising principal steel supports of I-section profile resting on triangular feet, many of which have been encased in concrete (Plate 16). Lateral support is provided by a series of simple I-girders braced from the posts by bolted L-section pieces but in other places, composite, latticed trusses have been used. Most of the steel is embossed with the mark of the Frodingham Steel Company, but other makers are also in evidence, including Cargo Fleet, Round Oak, Shelton and Appleby-Frodingham, usually distributed in a discrete way which suggests later modification.

5.47 The roof is fairly lightweight, preserving sarking boards on the south pitch, once carrying grey slates. Where these survive, they have mostly been smothered with pitch or asphalt. Most of the glazing, which was patent, has been removed. A concrete floor retains impression of rail systems and machinery bases, though only a few sections of pipework and electrical boxes, stripped of their contents, survive.

5.48 From the start, the offices were maintained as a distinct unit. The three front doors gave separate access, which appears to be related to status. The central door formed the most imposing entrance for the higher officials, with the north door for clerical workers and the south door, which gives access to the factory and the mezzanines, for manual workers.

5.49 The main entrance was probably once enclosed by impressive panelled oak doors but these are lost. A well-appointed large open vestibule is dominated by a grand staircase, floored and constructed in fine cream terrazo with inlaid borders (Plate 18). The staircase curtails with a sinuous swept lower tread, with two short lateral steps giving access to a lift. The stair balustrade is absolutely typical of the 1920s, being of cast-iron, modular panels in the Moderne style with x-bracing and small central bosses with a spiders-web motif. The handrail, probably mahogany, has been removed but

its profile remains as an impression where it terminated against the plasterwork, revealing a traditional toads-back form. The walls were once adorned with heavy fictive panelling and dado rail but these have for the most part been removed. The stair itself rises to an intermediate landing at first floor level which also has a swept concave profile to accommodate a window above the door, before continuing to second floor level. Miraculously, the lift has escaped the predations of the thieves and retains its elegant 1920s veneered interior.

5.50 The north doorway and staircase is simple, with little fine architectural detail, but was nevertheless enclosed by oak doors, of which only the northern jamb survives. This leads to a simple tiled lobby with a solid staircase rising to both the first-floor mezzanine and office floor. The floor and walls are tiled, while the balustrade is plain, with metal sticks and a timber handrail (removed). Adjoining the lobby was the probable cash office, which retains a little hatch. Within the office, an inner room complete with large safe survives.

5.51 The rooms ranged along the north side of the building once provided recreation and welfare facilities to the factory workers, including an engineer's store and design office, all housed within the lower part of a mezzanine framework (Plate 19). The walls dividing the canteen and kitchen do not respect the framework suggesting some alteration. The lower windows are of factory-type steel casements but at least one upper light is a 1930 or '40s Crittall-type domestic casement. To the east further subdivision is evident in modern blockwork and it includes an older, contemporary lavatory block. Most of the glazing for the northern lights survives in this area.

5.52 On the south side of the factory, entrance was given into a third plain lobby and staircase which rises in a straight flight against the south facade.

5.53 Part of the adjoining area is occupied by two large freight lifts with concertina doors enclosed in a brick shaft rising to the upper floor (Plate 20). These appear to be contemporary. Several enclosed rooms extending along the south wall beneath a mezzanine are pierced by doors and wide apertures. All retain wrecked and residual machinery illustrating their use as a stamping shop, switching rooms and possible workshops. A second staircase at the east end of this group forms a companion to the south entrance, thus allowing access to the mezzanine from both ends, and to the bridge spanning the railway.

5.54 The south side once gave access to a railway platform via an aperture enclosed by a roller shutter door, but there has, as noted, been much modification in the area.

5.55 Some evidence of use survives on the upper mezzanines. The north mezzanine is mostly destroyed but surviving elements suggest that it was formerly floored in pine boarding and partitioned with modern blockwork to create offices. These were not accessible for further inspection.

5.56 The south mezzanine, by contrast accommodated water tanks and machinery. A narrow walkway survives along the outer wall, with a thin line of decorative tiles laid into the floor, separating traffic flow (Plate 21). To the north, the western end is occupied by large tanks formed with riveted plates, with glazing at upper level allowing visual inspection. Here the large supporting steel joists (9" x 4") are stamped with the mark of Cargo Fleet, not seen elsewhere in the building. The eastern end of the mezzanine retains only the supporting girders with some traces of timber joisting indicating a lesser need for structural support at this end. Steel-framed glazing extends along the south wall 1.30mm above the walkway. Two staircases which formerly rose to the second floor rooms are entirely enclosed and now inaccessible. Surviving equipment includes a casing for pumps, pipework, switching covers and metal cupboards, but most usable machinery has been wrecked or removed.

5.57 The administration floor is now a shadow of its former self and partly inaccessible due to fire damage. The principal central staircase once gave access to a large office space, which may once have been subdivided with partially glazed partitions (Plate 22). It was evidently fairly well appointed, as impressions remain for parquet floor blocks and timber dressings to the supporting columns. Traces of a suspended ceiling also survive. Generous light was provided by large windows overlooking Mill Road, but also roof lanterns. The rear wall, by contrast is unglazed, but small brick slips in the brickwork suggest the presence of panelling or shelving on this side.

5.58 The north end was slightly more utilitarian, with the secondary staircase giving additional access to the office and to staff lavatories and cloak rooms. The staircase preserves an original 1920s pendant light. Much of the area remains floored in terrazzo, with some original tiles and ceramic lavatory pans, while the men's also preserves an impressive, and architectural ceramic urinal.

5.59 The southern part of the area could only be glimpsed from a distance, as the fire has deformed much of the steelwork and access was not possible. Latterly, the area appears to have been divided into small offices, many with plasterboard partitioning, but a few earlier, timber and glazed walls of 1920s date survive, albeit in a charred condition. The south-west corner room was clearly of some importance, as an enriched plaster ceiling can be glimpsed from the exterior. Latterly the area housed a dentist and medical rooms.

Building 11 – Extension to Fiberite Building (Building 10) -1930s
(Figs 18, 20 & 21)

Exterior

5.60 Building 11 was extended in 1930 with a similar, but perhaps more robustly built element which remains structurally separate. The lower floor is extremely solidly built, but the upper floor, housing northern-lights glazing differs little from its companion. Along the northern end, a low structure, (Building 12) is contemporary (Plate 23). The building is abutted on the west

by a tall lean-to structure which appears as a projection, though clad in corrugated sheeting. Other additions include loading canopies on the north and west.

5.61 As with Building 12 the whole structure stands on a raised sill above ground floor level, though here the outer walls are constructed of a regular arrangement of concrete posts and beams infilled with brick and glazing at each level, without recourse to a cosmetic brick skin. This is expressed well on the north at the east end, which otherwise only contains a large opening enclosed by roller shutters, and above Building 12, while at the west end this side is occupied by an early canopy enclosing a number of integral loading bays within Building 11. The canopy sits on a system of I-section girders all now clad in modern corrugated sheet metal. Below this, the external wall is well-expressed with a symmetrical arrangement of a roller shutters with overlights and flanking metal-framed windows. The shutters are possibly original, marked 'Rolador' and produced by Haskin's of London, which have clearly endured over 70 years of use.

5.62 A modern loading bay has been attached to the west end with raised concrete platforms for side access to lorries, all protected with corrugated sheet metal with a pitched roof covered in chrysotile asbestos. It appears to be 1950s to '70s in date. Where the loading bay abuts Building 11 the wall has been removed allowing open access to the ground floor. Above this, the three gables are visible, all clad in corrugated sheeting to the apex.

Interior

Ground Floor

5.63 The upper floor was clearly intended to house heavy machinery from the outset, as the floor is supported at lower level by massive octagonal concrete columns with flared capitals to reinforced square pads (Plate 24). The effect is now cavernous and poorly lit despite the presence of almost continuous glazing along the north and east walls. The space has been latterly subdivided into two main areas with various smaller compartments formed by modern brickwork, although all has now been comprehensively stripped out and so provides few clues as to its former use. The ceiling was originally pierced by two large apertures, expressed by subtle differences in the spacing and treatment of the columns, though these have been infilled with cement and steel joisting.

5.64 Rolador shutters, flanked by fixed windows provide access to the loading bays on the north as noted above, while further large apertures on the west serve the modern loading bays, some enclosed by roller shutters. Various freight lifts also remain in situ on the north and south with metal concertina doors and manufacturing plates with the date 1930.

5.65 At the eastern end, Fletton brick have been used to enclose offices and small pens, some latterly raised to full height in firebrick. A simple solid cement staircase rises on short columns against the north wall to first floor

level and two further enclosed staircases are set adjacent to the lift shaft on the south and in the south-east corner.

First Floor

5.66 The first floor bears many similarities to the adjoining 1924 factory, and is divided into three bays defined at upper level by large composite trusses supported by vertical I-section girders and bolted-on L-section or T-section braces (Plate 25). The outer walls, as noted above, rise with cement posts, infilled with brick panels and continuous glazing on the north, east and west sides. The south wall differs in being entirely infilled with brick. The northern lights roof differs slightly; here the glazing does not occupy the entire north pitch but instead rises at a steeper angle from a lower boarded area. Wider sections of underboarding span the trusses with no support from purlins as in the adjoining building.

5.67 Some sense of the original layout may still be discerned, where the western end has been sectioned off into a number of compartments with low Fletton brick walls and mesh sheeting carried on steel members to truss level. Freight lifts provide access on the north and south with accompanying enclosed staircases all constructed in Fletton bricks. On the south the lift towers continue above roof level where a small room containing the winching mechanism is reached by a steel ladder and walkway.

5.68 As elsewhere, various residual fixtures survive, including casings for ventilation ducts and extractor fans set into the walls. Oral testimony indicates this space was used to recharge enormous batteries, and the west end retains a metal framework for platforms and a moveable hoist to carry the batteries. The hoist is marked Herbert Morris Ltd of Loughborough, indicating a capacity of one ton.

Building 12 – Carpenters' Workshop - 1930

Exterior

5.69 Building 12 lies along the north side of Building 11 and was most recently used as a carpenter's workshop. To the east a low, wide lean-to contemporary with the main structure extends for a further bay to the east. The main element is clad entirely in old corrugated sheeting set over a brick dwarf wall with a shallow pitched roof. The northern façade is blank, but pierced by a series of large apertures enclosed by roll-shutter doors. A central door of domestic proportions also gives access, while a second door at the western end of the building is flanked by casement windows indicating office space beyond.

5.70 The eastern lean-to has a mono-pitch roof pierced on the north by continuous glazing and a door on the east which is now blocked. Associated with this structure, but standing independently is a metal framework

supporting a large hopper from which a large pipe extends to the east gable of the building.

Interior

5.71 The interior forms a single space but there is little indication of earlier use. It is constructed of a series of steel trusses supported on the north by principals of I-section set on concrete stylobates and bolted to a robust I-girder, supported by brickwork on the south (Plate 26). The trusses are lightweight, comprising L-section members carrying purlins and corrugated sheet cladding. This is pierced by continuous roof lights along the northern pitch. As mentioned above, the principals on the south are infilled with brickwork at lower level with horizontal members supporting corrugated sheeting above. A number of roll-shutter doors occupy the space between the principals.

Building 13 – Kitchen/Canteen – 1970s

5.72 Building 13 was latterly used as a kitchen and canteen but its original use is unknown. It is divided into three distinct units all constructed at different times in pink Flettons, and a flat roof covered in asphalt (Plate 27). The southern range appears to have been divided into two units; that to the south has no windows and is given access from reinforced metal doors on the west. The ceiling is formed of firebrick divided by concrete sections with timber pieces. Original gas pipes survive with their contemporary thick glass shades. The south-eastern corner is enclosed, forming a small square store room with independent external access from the south. Within, the floor is raised with floor boards and a short 'I' girder at high level has been inserted, probably to allow the hoisting of heavy objects.

5.73 The second unit to the north is reached through a standard timber door comprising two lower plain panels and four upper glazed panels. Internally the floor is concrete with painted brick walls and a tiled ceiling. Six metal-framed windows pierce the eastern wall (each of two panes) with alternating lights forming side-hung casements. A large, almost full width aperture on the north probably indicates the position of a former window with a chamfered and stopped concrete lintel, all now infilled with blockwork.

5.74 The range to the north was latterly used as a kitchen with tiled walls and floor. The ceiling, where it is exposed is of the same firebrick as seen elsewhere. The windows on the north, west and south are metal framed but have more slender bars than in southern range and are four-light elements fixed on the north and south with casements on the west. A possible window aperture has been blocked suggesting a different date but generally all are of the same construction. To the exterior all the windows have bull-nosed blue brick sills and on the north a concrete lintel, chamfered and stopped.

5.75 The later brick addition to the east was probably added in the 1980s with three rooms and a lavatory, all tiled. A timber window on the south has metal security bars.

