APPENDIX 5

Copy Archival Record and Statement of Heritage Impact, Original Open Hearth Furnaces, Open Hearth Change House and Mould Conditioning Building

STATEMENT OF HERITAGE IMPACT

PROPOSED DEMOLITION OF THE ORIGINAL OPEN HEARTH BUILDING, OPEN HEARTH CHANGE HOUSE AND MOULD CONDITIONING BUILDING

Figure 0.1: View West of the Open Hearth Change House.
Source: Authors image OH-BH-01

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CONTENTS

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) 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 THE CONTEXT OF THE PROPOSAL

2.1 Physical Context

The Open Hearth Building, Open Hearth Change House, and Mould Conditioning Building are sited near the northern boundary, West of the No 1 Bloom and Rail Mill and South of No 4 Blast Furnace and stoves.

2.2 Statutory Context

The Open Hearth Building, Open Hearth Change House and Mould Conditioning Building are identified within the group identification forming Part B of Schedule 4 (Port Waratah – BHP Steelworks and Office) of "The Hunters Heritage" – Hunter Regional Environmental Plan 1989. The Open Hearth Building is identified individually within Schedule 4 of The Newcastle Local Environmental Plan 1987 as being an item of State – level heritage significance while the Open Hearth Change House and Mould Conditioning building are identified as having Regional – 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 items do 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

3.1 Open Hearth Building

Essentially, the production of steel from pig iron by any process consists of burning out the excess carbon and other impurities present in the iron. The major difficulty in the manufacture of steel is its high melting point which prevents the use of ordinary fuels and furnaces. The use of air recuperators, in which hot flue gasses of the furnace are used to pre-heat the incoming air used to burn the fuel, enables much higher temperatures to be achieved.

The furnace itself typically consists of a flat, rectangular brick hearth 6.000m x 10.000m which is roofed over at a height of about 2.500 metres. A series of doors open out on to a working floor in front of the hearth. The entire hearth and working floor are one story above ground level, and the space under the hearth is taken up by the heat-regeneration chambers of the furnace. Typically, an Open Hearth Furnace produces its capacity every 11 hours, in the form of molten steel which is poured into cast iron moulds. The moulds produce ingots which are generally 1.500 m long and .480m square, this form being the basic material for all steel products. Ingots are then heated and rolled into the desired shapes.

When the steelworks opened in 1915 two open hearth furnaces, whose capacity was 60 tons each, were operational. A third furnace was commissioned in August 1915 and an Open Hearth mixer along with four additional furnaces were installed in 1917.

A steady development process continued with improvements of the existing furnaces and additional furnaces being built during the intervening years. By 1936, 11 furnaces had been commissioned and were in operation. The building housing these furnaces had been extended in 1932 by three bays and was again extended by four bays eastwards to accommodate the No. 11 furnace was utilitarian, steel framed, large spans with few obstructions. It was constructed of rolled and riveted columns, lightweight trussed roof structures, all clad with galvanised steel sheet. Separate columns and beams supported the crane rails.

In 1944 the No. 14 open hearth furnace was commissioned. War shortages of both manpower and materials reduced steel production to 830,000 tons for that year. By 1954 the annual steel production had risen to 1,000,000 tons and by 1956 all of the furnaces were burning fixed fuel. The increasing production requirements brought about by post war consume demand resulted in the gradual demolition of the Open Hearth Furnaces so as to make way for the BOS Plant in 1962.

The 1960's saw the construction of the Continuous Bloom Caster which did away with ingots, ingot moulds and the traditional function of the Mould Conditioning building.

In December 1965 the last open hearth furnace was shut down.

3.2 Open Hearth Change House

It is in this period (completed May 1937) that the Open Hearth Change House was planned and constructed. This building was constructed of a reinforced concrete frame with brick cavity walls, reinforced concrete slab floors and steel truss roof structure with corrugated galvanised sheet roofing. Its purpose was to provide workers with an amenity building of high quality. The building contained lockers, seating crib tables, and toilet and shower blocks for 800 people. The original plans for the building show the showers arranged in a series of cubicles in conformity with building regulations at the time. However, an exemption was obtained and as a result, the shower area was built without dividing walls, and a system of overhead pipes with shower roses at regular intervals was installed.

Lockers were provided in separate areas – the east end of the ground floor, and the east and west ends of the top floor – for the three shifts of employees who worked in the department. A lunch room was situated between the two locker sections on the top floor.

In 1980, new plumbing was provided, floor levels adjusted to allow efficient drainage, exhaust fans installed and non-slip tiles laid on the floors. The new plumbing involved removing the overhead showers, and installing them in rows along the walls. Pipes were bedded into the walls and covered with cement render. The walls were then tiled, providing a more hygienic surface than the original painted finish but also enabling easier removal of graffiti, which had been a long-time problem in change houses throughout the plant. The original lockers were removed and their brick bases, which provided a harbour for rats, were demolished. Dining facilities were also improved and the original rows of individual seats with attached eating tray, which were very unpopular with the employees, were replaced with conventional tables and plastic chairs. As open hearth steel making was phased out and workforce declined, areas of the building were occupied by other departments. This building provides a link to the social history of the steelworks, and is also an example of the company's tendency to adapt redundant accommodation to cater for present needs.

3.3 Mould Conditioning Building

In 1942 the Mould Conditioning building was completed on the southern side of the Open Hearth building. The building was constructed to house the mould strippers. After stripping, the ingots were transported to the soaking pits on buggies in order to free the charging cranes. The consequent loss of ingot heat and mixed steel problems due to ingots being split on the way, led to the abandonment of this system. Although ingots were no longer stripped in the building, the conditioning of moulds for re-use became the major function on the site.

Following the installation of the Bloomcaster in 1987, ingot moulds were phased out and in 1991 the Mould Conditioning plant was demolished, leaving only frame, roof cladding and roof ridge venting structure.

4.0 SUMMARY CONDITION ASSESSMENT

4.1 Open Hearth Building and Mould Conditioning Building

In the 1999 Conservation Plan the condition of the Open Hearth building was described as:

"Its age and continuous use has meant that the original fabric of this building has deteriorated significantly. Much of the fabric has outlived its original purpose."

Both the Open Hearth Building and Mould Conditioning Building are now (April 2000) essentially shells of the original functioning buildings. The structure remaining shows many alterations and use of newer materials. Some components of the original structure remain, particularly in the pool area and some columns and beams and wall and roof cladding. Having said this however, the fine trusses of the Open Hearth building roof remain intact as does the roof and secondary cladding of the Mould Conditioning Building.

4.2 Open Hearth Change House

The Open Hearth Change House, as existing, externally reflects the varied upgrades and modifications in use that its interior has undergone. The ground floor has been substantially modified internally from the original functioning layout, while the upper floor showers and crib room utilities have been remodelled from original. Many external windows and openings have been modified, but enough of the external masonry fabric remains to indicate the original neo Georgian style of the building. The "presentation" east and west facades remain intact, sharing their provenance with the design of the double – height A.C. Pumphouse extension.

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 Open Hearth Building, Open Hearth Change House, and Mould Conditioning Building have been assessed (1991 Port Waratah Steelworks Construction Plan) as having STATE REGIONAL level 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

The Open Hearth Building, Open Hearth Change House, and Mould Conditioning Building not only represent the first element in the construction and later development of the Newcastle Steelworks but also form an important link with the development and growth of iron and steel making in Newcastle from 1913 to the present.

They are associated with the establishment and evolution of the major integrated Steelworks in NSW and as such have STATE HISTORIC heritage significance.

5.1 The Open Hearth Building

The Open Hearth Building derives its significance from its role in the steel making process and its physical location in relation to the buildings surrounding it is sufficient to provide initiates information about that role. Its fabric, while significant in this context, no longer contains significant interpretive evidence. It most certainly is associated with a State – significant activity, but no longer, of itself adequately demonstrates the continuity of a historical process or activity. For this reason the building must be considered to have STATE HISTORIC heritage significance.

5.2 The Open Hearth Change house

The Open Hearth Change House retains greater interpretive potential than its parent building, as it retains clear evidence of purpose – designed and fitted shower and change areas etc. It demonstrates the evolution of a Regionally – significant major industrial works staff activity and as such, must be seen to retain its LOCAL HISTORIC heritage significance.

5.3 The Mould Conditioning Building

As with the above associated buildings, the Mould Conditioning building has STATE HISTORIC significance.

Aesthetic Significance

Aesthetically the buildings are representative of their type and age. The Open Hearth Change House building is the more distinctive, as it is a masonry building, but neither is architecturally distinctive nor associated with creative or technical accomplishment. For this reason none has Aesthetic heritage significance.

Social Significance

Like all of the elements on the Steelworks site, the Open Hearth Building, Open Hearth Change House, and Mould Conditioning Building, represent the development of iron and steel making on the Newcastle steelworks site and for its important linkage with the creation of employment in Newcastle and the region. As such, these buildings and the larger site has highest level Local SOCIAL Significance.

Technical Significance

The Open Hearth Building, technically, has the greatest potential to yield worthwhile historical information about the evolution of work practices on a site of State significance Technically. However that potential has been compromised through loss of internal interpretive fabric. This building has STATE level Technical Significance. The Open Hearth change House has STATE level Technical Significance for its importance as a benchmark building of rarity in the Region and State. The Mould Conditioning building has LOCAL Technical Significance. For this reason alone, the group has, STATE level Technical Significance.

6.0 OPTIONS FOR PHYSICAL INTERVENTION

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

"After closure of steel making, 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).

These items are 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 buildings to remain. However this proposition is considered untenable given:

a) If the Open Hearth Building, Open Hearth Change House and Mould Conditioning Buildings remains, none can easily be re-used or adapted, within a Multi Purpose Terminal proposal They will also require continuous expensive stabilisation and maintenance, or will otherwise deteriorate and become a potential health and safety hazard. Their location does not readily allow for access by private citizens.

b) Remediation of this area of the site is required. The remediation proposal involves capping the proposed Multi Purpose Terminal site with a flexible wearing pavement.

c) The Open Hearth Building is not easily useable or relocatable in its present form. Framing and cladding could all be re-used elsewhere. The masonry fabric of the Open Hearth Change House is not re-useable, but its remaining fittings are. However, in general, removal of them could damage existing significant fabric. There is insufficient mould conditioning building fabric remaining to justify retention or relocation other than the frame. Little of the fabric of any of these buildings would provide valuable interpretive information about the function of the building other than if a wall or section thereof, were to be erected elsewhere within the main site. Only in such a circumstance could relocation and rebuilding, be justified.

In accordance with Burra Charter and NSW Heritage Office requirements appropriate recording has been undertaken. (see Building "Archival Record"). 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:

Remanent steel work ad brickwork of No. 2 Ope Hearth Furnace.
Lockers.
Remaining seats with integral crib table.

As part of the overall interpretation strategy it is proposed to identify the location of the Ope Hearth Change House ad Mould Conditioning Buildings using a coloured glass bead trafficable applied surface to the MPT pavement. Further items will be relocated to the Interpretive Centre ad Archaeological Repository

7.0 THE HERITAGE IMPACTOF THE PROPOSAL

These items are substantiated as having STATE level significance, therefore demolition of the item to enable development of the Multi Purpose Terminal will impact on the 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.

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 APPENDICES:

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

Appendix 8.2: Site Development Master Plan – showing identified Heritage items.

Appendix 8.3: Conceptual Paving Patter to existing Heritage items.

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".

