APPENDIX 7

Copy Archival Record and Statement of Heritage Impact, Steel Foundry

STATEMENT OF HERITAGE IMPACT

PROPOSED DEMOLITION OF THE STEEL FOUNDRY

Figure 0.1 Interior view looking east of Steel Foundry Building.
Source: Author, Roll 9870, 24A

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1.0 THE PROPOSAL

Major changes have occurred in Newcastle and the hunter Region over the past 20 years. The downsizing and eventual decision to close BHP steel making operations and the rationalisation of the coal industry are a reflection of these changes. The BHP steel making site is strategically placed, not only on a local and regional level, but on a State and National level. It has been proposed that the existing site be redeveloped as a major Multi Purpose Terminal servicing the east coast of Australia. The area to be developed as the Multi Purpose Terminal, would require the demolition of all above ground structures located within this area (see Appendices for location plan) to enable remediation of the land and redevelopment of the site. Development of the remainder of the site at a later stage for industrial/commercial purposes is also proposed. The buildings proposed for demolition are:

1. No. 1 Blast Furnace
2. No. 1 Blower House
3. Open Hearth Building
5. No. 1 Bloom & Rail Mill
6. Steel Foundry
10. DC Sub Station
11. Wharves
14. No. 3 Blast Furnace
15. AC Pump House
16. Power House
19. Open Hearth Change House
20. Mould Conditioning Building
21. BOS Plant
23. No. 4 Blast Furnace

2.0 CONTEXT OF THE PROPOSAL

2.1 Physical Context

The Steel Foundry site is located at the North Eastern sector of BHP's Port Waratah works. The Steel Foundry is sited immediately to the north of the Machine Shop and to the immediate south-west of the DC Substation.

2.2 Statutory Context

The Steel Foundry is identified within the group identification forming Part B of Schedule 4 (Port Waratah – BHP Steelworks and Office) of "The Hunter's Heritage" – Hunter Regional Environmental Plan 1989. It is identified individually within Schedule 4 of The Newcastle Local Environmental Plan 1987 as being an item of State – level heritage significance. (This ascribed level of significance is consistent with the level of significance determined in the Port Waratah Steelworks Conservation Plan prepared by EJE Architecture in 1991). The item does not fall within a Conservation Area and is not included on the State Heritage Register. Under the EP and A Act, if an item is of State level heritage significance, the Approval Authority is required to obtain the consent and concurrence of the Department of Urban Affairs and Planning to any major intervention into the item. Under the Integrated Approvals Amendment Act 1998, "Integrated development" is development (not being complying development) that, in order for it to be carried out, requires development consent and approval under other, listed environmental legislation (s 91 (1)). The "other listed environmental legislation" includes the Heritage Act 1977. Under the new legislation, (in Section 91a):

(2) Before granting development consent to an application for consent to carry out the development, the consent authority must, in accordance with the regulations, obtain from each relevant approval body the general terms of any approval proposed to be granted by the approval body in relation to the

development. Nothing in this section requires the consent authority to obtain the general terms of any such approval if the consent authority determines to refuse to grant development consent. A Consent granted by the consent authority must be consistent with the general terms of any approval proposed to be granted by the approval body in relation to the development and of which the consent authority is informed. For the purposes of this Part, the consent authority is taken to have power under this Act to impose any condition that the approval body could impose as a condition of its approval.

(3) A consent granted by the consent authority must be consistent with the general terms of any approval proposed to be granted by the approval body in relation to the development and of which the consent authority is informed. For the purposes of this Part, the consent authority is taken to have power under this Act to impose any condition that the approval body could impose as a condition that the approval body could impose as a condition of its approval.

3.0 HISTORICAL REVIEW AND DESCRIPTION

Whilst developed initially as the separate entities of the Steel Foundry and the Direct Metal Foundry, the facilities were combined to form what was the largest foundry in Australia. At a different location on the works a Brass Foundry also existed but has been totally disassembled in recent years.

The Steel Foundry was established in 1915 to ensure total self reliance in the production of new and replacement plain carbon steel rolls, alloy steel rolls and chilled iron rolls for the various rolling mills, with weights varying from 350kg to 25 tonnes, whilst also producing steel castings for off-works customers to a variety of specifications.

The direct metal foundry's main function was in the casting of the standard ingot moulds into which molten steel, first from the Open Hearth and then BOS furnaces was "teemed". An average of sixteen ingot moulds per day were cast in the direct metal foundry.

The original buildings have been extended and inter-connected and while the open hearth furnaces were replaced by two of the first mains frequency, electric induction furnaces, there is still a great deal of evidence of the early casting techniques remaining in the buildings. From the original black sand moulding, techniques moved to chemical sand moulding and the use of the latest technology in centrifugal casting.

This building is anonymous and universal. The size of new machines and plant demanded large spaces with a minimum of obstruction. Characteristics of these buildings are rolled and riveted steel columns with light steel angle, triangulated trusses and a covering of corrugated iron to both roofs and walls. The trusses incorporate members of the ridge for large roof ventilators to dissipate heat and encourage circulation. Separate columns and beams supporting the crane rails are also a feature.

The main function of the Steel Foundry was to produce steel roll castings for use in the rolling mills. These castings were often too large for other commercial foundries and required special techniques to produce the metallurgical qualities necessary for rolling mill rolls. Roll consumption is relatively high in a rolling mill and a reliable supply of rolls is essential. The alternative to locally produced rolls would have been to import from overseas and this would have been an expensive option.

4.0 SUMMARY CONDITION ASSESSMENT

The two (actually three) buildings, although essentially gutted of internal equipment, generally remain in sound, condition structurally. The Steel Foundry consists of "Main" and "Furnace" buildings, both of which are metal clad, steel frame buildings with open steel roof trusses, bare concrete floors and gantry crane frames and tracks. The "Furnace" building has rapidly deteriorating galvanised iron fabric, with sections of the middle southern elevation missing, while the north elevation of the main building is similarly affected. The twin roofs of this building are, (as indicated above, actually two building forms joined together) and have: intact clerestory/roof ridge ventilation sections to each ridge and; "alsinite" – type window panels at middle and upper sections of its walls. The main building is of similar construction. Both require cladding maintenance, as well as the replacement of damaged/lost "window" panels. The east end only, of the main building currently demonstrates such intervention as this end has been extended. External cable trays and

downpipes etc are evident on the faces of the buildings. A "General Office", smaller scaled skillion-roofed addition, is attached to the eastern end of the northern façade (and is also referred to as a Tool Store). The external crane stairs (and other stairs) at the south-west junction of the main building and Furnace buildings, remains intact. The internal furnace structures remain interpretable.

The structural integrity of the building is suspect, with settlement of building columns having taken place to such an extent that overhead cranes could not safely travel along the crane runways.

The condition of each of the subject buildings is fully described in written and photographic form in the Archival Record document produced to accompany this Statement of Heritage Impact.

5.0 ASSESSMENT OF SIGNIFICANCE

The Steel Foundry has been assessed (1991 Port Waratah Steelworks Construction Plan) as having State significance within the context of the development of the Steelworks.

The following detailed Assessment of Significance has been undertaken to reflect current NSW Heritage Act, Heritage Amendment Act and Burra Charter requirements.

Historic Significance

As with all remaining earliest buildings on the site, the Steel Foundry represents a significant contribution to the development of steel making in New South Wales. From 1917 when acid open hearth furnaces were installed, through to the development of centrifugal casting facilities developed in 1983, the Steel Foundry provided elements critical to the operation of the Steelworks. The building was for eighty years associated with the evolution of N.S.W.'s major integrated Iron and Steel works and amply demonstrates the continuity of the activity. It is of STATE HISTORIC heritage significance for this reasons.

Aesthetic Significance

While interesting for providing visual evidence of the various stages of their evolution, the buildings are simply representative of type and have no Aesthetic significance.

Social Significance

As with all remaining earliest buildings on the site, the Steel Foundry has high-level significance for its association with the development of steel making in Newcastle and for its important linkage with the creation of work, technical skills, and social fabric of the region. It is held in high esteem as part of the workplace for generations of regional families and is integral to the definition of the early steelworks site. For these reasons the Steel Foundry has LOCAL SOCIAL heritage significance.

Technical Significance

The Steel Foundry maintained a reputation of high technical standards and as a result created a demand for highly innovative and skilled workforce. BHP Newcastle Steelworks, of which this item forms an early, integral part, has highest level potential to yield historical/industrial archaeological information of value.

The Steel Foundry was the largest in Australia. Since its establishment, the Steel Foundry retained a reputation for developing new technology to improve output and quality of its product, and as such forms a benchmark or reference site providing clear evidence of the evolution of technology unavailable elsewhere. For these reasons it has STATE – level TECHNICAL heritage significance.

6.0 OPTIONS FOR PHYSICAL INTERVENTION

The Conservation Plan BHP Port Waratah Site Addendum 1999 described the following options:

"After closure of steelmaking, the 27 items of heritage significance identified in the Newcastle LEP 1987 (as well as all other heritage items identified in this Conservation Plan), will remain in situ until:

a) the item becomes unsafe and/or uneconomic to maintain; or
b) the item is to be removed to facilitate remediation of the site; or
c) the item is sold; or
d) the item is to be removed to facilitate the proposed redevelopment

Where "Front End" items are to be demolished they should, where easily transportable and relocatable, be relocated, to a low impact, operating environment within the overall Steelworks site. Components/elements of existing structures/buildings should be similarly relocated or preferably, be relocated to either the proposed Interpretation Centre or, (if that is not appropriate), to the proposed State Industrial Archaeological Repository, both being within the existing Steelworks site. Items capable of continuing to provide service within a steel-making operation, should be relocated to Port Kembla Steelworks or other iron and steel making operation elsewhere in Australia or the world. Where buildings/structures of higher level significance are demolished and removed, interpretation of the building form at ground level is required (Burra Charter and NSW Heritage Act – As Amended).

This item is to be removed to facilitate this proposal. Therefore in accordance with Burra Charter and NSW Heritage Office requirements, recording and interpretation must be undertaken.

It would be preferable for the building to remain. However, this proposition is considered untenable given:

a) If the Steel Foundry remains, it cannot be re-used or regenerated into any other useful object, will require continuous expensive stabilisation and maintenance, or will otherwise deteriorate and become a potential health and safety hazard.

b) Remediation of this area of the site is required. The remediation proposal involves capping the proposed Multi Purpose Terminal site with a monolithic concrete slab.

c) The item as a whole cannot be relocated. However, some items can/might be salvaged for re-use. See below.

Off-site (i.e. not in-site) interpretation, will only be undertaken at last resort and will involve samples of highest-level fabric/fittings/equipment.

Possible re-use or interpretation items include:
No. 5 Annealing Furnace outside SW corner of building.
Dust and Fume (#151480) collector to South of building.
No. 2 Furnace Building at West end of Foundry.
1983 Centrifugal No. 9 Casting Pit at West ed of Foundry building.
40 ton crane main building in Foundry.

7.0 THE HERITAGE IMPACT OF THE PROPOSAL

This item is substantiated as having STATE level significance, therefore demolition of the item to enable development of the Multi Purpose Terminal will impact on the high-level significance of the item. The closure of operations at the Newcastle Steelworks impacted on the interpretation of the processes of iron and steel making, demolition of the item changes the interpretation of the processes and the significance of the item.

As part of the overall interpretation strategy it is proposed to identify the location of the foundry ad its

important equipment using a coloured glass bead trafficable applied surface to the MPT pavement.