Building 14 – Laboratory (Quality control?) -

5.76 This building comprises two distinct elements, the east range dates to the 1950s and the western range later probably built sometime in the 1980s (Plates 28). The earlier north-south range has a short linking unit on the west leading to a later rectangular lateral range. The earlier range is constructed of metal-framed trusses on a base of concrete hard-standing rising to a pitched roof and clad entirely in corrugated asbestos sheeting. It is pierced by a series of metal-framed windows on the east and west with a fire exit on the north and two doorways on the east. A later doorway has been inserted on the west to give access to the adjoining unit. The windows vary in size, comprising three large, wide windows each with 30 panes incorporating two six-pane pivoting casements with three fixed lower panes. The doors are all of timber and plywood.

5.77 The trusses comprise 'I' girder outer posts with 'L' section ties, rafters and struts all secured with bolted metal plates. In the north-west corner a slightly raised and tiled cubicle for cleaning survives and there are cement platforms elsewhere for removed machinery. Some remaining pipework survives at roof level as does a large drum on the west of metal and timber paddles for testing boxes.

5.78 Double doors on the west lead to a linking unit and the western range. This is constructed entirely of studwork with vertical timber boarding to the exterior and modern plasterboard to the interior. The roof is flat. The large timber windows and doors are all made of safety glass.

5.79 The later range is divided into a number of rooms, now mostly plain with nothing of note surviving. A small plant room in the north-west corner is given access from the exterior and ladies and gents lavatories stand in the north-eastern corner. The central room retains some original elements suggesting some chemical process was carried out here. The floor is tiled and there are cupboards and shelves on the north with gas taps.

Building 15 – Bicycle Shed - 1930s

5.80 Building 15 is a long narrow east-west range on the northern side of the site to the south of the car-park, latterly used as bicycle sheds, with central apertures to the gable ends (Plate 29) . It is constructed as a simple metal frame on concrete, all clad with corrugated metal sheeting. The roof is pitched with a raised central section open to the sides for ventilation and light. The trusses are constructed of I-section posts and rafters supporting the purlins above, the form creating an aisle on either side of a central corridor. Short metal struts rise at the bay divisions to support the centrally raised, slightly

curved roof. The bay walls are spanned by horizontal L-section pieces to support the external cladding. The south side has largely been rebuilt but on the north there is a curious arrangement which includes a horizontal timber extending the length of the building at approximately 0.60m in height. Fixed to this are sections of timber boards with a lower inverted 'V' with approximately 0.15m between them possibly suggestive of an earlier form of racking (Plate 30).

Building 16 – Warehouse – 1960s

5.81 Building 16 is a large range in the north-east corner of the site probably of the same date as the eastern range of Building 14. Constructed on concrete hardstanding from I-girders and L-section pieces all bolted together with metal plates to form trusses dividing the building into nine bays. Access is given through a large aperture on the south almost extending the full height of the building with a smaller flanking doorway to the west with a sliding door hung on rollers. The outer bays are both reinforced with long L-section cross-pieces and to the rear across all bays, four horizontal members to which asbestos cladding is fixed.

5.82 Many of the bays are pierced with 12-pane metal-framed windows with central four-pane pivoting casements. This differs in the fourth bay on the west where there is a standard sized doorway and in the eighth bay which has a large bay-width door formed of a metal frame covered in modern metal sheeting. A concrete upstand with a drain cover is preserved in the north-western corner and original pendant lighting hangs from a pipe system – three in each bay.

Building 17 – Pump House

5.83 Located on the north side of the site to the south-west of the reservoir (Building 18) the pump house is brick-built with a pitched roof (Plate 31). The bricks are yellow with occasional straight skintles with cement mortar and a low, cement-rendered plinth all round. The roof is covered with corrugated sheeting and to the east and west sides there are little timber boards to the eaves.

5.84 The northern and western walls are entirely plain. The south gable has a high aperture with double timber doors and concrete lintel above. Below this a robust I-girder protrudes for approximately 1.50m and is stamped with the mark of Dorman Long & Co. Ltd of Middlesborough.

5.85 The eastern wall has a doorway slightly off set to the south set beneath a concrete lintel. The door is timber. Adjoining to the north is a little attached box with a telephone for emergencies. There is one window to the south and two to the north, all of the same form comprising three-light transom and mullions with lower four-pane fixed lights and upper two-pane bottom-hung casements below concrete lintels, which are chamfered and stopped.

5.86 The interior was inspected briefly but was in a very dilapidated state. It retains a pit with pipework occupying the majority of the space (Plate 32). At the south end further shallow pits hold more pipework covered by metal grilles. Protruding pipes connect to two motors set on upstands immediately to the north. Metal grille walkways extend around the edge of the building over the pit. Fuse boxes and similar are attached to the walls. Robust I-girders extend north-south across the whole space to which a pulley system is attached presumably for raising motors and pipework for maintenance.

5.87 The roof structure is formed of three trusses with the ends set in the brickwork gables. The trusses consist of L-section tie-beams, rafters and struts all bolted together with metal plates.

Building 18 – Reservoir

5.88 Building 18 is a square unobtrusive block housing two covered reservoirs and associated with two smaller buildings to the south-west and immediately to the north. An inscription in the cement on the south side indicates a date of 1965. If so, it replaces a smaller late 19th century example visible on the 1897 map.

5.89 A flight of concrete steps rises to the main reservoir block which is low, square and flat encompassing two reservoir tanks capped by solid concrete slabs set at slightly different levels (Plate 33). A higher independent unit is located to the south-west and given access via a metal staircase. The whole arrangement is enclosed by tubular metal railings as are a series of concrete inspection apertures standing proud of the roof, sealed by metal grilles. On the northern side two of the pits have structures above them, possibly for screening.

5.90 The building to the north is late 19th century in date, constructed of yellow Fletton bricks or a yellow stock brick with occasional straights skintles and rusticated red-brick quoining to the corners. There is a plinth all. It has a fairly shallow mono-pitch roof with brick parapets on the east and west to give the impression of an even level from the north. It is given access through double doors on the west, set in a simple slightly chamfered and stopped frame. The doors are boarded with central louvres for ventilation. Adjoining to the south is a small recess for a cupboard which has a simple frame, a protective timber hood and a second tiled hood above, the door has been lost and a single shelf remains within. There is no access to the north side of the building.

5.91 The interior is entirely plain with two I-girders extending north-south across the ceiling. The metal roof structure is constructed of L-section pieces supporting sheeting above. The window on the south is metal-framed set beneath a red-brick flat gauged arch and queen closers indicating an original aperture.

5.92 The rear side of a small cupboard is visible with three recesses on the north which are boarded to rear. It has latterly been used as an electrical sub-station. Adjoining to the east is a very small brick unit which apparently supplied gas to Purfleet, though now decommissioned and scheduled to be demolished. A large yellow gas pipe, water and sewage pipes from the reservoir extend from this area.

Building 19 – Effluent Pump House

5.93 The original 19th century mill buildings which once stood on the south site were progressively demolished to construct an effluent treatment plant to deal with waste products, which in former times would have been discharged into the river without treatment. This has also been removed leaving the foundations of the giant circular tanks *in situ.* The single surviving elements lie at the south-western corner, and comprise the effluent pump house and the stump of the onloading ramp (Plate 34). The building is built of brick with a cement slab roof formerly open on three sides but now fully enclosed. The south side retains steps and a tubular balustrade of simple, industrial form. The west side of the building is pierced by three large windows with concrete lintels and sills blocked with textured Flettons. The whole building stands over three large concrete lined tanks with large outlet valves enclosed by a rail.

5.94 The ramp is constructed of massive I-section joists supporting a concrete floor and a steel balustrade of heavy section which spans a high embankment to the south, but continued to the water's edge. The western side of the ramp has been enclosed with brickwork at lower level, infilling the sections between the framing elements and rising to a parapet which responds to the balustrade on its opposing side. Where the ramp meets the waters edge a large steel frame for a crane stands above for maintenance. The ramp stops abruptly and is simply a residual fragment of a larger structure.

5.95 Also of note is a small section of early cobbled surface running adjacent to the railway and incorporating two sets of narrow gauge tracks and a crossover which once serviced the south mill (Plate 35). The full extent of the track is now no longer visible hidden beneath various layers of tarmac and concrete or in some cases removed completely.

6 DISCUSSION

6.1 Only a fraction of the once extensive industrial site now survives at the former Thames Board Mills, but until production ceased, the complex had a long and continuous history of paper and board manufacture (Fig. 23). The Victorian mills, standing on the south site from around 1887 gave way in turn to new machine houses in the early 1920s, which were added to piecemeal, together with supporting warehousing and other ancillary structures, served by the river, road and railway. The complex was self-contained, with workers' housing, and even its own power plant in the early days. From the early

1920s to the eve of the Second World War, the addition of storage and production buildings of high quality and modern form attest the success of the plant and the rate of expansion, even during the years of the Great Depression.

6.2 Radical change occurred in the 1960s, when the earlier machines were superseded by a single machine of gigantic proportions, housed in the cathedral-like north mill, a testimony to the confidence in, and ultimately doomed hope for the longevity of heavy manufacturing in post-war Britain. However, changes in the industrial infrastructure in the early 1980s meant that the plant was drastically altered, with the closure and demolition of the south site in rapid succession. On final decommissioning in 2004, much of the machinery was dismantled and removed to Riyadh, leaving the empty buildings with no further use.

6.3 Of the surviving buildings, most can pass with little further comment, being undistinguished or much altered. Even the north mill, though impressive, was built within living memory, and now stripped of all its machinery, has been reduced to a shell. Three buildings however stand out. The converting factory is typical of its period, expressing in style and form the growth of industrial output in the 1920s. It was constructed to the designs of James Lomax Simpson (1882-1977), a godson of Lord Leverhulme, whose company Unilever was eventually to acquire the site. His principal architectural legacy remains the opulent and impressive Unilever House in central London of 1929-30 but his name has hitherto not been linked in published accounts with the building. It was carefully planned, combining factory and offices, in high quality and technologically advanced materials, styled in a manner designed to impress.

6.4 In 1930, the converting factory was extended to the north to provide extra capacity. This building was designed by the engineering partnership of L.G. Mouchel, who had pioneered the use of ferro-concrete in Britain during the last years of the 19th century, where concrete could be substituted for steel, as well as providing good fireproofing. The massive columnar supports of the lower storey were to prefigure construction techniques in the post-war period.

6.5 Less is known about Building 6, a warehouse which resembles closely a First World War aircraft hangar, and here constructed in the late 1930s, it is perhaps one of the latest manifestations of this form known. It is possible that the building was dismantled from elsewhere and re-erected, but it remains unusual in that all other buildings on the site were constructed of iron and steel with this single exception.

7 CONCLUSION

7.1 The buildings on the site retain some interest as a reflection of inter-war development in British industry, though with the exception of the timber warehouse with its Belfast trusses, the type remains typical and fairly

common. They add to the known canon of buildings by James Lomax Simpson in particular and attest the development of modern structural techniques.

ARCHIVE

A copy of the full archive comprising drawings, photographs, negatives, and the film register, copies of any correspondence and the full report shall be submitted to the appropriate museum (Thurrock) within the twelve months of completing the fieldwork.

ACKNOWLEDGEMENTS

Archaeological Solutions Limited would like to thank the client British Gypsum for funding the project (in particular Mr Guy Mowbray for his assistance) and their consultants (CRA (Europe) Ltd for their assistance (in particular Mr Martin Danihel and Ms Nicole Gilmore).

AS would also like to acknowledge the assistance of Ms Laura Belton, Essex HER Records Officer at ECC, Mr Alan Gosling at Purfleet Heritage and Military Centre, and staff at the Chelmsford Record Office.

AS would also like to acknowledge the input and advice of Mr Richard Havis of ECC Historic Environment Management Team

Archaeological Solutions are also grateful to Mr Keith Ford and the security staff based at the site for their help and advice and also Brown and Mason for ensuring a safe working environment.