ARCHIVAL RECORD

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

OPEN HEARTH BUILDING

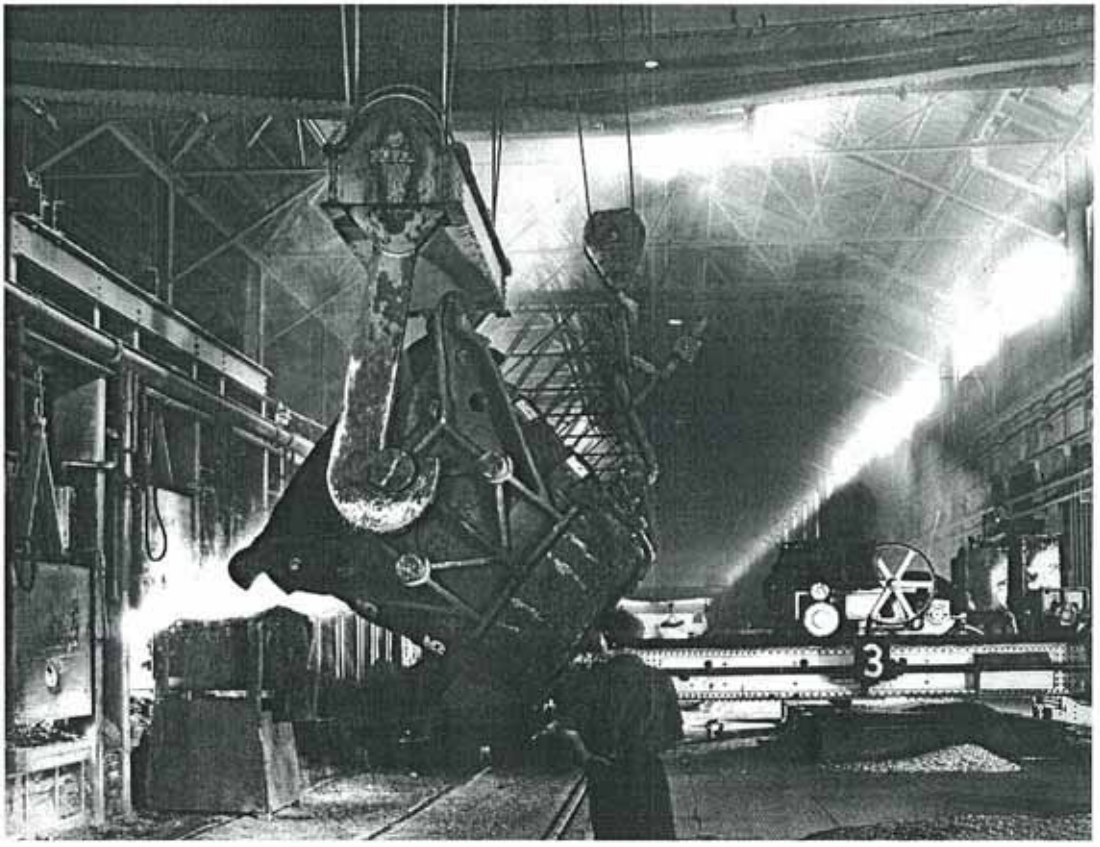

Figure 0.1: Open Hearth Ladle (1938)
Source: BHP Staff (1984) to Sir James McNeil (from the Frank Hurley collection)

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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 Open Hearth Building - an item classified as having a 'State level of heritage significance'[1].

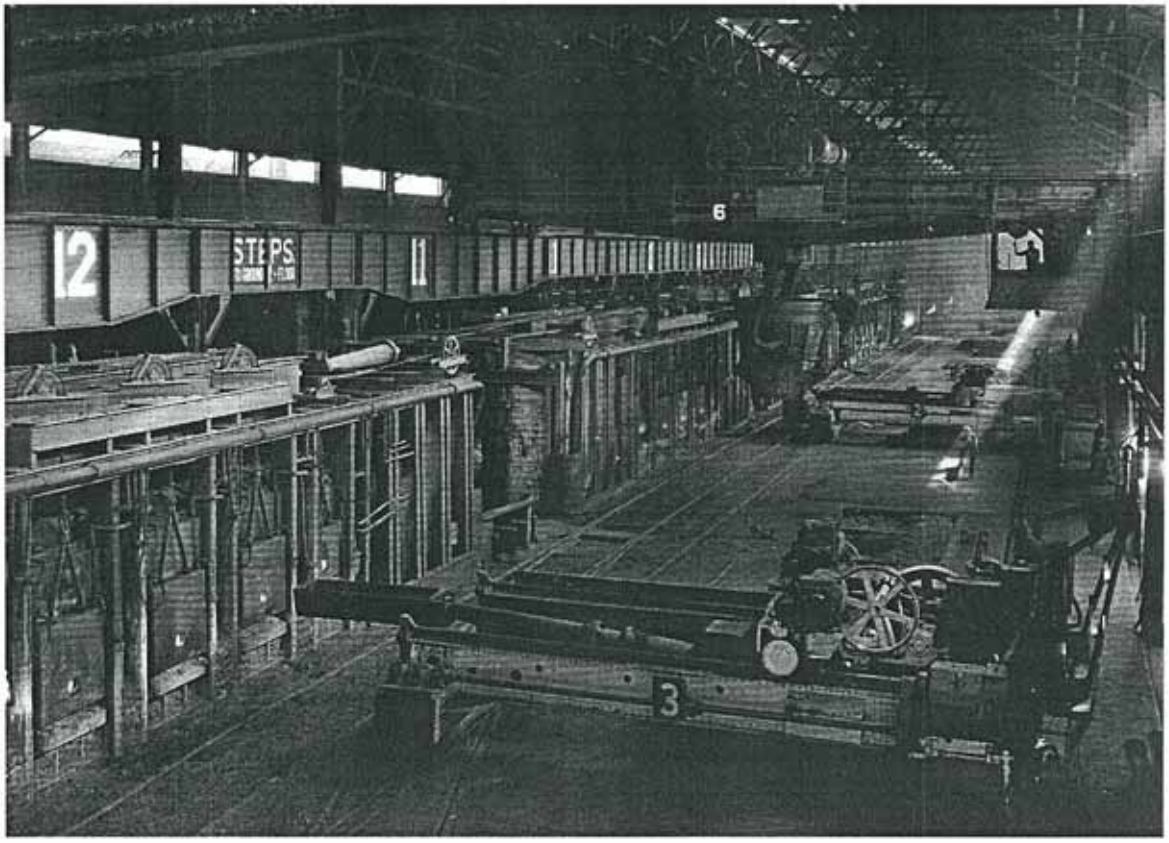


Figure 1.1 Charging side of the Open Hearth Furnaces. (1938)
Source: BHPA N3040/24

[1] Identified individually within Schedule 4 of The Newcastle Local Environmental Plan 1987 and the Port Waratah Steelworks Conservation Plan 1991.

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.

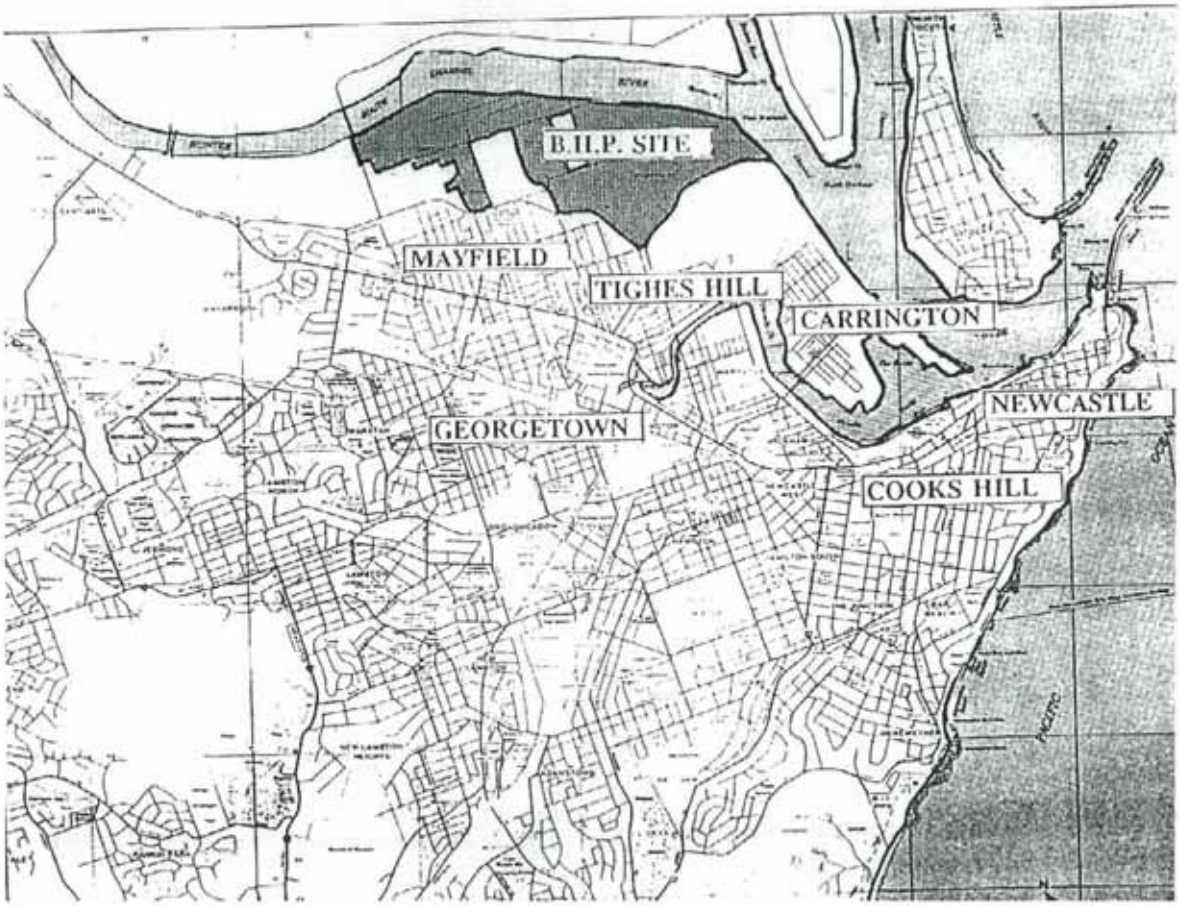
The written descriptions provide a background to the building and the functions that it housed and incorporate relevant photographs. As an essential part of the written component, a statement on the item's heritage significance details why the item is valued.

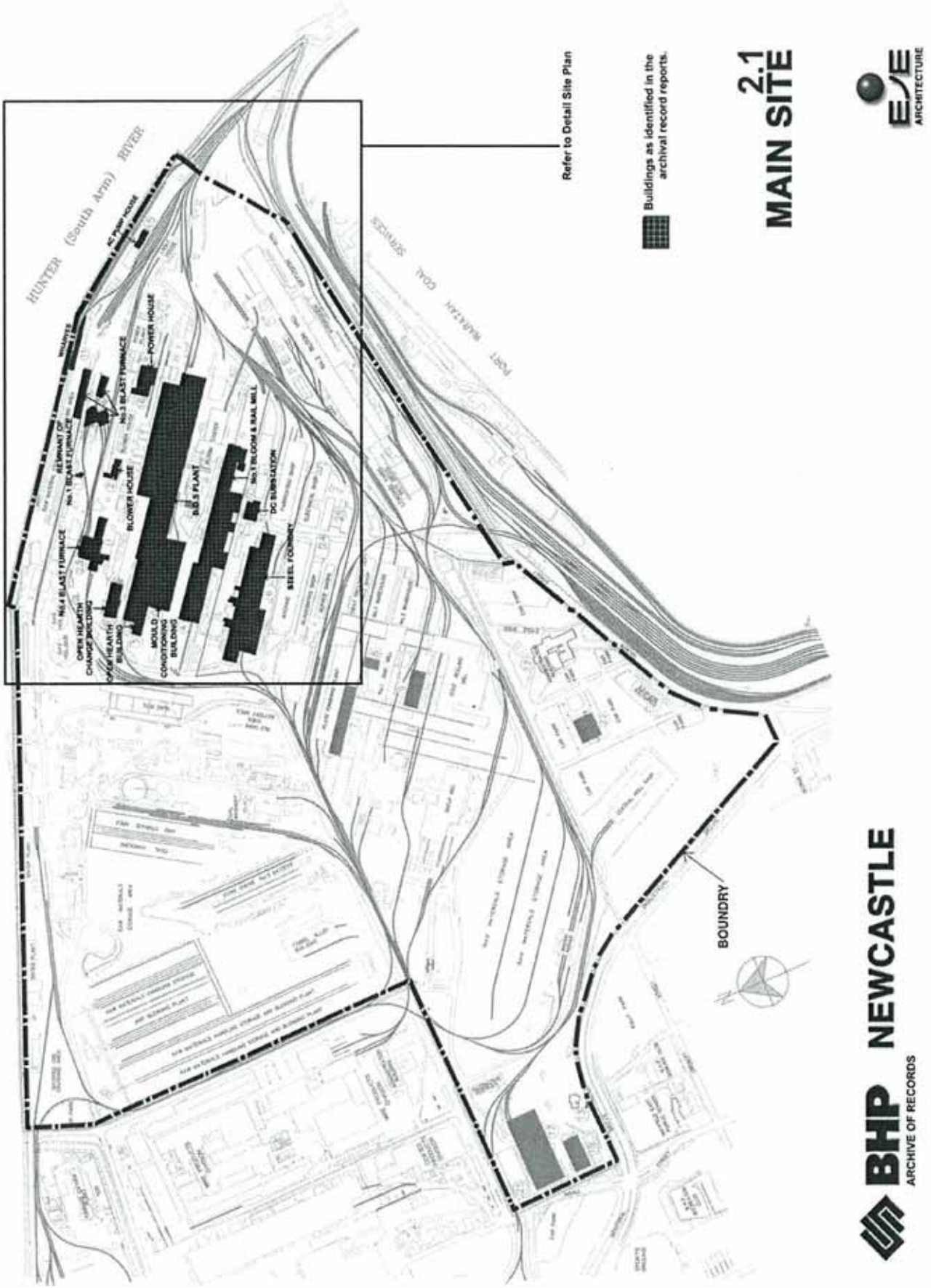
The bulk of the information in this report comes from the pictorial descriptions. Comprising of both historic and contemporary photographs, an account of the building fabric, the various industrial processes contained and the changes that have taken place through time is made. In addition, a selection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