This impact will be ameliorated by fully recording the item in accordance with the NSW Heritage Council Guidelines and interpretation and protection of the in-situ remains below the pavement of the proposed Multi-Purpose Terminal. The individual site will be interpreted using pavement treatment that can identify the extent of the item and accommodate the operation of the Terminal. The processes associated with the item will be further interpreted on the main site at Port Waratah via the Delprat Interpretive Centre and supplemented by selected items being deposited in the proposed State Archaeological Repository. However, the physical site will remain and its location will be identified through interpretive design within the pavement of the Multi Purpose Terminal.

8.0 APPENDICIES

8.1 Site Development Masterplan – showing area of proposed Multi Purpose Terminal in yellow

8.2 Site Development Masterplan – showing identified Heritage Items

8.3 Conceptual Paving Pattern to existing Heritage items.

ARCHIVAL RECORD

WATERFRONT PRECINCT HERITAGE BUILDINGS, MAIN SITE BHP PORT WARATAH STEELWORKS, NEWCASTLE

STEEL FOUNDRY

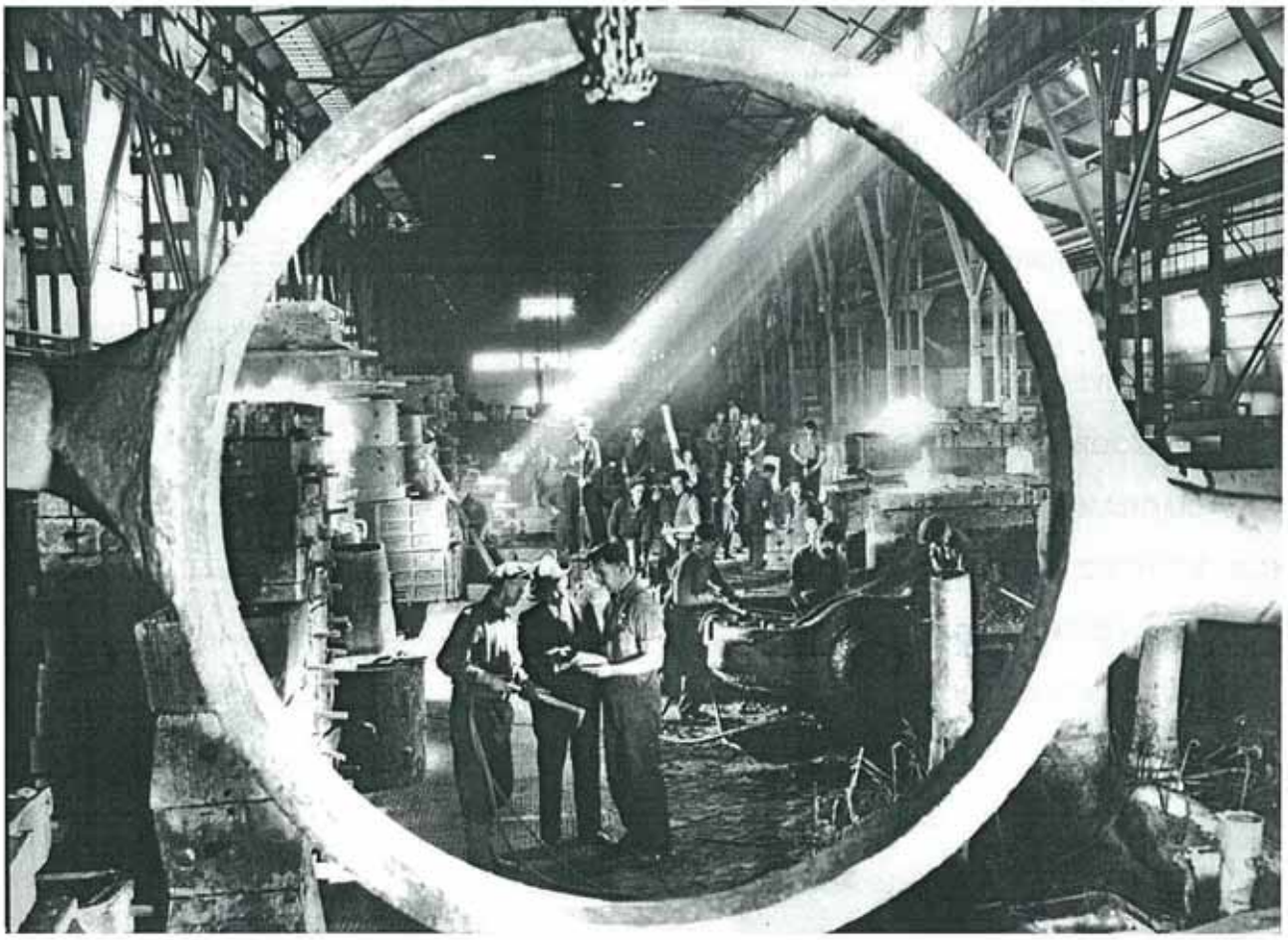

Figure 0.1 View west, Steel Foundry, 1938
Source: BHP Staff,1984 to Sir James McNeill (from the Frank Hurley Collection.

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1.0 INTRODUCTION

1.1 Background to the project

Major changes have occurred in Newcastle and the Hunter region over the past 20 years. The downsizing and eventual decision to close BHP steel making operations and the rationalisation of the coal industry are a reflection of these changes. The BHP steel making site is strategically placed, not only on a local and regional level, but also on a State and National level. It has been proposed that the existing site be redeveloped as a major Container Handling Terminal servicing the east coast of Australia. The area to be developed as the Container Handling Terminal would require the demolition of all above ground structures located within this area to enable remediation of the land and redevelopment of the site. Development of the remainder of the site at a later stage for industrial /commercial purposes is also proposed.

In light of the above, EJE Architecture has been commissioned to prepare detailed archival records of the buildings proposed to be demolished that are considered to have heritage value. These records involve documenting the relevant buildings and items they contain as well as the industrial processes that took place within them. Designed to help ascertain the heritage significance of the buildings and associated processes, these archival records also form a statement for the future interpretation of this now redundant part of Newcastle's industrial culture.

The following document constitutes the Archival Record of the Steel Foundry - an item classified as having a 'State level of heritage significance'

1.2 Archival Recording Methodology

The approach taken in recording these heritage items and the document format is based on heritage consultant input and current NSW Heritage Office's guidelines including those relating to the preparation of archival records and their photographic recording.

A number of important aspects have been identified in the statement of heritage significance included in the report whose recording was necessary to reflect the item's character and value described. Hence it is this statement that drives the rationale for the report and determines the relevance of information collected. Derived from three main elements - buildings (structure and fabric), the individual items they housed and the processes that took place within them - these aspects are elaborated on in a number of different ways, which reflect their respective social, technical and aesthetic qualities.

As a way of dealing with the items various facets of heritage value, the report is broken into 3 main components:

-Written descriptions (history, process and heritage statement),
-Pictorial descriptions (photographs and working drawings)
-Inventories and other supporting information

Together these components create a comprehensive account of the chronological development of both the buildings and the industrial technologies held within them that have invariably changed throughout their lives. At times the components are incorporated into each other to provide a more coherent and illuminating description. All material is cross-referenced to each other and referenced to archival registers and source publications.

The written descriptions provide a background to the building and the functions that it housed and incorporate relevant photographs. As an essential part of the written component, a statement on the item's heritage significance details why the item is valued.

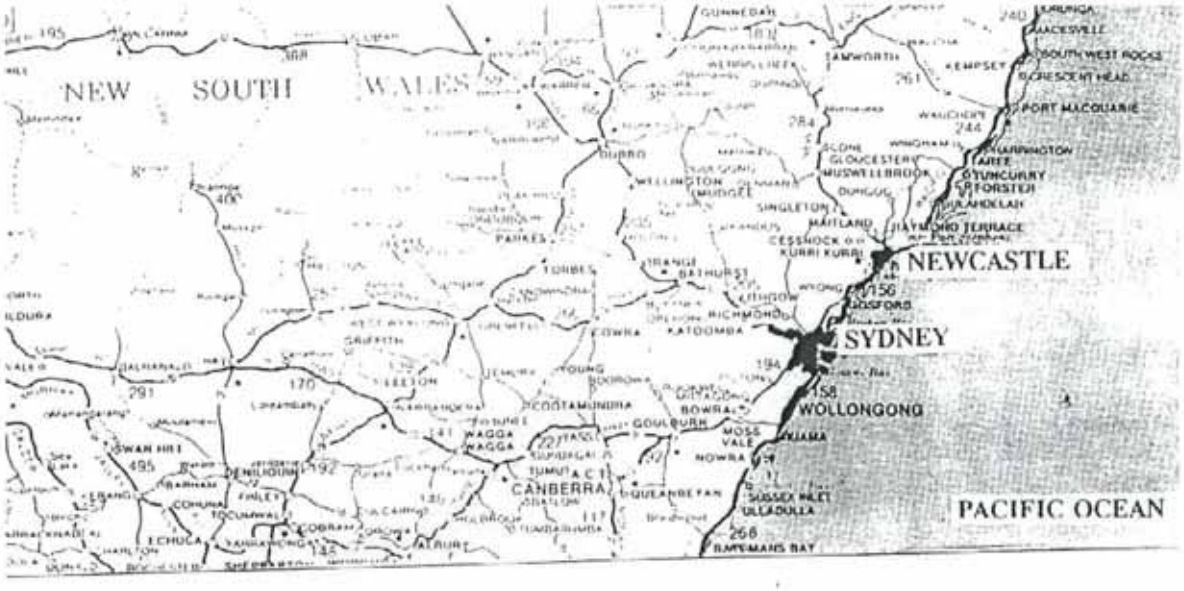
The bulk of the information in this report comes from the pictorial descriptions. Comprising of both historic and contemporary photographs, an account of the building fabric, the various industrial processes contained and the changes that have taken place through time is made. In addition, a