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APPENDIX 1 CARTOGRAPHIC SOURCES

Fig.	Title	Date	Scale	Reference/ Location
1	Site location	modern	1:25,000	OS Explorer
2	Detailed site location			
3	First Edition OS Map	1867	1:10,560	CRO: 3
4	Second Edition OS Map	1897	1:2,500	CRO: 83.9
5	OS Map	1920	1:2,500	CRO: 94 NE 4 & 5
6	OS Map	1939	1:2,500	CRO: 94 NE 4 & 5
7	Aerial Photo of Thames Board Mill	1950s-60s		PH&MC
8	Pictorial record of the board and packing case manufacturing stages	1950s -60s	-	PH&MC
9	View from the south-east of Building 9 during the flood	1953	-	PH&MC
10	View from the south of Building 10 with the connecting bridge from South Mill	1953	-	PH&MC
11	No. 4 machine in Building 10	1953	-	PH&MC

APPENDIX 2 HER SUMMARY SHEET

Site name and address:	BPB Boardmills Purfleet, Essex
County: Essex	**District:** Thurrock
Village/Town: Purfleet	**Parish:** West Thurrock
Planning application reference:	11/50404/TTGDEM
Client name/address/tel:	British Gypsum
Nature of application:	Demolition and redevelopment
Present land use:	Derelict paper board mill
Size of application area:	**Size of area investigated**
NGR (8 figures):	TQ 5585 7781
Site Code:	THPP12
Site director/Organization:	Archaeological Solutions
Type of work:	Historic Building Recording
Date of work:	February-April 2012
Location of finds/Curating museum:	Thurrock
Related SMR Nos:	**Periods represented:** 19th / 20th century
Relevant previous summaries/reports: -	
Summary of fieldwork results:	In February 2012 Archaeological Solutions (AS) conducted a programme of historic building recording at the former Thames Board Mills, Purfleet, Essex. (NGR TQ 5585 7781). The work was commissioned by British Gypsum and was undertaken prior to the demolition of the remaining industrial buildings on the site. The Thames Board Mills originated in around 1887 when Louis Cartiaux formed the St. Louis Park Mills Co on the southern, Thames side of the railway line. In 1902, an American, W. J. Alford took over the site, forming the Thames Paper Mill Company Ltd (TBM). From 1924 the mill expanded and a new converting factory was constructed to the north (Building 10). By 1939 many more buildings had been added, and in the early 1960s a major expansion resulted in the construction of the north mill (Building 4). In 1965 TBM became part of the Unilever Group, but by 1975 the company was in decline and South Mill closed, with many of the buildings being demolished in the following years. In 1986 Unilever sold TBM to Davidson Ltd. who renamed it Purfleet Board Mill. In 2004 production on the site ceased. The principal surviving buildings include the converting factory, constructed in typical industrial style to the designs of James Lomax Simpson in 1924-26, which was expanded to the north in 1930 by the notable engineers L.G. Mouchel & Partners using the Hennebique system of fire-proof, reinforced concrete. Immediately opposite to the west, a second converting factory was constructed in 1936, with an attached warehouse following in 1939. The factory element was demolished in the 1990s but the warehouse survives as a typical late 1930s industrial building. A nearby building of note is a warehouse of 1937-8 at the western end of the site, which is constructed almost entirely of timber, spanned by enormous laminated Belfast trusses; a late occurrence of a type more normally associated with World War I aircraft hangars, and possibly relocated to the site from elsewhere. This building was partially truncated by the construction of the North Mill in the mid-1960s. This latterly formed the principal paper-making plant on the site, and was highly advanced at the time of its construction in 1964. At the time of the survey, the buildings had been ransacked and looted after decommissioning, with some fire damage of the former converting factory. Several important components remained in situ, however with most buildings remaining structurally intact.
Author of summary: Lee Prosser	**Date of Summary:** March 2012

APPENDIX 3 ARCHAEOLOGICAL SOLUTIONS BUILDING RECORDING ARCHIVE FORM

Site Details	
Site Name: BPB Boardmills, Purfleet, Essex	**NGR**: TQ 5585 7781
County: Essex	**Museum Collecting Area:** Thurrock
Site Code: THPP12	**Project Number:** 4529
Date of Work: February – April 2012	**Related Work:** n/a

Brief/s		**Specification/s**	
Date	**Present**	**Date**	**Present**
February 2012	Yes	3rd February 2012	Yes

Site Records (Description)

Notes taken on site (28 pages A4)

Site Drawings (Give Details of Formats & Size)

1 x A4 sheet of draft film

Architect's Drawings:
Plans and elevations 16 sheets A3
Plans and elevations 5 sheets A3 – annotated
Plans and elevations 2 sheets A4
Sketch Plans 8 A4 – annotated
Plans 1 sheet A1

Digital Drawings

Printouts of Drawings	**Printouts of Data**	**Digital Data**
In report		Digital photographs and drawings in digital format on CD 2 x CDs of plans and photos

Reports

Report No	**Report Type**	**Present**
4053	Historic Building Recording	Yes

Site Photographs

Black & White Contact Prints					Colour Slides		
Film No	**Film Type**	**Negs**	**Negs Present**	**Contacts Present**	**Film No**	**Negs**	**Present**
1	120mm	1-15	Yes	Yes	1	1 -34	Yes
2	120mm	1-15	Yes	Yes			
3	120mm	1-15	Yes	Yes			
4	120mm	1-15	Yes	Yes			
5	120mm	1-15	Yes	Yes			
6	120mm	1-15	Yes	Yes			
7	120mm	1-9	Yes	Yes			

Photographic Location Plans Present? (Give Details)
In report and separate printouts in archive folder

Digital Photographs (Give Details):
Digital photography. Index and selected plates printed in report. Separate printout of index included in archive folder and digitally on CD

PLATES

Plate 1 Aerial view of BPB Paperboard, Purfleet, taken from the east

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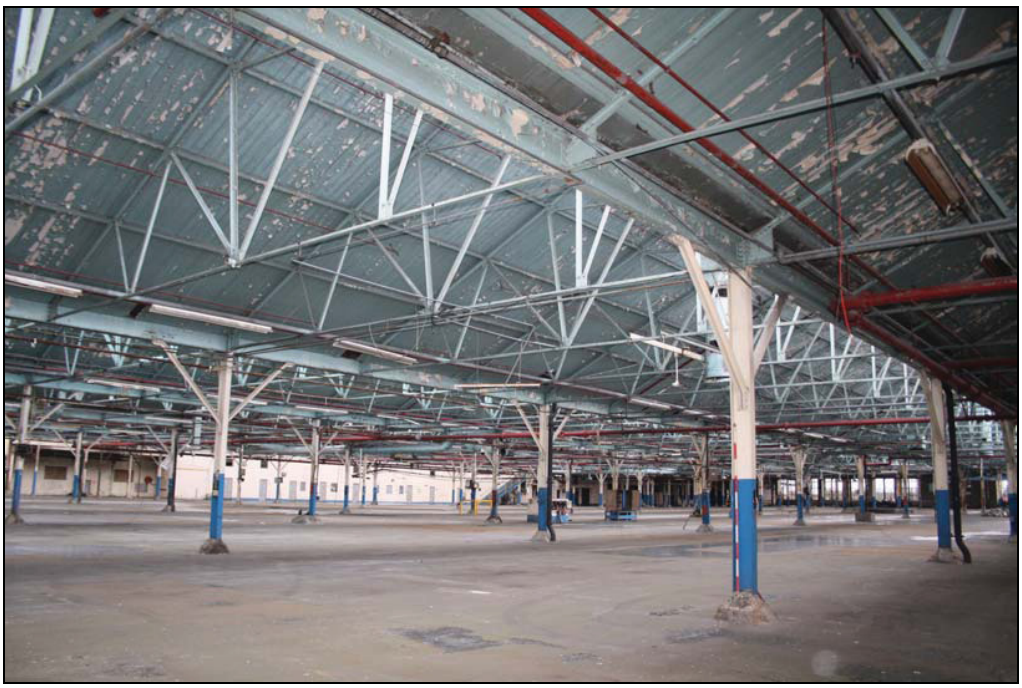

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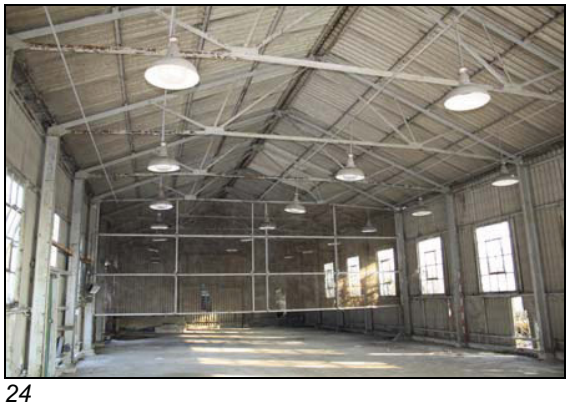

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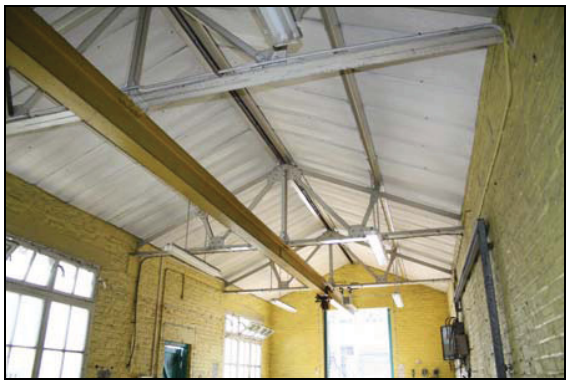

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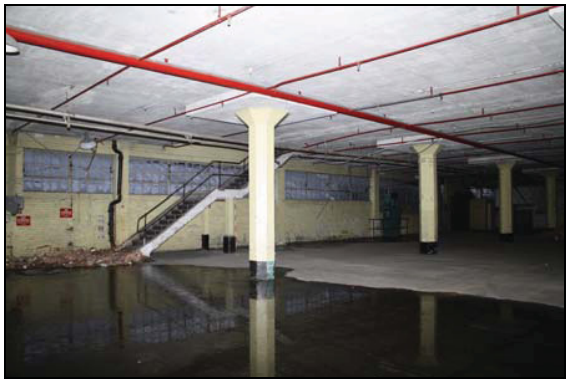

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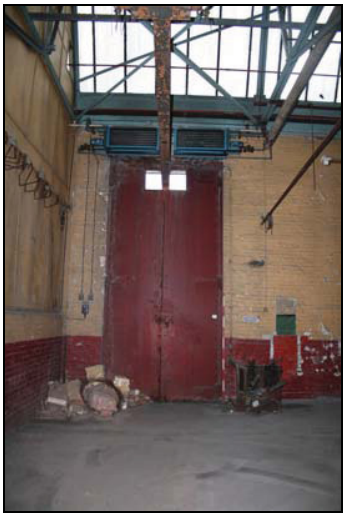

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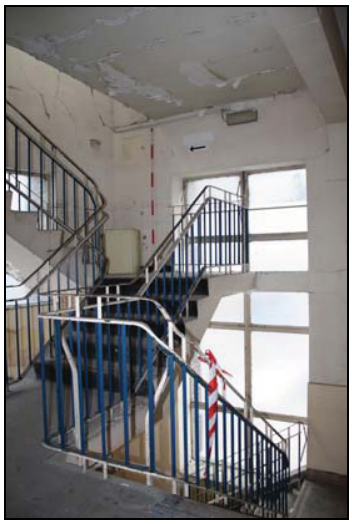

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Interior, north-western unit, Building 6, taken from the north-east

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Remaining machinery, interior, north-western unit, Building 6, taken from the south-west

195

Interior, south-western unit, Building 6, taken from the north-west

196

Belfast roof trusses, interior, south-western unit, Building 6, taken from the south-west

197

Interior, south-western and south-eastern units, Building 6, taken from the south-west

198

Principal-post supported by long straight braces, interior, south-western and south-eastern units, Building 6, taken from the south-west

199

Belfast roof trusses, interior, south-eastern unit, Building 6, taken from the south-west

200

Bracing to the Belfast roof trusses, interior, south-eastern unit, Building 6, taken from the south

201

Belfast roof trusses, interior, south-western unit, Building 6, taken from the east

202

Straight bracing to the principal-posts and tie-beams, interior, south-western unit, Building 6, taken from the south-east

203

Interior, Building 7, taken from the north-east

204

Interior, Building 7, taken from the south-west

205

Interior, Building 7, taken from the south

206

Interior, Building 8, taken from the north-east

207

Kiosk, mill road, taken from the south-east

208

Weighbridge, taken from the south-west

209

Building 2, interior, taken from the south-west

210

Building 2, interior, taken from the north-west

211

Interior, Building 1, taken from the east

212

Warehouse at eastern end of Building 4, taken from the north-west

213

Crane structure, warehouse at eastern end of Building 4, taken from the north-east

214

Warehouse at eastern end of Building 4, taken from the south-east

215

Warehouse at eastern end of Building 4, taken from the east

216

Main staircase and entrance lobby, ground floor, Building 4, taken from the south-west

217

Base of hydro-pulper, ground floor, Building 4, taken from the north-west

218

Electrical room, ground floor, Building 4, taken from the south

219

Machinery, ground floor, Building 4, taken from the south-east

220

Chests and redundant pipe hangers, ground floor, Building 4, taken from the south-east

221

Ground floor, Building 4, taken from the north-west

222

Substation, ground floor, Building 4, taken from the north-east

223

Tanks and chests, ground floor, Building 4, taken from the south-west

224

Redundant pipework, ground floor, Building 4, taken from the north-east

225

Ground floor, western end of Building 4, taken from the south-west

226

Sliding roller doors, ground floor, western end of Building 4, taken from the south-east

227

First floor, western end of Building 4, taken from the north-west

228

Testing rooms, first floor, western end of Building 4, taken from the south-east

229

Large crane structure, first floor, western end of Building 4, taken from the north-east

230

Machinery, first floor, western end of Building 4, taken from the north-east

231

Conveyor belt leading from Building 4 to Building 6, first floor, western end of Building 4, taken from the north-east

232

Main machine hall running the length of Building 4, ground floor, taken from the north-west

233

View from first floor into the space once occupied by the machine, first floor, Building 4, taken from the north-east

234

View from first floor into the space once occupied by the machine, first floor, Building 4, taken from the north-west

235

Machinery, first floor, Building 4, taken from the south

236

Machine hall, first floor, Building 4, taken from the north-east

237

Cap of hydro-pulper, first floor, eastern end of Building 4, taken from the south-east

238

Interior of hydro-pulper lined with ceramic tiles, first floor, eastern end of Building 4, taken from the north-west