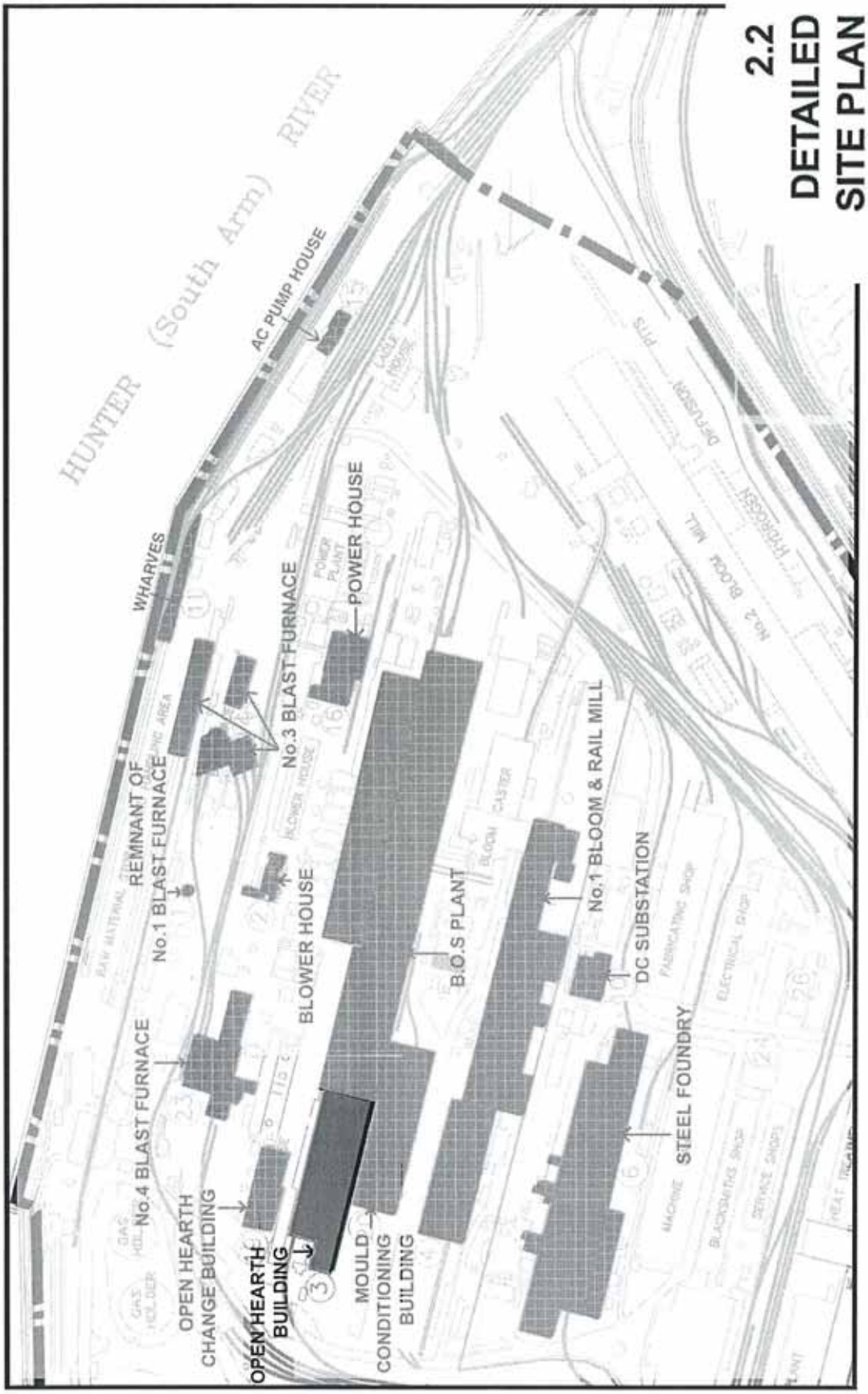
Supporting both the written and pictorial information is a series of inventories and tables which provide details of equipment contained within the building, cross referenced descriptions of photographs and shot locations, and bibliographical information.

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

2.0 LOCATION PLANS




2.1
MAIN SITE
Refer to Detail Site Plan
Buildings as identified in the archival record reports.
BOUNDRY
HUNTER (South Arm) RIVER
EJE ARCHITECTURE
BHP NEWCASTLE
ARCHIVE OF RECORDS


HUNTER (South Arm) RIVER
AC PUMP HOUSE
WHARVES
REMNANT OF No.1 BLAST FURNACE
No.3 BLAST FURNACE
POWER HOUSE
No.4 BLAST FURNACE
BLOWER HOUSE
B.O.S PLANT
No.1 BLOOM & RAIL MILL
DC SUBSTATION
STEEL FOUNDRY
OPEN HEARTH CHANGE BUILDING
OPEN HEARTH BUILDING
MOULD CONDITIONING BUILDING
2.2
DETAILED SITE PLAN
OPEN HEARTH BUILDING
EJE ARCHITECTURE
BHP NEWCASTLE
ARCHIVE OF RECORDS

3.0 OUTLINE OF HISTORY AND INDUSTRIAL PROCESS

The Open Hearth Building housed the Open Hearth furnaces which produced steel from 1915 until 1965, when they were superseded by Basic Oxygen Steelmaking technology. Initially housing only two furnaces, the building was extended over the years until 1945, by which time a total of 14 furnaces were in operation.

The first open hearth furnace in Australia began operating in 1900 at the Eskbank Iron Works. It had a capacity of only four tons and its design and operation were based on European practice. However, a series of rapid and radical changes in open hearth technology, especially in the US, led BHP to favour American practice for the Newcastle steelworks. The steelworks opened with two furnaces of 60 tons capacity and their function was described in the *Souvenir of the Opening:*

> The cast iron required for steel making is lodged in the neighbourhood of the open hearth, and the furnace, already equipped with a bath of scrap, receives its ration of hot "pig". This is effected by means of a powerful crane, which raises the ladle and pours the liquid iron down a funnel into the furnace. During the melting period, accomplished by the combustion of gas and air at a high temperature, the boiling mass is carefully observed and frequently tested to see that its chemical elements are in due proportion, and, when ready for tapping, the liquid steel is run off into a big cup ...This is another of the startling firework effects that make a round of the works such an eerie and hair-raising experience....

Figure 3.1: Charging the Open Hearth Furnace.
Source: BHPA N3040/22

Having produced the quality of steel required, the final process in the manufacture is to turn the steel into ingots of a size convenient for working up into blooms, rails or bars. Rows of ingot moulds on bogey wagons are ranged along the opposite platform. The ladle of molten steel is lifted by a 100 ton overhead travelling crane, and, by means of a valve in the bottom of the cup, and worked form the platform by compressed air, each mould is filled with the metal, the crane moving the ladle along until each one is filled.[2]

[2] *Souvenir of Opening, Newcastle Steelworks,* June 1915, p.32.

Figure 3.2: "General view of Australian Blast Furnace & Steel Works." (1915)
Open Hearth Building shown in centre of picture.
Source: W.B Pollock Company, Youngstown, Ohio. (1915)

A third furnace was commissioned in August 1915 and four additional furnaces were installed in 1916-7[3], as well as a 100t. open hearth mixer.[4] The mixer was converted to two 400 ton mixers in 1922. In 1922 a further two furnaces were installed and by 1925 there were nine furnaces in operation. During the Depression years the furnaces were upgraded and in 1932 No.10 furnace, capable of producing 125 tons, was constructed. As well as building the furnace, the task included a three bay extension to the building, construction of a new chimney stack and the manufacture of a 100 ton crane. Two 100 ton fabricated steel ladles were made, as well as 14 ingot cars and 8 charging cars.[5]

In 1935 the building was extended by one bay on the western end for storage purposes. One crane of 60 ton capacity, with a 10 ton auxiliary hoist (known as the 'new 60') and one charging machine were also manufactured at this time.

No.11 furnace was built in 1936, necessitating a four bay extension to the east of the building and shortly after its commissioning, excavations began for the construction of No.12 Furnace and associated building extensions, which were completed in early 1937. In September of that year, the erection of No.13 furnace, together with a five bay extension to the western end of the building, was authorised.[6] For superstitious reasons, No.13 furnace was originally known as "A" furnace.

The last open hearth furnace, No.14, was commissioned in 1944[7] and the building was further extended at the western end in 1945.[8]

Since the commencement of steelmaking at Newcastle, methods of firing the open hearth furnaces had undergone considerable change. The early furnaces were fired with producer gas but those installed between 1937 and 1944 were intended to be fired with liquid fuel, but designed for conversion to producer gas firing if necessary. In 1930 plant extensions made possible the addition of coke ovens gas to supplement the producer gas and in 1938 blast furnace gas was also used. Following experimentation to ascertain the possibility of tar as a fuel, several furnaces were converted to tar firing, some of them using both tar and coke ovens gas. The last five furnaces were designed to fire both tar and coke ovens gas. In 1953, the conversion of Nos.8 and 9 furnaces to tar and coke ovens gas firing resulted in a marked increase in performance and by 1956 all of the furnaces were burning fixed fuel.[9]

Furnace capacity had also increased considerably. The initial capacity of No.1 open hearth furnace was 60 tons, but No.14 furnace, which ceased operation in December 1965, was capable of producing 130 tons. The open hearth furnaces produced a total of 32 million tons of steel, and in

[3] Open Hearth Department – General Data, 25 June 1952, BHPA:W5/3/19.
[4] D. Baker, "Reminiscences of the Broken Hill Proprietary Company's Adventure in Steel", *The BHP Review*, February, 1936, p.7.
[5] Report for half year ended 30 November 1932, p.163.
[6] Reports for half year ended 31 May 1936, p.62, 30 November 1936, p.149, 30 November 1937, p.63.
[7] Report for half year ended 31 May 1944, p.200.
[8] Report for half year ended 31 May 1945, p.63.
[9] *BHP Review*, February 1966.

the last complete year of operating all fourteen furnaces, the average weekly production was 24,275 tons.

In 1957 it was decided to replace the 14 open hearth furnaces, of 125 to 135 ton capacity, with five 350 ton modern open hearth furnaces. Construction of a building to house the new open hearths was underway when it was decided to install Basic Oxygen Steelmaking furnaces rather than open hearth furnaces. As a result, the new building was used for the BOS. It was designed for erection over and around the original building, but retained the original crane runway spans of 62'6" and 50'0", allowing steelmaking to continue without interruption. A programme of open hearth demolition began and steelmaking commenced in the new BOS furnaces in 1962.