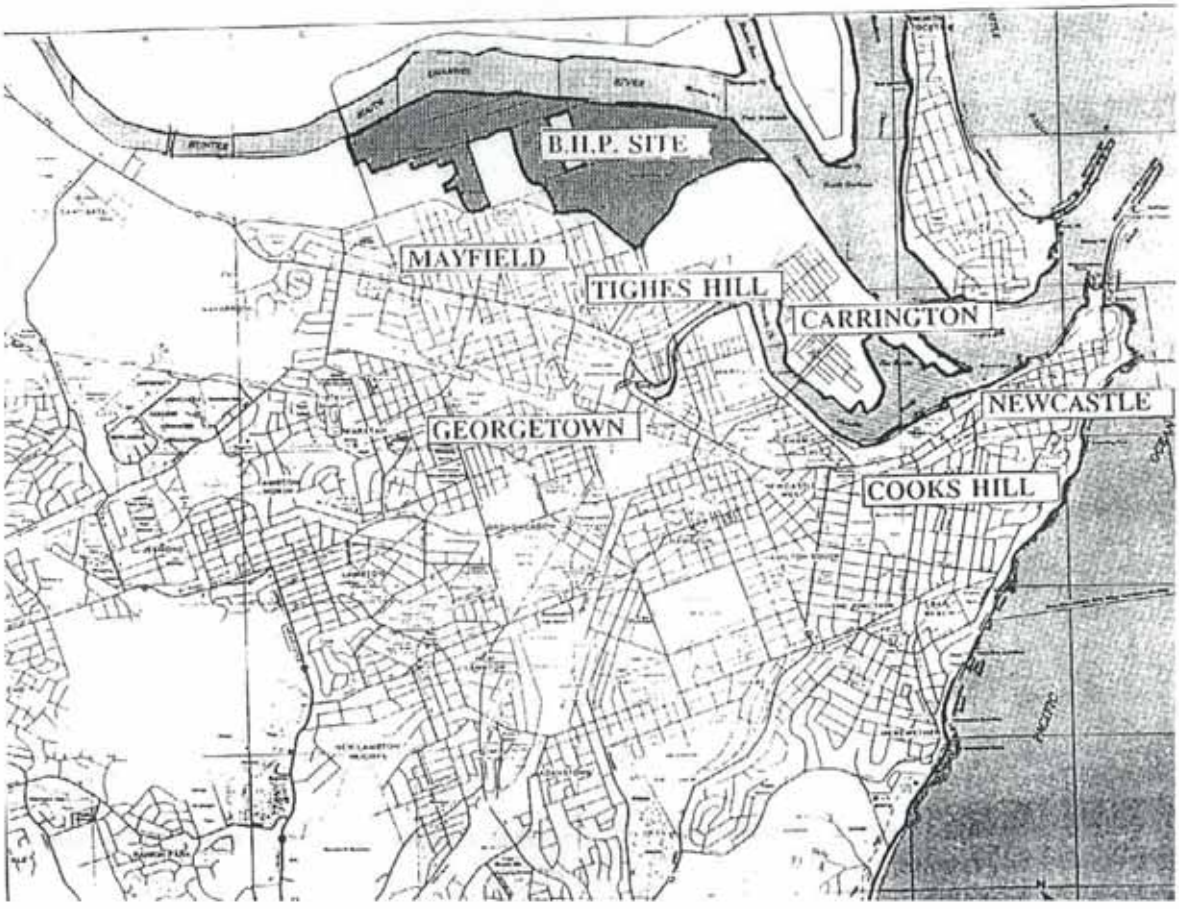
selection of original working drawings provide a detailed picture of the construction techniques, structure and fabric details and offer substantial dimensions and measurements, making largely redundant any requirement for contemporary measured drawings or scaled photographs.

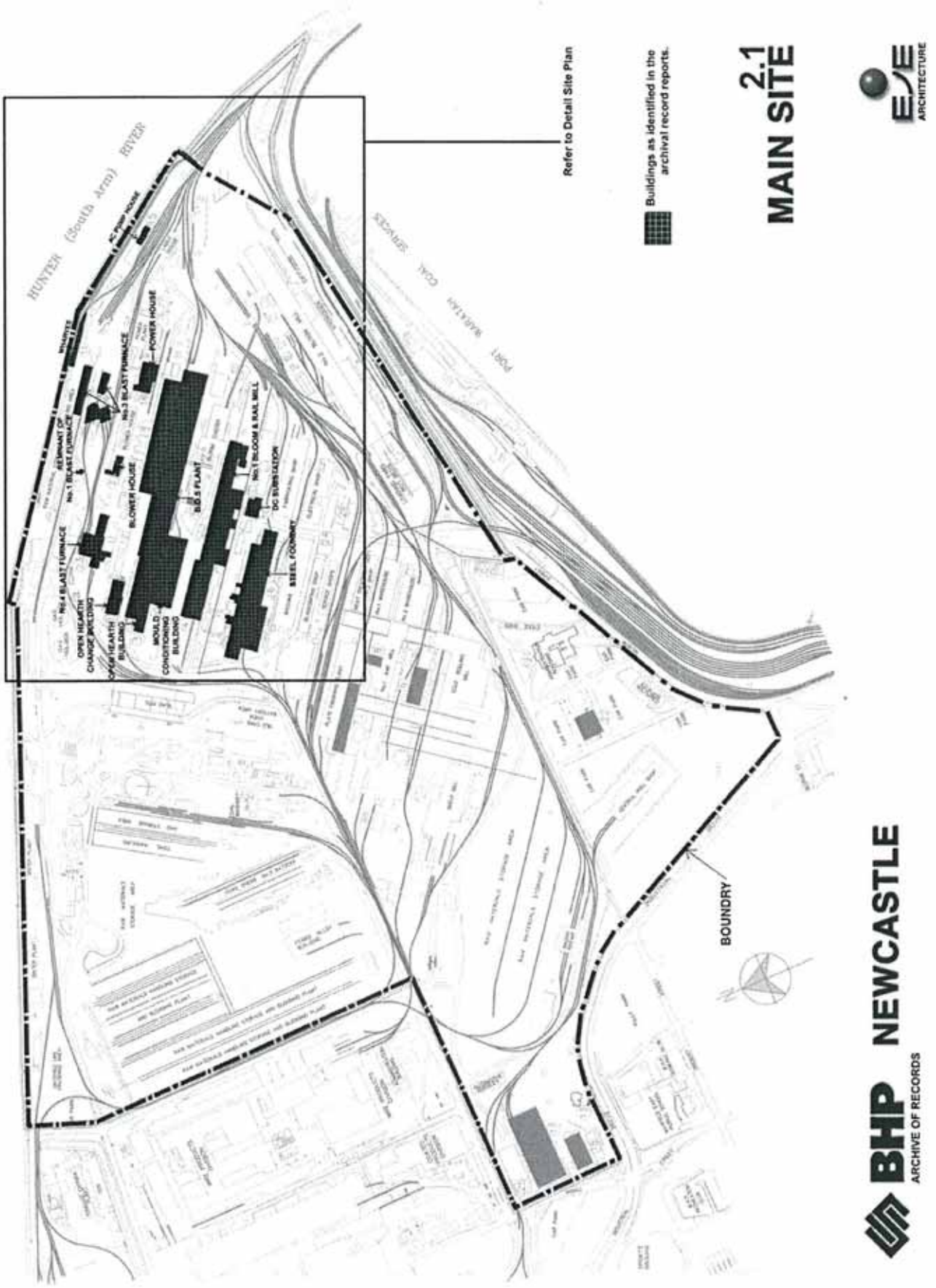
Supporting both the written and pictorial information is a series of inventories and tables which provide details of equipment contained within the building, cross referenced descriptions of photographs and shot locations, and bibliographical information.

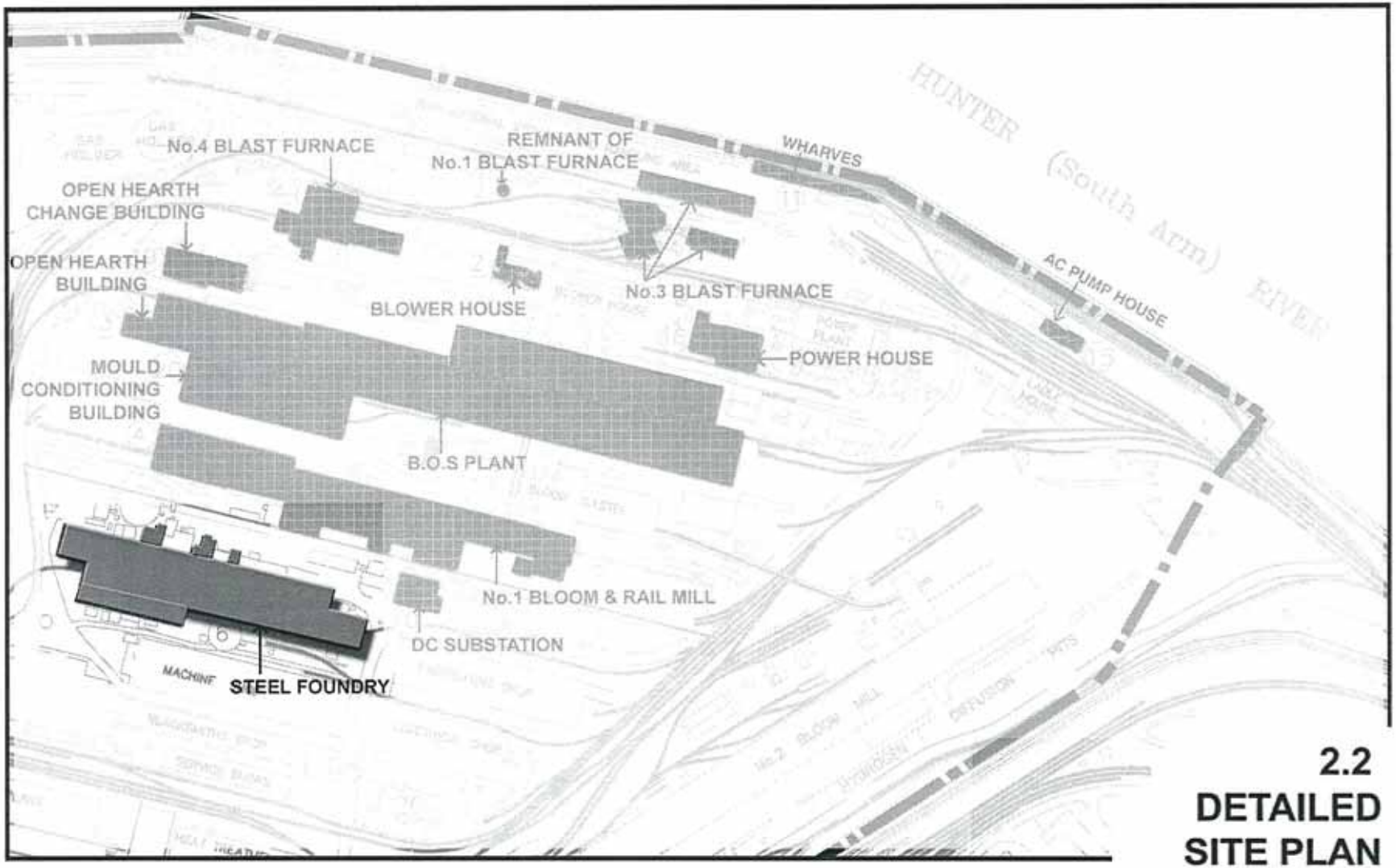
The process of documenting the heritage items involved a number of input teams, of which EJE was the coordinator.

2.0 LOCATION PLANS






Refer to Detail Site Plan
Buildings as identified in the archival record reports.
2.1
MAIN SITE
EJE ARCHITECTURE
HUNTER (South Arm) RIVER
POST WARATAH COAL SERVICES
POWER HOUSE
No.3 BLAST FURNACE
No.1 BLAST FURNACE
No.4 BLAST FURNACE
BLOWER HOUSE
B.O.S. PLANT
No.1 BLOOM & RAIL MILL
D/C SUBSTATION
STEEL FOUNDRY
OPEN HEARTH CHARGE BUILDING
OPEN HEARTH BUILDING
MOULD CONDITIONING BUILDING
BOUNDRY
BHP NEWCASTLE
ARCHIVE OF RECORDS



2.2
DETAILED SITE PLAN
STEEL FOUNDRY

BHP NEWCASTLE
ARCHIVE OF RECORDS

EJE ARCHITECTURE

3.0 OUTLINE OF HISTORY AND INDUSTRIAL PROCESS

The Steel Foundry was one of several foundries, each with a distinct function, which operated at various locations on the steelworks site. Other foundries included the Direct Metal Foundry (demolished 1998) where molten iron was received direct from the Blast Furnaces, then cast into products such as ingot moulds, furnace castings, open hearth and steel foundry equipment. A High Frequency Foundry was built during the 1940s to produce small steel castings, largely for the Manganese Plant, while a Brass Foundry provided the works with items such as bearings for plant machines and copper tuyeres and coolers for the blast furnaces until this function was transferred to Port Kembla in 1982.[1]

The main function of the Steel Foundry was to produce steel roll castings for use in the rolling mills, ensuring self-reliance in the production of new and replacement rolls. These castings were often too large for other commercial foundries and required special techniques to produce the metallurgical qualities necessary for rolling mill rolls. Roll consumption is relatively high in a rolling mill and a reliable supply of rolls is essential. The alternative to locally produced rolls would have been to import from overseas and this would have been an expensive option. The steel for these castings was produced in an acid open hearth furnace.