239

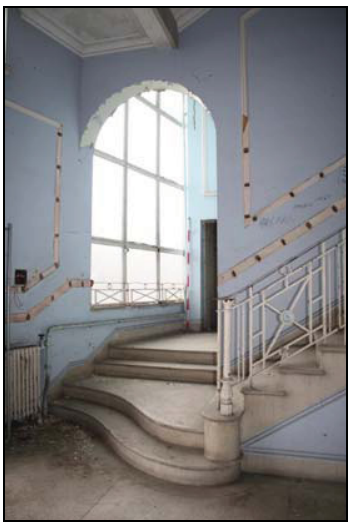
Door giving access to warehouse at the eastern end of Building 4, taken from the east

240

Canopy and loading bay to the south of the western end of Building 4, taken from the south-east

241

Main entrance, Building 10, taken from the west



242

Central staircase, Building 10, taken from the south-east

243

Small aperture, north elevation, Building 10, taken from the north

244

Building 10 supported on concrete piles, taken from the north-west

245

Building 10 supported on concrete piles, taken from the east

246

Original internal safe doors, Building 10, taken from the east

247

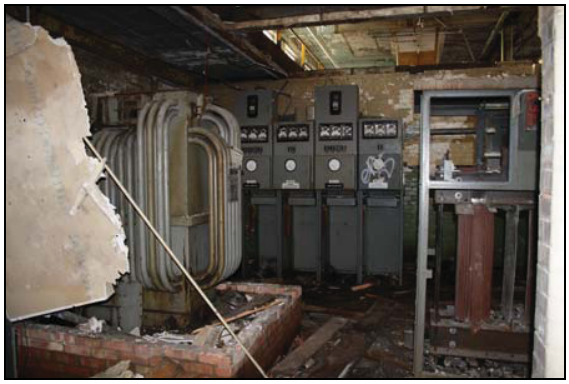
Original 1920s urinals, interior, second floor, Building 10, taken from the south-east

248

Pendant lighting, north-west stairwell, second floor, Building 10, taken from the south-west

249

Machinery, interior, ground floor, Building 10, taken from the north-west



250

Machinery, interior, ground floor, Building 10, taken from the north-east

251

Machinery, interior, ground floor, Building 10, taken from the south-west

252

Maker's mark: Booths' sure-shield fireproof shutters, interior, ground floor, Building 12, taken from the north

253

Maker's mark: Rolador original shutter doors, north elevation, Building 11, taken from the north

254

North elevation, Building 11, taken from the north-east

255

Interior, first floor, Building 11, taken from the north-east

256

Machinery by Herbert Morris Ltd, Loughborough, England, interior, first floor, Building 11, taken from the east

257

Machinery, interior, first floor, Building 11, taken from the south-west

258

Early Tannoy system, interior, first floor, Building 11, taken from the north

259

Small outshut, interior, first floor, Building 11, taken from the south-east

260

Maker's mark: Frodingham iron and steel co. Ltd, England, interior, second floor, Building 10, taken from the north

261

Maker's mark: Round oak, interior, first floor, Building 10, taken from the south-east

262

Maker's mark: Shelton, England, interior, first floor, Building 10, taken from the north-west

263

Maker's mark: Dorman Long and Co Middlesbrough, England, interior, first floor, Building 10, taken from the south-west

264

Maker's mark: Round Oak, interior, first floor, Building 10, taken from the south

265

Maker's mark: Cargo Fleet, England, interior, first floor, Building 10, taken from the south

266

Interior, ground floor, Building 4, taken from the east

267

Interior, ground floor, Building 4, taken from the south-west

268

Enclosed machine pit, interior, ground floor, Building 4, taken from the south-east

269

Enclosed machine pit, interior, ground floor, Building 4, taken from the south-east

270

'Dry end' of machine, interior, ground floor, Building 4, taken from the south-east

271

Interior, Building 5, taken from the south-west

272

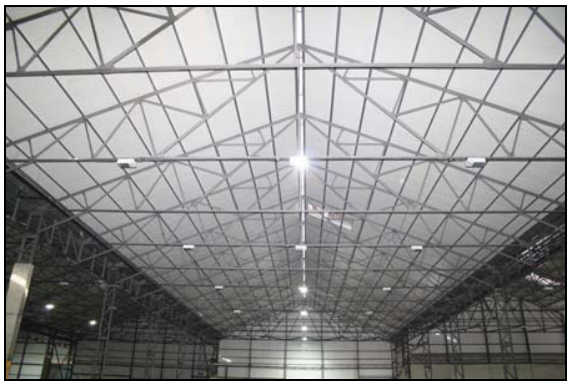
Interior, Building 5, taken from the north-east

273

Interior, Building 9, taken from the north-east

274

Steel roof trusses, interior, Building 9, taken from the north



275

Steel roof trusses, interior, Building 9, taken from the north

276

Steel roof trusses, interior, Building 9, taken from the south-west

277

Interior, Building 9, taken from the south-west

278

Cobbled surface incorporating narrow gauge train tracks, taken from the south

279

Cobbled surface incorporating narrow gauge train tracks, taken from the south-east

280

Cobbled surface incorporating narrow gauge train tracks, taken from the south-east

281

Pump house, Building 19, taken from the north-east

282

Pump house, Building 19, taken from the north-east

283

Pump house, Building 19, taken from the north-east

284

View looking back over the now demolished effluent plant towards Building 10, taken from the south-east

285

Pump house, Building 19, taken from the north-west

286

Interior, second floor, Building 4, taken from the north-west

287

Interior, second floor, Building 4, taken from the north-east

288

Interior, second floor, Building 4, taken from the west

289

Interior, second floor, Building 4, taken from the north

290

Interior, second floor, Building 4, taken from the south-east

291

Mezzanine gantry, interior, second floor, Building 4, taken from the south-east

292

Mezzanine gantry, interior, second floor, Building 4, taken from the south-east

293

South-western unit, interior, second floor, Building 4, taken from the north-east

294

South-western unit, interior, second floor, Building 4, taken from the south-west

295

Machinery, south-western unit, interior, second floor, Building 4, taken from the south-east

296

Mezzanine gantry, interior, second floor, Building 4, taken from the south-east

297

No. 11 Machine in situ, Building 4, taken from the east

298

No. 11 Machine in situ, Building 4, taken from the north-east

299

Building 5 under construction with the earlier extension to Building 9 in the background, taken from the north-west

300

Mill road flanked by Building 10 and the earlier extension to Building 9, taken from the north-west

301

Demolition of the south mill buildings, taken from the west

302

Demolition of the south mill, direction unknown

303

Silos, south mill, direction unknown

304

Water tower, south mill, direction unknown

305

Boiler house and chimney, south mill, direction unknown

306

Demolition of the south mill, taken from the north-east

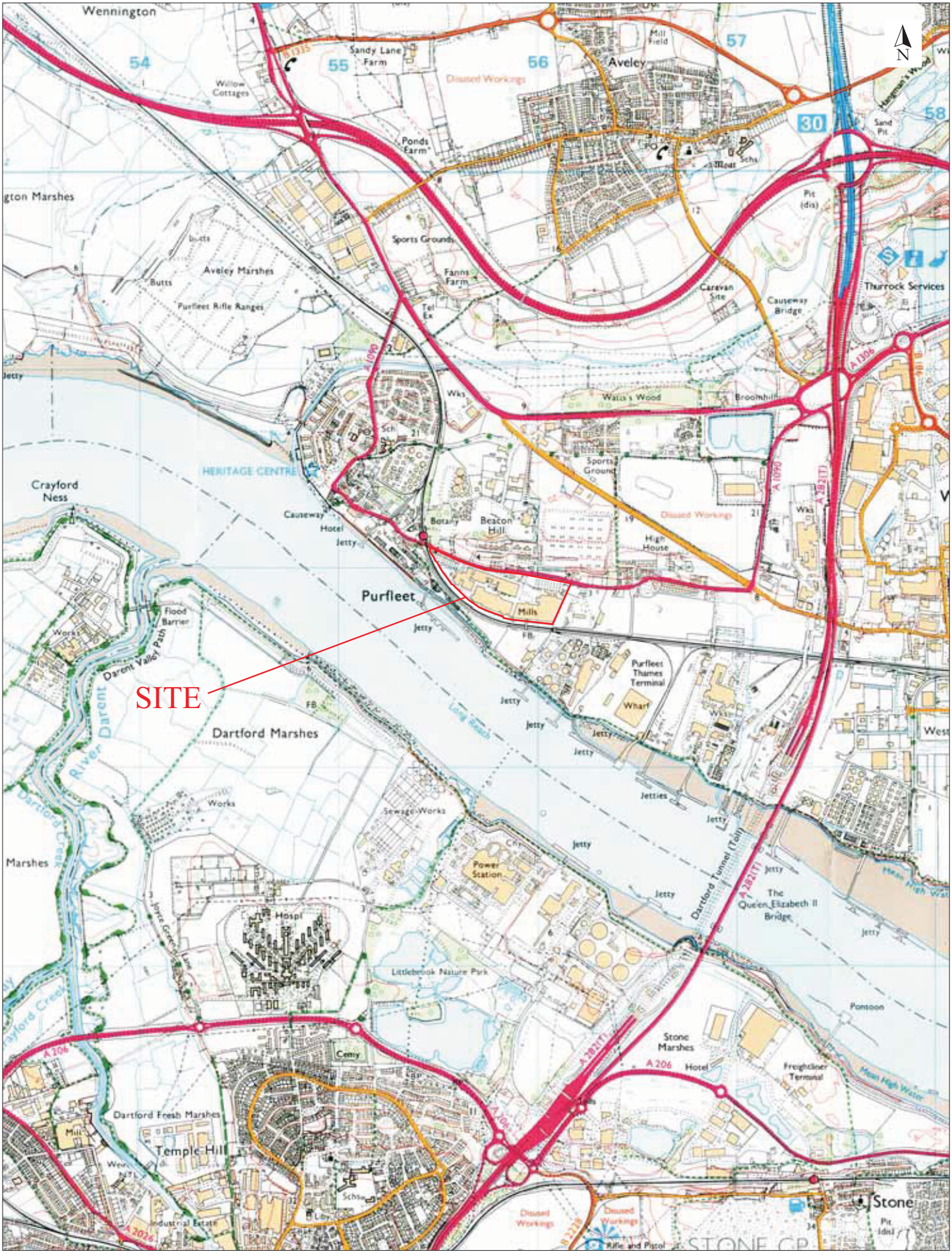


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Fig. 1 Site location plan

Scale 1:25,000 at A4

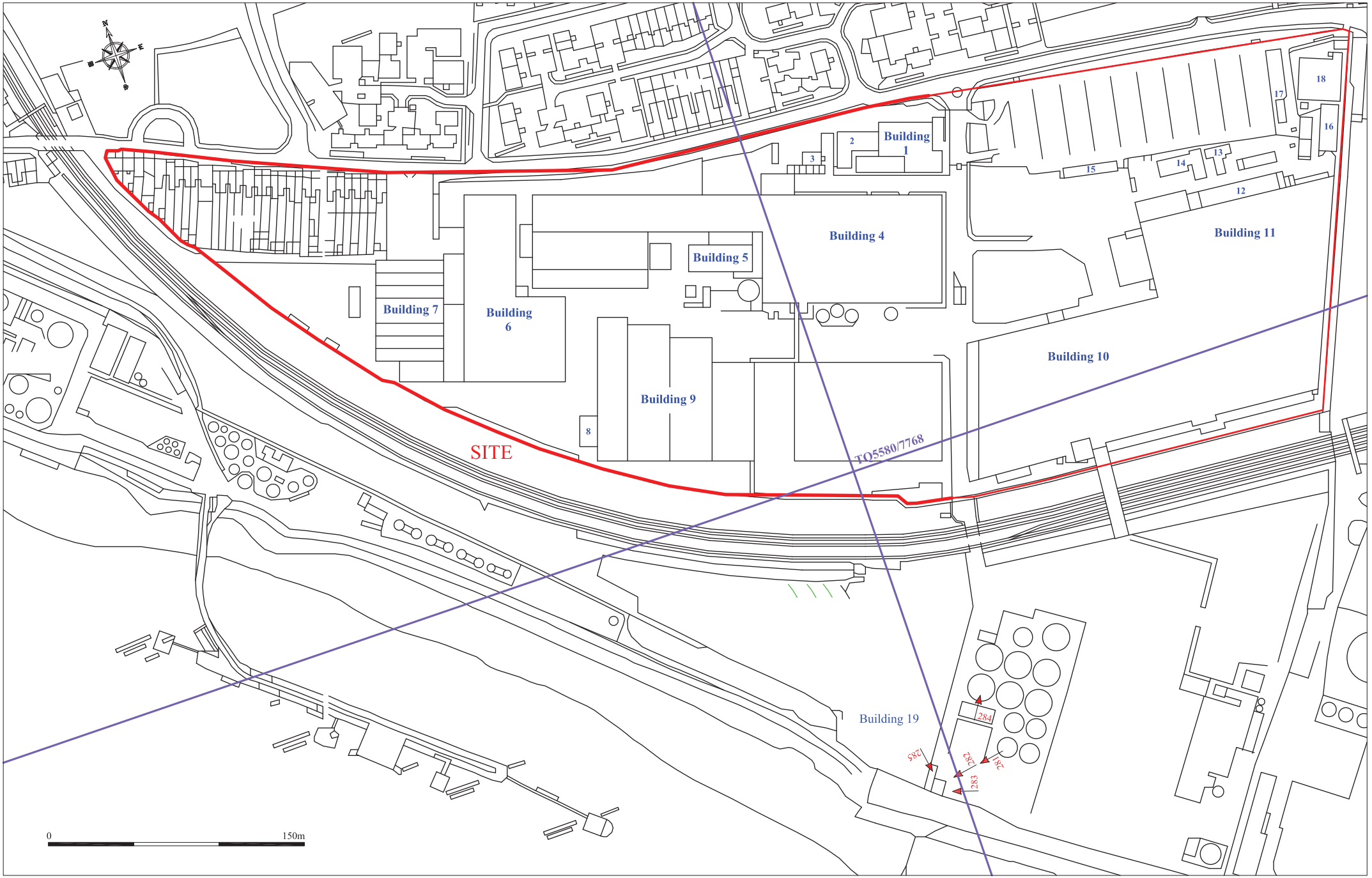

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Fig. 2 Detailed site location plan