The last open hearth furnace was tapped at 4.45 p.m. on 2 December 1965, bringing to a close 50 years of open hearth steelmaking at the Newcastle Steelworks. The last tapping was watched by senior Company officials and several former employees who had worked in the department in 1915.[10]

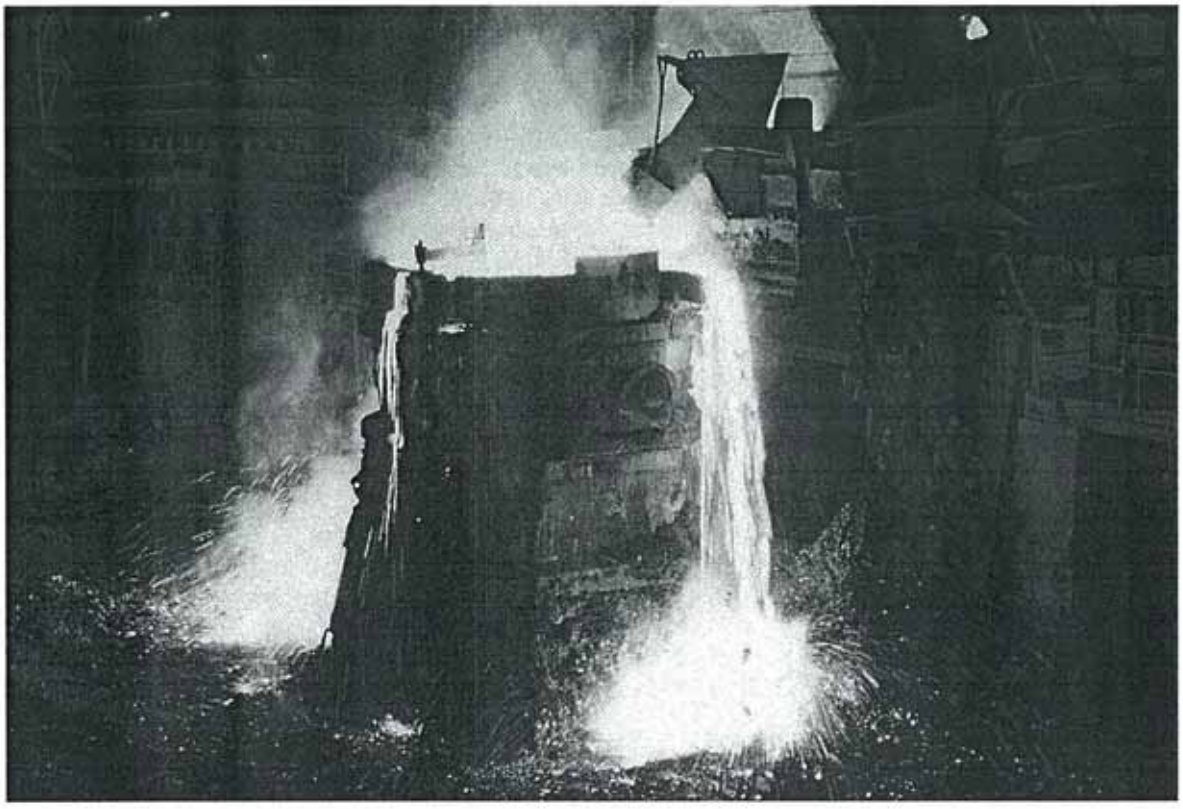


Figure 3.3: Slag overflowing onto the ladle floor as the Open Hearth is tapped.
Source: BHPA N3040/60

[10] "50 Years of Open Hearth Steelmaking at Newcastle", *BHP Review*, February 1966, pp.1-5.

3.1 The Building Description & Structure

The building is of the same basic design as others at the site such as the No.1 Bloom & Rail Mill building: it is of riveted steel-framed construction.

Significance lies not so much in the structure as the operation which was carried out within it.

Extensions carried out 1935 to 1945 are of similar riveted design to the original building, the only differences noted being the source of the steel used: 1935 extensions have the impression "BHP Co. Ltd" on webs of rolled sections; the later sections are simply labelled "BHP". Examples of steel from the various periods could be saved for record and further study.

Condition

The building is in very good condition for its age, but as in other buildings, the cessation of activities, which generate high temperatures, is likely to lead to rapid deterioration without significant work.

Steel condition & 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.

4.0 STATEMENT OF HERITAGE SIGNIFICANCE

The Open Hearth Building is identified within the group identification forming Part B of Schedule 4 (Port Waratah – BHP Steelworks and Office) of "The Hunters Heritage" – Hunter Regional Environmental Plan 1989. The Open Hearth Building 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

The Open Hearth Building, together with Open Hearth Change House and Mould Conditioning Building, not only forms a part of the first elements in the construction and later development of the Newcastle Steelworks, but they also form an important link with the development and growth of shipping into Newcastle from 1913 to the present.

Further, because of the importance of the wharves to the receipt of raw materials and ship finished products over the life of the Newcastle Steelworks, they illustrate a continually developing support element to the manufacture of iron and steel. They are associated with the establishment and evolution of the major integrated Steelworks in NSW and as such have HIGHEST - level heritage significance.

The Open Hearth Building derives its significance from its role in the steel making process and its physical location in relation to the buildings surrounding it. Its fabric, while significant in this context, no longer contains substantial interpretive potential. Whilst it is associated with a State significant activity, it no longer of itself adequately demonstrates the continuity of a historical process or activity. For this reason the building must be considered to have REGIONAL HISTORIC heritage significance.

Aesthetic Significance

The building's aesthetic quality is representative of its type and age. The Open Hearth Building is neither architecturally distinctive nor associated with creative or technical aesthetic accomplishment. For these reasons it has no aesthetic heritage significance.

Social Significance

Like all of the elements on the Steelworks site, the Open Hearth Building represents a part of the development of iron and steel making on the Newcastle steelworks site and forms an important link with the creation of employment in Newcastle and the region. As such, this building and the larger site has highest level REGIONAL (and therefore State), SOCIAL Significance.

Technical Significance

The Open Hearth Building, technically, has the potential to yield worthwhile historical information about the evolution of work practices on a site of State significance. However that potential has been compromised through the loss of internal interpretive fabric. Therefore this building has REGIONAL level Technical 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.

Baker, D. "Reminiscences of the Broken Hill Proprietary Company's Adventure in Steel", *The BHP Review,* February, 1936

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

Cherry, R. J. *Containing the Fires of Iron and Steel.* Newcastle, 1999

Greenhalgh, K. G. *Men of Steel, An Anecdotal History of Steelmaking,* Newcastle 1999

Souvenir of Opening, Newcastle Steelworks, June 1915

The BHP Review, February 1966

Newcastle Steelworks Half Yearly Reports: 30 November 1932, 31 May 1936, 30 November 1937, 31 May 1944, 31 May 1945.

Discussions with:

D. Ruddell, former Chief Construction Engineer, Newcastle Steelworks

6.0 SELECTED PHOTOGRAPHS

Figure 6.1 Open Hearth Building. West Elevation. Open Hearth Change House (brick building) to the left of overhead Coke oven's gas mains.

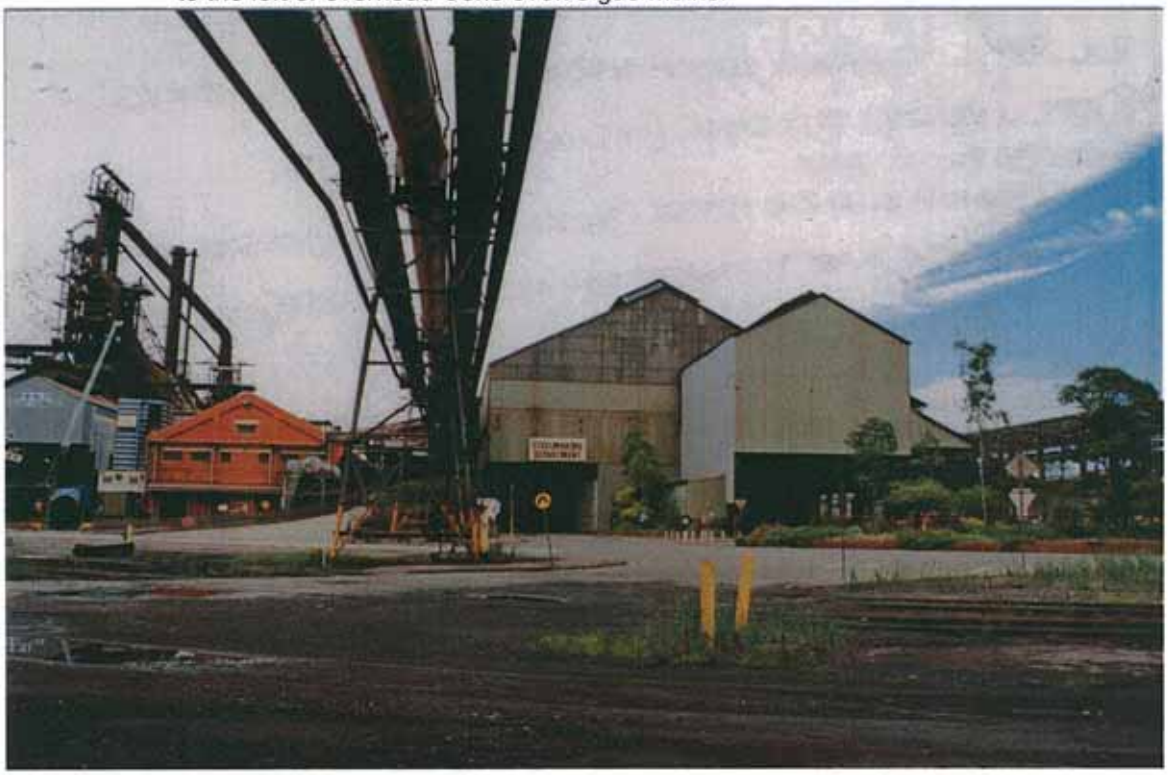


Figure 6.2 Internal view West of "The Pit Side" west end of Open Hearth Building.

Figure 6.3 Open Hearth Building, View west showing North wall and partial remains of original skillion roof & wall structure.

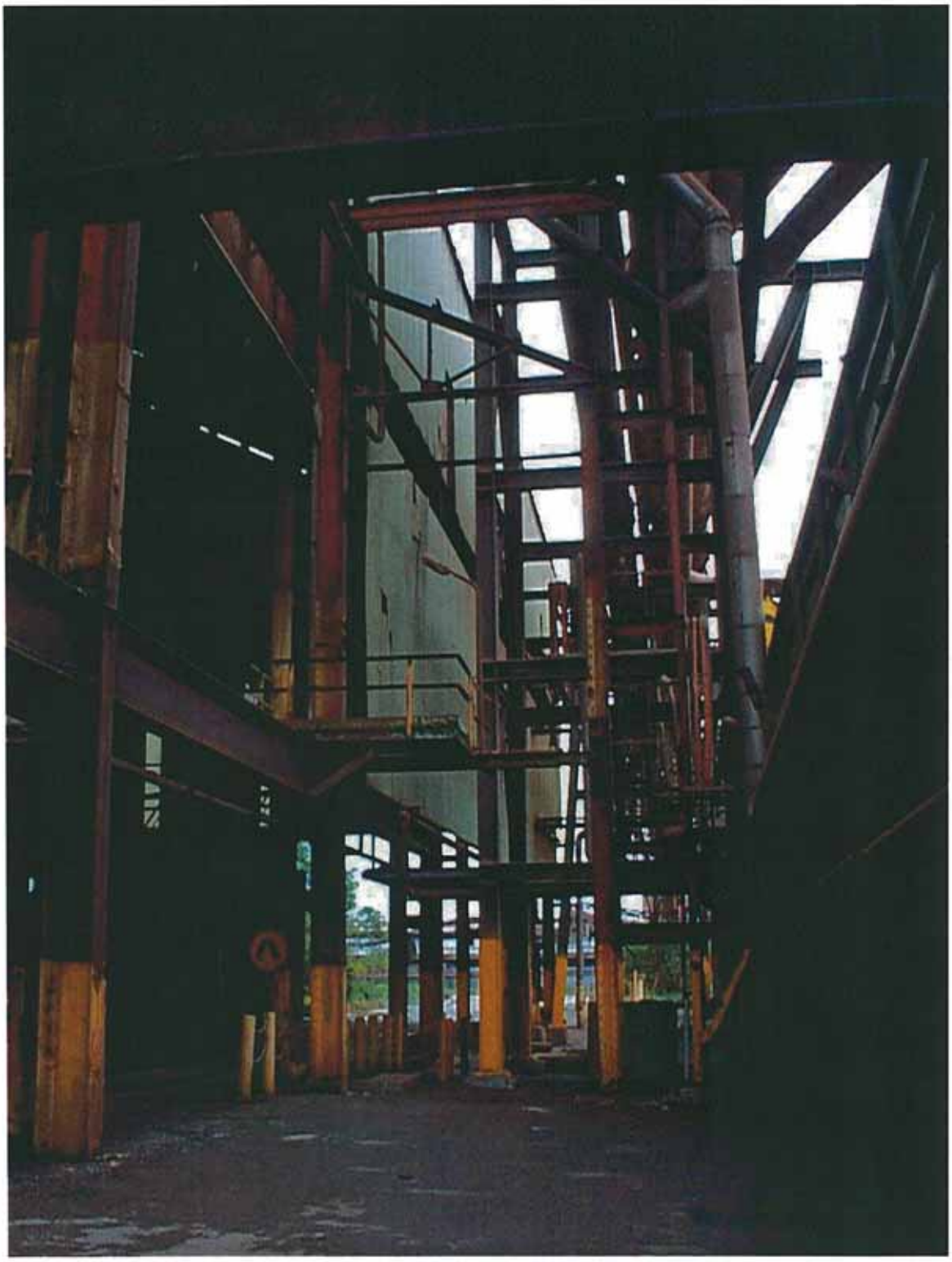


Figure 6.4 Open Hearth Building, internal view looking east.
Shows crane beams and structural components for furnaces at right .
B.O.S. building and overhead crane in background

Figure 6.5 Open Hearth Building, internal view from B.O.S. scrap ramp at No. 1, 2 & 3 furnace bays. More recent brick material bays visible at centre frame.