The Foundry also produced steels for specific purposes, and filled orders from outside the steelworks.

In his report for the half year ending 31 May 1918, the General Manager, reported favourably on the recently installed Steel Foundry:

> The new Steel Foundry has proved of immense benefit for erection work, as well as for current requirements for the existing plants, and the building has been extended during the half-year. It is self-contained with its own steel furnace, and the tonnage of castings amounted to 1,840 tons.[2]

By the following year the Foundry was performing well. Described as being of "great value at the works", it was producing castings at a price considerably cheaper than that quoted by outside firms. Production had increased to 4,184 tons, the foundry had paid for its erection and was again being enlarged.[3] Twelve months later a second roll annealing furnace had been installed. The Foundry was not only making all the steel castings required at the steelworks, but also producing rolls for Lysaghts, Newcastle and a large quantity of steel ingots for forging and milling for the Australian market.[4]

In 1927 a second 30 ton basic open hearth was constructed and 12 bays added to the building. Mechanical charging equipment was also provided, and a crane over the stockyard.[5] When the acid furnace was rebuilt in 1933, the length of the bath was extended by 4 ft. and the area of the air regenerative chamber was increased by approximately 50%.[6]

A description of the department was included in the 1935 Jubilee edition of the *BHP Review*, highlighting the range of products made in the foundry. The department was divided into two sections, the furnace and the foundry. In the furnace section were two open heath steel furnaces each of 35 tons capacity. One was known as the acid open hearth, with a lining of siliceous sand and other was known as the basic open hearth, with a lining of basic material such as magnesite or dolomite. These furnaces were housed in a building which was offset from the main building on the south side, and placed so that the metal from the tapping side ran into ladles in the main building.

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[1] Discussion with J.C. Richardson, former Supt. of Foundries, Newcastle Steelworks.
[2] General Manager's Report for the Half Year ended 31 May, 1918, p.15.
[3] General Manger's Report for the Half Year ended 31 May 1919, p.20.
[4] General Manager's Report for the Half Year ended 31 May 1920, p.18
[5] Report for six months ended 31 May 1927
[6] Report for six months ended 31 May 1933

In 1935 the foundry was producing several grades of plain carbon steel, including mild steel for forging, and steel for making axles, springs and rope. These steels were poured into ingots of approximately 3 ¼ tons. Two sizes of tyre-steel ingots were also produced in twelve sided fluted ingots, being of 12 inch and 15 inch nominal diameter, and weighing approximately 24 cwts. and 39 cwts. respectively. These ingots were transported to the Commonwealth Steel Company Ltd. where they were processed into railway tyres.

Various grades of alloy steels were also made, such as nickel-chrome, chrome axle, chrome spring and silico-manganese spring steels.

Large forging ingots were made in sizes varying from 5 to 20 tons in weight, in specially designed moulds in four sizes – 24", 30", 36" and 42". These ingots were octagonal and fluted in shape and were used extensively for large forgings of various kinds, Many were used for tail shafts and other large forgings for Australian built ships.

The foundry section, in which steel castings and rolls for the various mills were made, was housed in the main building which was equipped with two 50 ton electrically operated cranes.

Steel castings, up to 30 tons in weights, were made for plant maintenance and repair and for new construction work, as well as for outside firms. Plain carbon steel rolls, alloy steel rolls and chilled iron rolls were also made for the various mills.

All castings and rolls, with the exception of chilled iron rolls, were subjected to an annealing process which removed the casting strains and refined the grain, producing a tougher and more serviceable product. This process was carried out in an annealing furnace.[7]

In 1936, the Steel Foundry was extended to cater for the increasing demand for castings and rolls for the maintenance of operating units on the plant. Demand was also increasing for castings for new construction work, and for the manufacture of chilled iron and alloy rolls. The merger of BHP with the Australian Iron and Steel Company further increased the need for previously imported castings and rolls.

These extensions to the foundry were made in four sections.

1. The main building was extended two bays (50 ft.) on the western end to give more area for pouring of special steels and also to give more pit room for the furnaces and the storage of moulds.

2. The furnace building was extended four bays (100 ft.) on the western end to facilitate the delivery of hot metal from the open hearth mixers. The metal was delivered by loco, on a specially designed hot metal carriage. The ground floor area of this extension was then used for the storage of nozzles, sleeves, tyre and role runner bricks and ladle bricks. Sufficient furnace bricks were also stored here to allow minor repairs to be carried out. The furnace floor level of this building was extended 50 ft. westward, creating an area for clothes lockers.

3. On the northern side of the old building a "very substantially erected" building, 275 ft. long, 75 ft. wide and 71 ft. high was constructed. It was fitted with an electrically operated overhead crane with a lifting capacity of 70 tons on the main hoist and 15 tons on the auxiliary hoist. Three wall cranes were also provided to handle small jobs. This building was used for the moulding and casting of all rolls, and the moulding of the majority of box-work castings. Practically all the floor area was covered with cast iron floor plates, which prevented moulding work being carried out on the floor. All floor work castings were made in a specially designated area in the old building.

   As the rolls required by A.I.& S. were larger than those required at Newcastle, a large casting pit was provided, made in two sections. One section, 30ft. x 12ft. and 12ft. deep, enabled the vertical casting of items up to 25 ft. in length. The other section of the pit, 65ft. long, 9ft wide and 6 ft deep, was used for the casting of all chilled iron rolls and the smaller

[7] *The BHP Review, Jubilee Number*, June 1935, pp.84-85.

size alloy rolls for the vertical mills. The whole of the pit was constructed of reinforced concrete lined with 9" of brickwork. As the deeper section of the pit was 10 ft. below the main water duct it was necessary to use sheet piling.

A mould drying stove, 24ft. long, 18ft. wide and 11ft. 6in. high, was erected on the northern side of the building. The stove was gas fired through an insulated combustion chamber, 6ft. diameter, 9ft. long. Beside the stove was a large, 90 ton capacity, gas fired annealing furnace, 25ft. long, 14ft. wide and 8ft.4in. high from the top of the carriage bearer to the centre of the arch.

4. An extension to the eastern end of the building was made to house modern lathes with roll cropping and necking equipment. Necessary work on steel foundry moulds and forging ingots was also carried out in this area. The building was extended by six bays, 150ft. by 50ft. wide and fitted with an overhead electric crane with a maximum lift of 50 tons on the main hoist and 10 tons on the auxiliary. This crane served the two 36 in. heavy duty lathes, wobbler cutting machine and drilling machine for centering the rolls.

   The existing "lean to" of the foundry building was extended six bays, 150ft. by 25 ft. wide, to house the 18in. and 16in. Craven roll turning lathes and other lathes for use on the smaller sized rolls. It was served with a 10 ton overhead electrically operated crane.

   The stockyard runway was also extended 6 bays (150ft.) to allow for the storage of rolls prior to delivery.[8]

Between 1941 and 1946 the building underwent a series of extensions, progressively increasing its length by a total of 18 bays, and the office was extended in 1949.[9] Improvements in 1952 included a 70 ton EOT crane, electric hot top equipment, drying stove, flasks, chills and lifting beams.[10] The roof of the foundry was partially re-sheeted in 1956,[11] and again in the early 1970s when a major re-sheeting and repair job was carried out.[12] A heavy duty weighbridge was installed in the stockyard in 1957, at a cost of £6,000.[13]

The final extension to the building was made in 1961, when three bays were added to west and 5 bays to the north-east. This year also saw the cessation of the roll finishing process at the Steel Foundry, when lathes and associated equipment were transferred to the newly established Central Roll Shop.[14] An additional roll casting pit was installed in 1968. The acid furnace ceased operation in 1970 and in the following year the open-hearth furnaces were replaced by two 50 ton electric induction furnaces. A stress-relieving furnace was also commissioned at this time. Centrifugal casting facilities were provided in 1983.[15]

The Steel Foundry ceased operations in the early 1990s, after which the furnaces were demolished and the pits filled in. The building has since been used for storage purposes.[16]

[8] *BHP Review*, August, 1936.
[9] BHP Newcastle, Mechanical Drawing Office, Drg. No.148880, "Steel Foundry Development – General Arrangement of Foundry.
[10] G. Blaxell, "A Time Chart of Significant Events at BHP Newcastle Steelworks", 16 April 1998
[11] Manager to Senior General Manager, Melbourne, 6 August 1956, BHPA:D1/1/1255.
[12] Discussion with E. Melville, former Maintenance Engineer, Newcastle Steelworks. April 2000.
[13] Asst. General Manager Commercial to Manager Newcastle, 13 March 1957, BHPA:D1/1/1255.
[14] Discussion with J.C. Richardson.
[15]. G. Blaxell, "A Time Chart of Significant Events at BHP Newcastle Steelworks", 16 April 1998
[16] Discussion with J.C. Richardson.

3.1 The Remnant Building Description & Structure

The Steel Foundry building is a riveted steel framed building, similar to many others on site. It has no particular significance for its building structure.

Condition

The building is of similar condition to other buildings of the same type.

Steel conditions & protection at BHP Steelworks site

The BHP site in Newcastle is in a "Marine" to "Severe Marine" zone in accordance with AS/NZ 2312:1994 — "Guide to protection of iron and steel against exterior atmospheric corrosion". Now that the localized micro-climate from the operation of the plant has been removed, protection of the steelwork needs to be considered in terms of this Standard.

Observation at the site indicates that none of the steelwork on site has a coating system complying with this Standard for a design life of greater than 5 years. Some of the steelwork, such as the blast furnaces, is not protected at all and has been designed to operate in a hot environment where corrosion is inhibited by high temperatures driving off moisture; other steelwork was designed with extra thickness to form a sacrificial layer. In almost all buildings and in areas nearby the high temperature operations have been successful in keeping the corrosion under control except where steel has been insulated by brickwork which has trapped moisture and corrosion has been severe. There does not appear to be any general galvanic protection (i.e. galvanizing or zinc-rich coating) on major structural elements.

If major structural elements were to be retained on the site for a period in excess of 10 years the Standard gives the following coating systems:

(i) galvanizing plus a two coat paint system (not possible in situ);

(ii) various two and three coat paint systems applied after abrasive blast cleaning and having either a zinc based primer or high-build epoxy;

(iii) a sprayed metal coating followed by a two coat painting system.

Of these, only (ii) is likely to be practical. All would be extremely expensive and require continuing maintenance. Maintenance painting similar in magnitude to that carried out on the Sydney Harbour Bridge would be one way of evaluating the problem.

4.0 STATEMENT OF HERITAGE SIGNIFICANCE

The Steel Foundry is identified within the group identification forming Part B of Schedule 4 (Port Waratah – BHP Steelworks and Office) of "The Hunter's Heritage" – Hunter Regional Environmental Plan 1989. It is identified individually within Schedule 4 of The Newcastle Local Environmental Plan 1987 as having an item of State – level heritage significance. (This ascribed level of significance is consistent with the level of significance determined in the Port Waratah Steelworks Conservation Plan prepared by EJE Architecture in 1991). The item does not fall within a Conservation Area and is not included on the State Heritage Register. The following Assessment of Significance has been undertaken to reflect current NSW Heritage Act, Heritage Amendment Act and Burra Charter requirements.