Scale 1:2000 at A3

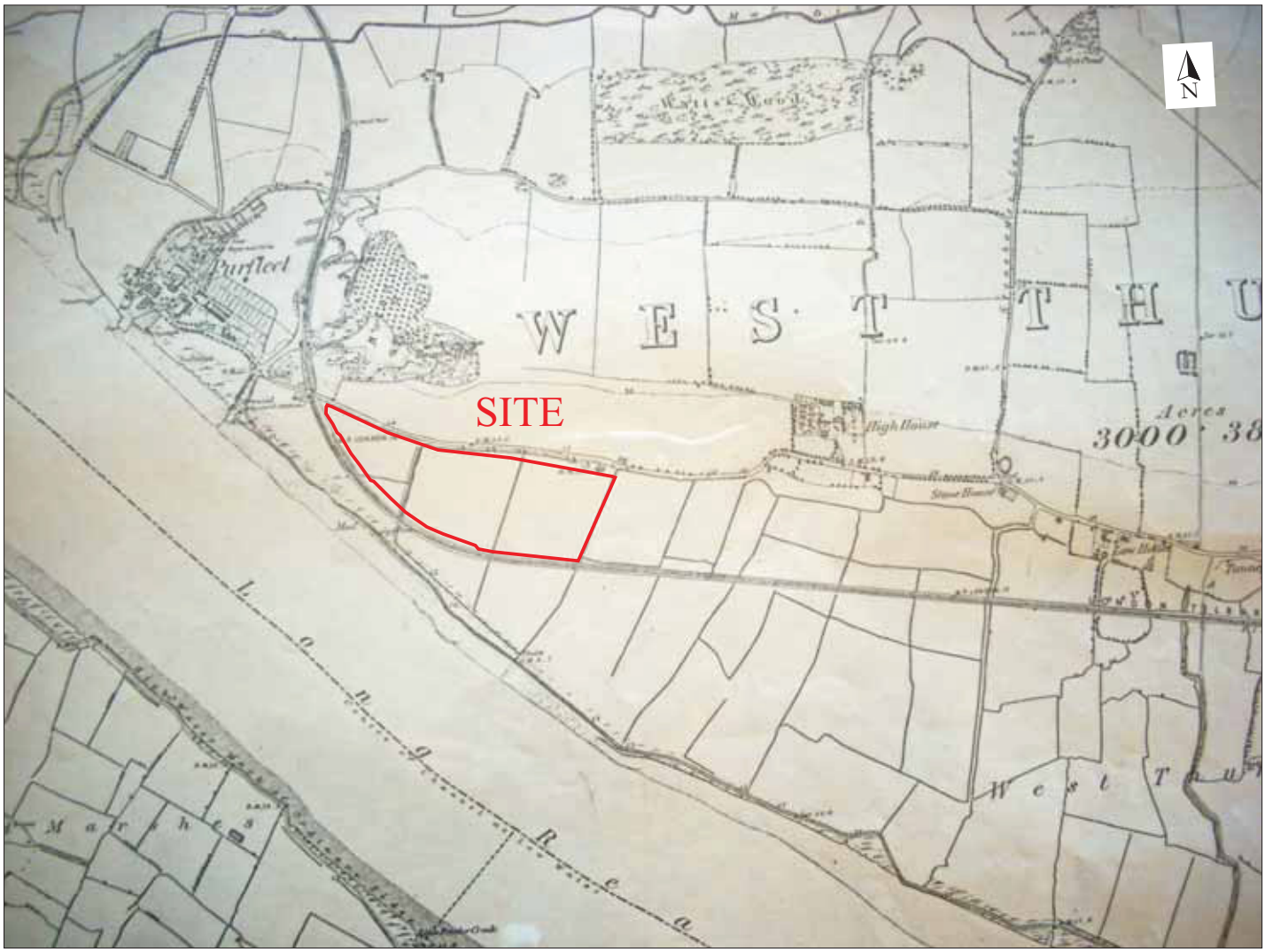

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Fig. 3 OS map, 1867
Not to scale

Archaeological Solutions Ltd
Fig. 4 OS map, 1897
Not to scale

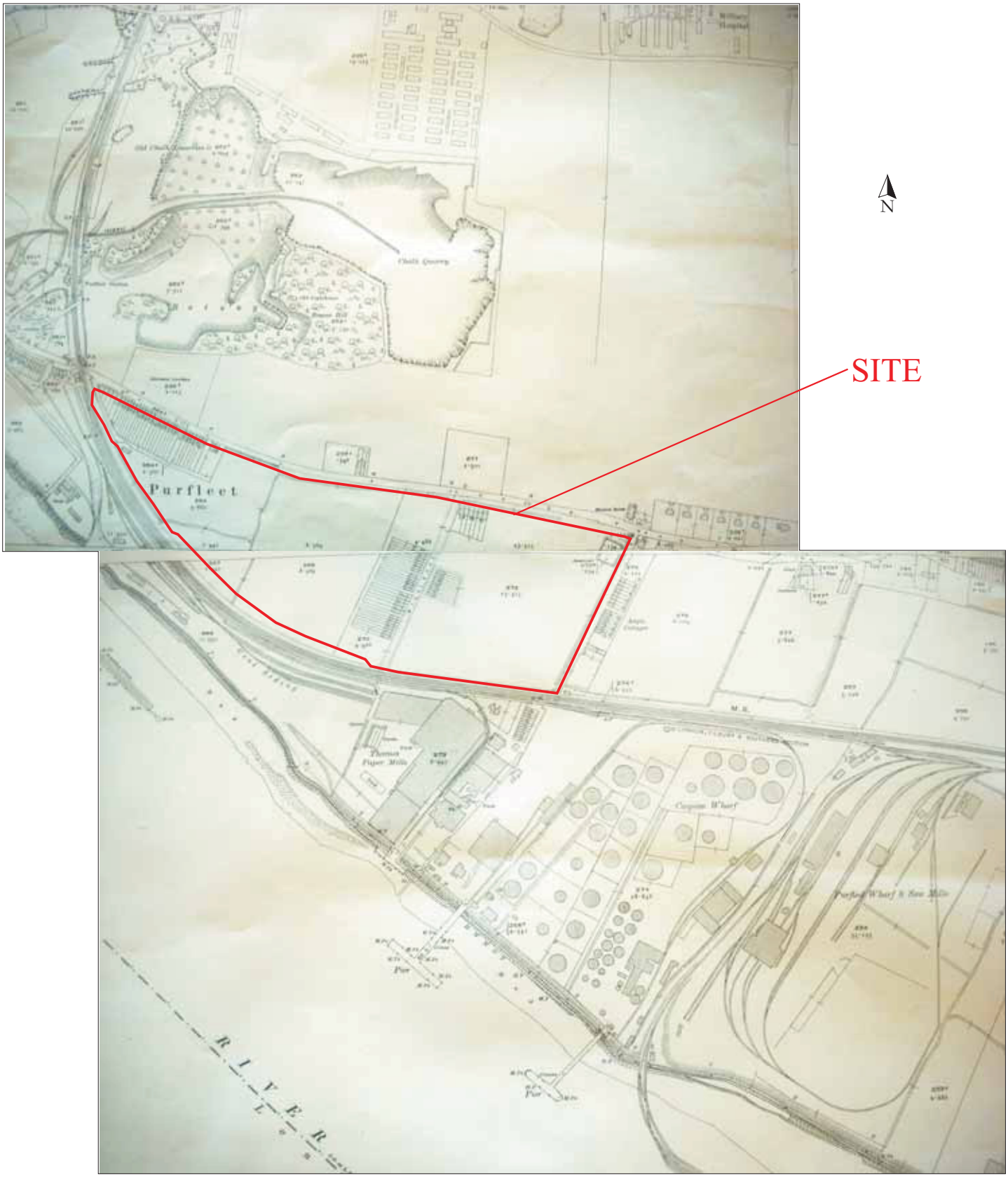

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Fig. 5 OS map, 1920
Not to scale

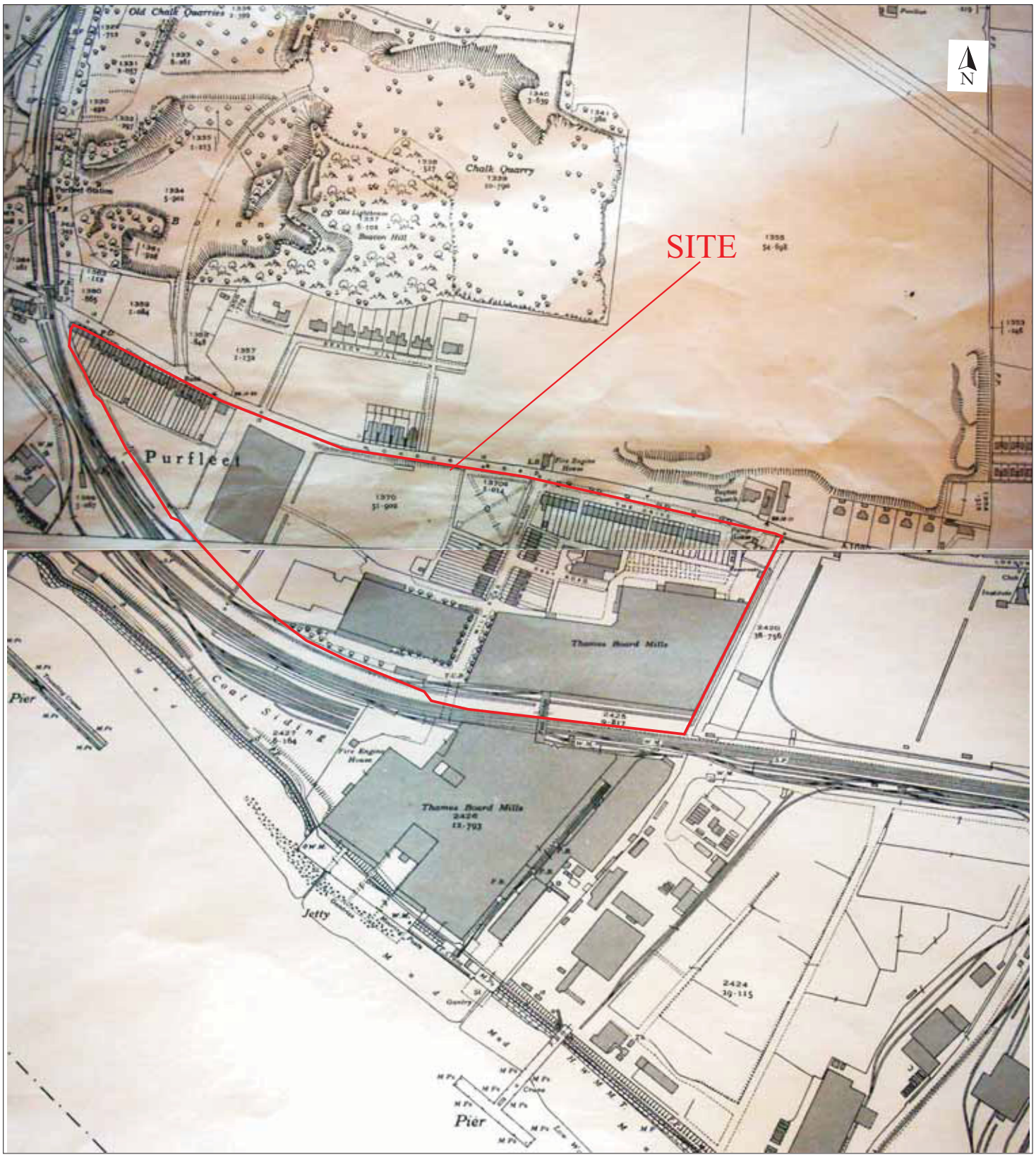

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Fig. 6 OS map, 1939
Not to scale

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Fig. 7 Aerial photograph of Thames Board Mills taken in the 1950's-60's
Not to scale