Figure 6.6 Open Hearth Building, internal view looking up into roof truss framing. Taken looking at No.3 furnace column and newer B.O.S building junction.

Figure 6.7 Open Hearth Building, internal view looking north east. Shows the remains of open hearth furnaces No.s 2 & 3 at the junction B.O.S building structure

Figure 6.8 Open Hearth Building, internal view looking north east. Shows the remains of open hearth furnaces No.s 2 & 3 at the junction B.O.S building structure

Figure 6.9 Open Hearth Building, internal view looking south. Shows detail of No.2 furnace brickwork remains at centre grid column.

Figure 6.10 Open Hearth Building, internal view looking south – west. Shows remains of No.3 furnace brick work at centre grid column. Junction to newer B.O.S building structure.

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 9601– 9/3/2000
Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

Neg No.	Figure No.	Description
1	-	Open Hearth Building. West Elevation. Shows skeletal frame of soaking pits & former No.1 Bloom Mill at right. Coke oven's gas mains overhead at far left.
2	6.1	Open Hearth Building. West Elevation. Open Hearth Change House (brick building) to the left. No.4 blast furnace behind at far left. Coke oven's gas mains overhead.
3	-	Open Hearth Change House. West Elevation.
4	-	Open Hearth Change House. West Elevation.
5	-	Open Hearth Building. West Elevation. Shows skeletal frame of soaking pits & former No.1 Bloom Mill at right. Coke oven's gas mains overhead at far left.
6	-	Open Hearth Building. West Elevation. Open Hearth Change House (brick building) to the left. No.4 blast furnace behind at far left. Coke oven's gas mains overhead.
7	-	Open Hearth Change House West Elevation. Open Hearth Building at right behind coke oven gas mains.
8	-	Open Hearth Change House. West Elevation.
9	-	Open Hearth Change House. North Elevation. Open Hearth Building directly behind. Note B.O.S. Building at left, enveloping Open Hearth Building.
30	-	Open Hearth Building. Interior: View north to top of No.4 blast furnace.
31	-	Open Hearth building. Interior. View West from approximate location of No.3 Open Hearth (since removed)
32	-	Open Hearth building. Interior: View West (10m above floor level) of remnant brickwork of No.2 open hearth.
33	-	Open Hearth building. Interior: View West.
34	-	Open Hearth building. Interior: View West.
35	-	Open Hearth building. Interior: View West of remnant brickwork of No.2 Open Hearth.
36	-	Open Hearth building. Interior: View West of remnant brickwork of No.2 Open Hearth. Note double column in middle of open hearth building.
37	-	Open Hearth building. Interior: View West of double column structure at back of former furnaces. Note roof structure and continuous ridge vent.

ROLL 9602 – 9/3/2000

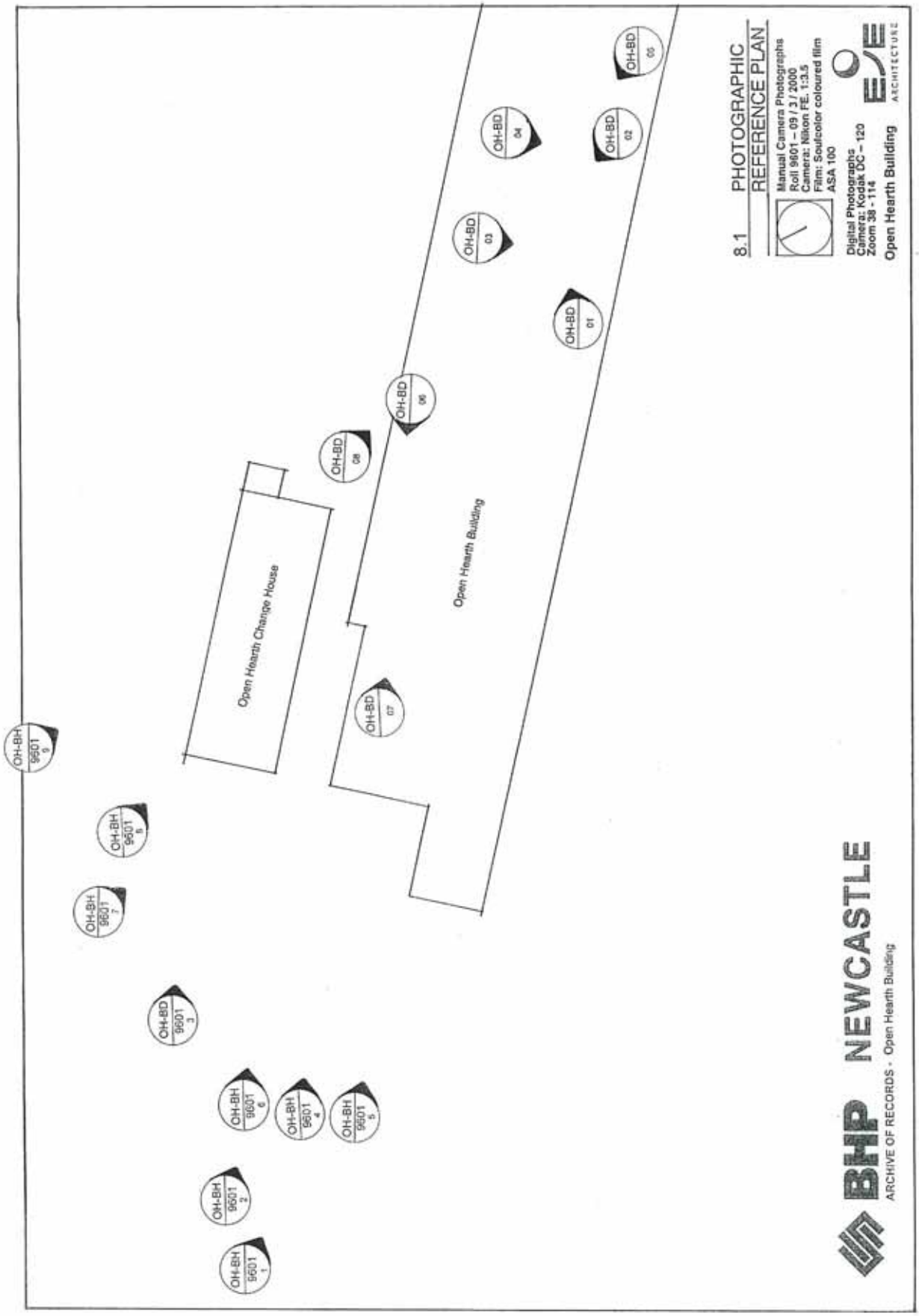
Camera: Nikon FE. F 1:3.5
Film: Soulcolor coloured film ASA 100

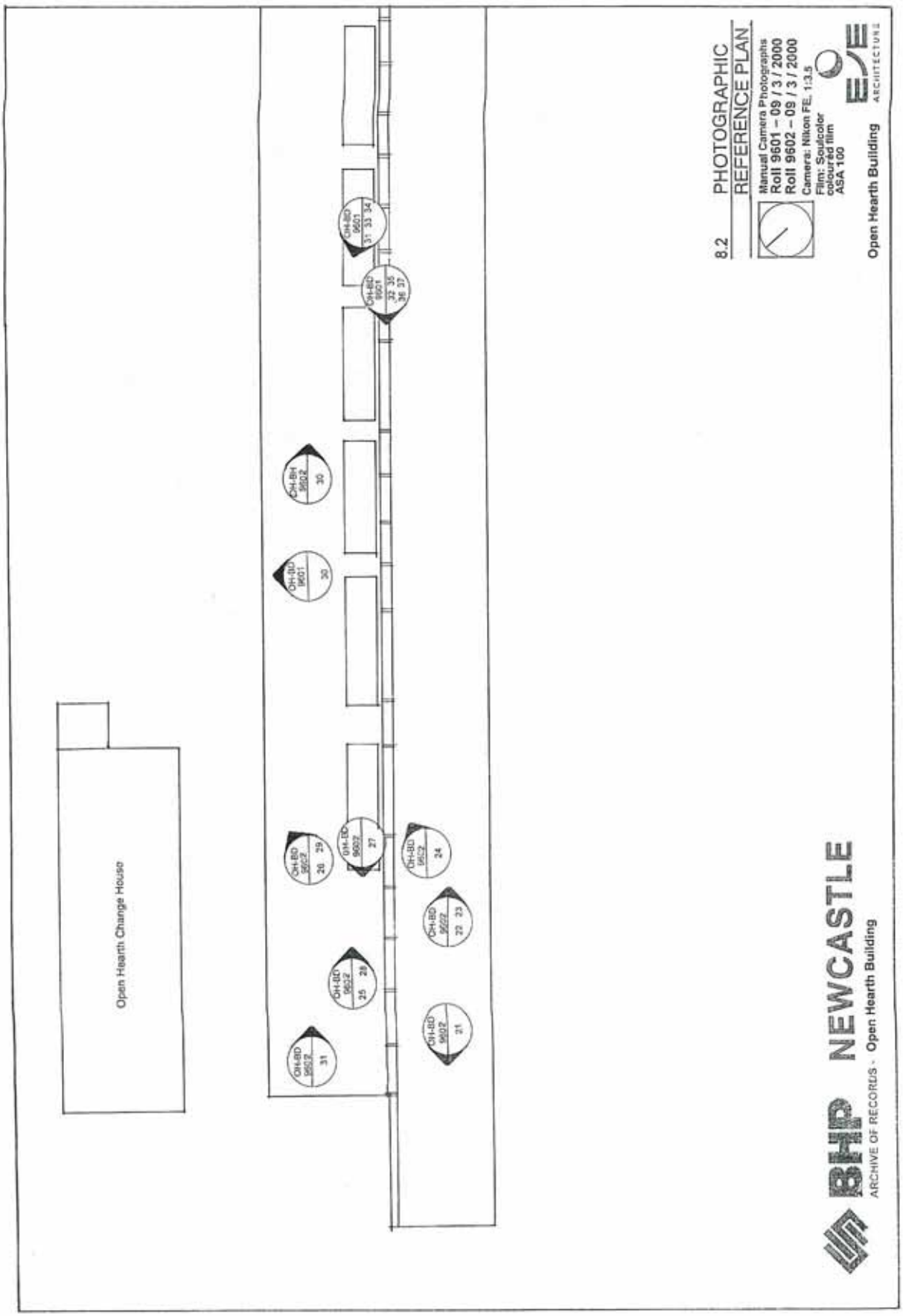
Neg No.	Figure No.	Description
21	6.2	View West of "The Pit Side" west end of Open Hearth Building.
22	-	View East at "The Pit Side" west end of Open Hearth Building. Note: Riveted steel columns.
23	-	View East at "The Pit Side" west end of Open Hearth Building. Note: Double column in centre of building which were at the rear of the furnaces.
24	-	View East at "The Pit Side" west end of Open Hearth Building looking up to the iron roof trusses and light from ridge vent.
25	-	View East at the West end to the "Furnace Side" of the open Hearth Building.
26	-	View North at the West end on the "Furnace side" from the Open Hearth Building to Open Hearth Change House and No.4 Blast Furnace Behind.
27	-	View West at west end on the "Furnace side" of the Open Hearth Building looking at roof structure.
28	-	View East at the West end to the "Furnace Side" of the open Hearth Building looking to the B.O.S. building.
29	-	View North from the Open Hearth Building to top of No.4 Blast Furnace.
30	-	View East at the West end to the "Furnace Side" of the open Hearth Building looking to the B.O.S. building.
31	-	View East at the West end to the "Furnace Side" of the open Hearth Building. Note: Riveted steel columns at left.