Historic Significance

As with all remaining earliest buildings on the site, the steel foundry represents a significant contribution to the development of steel making in New South Wales. From 1917 when acid open hearth furnaces were installed, through to the development of centrifugal casting facilities (developed in 1983), the Steel Foundry provided elements critical to the operation of the Steelworks. The building was for eighty years associated with the evolution of N.S.W.'s major integrated iron and steel works and amply demonstrates the continuity of the activity. It is of STATE HISTORIC heritage significance.

Aesthetic Significance

While interesting for providing visual evidence of their evolution the buildings are simply representative of type and have no aesthetic significance.

Social Significance

As with all remaining earliest buildings on the site, the Steel Foundry has Regional significance for its association with the development of steel making in Newcastle and for its important linkage with the creation of work, technical skills, and social fabric of the region. It is held in high esteem as part of the workplace for generations of regional families and is integral to the definition of the early steelworks site. For these reasons the Steel Foundry has REGIONAL SOCIAL heritage significance.

Technical Significance

The Steel Foundry maintained a reputation of high technical standards and as a result created a demand for highly innovative and skilled workforce. The Foundry forms an early, integral & progressive part of the BHP Newcastle Steelworks. It therefore has highest level potential to yield historical/industrial archaeological information of value.

The Steel Foundry was the largest in Australia. Since its establishment, the Steel Foundry retained a reputation for developing new technology to improve output and quality of its product, and as such forms a benchmark or reference site providing clear evidence of the evolution of technology unavailable elsewhere. For these reasons it has STATE – level TECHNICAL heritage significance.

5.0 INVENTORY OF ARCHIVAL DOCUMENTS

The Following list constitutes the archival documents used for this report and other documents that contain related material for this archival record. For archival drawings, the BHP drawings document register (documents located in the BHP archive, Melbourne) may be found on the computer disk located in the appendix.

Blaxell, G. "Time Chart of Significant Events at BHP Newcastle Steelworks" (unpublished), 1998

The BHP Review, *Jubilee Number,* June 1935 and August, 1936

General Manager's Half Yearly Reports, May 1918, May 1919, May 1920
Newcastle Steelworks Half Yearly Reports, May 1927, May 1933

Records held at BHP Archives, Melbourne

BHP Newcastle, Mechanical Drawing Office, Drg. No.148880, "Steel Foundry Development – General Arrangement of Foundry.

Discussions with: Melville, former Maintenance Superintendent, Newcastle Steelworks
J.C. Richardson, former Superintendent of Foundries, Newcastle Steelworks
D. Ruddell, former Chief Construction Engineer, Newcastle Steelworks

6.0 SELECTED PHOTOGRAPHS

Figure 6.1 East Elevation of "Foundry Building" and "Welding Bay"

Figure 6.2 East elevation of "Welding Bay", "Strickle Store" and Main Building.

Figure 6.3 Part North Elevation of "Main Building" and Welding Bay

Figure 6.4 Part North Elevation of "Main Building" and Eastern End

Figure 6.5 Part North Elevation of "Main Building and General Office

Figure 6.6 Part North Elevation of "Main Building"

Figure 6.7 Part North Elevation of "Main Building"

Figure 6.8 Part North Elevation of "Main Building"

Figure 6.9 West Elevation of "Main Building"

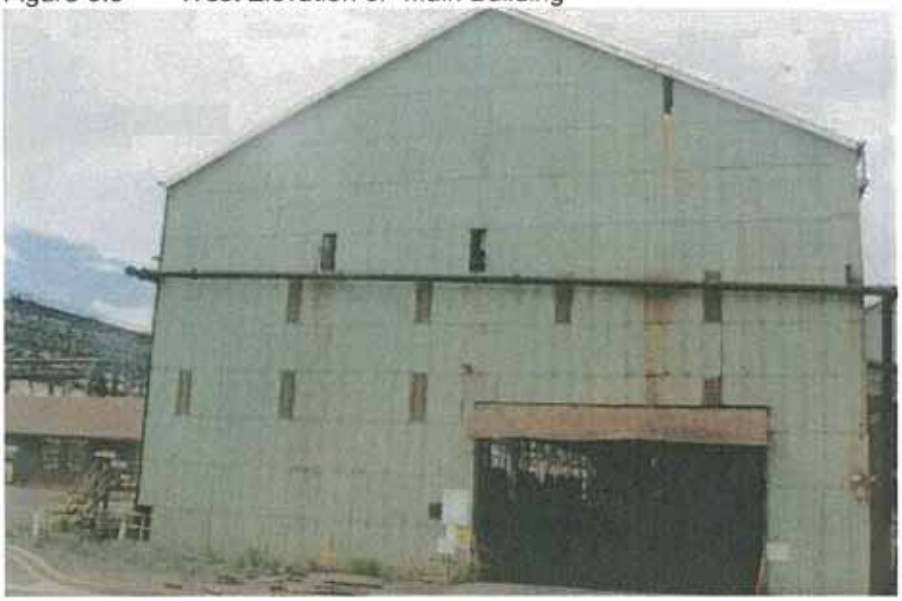


Figure 6.10 West Elevation of "Foundry Building" and Furnace Building

Figure 6.11 Part South Elevation and "Main Building"

Figure 6.12 South Elevation of "Furnace Building"

Figure 6.13 Detail South Elevation of "Furnace Building" and Annealing Furnace

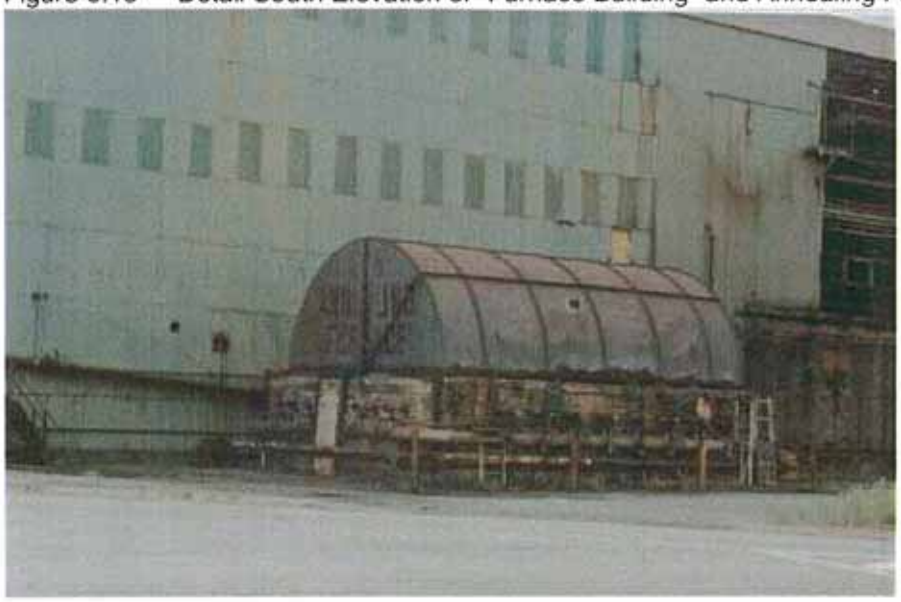


Figure 6.14 Part West Elevation Electrical Workshop ad Dust/Fume Collector

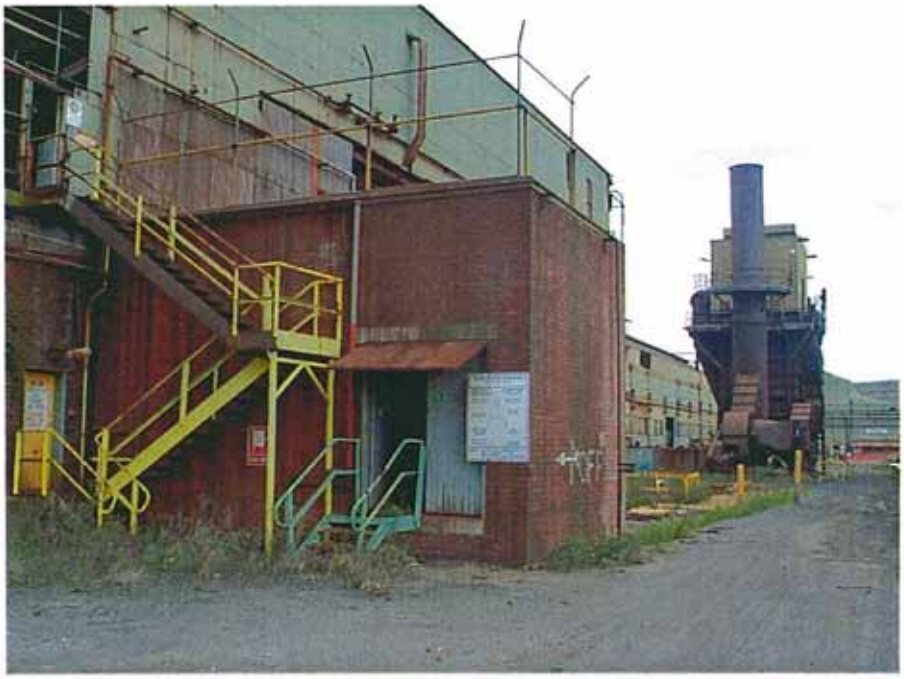


Figure 6.15 South Elevation of "Foundry Building"

Figure 6.16 South Elevation of "Foundry Building"

Figure 6.17 Detail West Elevation Dust and Fume Collector

Figure 6.18 East Elevation of "Furnace Building"

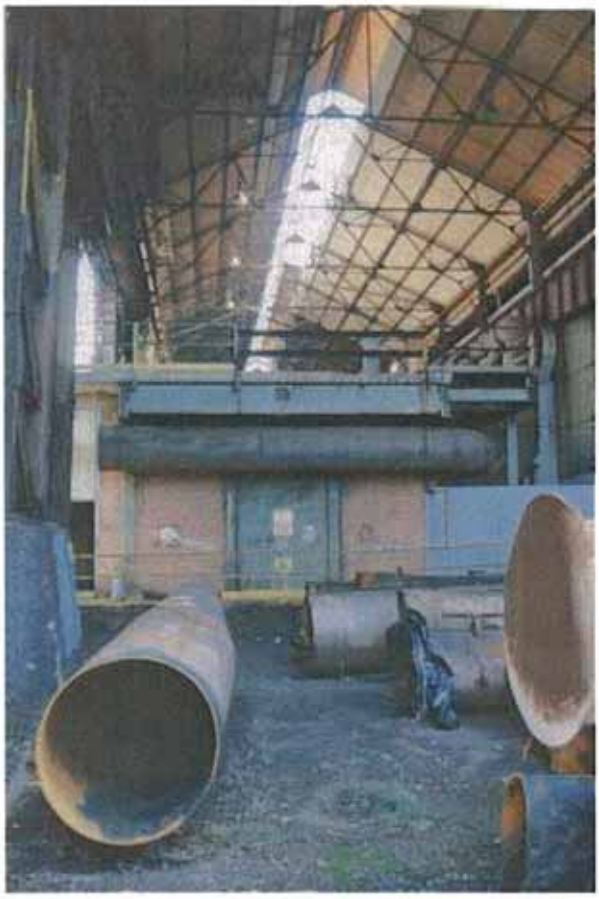


Figure 6.19 Interior of East Elevation of Main Building

Figure 6.20 Interior of Part North elevation "Main Building" and Core Oven

Figure 6.21 Interior Detail East Elevation "Main Building"