Archaeological Solutions Ltd

Fig. 8 Building 9 taken across the flooded railway line from the south-west, 1953

Not to scale

Archaeological Solutions Ltd
Fig. 9 View of south mill from the north-east
Not to scale

Archaeological Solutions Ltd
Fig. 10 Machine temporarily shut down due to flooding in the Converting Factory (Building 10), 1953
Not to scale

Archaeological Solutions Ltd
Fig. 11 1950's-60's pictorial record of the board and packing case manufacturing process undertaken in Building 10
Not to scale

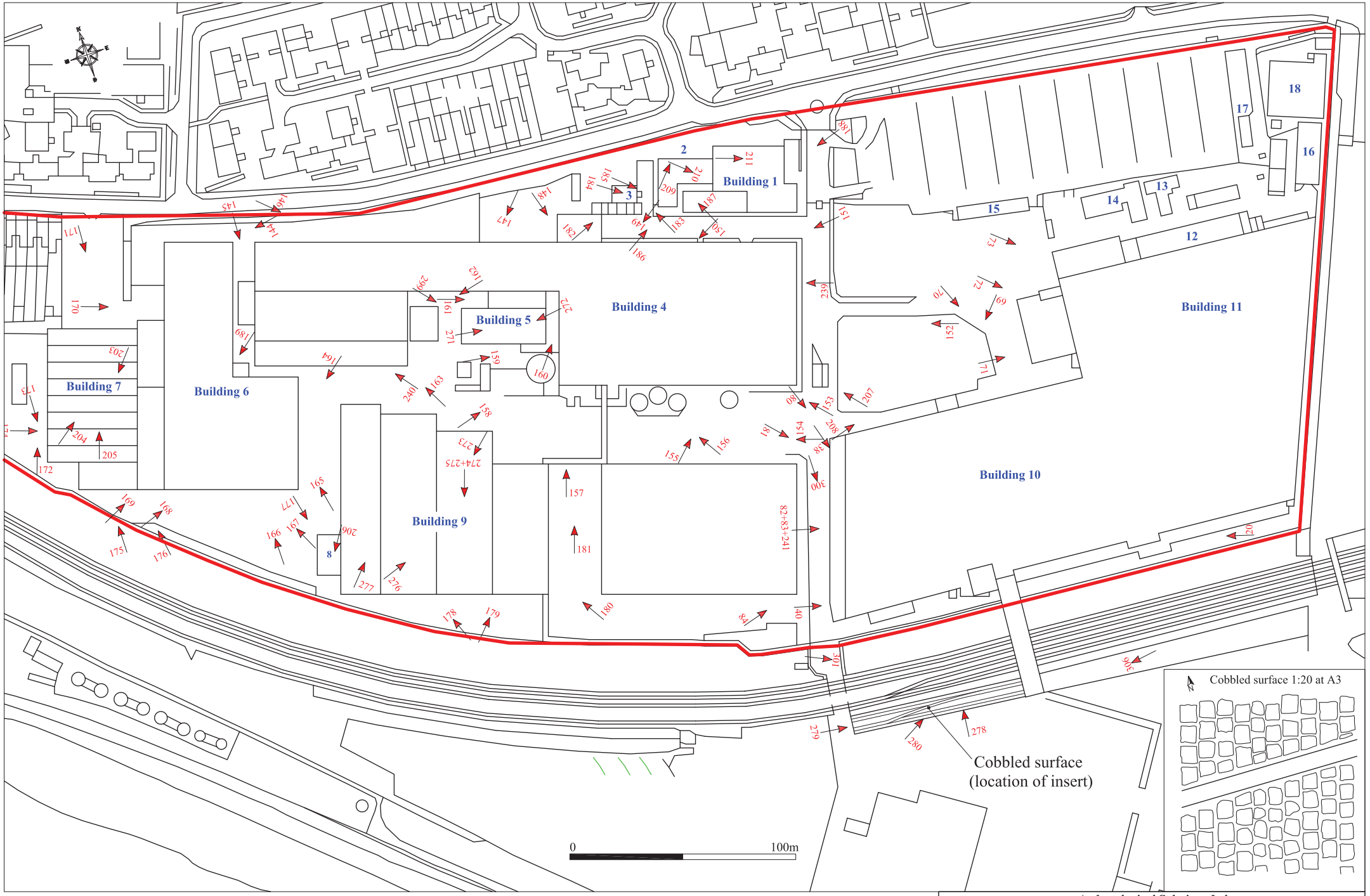

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Fig. 12 Main external photographic location plan

Scale 1:1500 at A3

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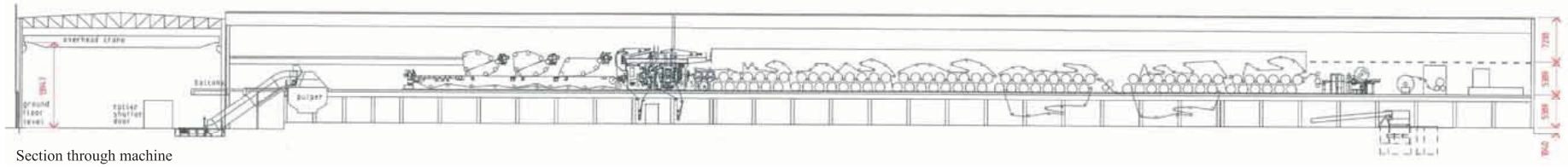
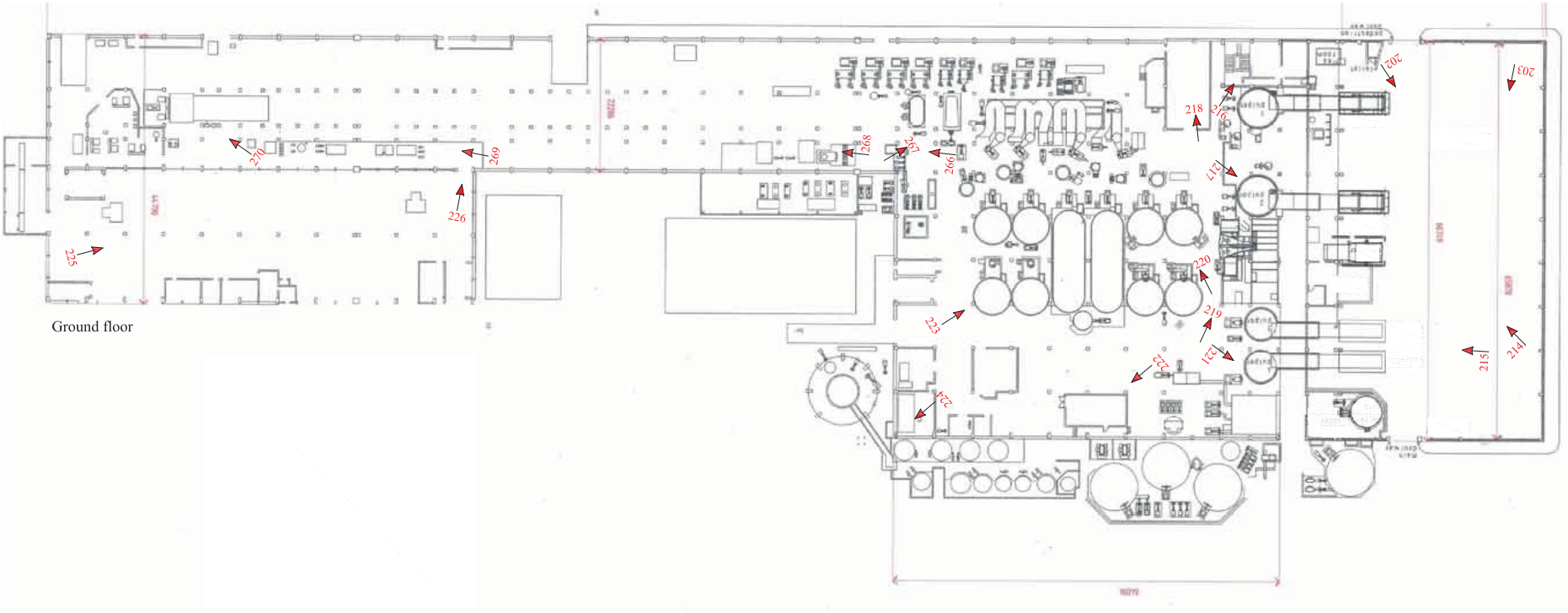
Fig. 13 Photographic location plan for Buildings 12-18

Scale 1:500 at A3



Section through machine



Ground floor

0 100m

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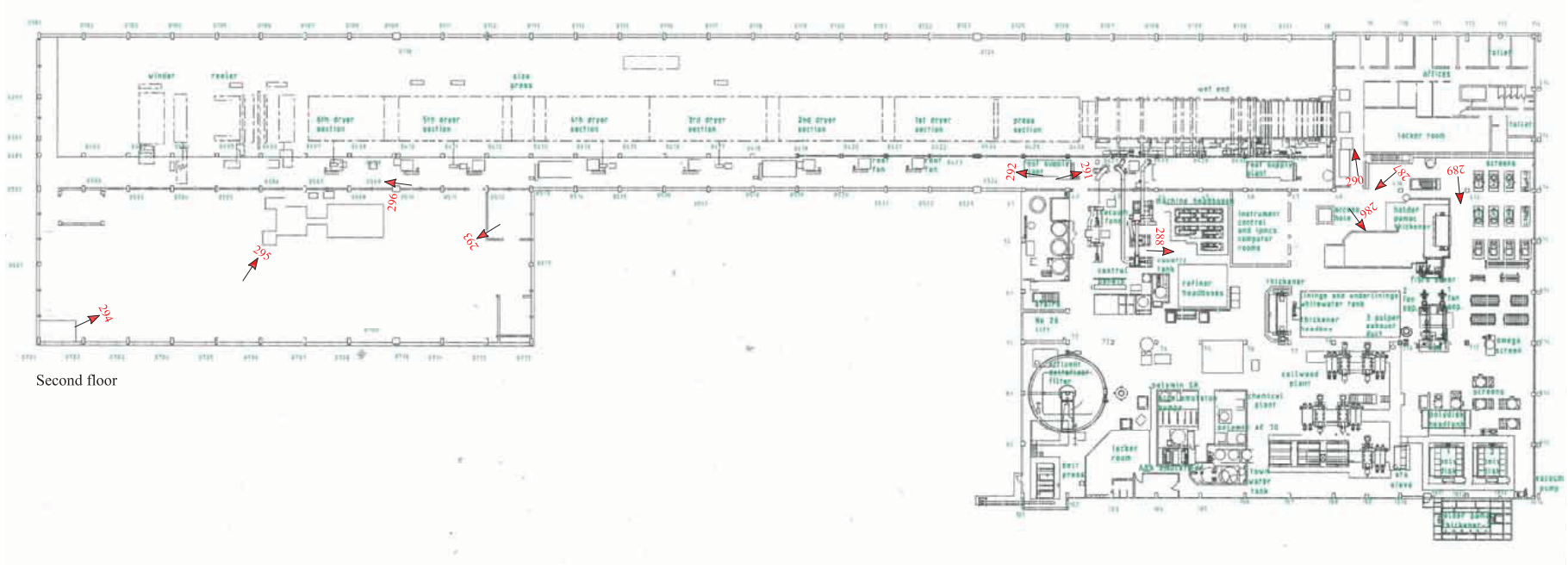
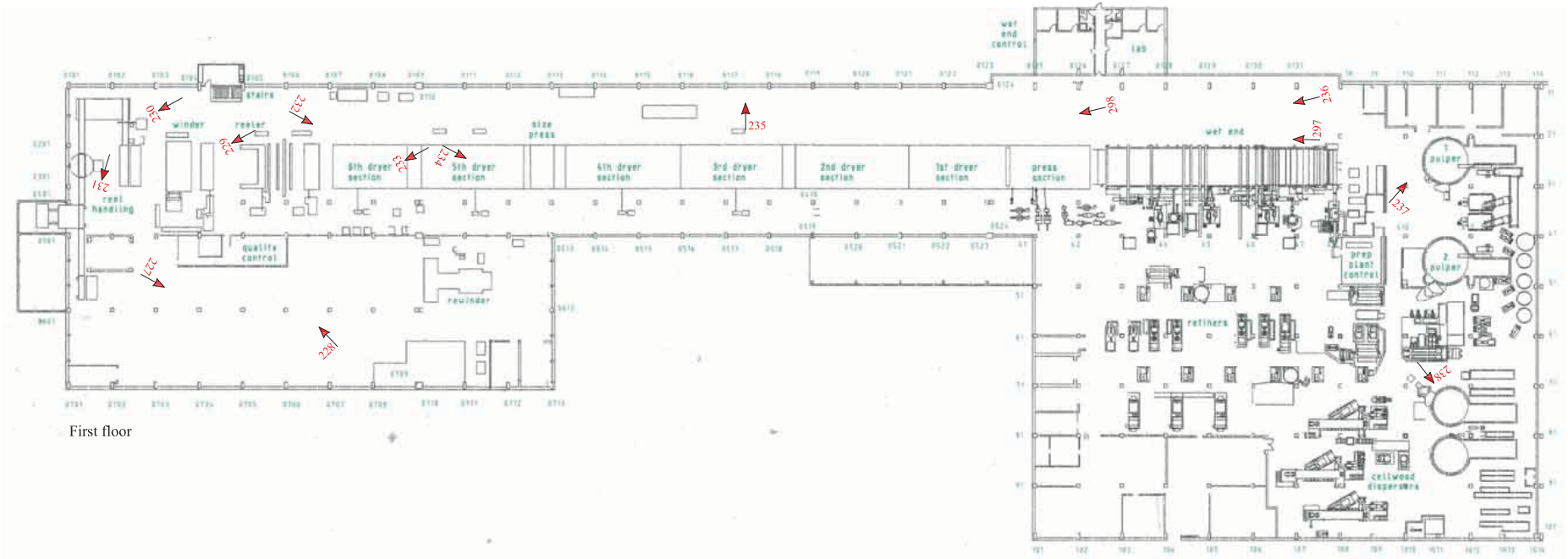
Fig. 14 Internal photographic locations for Building 4