Digital photographs
date
Camera: Kodak DC-120 Zoom 38 – 114

Photo No.	Figure No.	Description
OH – BD – 01	6.7	Open Hearth Building, internal view looking north east. Shows the remains of open hearth furnaces No.s 2 & 3 at the junction B.O.S building structure
OH – BD – 02	6.8	Open Hearth Building, internal view looking north – west. Shows remains of open hearth furnace brick work for No.s 2 & 3 furnaces.
OH – BD – 03	6.9	Open Hearth Building, internal view looking south. Shows detail of No.2 furnace brickwork remains at centre grid column.
OH – BD – 04	6.10	Open Hearth Building, internal view looking south – west. Shows remains of No.3 furnace brick work at centre grid column. Junction to newer B.O.S building structure.
OH – BD – 05	6.6	Open Hearth Building, internal view looking up into roof truss framing. Taken looking at No.3 furnace column and newer B.O.S building junction.
OH – BD – 06	6.3	Open Hearth Building, View west showing North wall and partial remains of original skillion roof & wall structure.
OH – BD – 07	6.4	Open Hearth Building, internal view looking east. Shows crane beams and structural components for furnaces at right . B.O.S. building and overhead crane in background
OH – BD – 08	6.5	Open Hearth Building, internal view from B.O.S. scrap ramp at No. 1, 2 &3 furnace bays. More recent brick material bays visible at centre frame.

8.0 PHOTOGRAPHIC REFERENCE PLAN




8.2 PHOTOGRAPHIC REFERENCE PLAN
Manual Camera Photographs
Roll 9601 – 09 / 3 / 2000
Roll 9602 – 09 / 3 / 2000
Camera: Nikon FE, 1:3.5
Film: Soulcolor coloured film ASA 100
Open Hearth Building
EJE ARCHITECTURE
BHP NEWCASTLE
ARCHIVE OF RECORDS - Open Hearth Building
Open Hearth Change House
OH-BD 9601 31 33 34
OH-BD 9601 32 35 36 37
OH-BH 9602 30
OH-BD 9601 30
OH-BD 9602 28 29
OH-BD 9602 27
OH-BD 9602 34
OH-BD 9602 22 23
OH-BD 9602 25 26
OH-BD 9602 21
OH-BD 9602 31

9.0 DIAGRAMMATIC RECORD AND DRAWINGS

Figure 9.1 Open Hearth Plant
Excavation & location of piling (1913)
Source: BHP drawing. Ref – 24

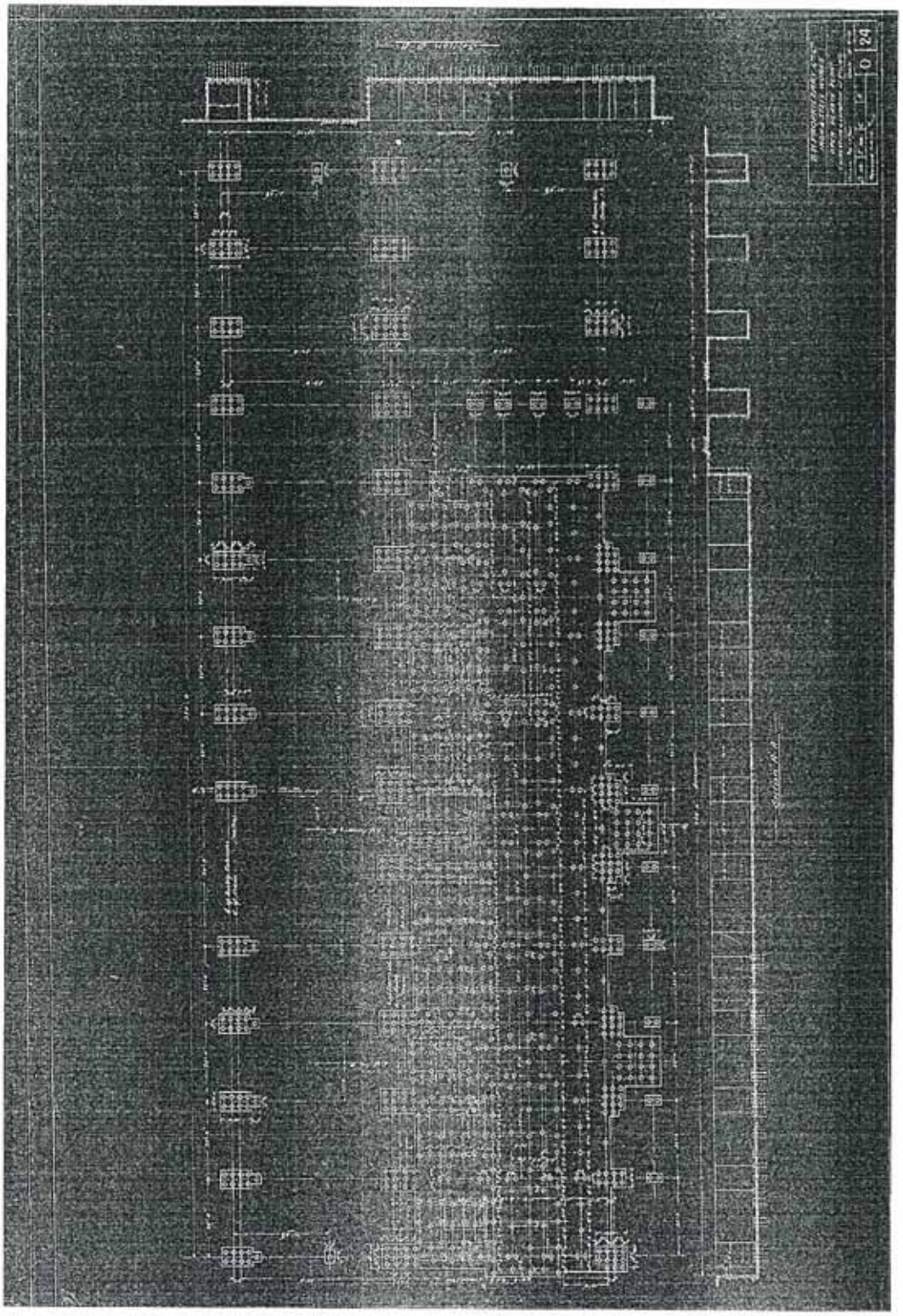


Figure 9.2 Open Hearth Plant
Foundations for one furnace (1913)
Source: BHP drawing. Ref – 29

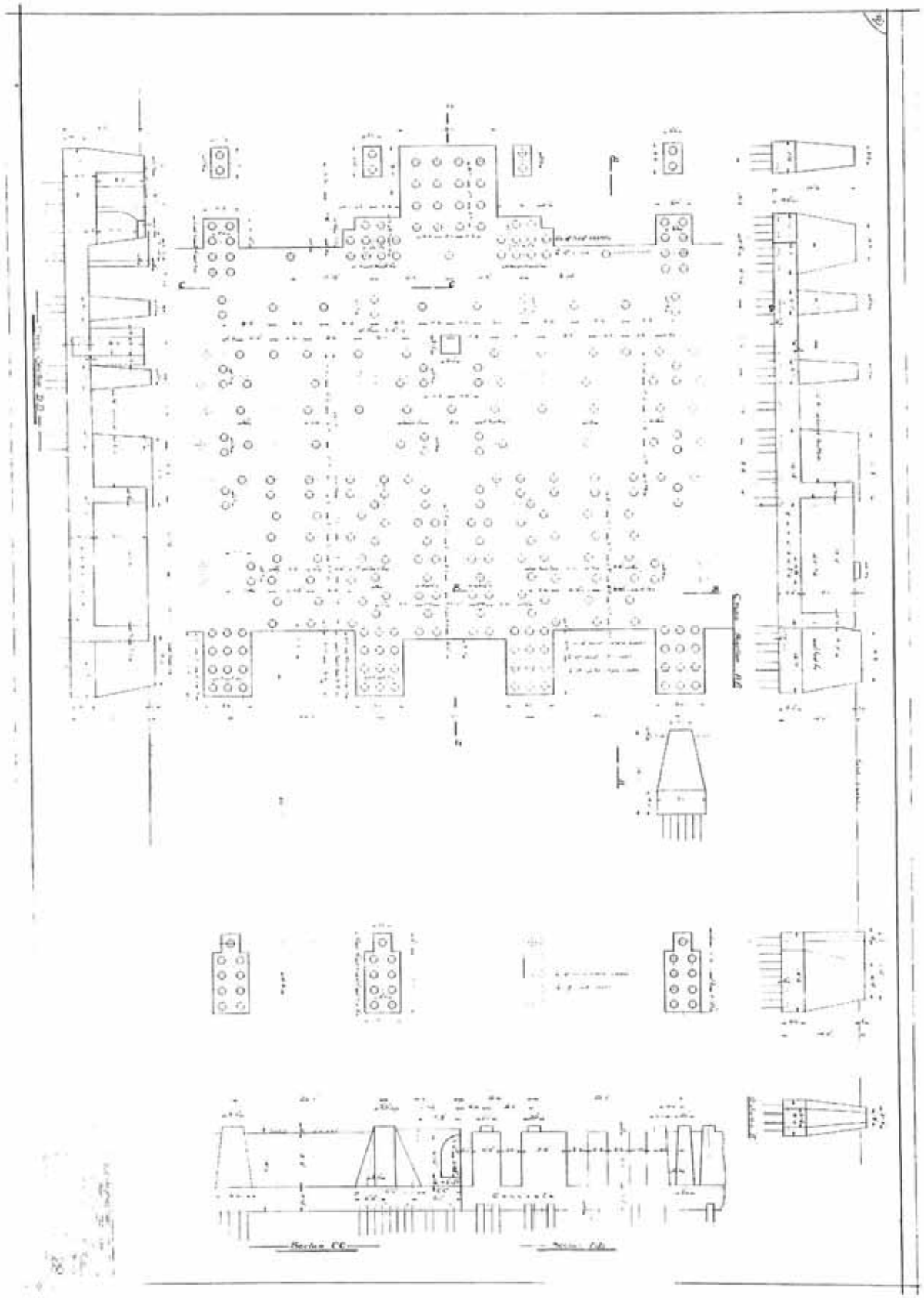


Figure 9.3 Open Hearth Plant foundations
Source: BHP drawing. Ref – 68

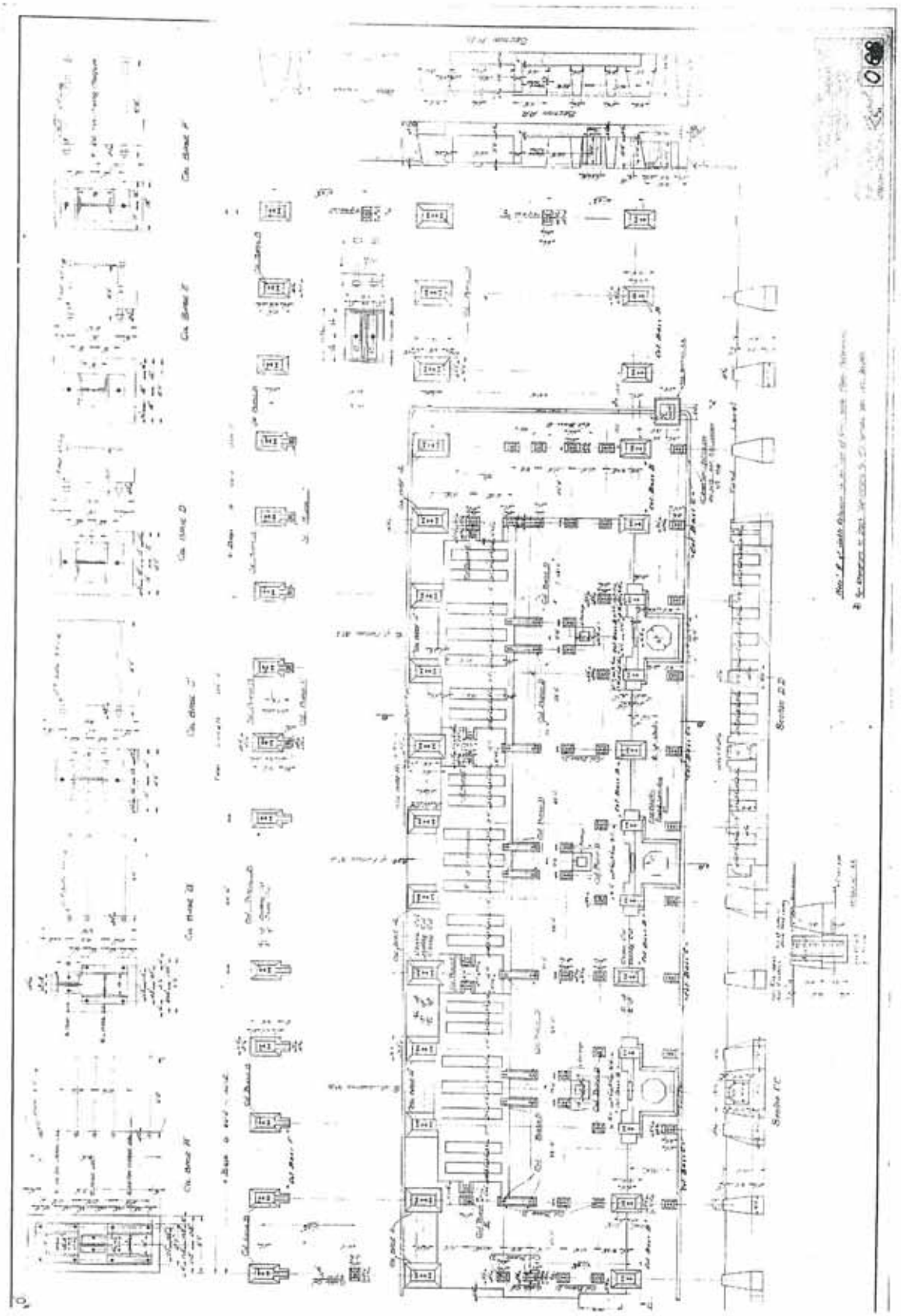


Figure 9.4 Open Hearth Plant. No. 10 Furnace – Building Extension Marking Plan of Roof Trusses(1927)
Source: BHP drawing. Ref – 6426