Figure 6.22 Interior Detail of riveted Steel Crane Rail in "Foundry Building"

Figure 6.23 Interior Elevation of No 2 Furnance Looking East at Western end of "Furnance Building"

Figure 6.24 Interior West Elevation "Main Building"

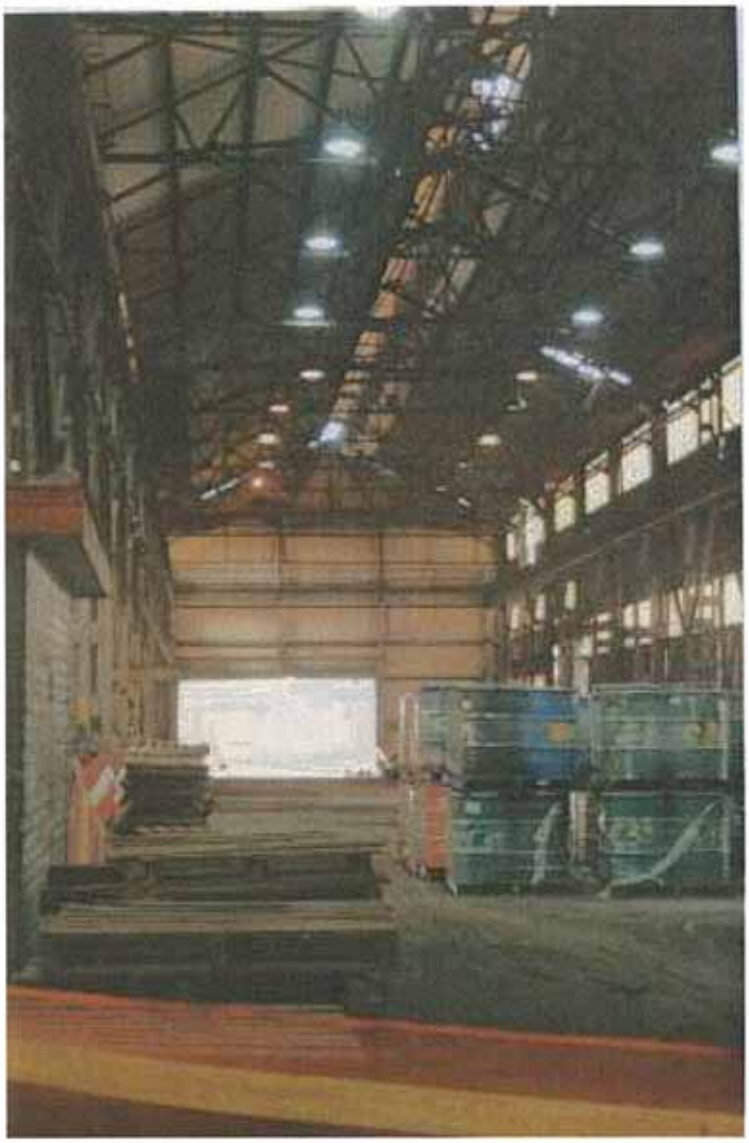
Figure 6.25 Interior Detail of No 9 Casting Pit

Figure 6.26 Interior of East Elevation of "Main Building" Along Casting FL.

Figure 6.27 Interior of West Elevation of "Foundry Building"

Figure 6.28 Interior Detail of Crane Supports at "Foundry Building"

Figure 6.29 Interior of East Elevation of "Foundry Building."



7.0 NEGATIVE REFERENCE LIST

The following information relates to the complete set of negatives taken for the recording of this building. Under each Roll Number is a table containing the negative numbers and a description of each frame taken of that roll. The roll and negative numbers, position and direction of frame taken are referenced in the plan in section 8.0 – photographic reference plan. The numbers in the column titled "Figure No." relate to the selected photographs in section 6.0 of this report. Items marked with a dash in this column have prints located in the appendix along with the complete set of negatives.

Manual camera photographs

ROLL 9602 – 09/03/00

Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

Neg No.	Figure No.	Description
21	-	Interior view of "pit side" west end looking West
22	-	Interior view of the "pit side" West end looking East
23	-	Interior view of the "pit side" West end looking East. Note double columns which were at the rear of the furnaces.

ROLL 9856

Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

Neg No.	Figure No.	Description
0A	-	East Elevation of Furnace Building and Part South elevation of Foundry building
1A	-	South elevation of Foundry building
2A	-	South elevation of Eastern end of Foundry Building. Detail of vent tower
3A	6.1	East elevation of Foundry building and Welding Bay
4A	-	East elevation of Main Building with East elevation of Strickle Store in foreground
5A	-	North elevation of Eastern part of Main building
6A	6.5	Part North Elevation of Main Building and General Office
7A	6.4	Part North elevation of Main Building at Eastern end
8A	-	North elevation looking to West

ROLL 9812

Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

Neg No.	Figure No.	Description
15A	6.9	West elevation of Main building
16A	6.10	West Elevation of Foundry Building and Furnace Building
17A	6.12	South Elevation of "Furnace Building"
18A	6.13	Detail South Elevation of Furnace Building and Annealing Furnace
19A	-	Detail of Electrical Workshop at Eastern end of South elevation of Furnace Building
20A	-	South elevation of Western part of Main Building
21A	-	Part North elevation of Main Building. Gas control Building in foreground.
22A	-	Part North elevation of Main B Building. Freshwater tank in foreground
23A	-	Part North elevation of Main C Building looking to Eastern elevation
24A	-	Part North elevation of Main Building to far Eastern end

ROLL 9870

Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

Neg No.	Figure No.	Description
16A	6.23	Interior elevation of No2 Furnace looking East at Western façade of Furnace Building.
17A	-	Detail of column supports for crane rails taken from Main Building to Southern elevation
18A	-	West Elevation of Foundry Building showing remaining crane
19A	6.24	Interior West elevation of Main Building
20A	6.25	Interior detail of No9 Casting Pit
21A	6.26	Interior of Eastern elevation of Main Building along casting floor
22A	6.27	Interior of West elevation of Foundry Building
23A	6.28	Interior detail of Crane supports at Foundry building
24A	6.29	Interior of East elevation of Foundry building

ROLL 9898

Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

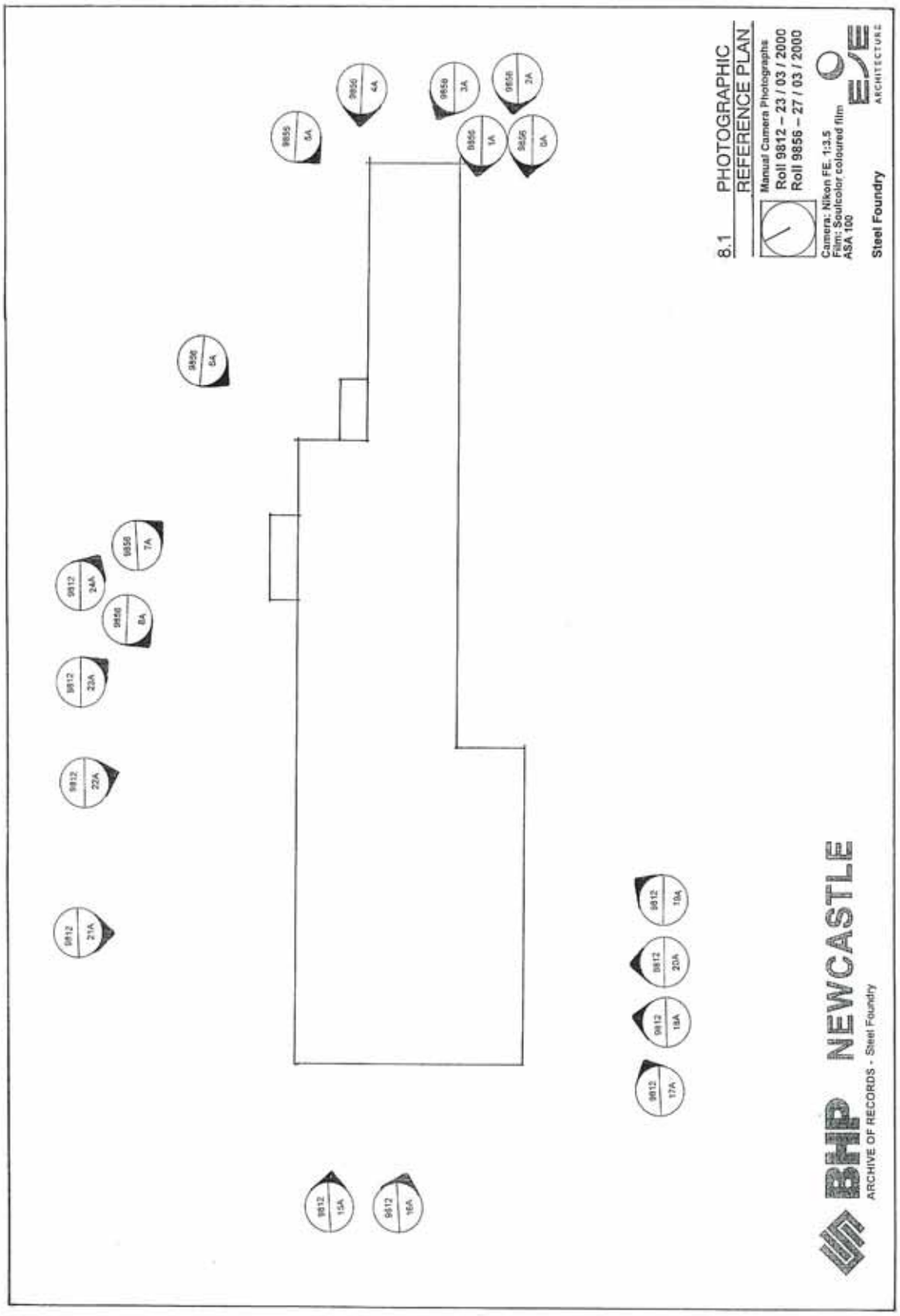
Neg No.	Figure No.	Description
0A	6,19	Interior of East elevation of Main Building
1A	6.20	Interior of part North elevation of Main Building and Core oven
2A	-	Detail of West elevation looking into Welding Bay
3A	6.21	Interior detail of East elevation of Main Building
4A	6.22	Interior detail of riveted steel crane rail in Foundry building
5A	-	Detail of Annealing Furnace facing West elevation
6A	-	Detail of Annealing Furnace facing West elevation
7A	6.17	Detail West Elevation of Dust and Fume Collector
8A	6.18	East Elevation of Furnace Building
9A	-	Detail East elevation and steel beam
10A	-	Stock yard and south elevation of Foundry Building