Scale Plans 1:750 at A3





0 100m

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Fig. 15 Internal photographic locations for Building 4

Scale Plans 1:750 at A3

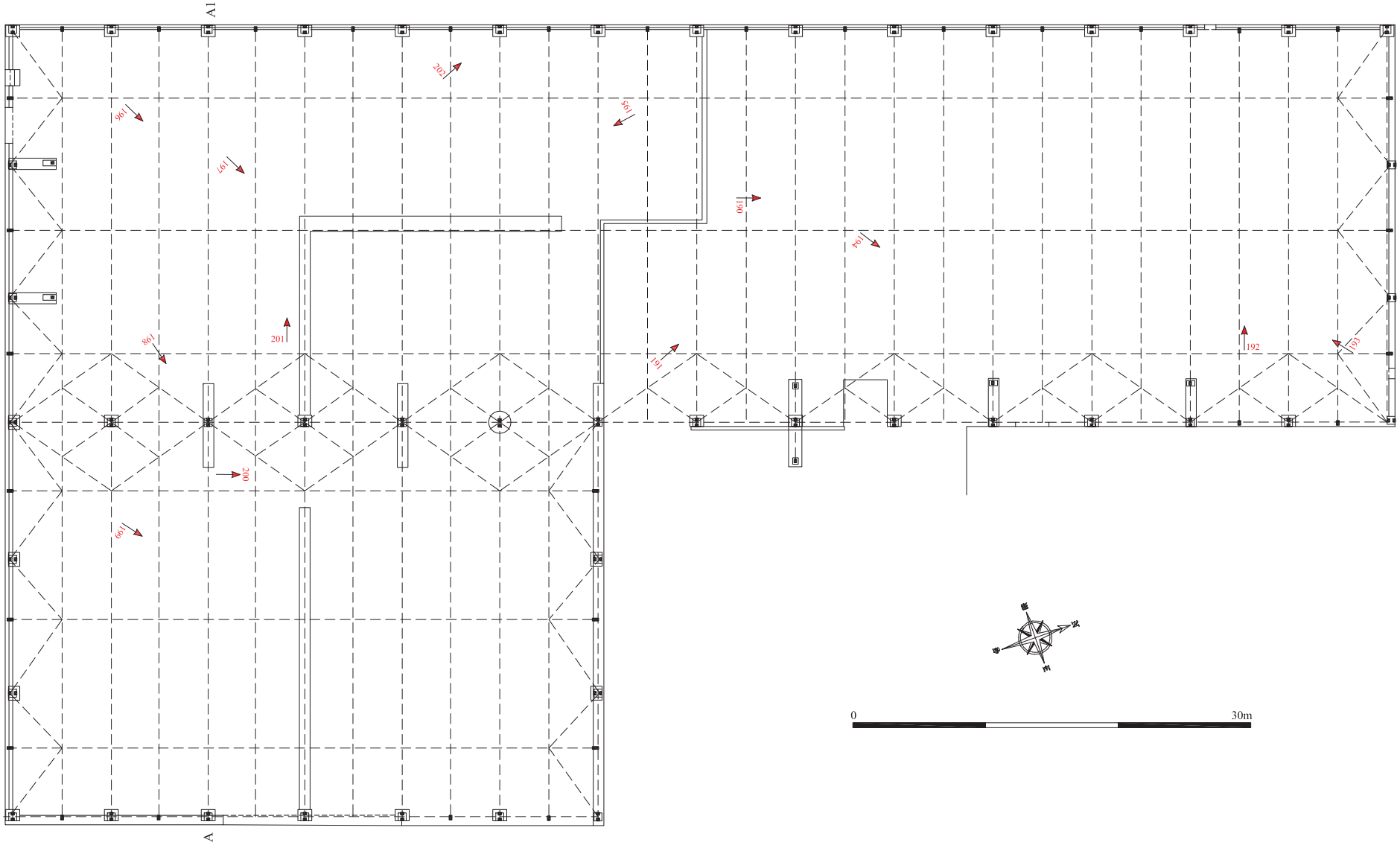

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Fig. 16 Plan of Building 6

Scale 1:300 at A3

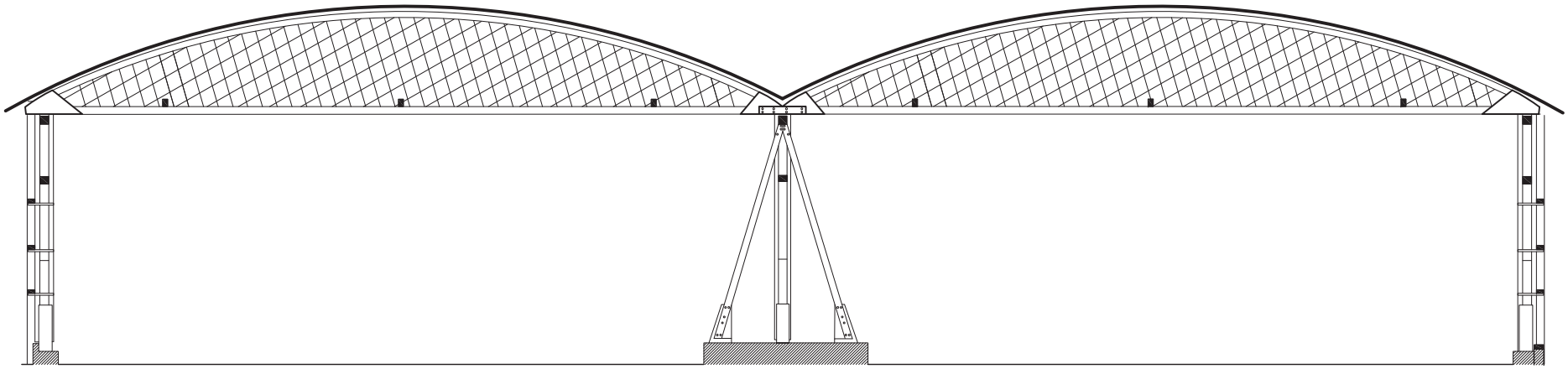

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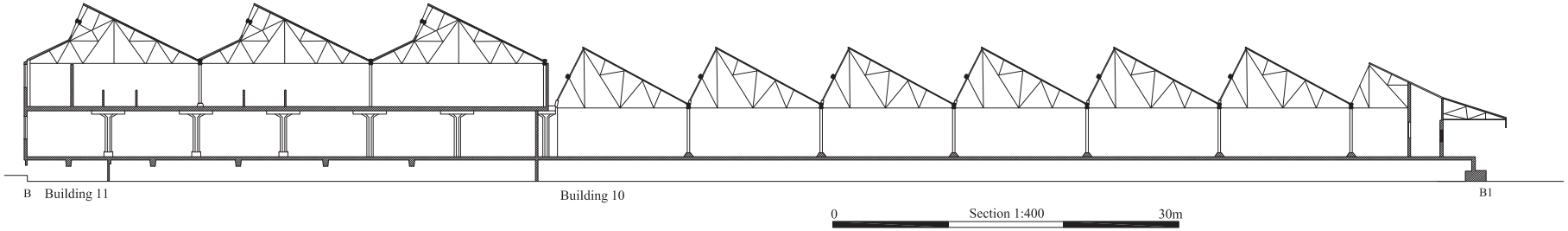
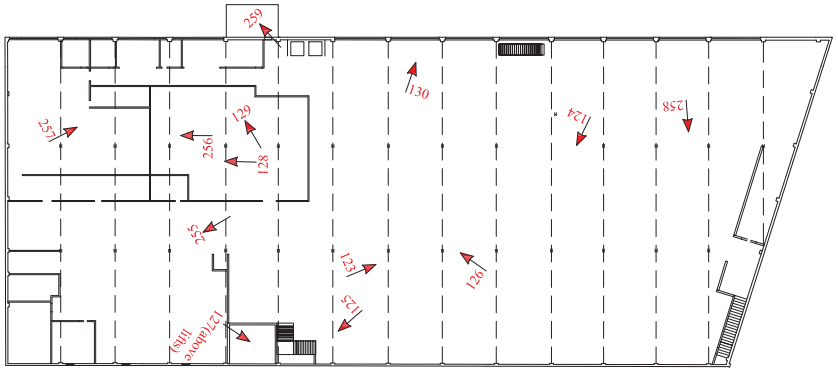
Fig. 17 Section through Building 6

Scale 1:250 at A4





Building 11 First floor

Building 12

Building 11

Photograph taken in undercroft

Building 10

0
Plans 1:750
100m

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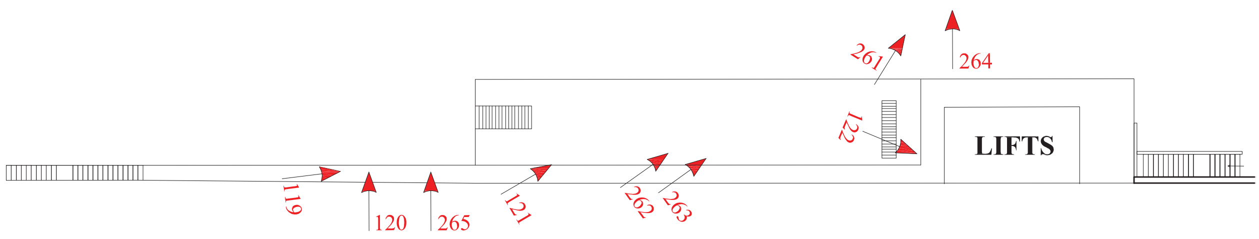
Fig. 18 Buildings 10,11 & 12

Scale Plans 1:750, section 1:400 at A3

Building 10 second floor before fire damage



Building 10 First floor mezzanine (south)

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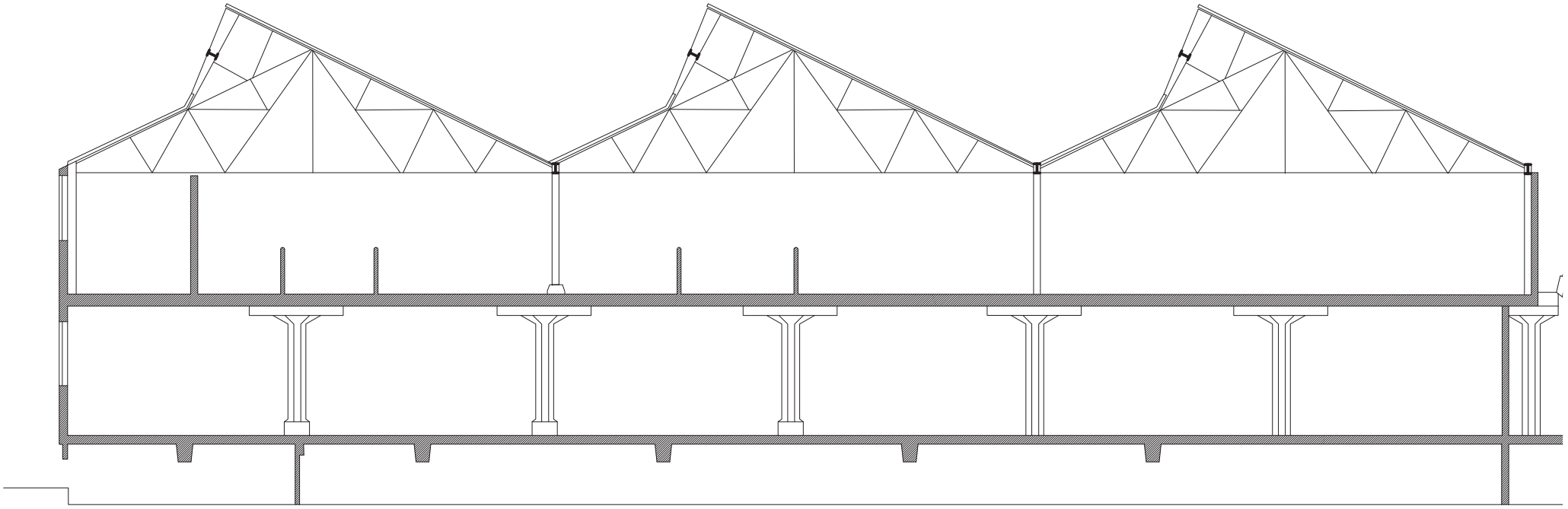
Fig. 19 Building 10, second floor & mezzanine