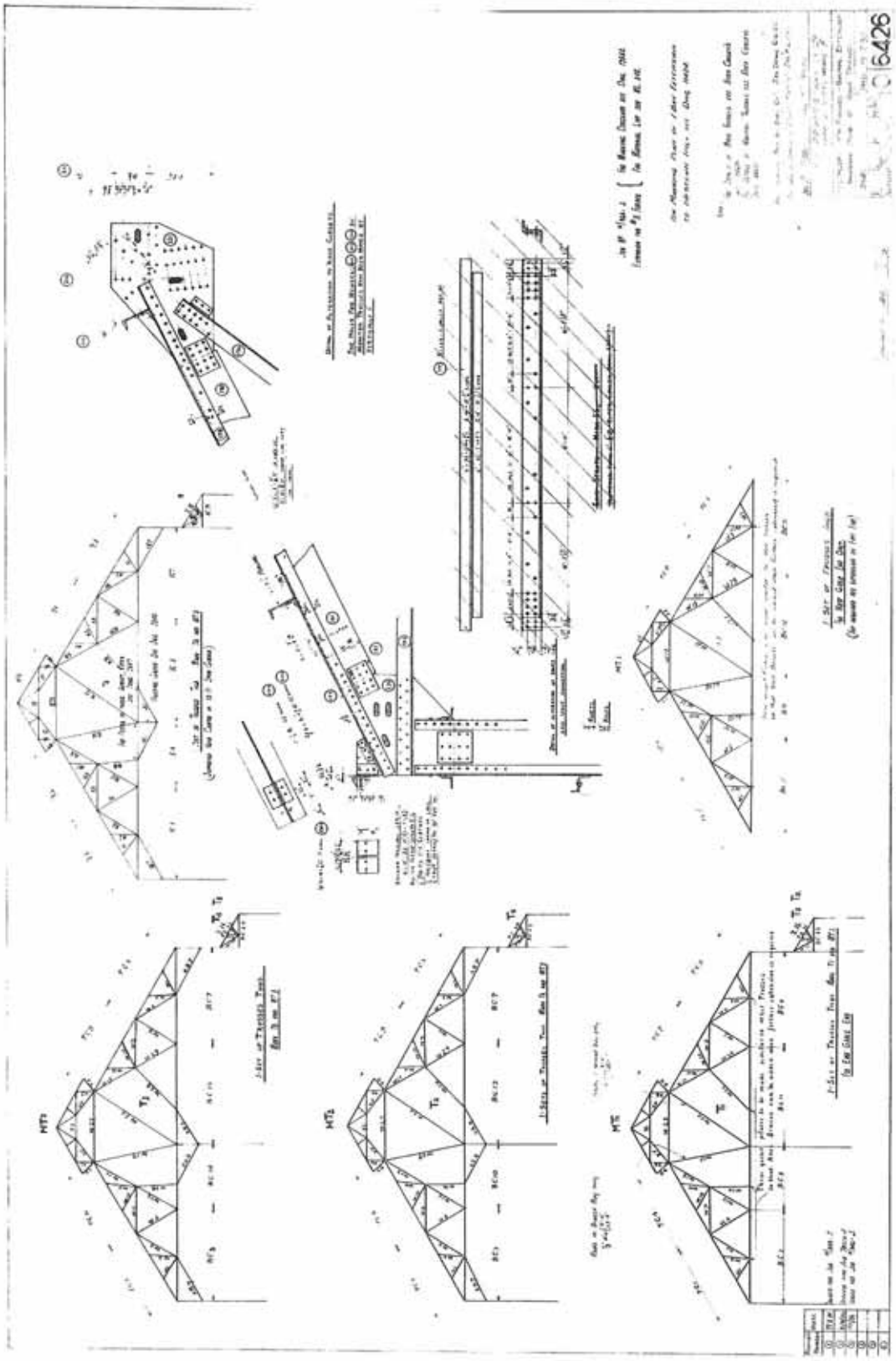


Figure 9.5 Open Hearth Plant
General Layout of Plant (c.1939)
Source: BHP drawing. Ref – 12971

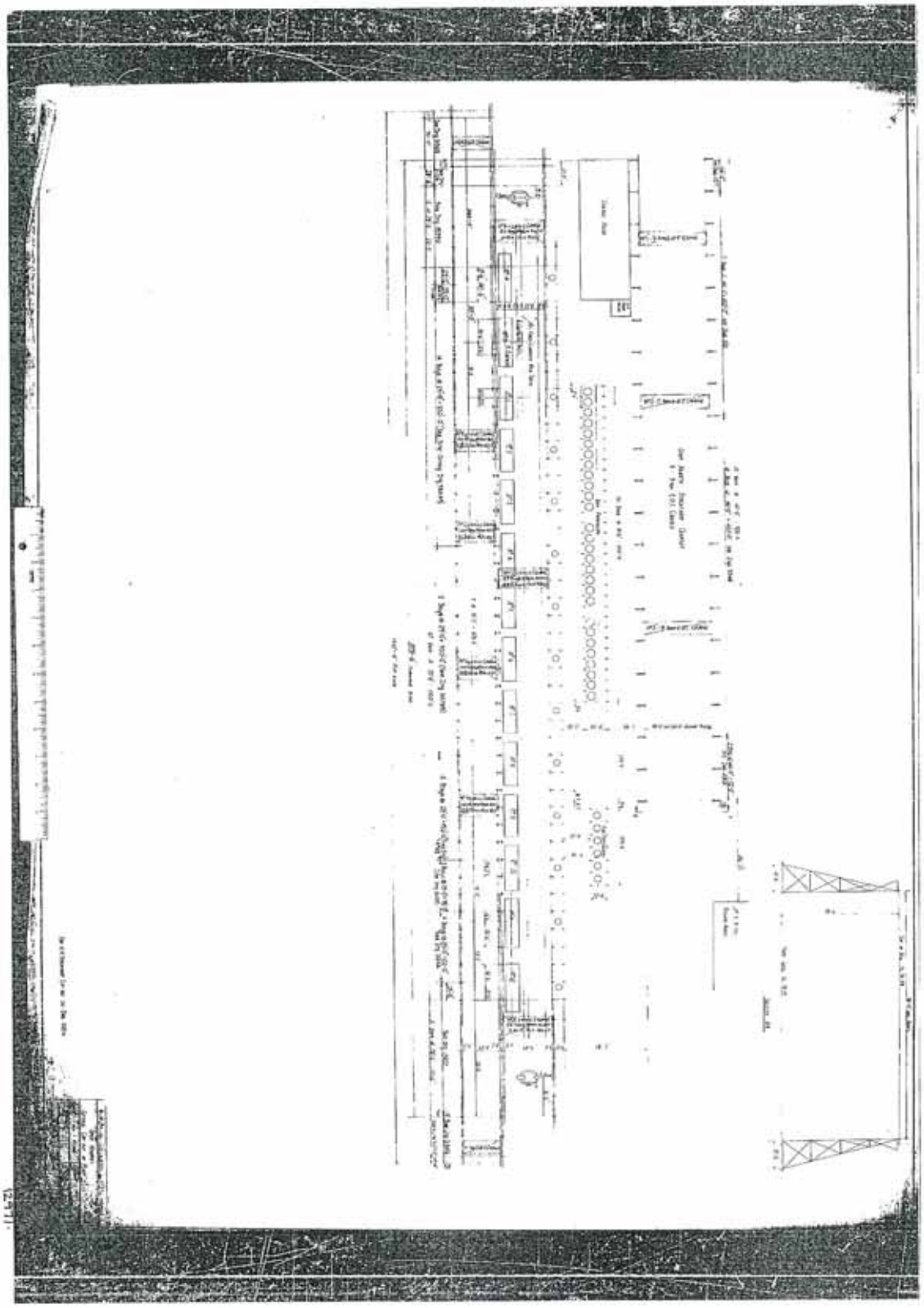
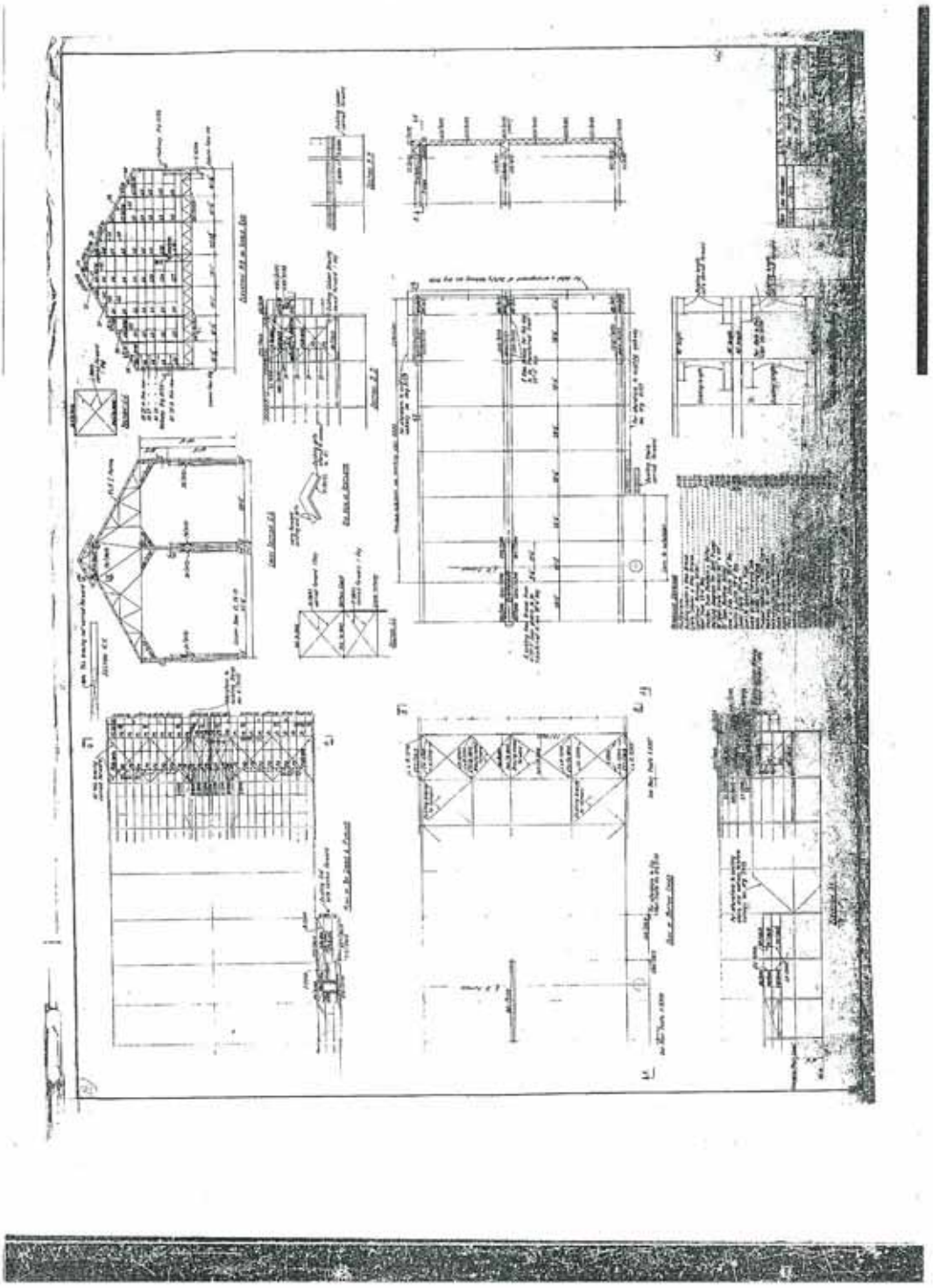