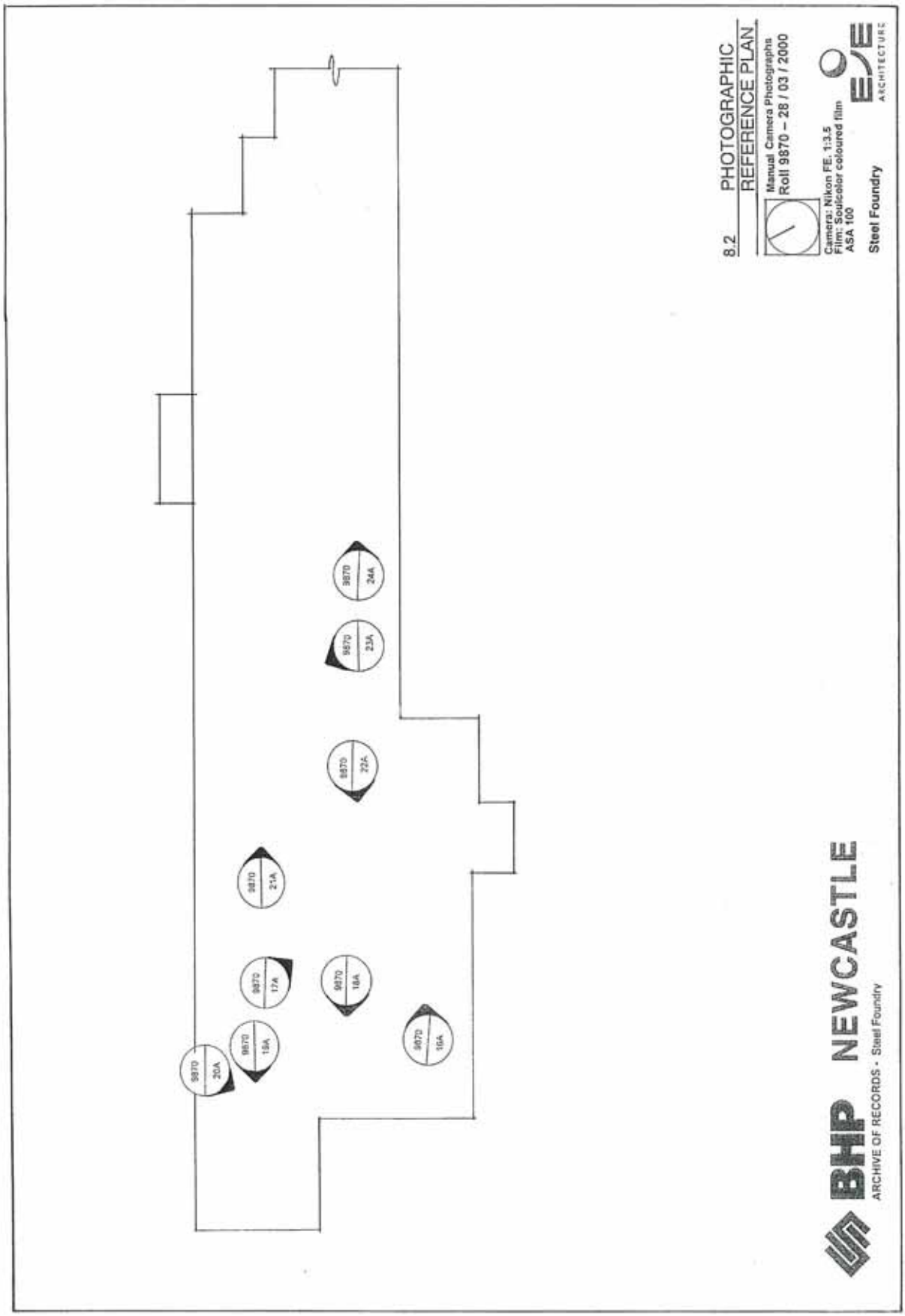
Digital photographs

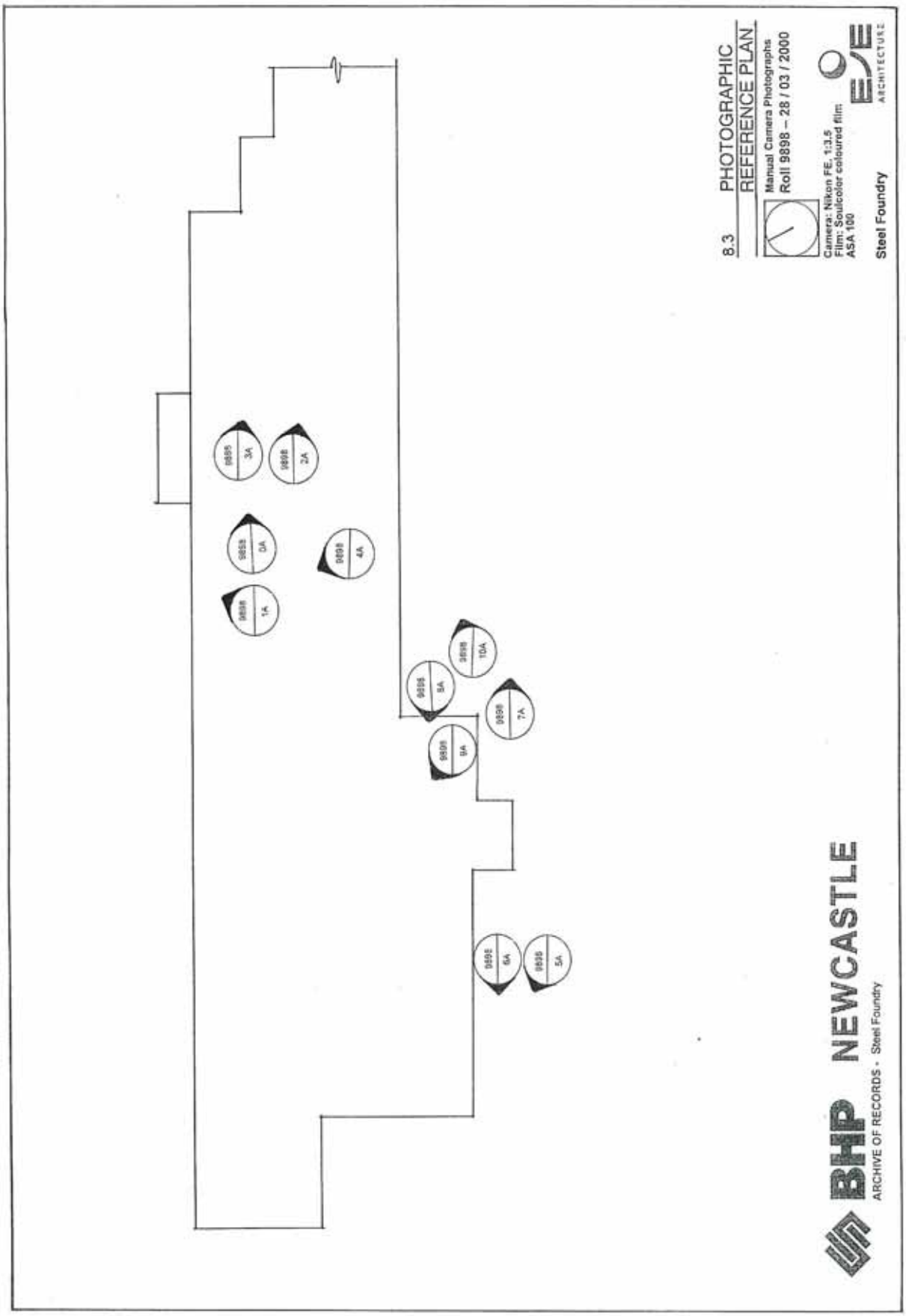
29/03/00
Camera: Kodak DC-120 Zoom 38 – 114

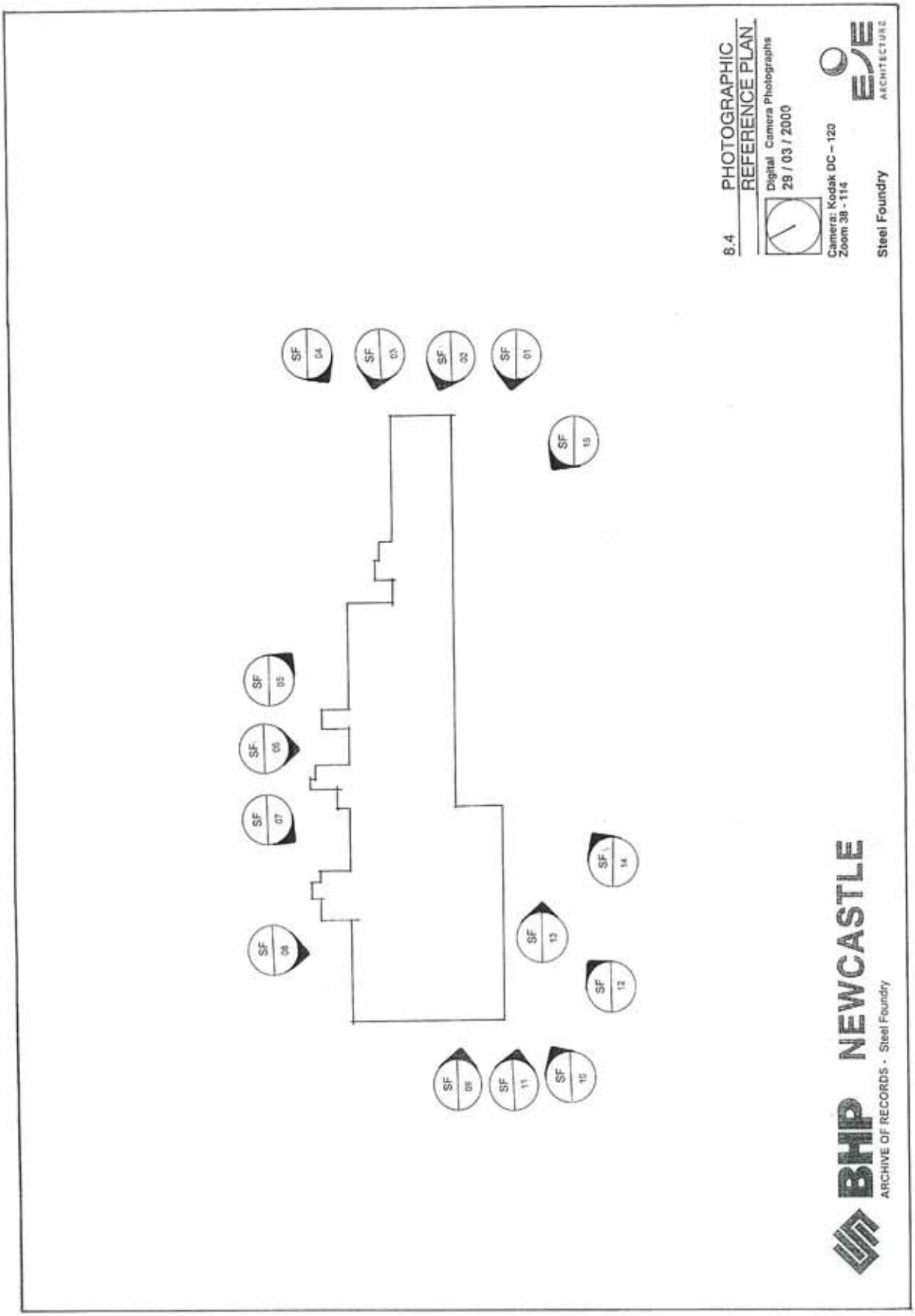
Photo No.	Figure No.	Description
SF-01	-	Part west elevation of stock yard, furnace building in background and part South elevation of Foundry building
SF-02	-	Eastern elevation of Foundry Building
SF-03	6.2	East elevation of Welding Bay, Strickle store and Main Building
SF-04	6.3	Part North elevation of Welding Bay and Foundry at East end
SF-05	-	Part North elevation of Main Building and General Office
SF-06	6.6	Part North elevation of Main Building
SF-07	6.7	Part North elevation of Main Building
SF-08	6.8	Part North elevation of Main Building at Western end
SF-09	-	Part West elevation of Foundry Building (left) and Furnace Building
SF-10	6.11	Part South elevation of Main building
SF-11	-	West elevation of Furnace Building and Annealing furnace
SF-12	-	South elevation of Furnace Building
SF-13	6.14	West elevation of Electrical workshop. Dust and Fume collector behind
SF-14	6.15	South elevation of Foundry Building
SF-15	6.16	South elevation of Foundry Building