Scale 1:500 at A4



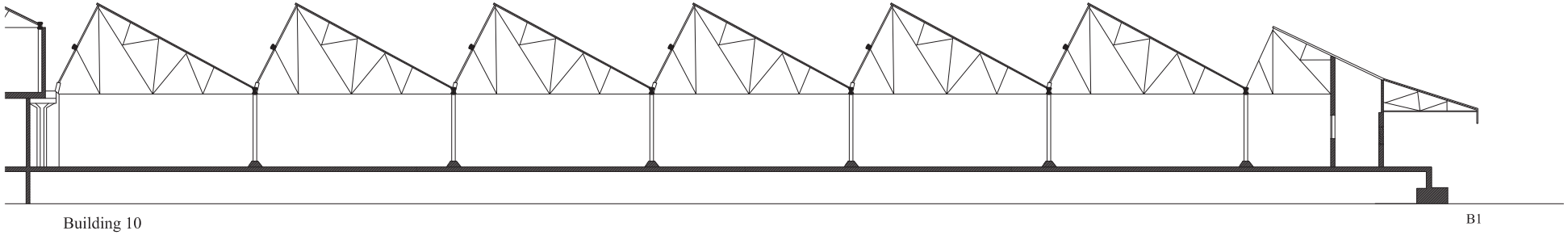


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Fig. 20 Section through Buildings 10 & 11

Scale 1:125 & 1:250 at A3

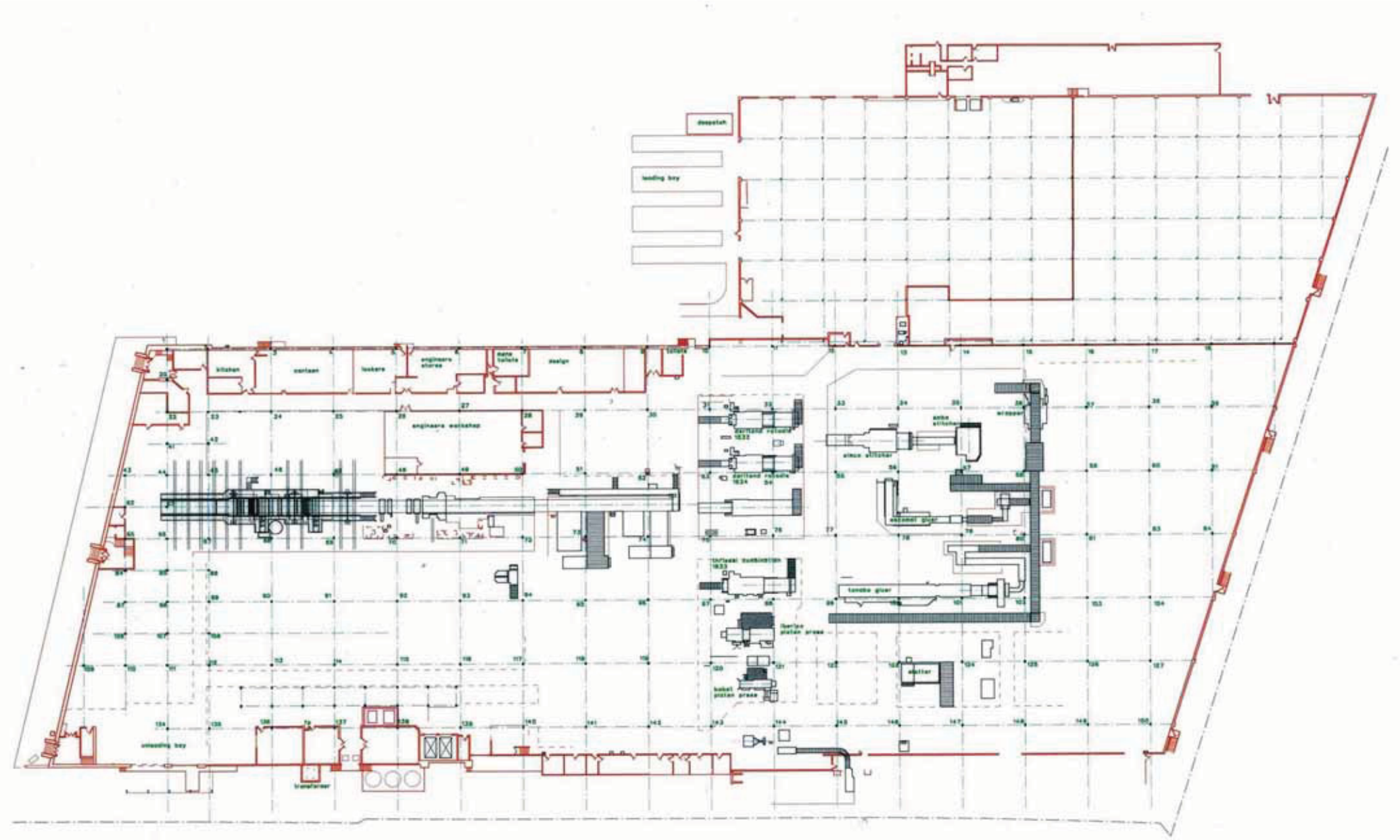

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Fig. 21 Buildings 10 & 11, ground floor, location of machinery
Not to scale

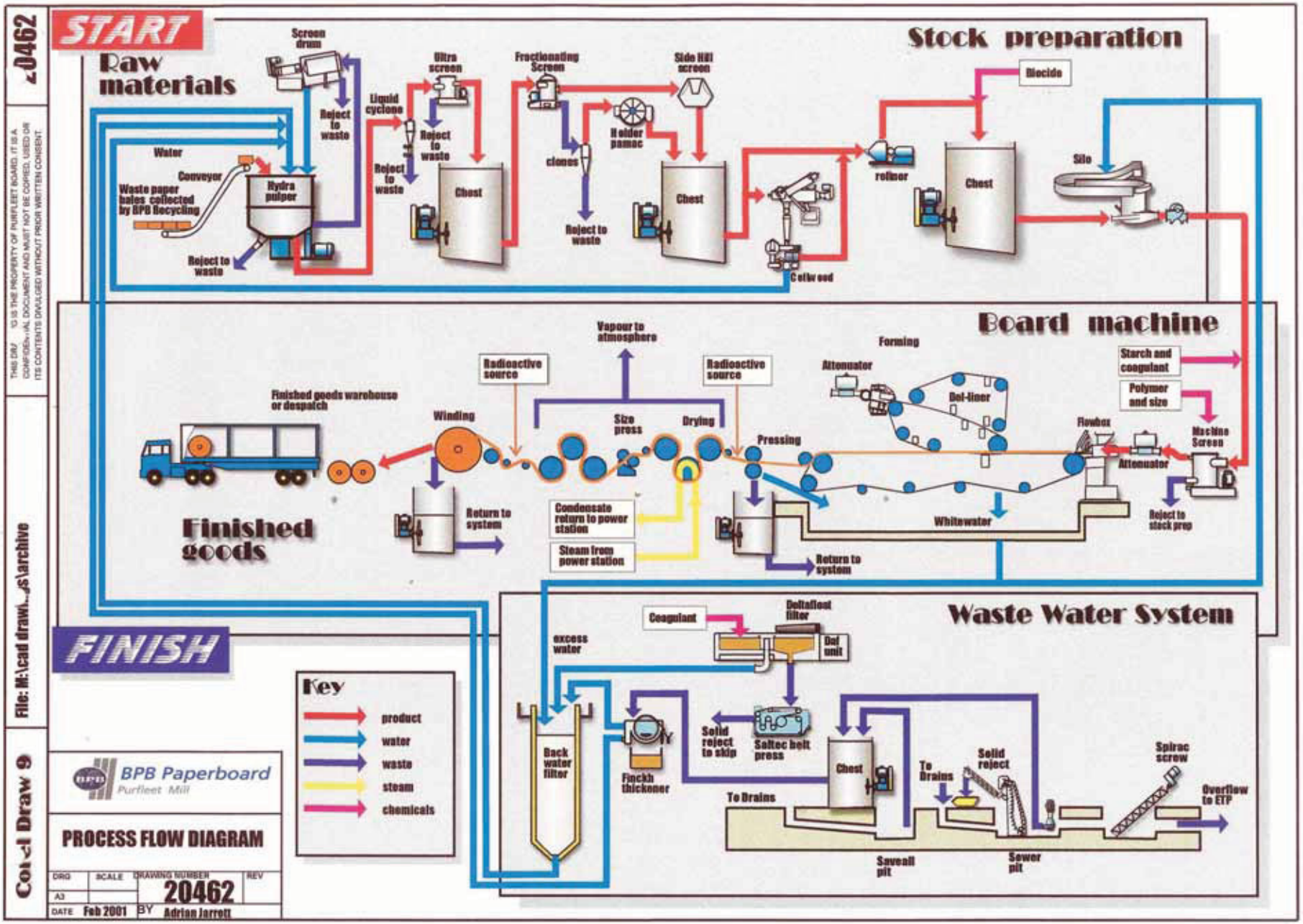

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Fig. 22 Process flow diagram

Not to scale

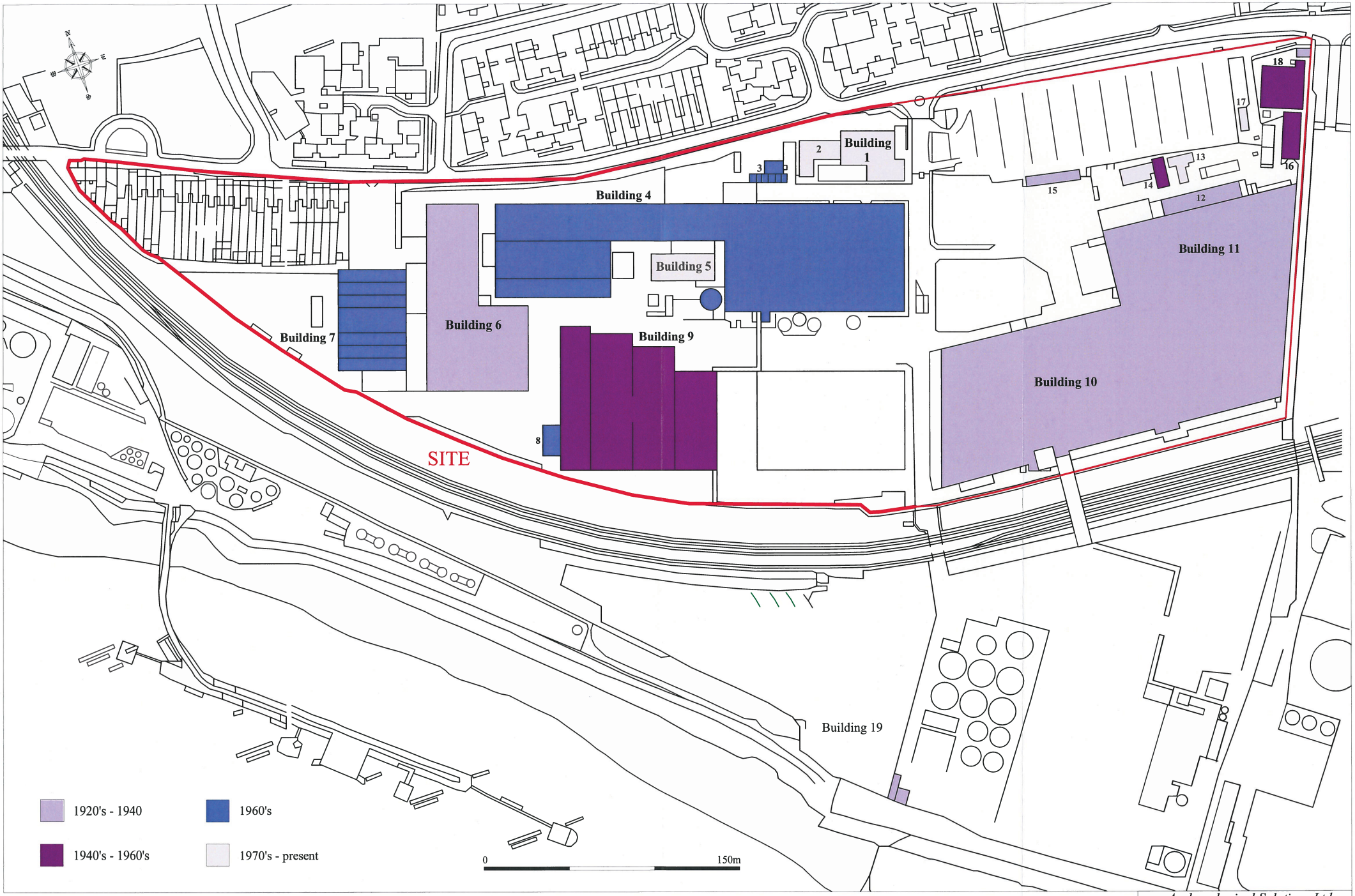

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Fig. 23 Phase plan

Scale 1:2000 at A3