8.0 PHOTOGRAPHIC REFERENCE PLAN




8.2 PHOTOGRAPHIC REFERENCE PLAN
Manual Camera Photographs
Roll 9870 – 26 / 03 / 2000
Camera: Nikon FE, 1:3.5
Film: Soulcolor coloured film
ASA 100
Steel Foundry
EJE ARCHITECTURE
9870 24A
9870 23A
9870 22A
9870 21A
9870 20A
9870 19A
9870 18A
9870 17A
9870 10A
BHP NEWCASTLE
ARCHIVE OF RECORDS - Steel Foundry


8.3 PHOTOGRAPHIC REFERENCE PLAN
Manual Camera Photographs
Roll 9898 – 28 / 03 / 2000
Camera: Nikon FE, 1:3.5
Film: Soulcolor coloured film
ASA 100
Steel Foundry
EJE ARCHITECTURE
BHP NEWCASTLE
ARCHIVE OF RECORDS - Steel Foundry
9898 3A
9898 2A
9898 8A
9898 4A
9898 1A
9898 10A
9898 9A
9898 7A
9898 6A
9898 5A


8.4 PHOTOGRAPHIC REFERENCE PLAN
Digital Camera Photographs
29 / 03 / 2000
Camera: Kodak DC – 120
Zoom 38 - 114
Steel Foundry
EJE ARCHITECTURE
SF 04
SF 03
SF 02
SF 01
SF 15
SF 05
SF 06
SF 07
SF 08
SF 14
SF 13
SF 12
SF 09
SF 11
SF 10
BHP NEWCASTLE
ARCHIVE OF RECORDS - Steel Foundry

9.0 DIAGRAMMATIC RECORD AND DRAWINGS

Figure 9.1: Steel Foundry Development
General Arrangement – Plan (1981 – 1983)
Source: BHP Archive. Ref – 148880 / 5

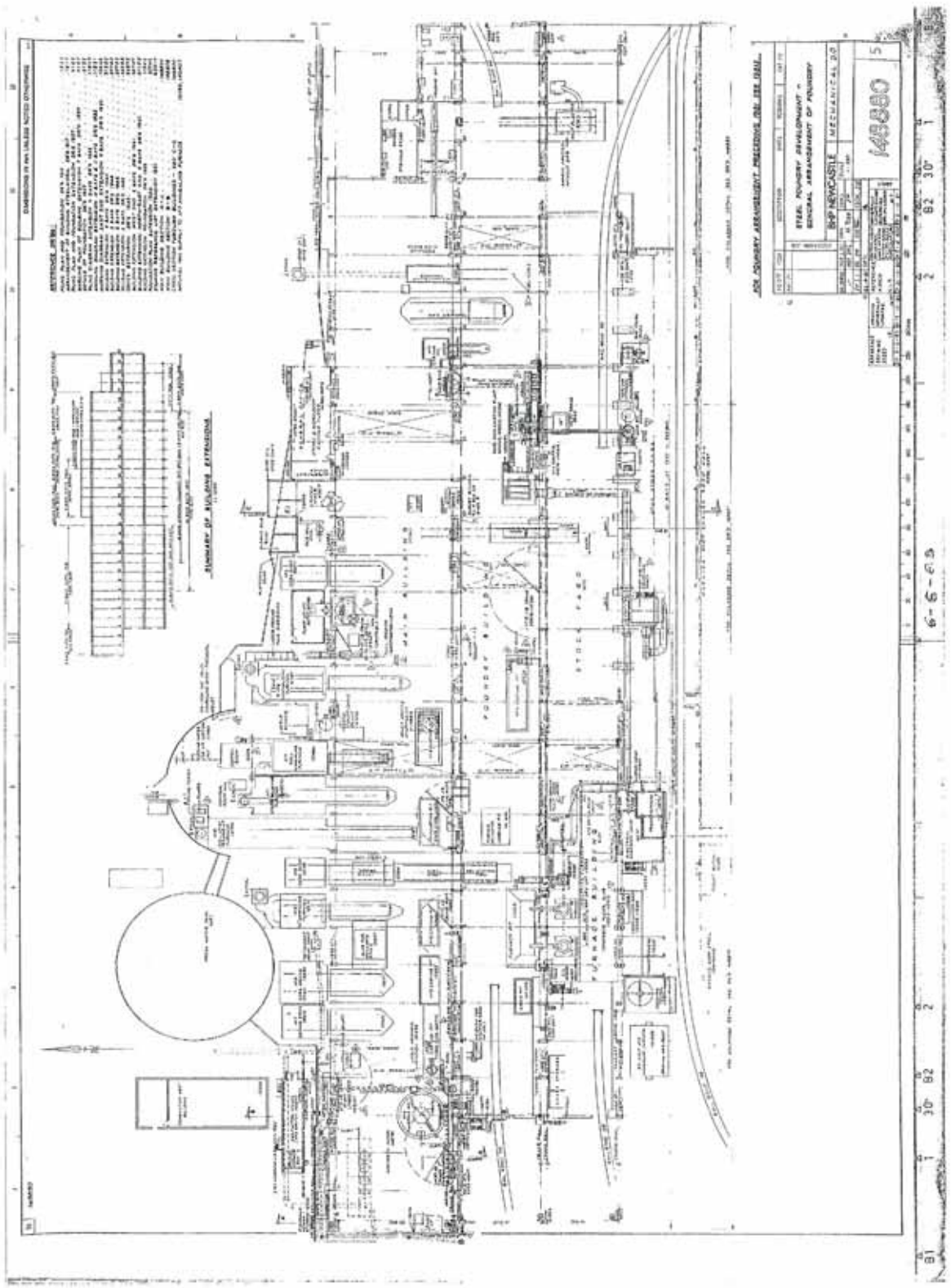


Figure 9.2 Steel Foundry
Arrangement of Building – Section, Elevation & Detail (1919)
Source: BHP Archives. Ref – M1617

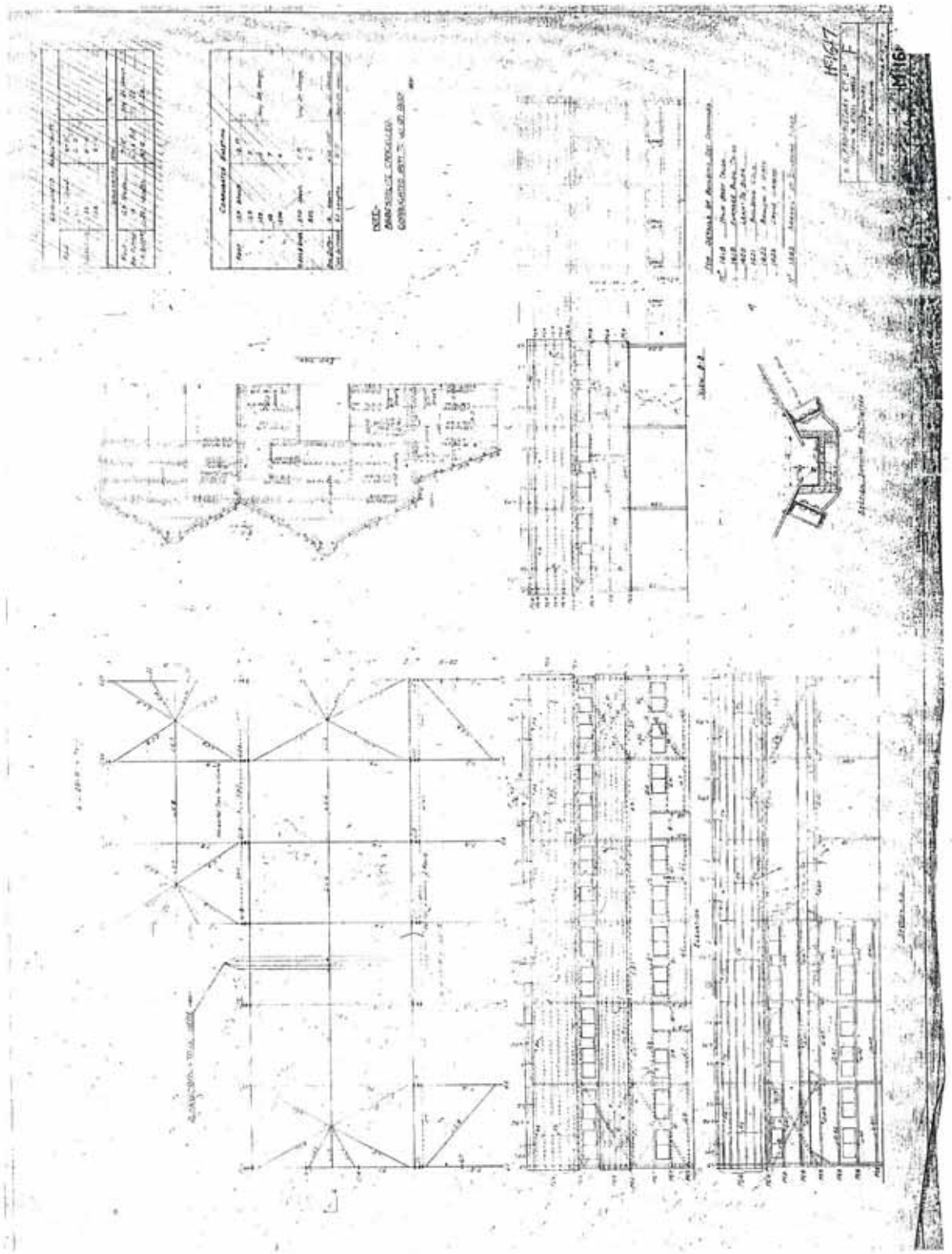


Figure 9.3 Steel Foundry
Arrangement of Building – Plan & Section (1918)
Source: BHP Archives. Ref – M2242

UNABLE TO PRINT
THIS FIGURE

10.0 HISTORIC PHOTOGRAPHIC RECORD

Note: No historic photographs were found of the Steel Foundry for the compilation of this report.

11.0 FULL FORMAT PHOTOGRAPHIC RECORD

Note: No full format photographs were found for the compilation of this report.

12.0 INVENTORY OF EQUIPMENT, FITMENTS & FINISHES

With the exception of one crane, dust/fume collector and annealing furnace, no equipment, as outlined in Section 3.0 (Outline of History & Industrial Process) remains.
Furnaces and casting pits have since been demolished and /or filled in.

13.0 APPENDICES

Appendix A: Manual camera negatives and photos

Appendix B: Digital images Proof Page and disk

Appendix C: Archive Drawing Register Disk

13.1 Appendix A:Manual camera negatives and photos

Refer to the final Archive Report master copy, to be submitted to the NSW Heritage Office, for negatives and additional mounted manual photographs

13.2 Appendix B:Digital images Proof Page and disk

Refer to the final Archive Report master copy, to be submitted to the NSW Heritage Office, for the digital images disc

13.3 Appendix C:Archive Drawing Register Disk

Refer to the final Archive Report master copy, to be submitted to the NSW Heritage Office, for the drawing register disk. Also accompanying the master copy shall be full size prints of the drawings as included in Section 9.0 -"Diagrammatic Records & Drawings"