Figure 9.6 Open Hearth Plant
Extension for "B" Furnace marking plan (1943)
Source: BHP drawing. Ref – 31109



10.0 HISTORIC PHOTOGRAPHIC RECORD

Figure 10.1 View at the "pit side of the Open Furnace rows. Ladles (right) of molten steel ready to be "teemed" into ingot moulds (left).
Source: BHPA N3040/21

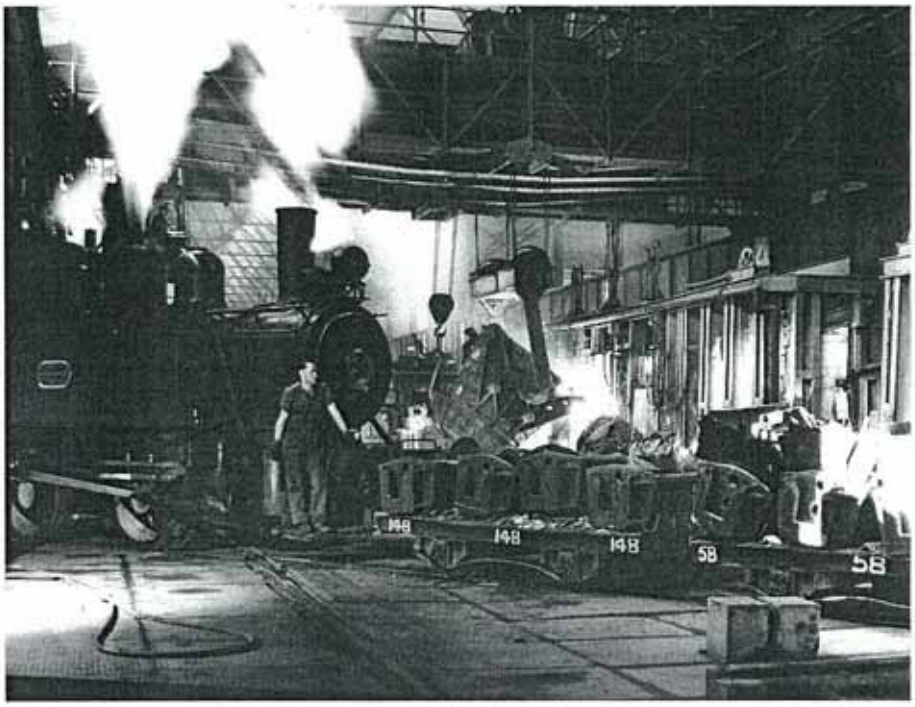


Figure 10.2 Scrap being delivered for charging into Open Hearth Furnaces by a Works' locomotive. Beyond, a furnace is being charged with molten pig iron from a 38 ton ladle. (1948)
Source: BHPA Ref No.- 10/Q/9

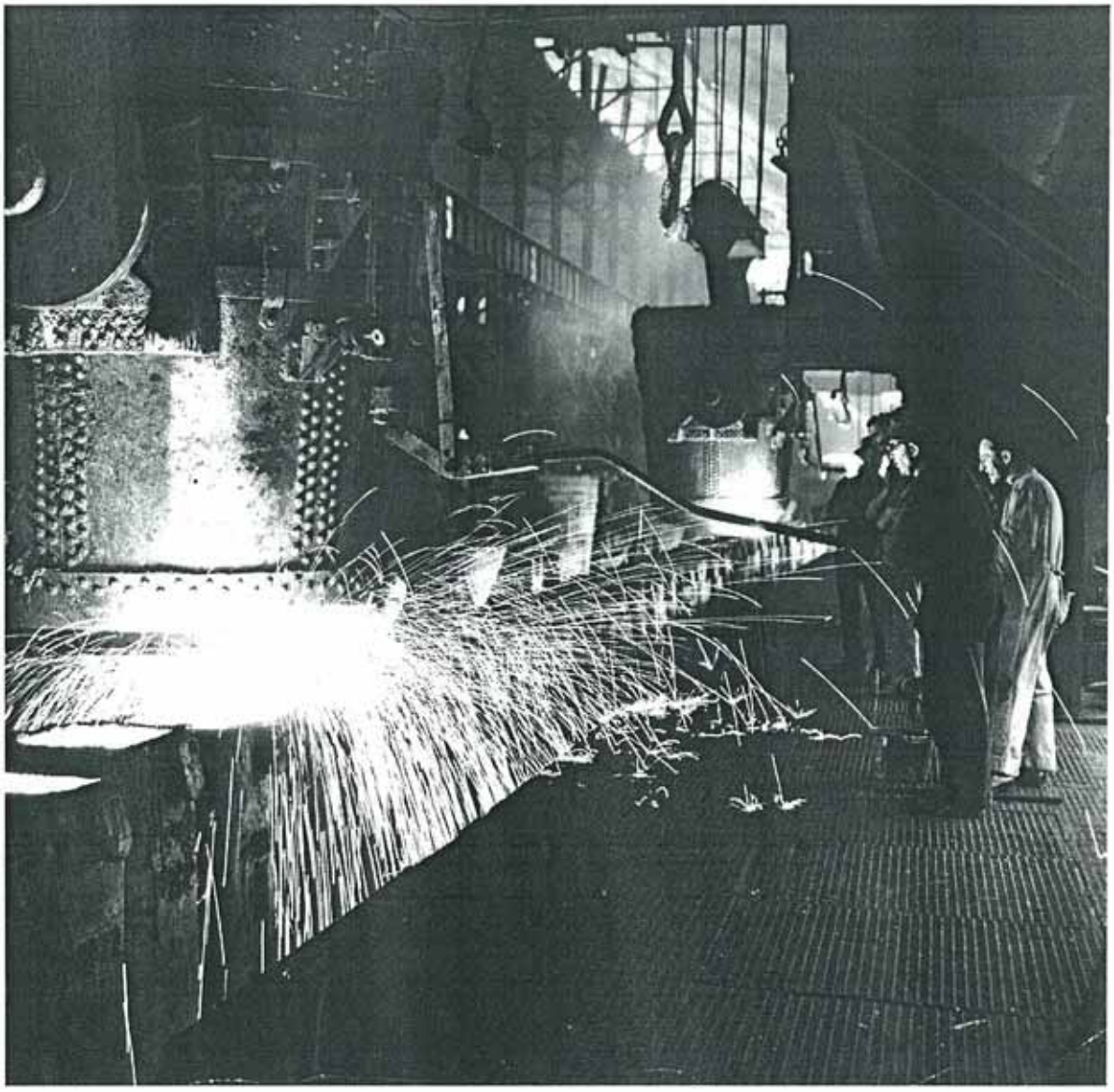


Figure 10.3 Teeming ladle into ingot mould.
Source: BHPA (Ref. No. unknown)

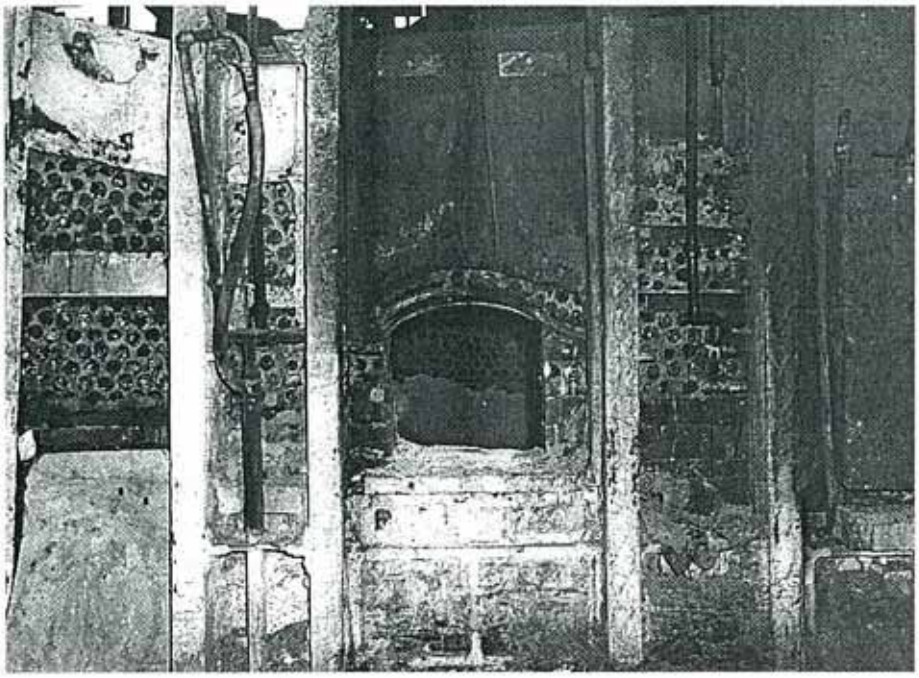


Figure 10.4: Open Hearth front doorway showing water cooled arch pipe supporting metal cased pipe refractory. The refractory mix being of magnesite and chrome.
Source: Cherry (1999: 39)

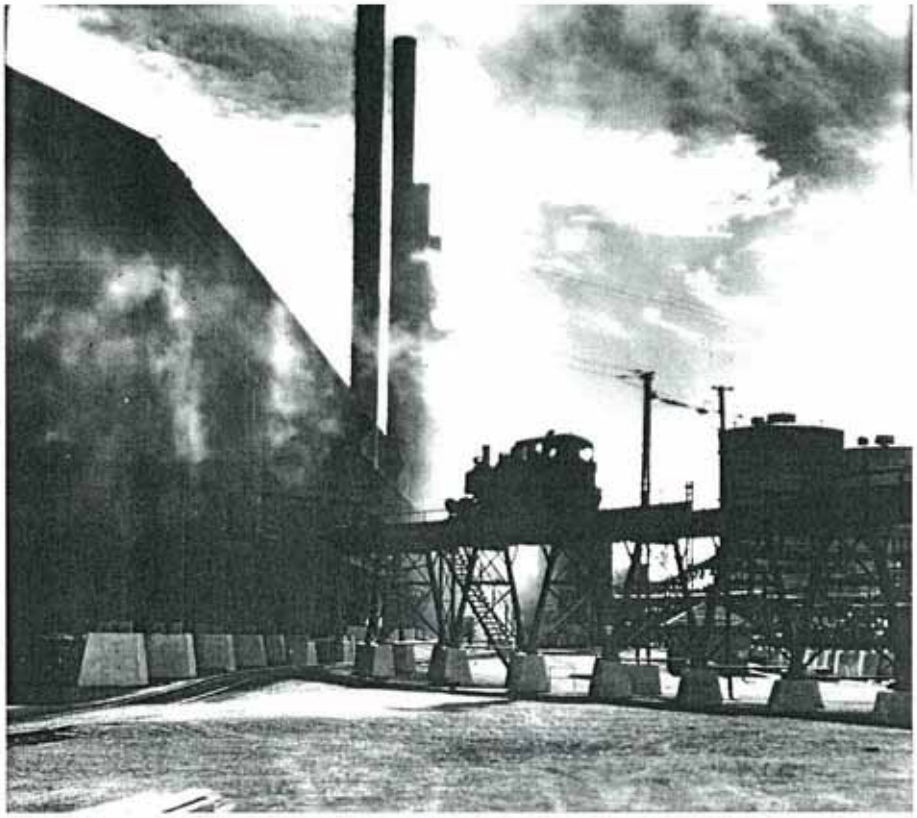


Figure 10.5: New trestle with locomotive at the Open Hearth. (1938)
Source: BHPA – Frank Hurley / No.34. (neg.H91)

11.0 FULL FORMAT PHOTOGRAPHIC RECORD

All images in this section are provided by Albert Erzetich - Black & White Photographic Record
Camera: Linhoff 5"x4" negative format view camera with wide angle and telephoto lenses
Film: Kodak T–max 100 or 400

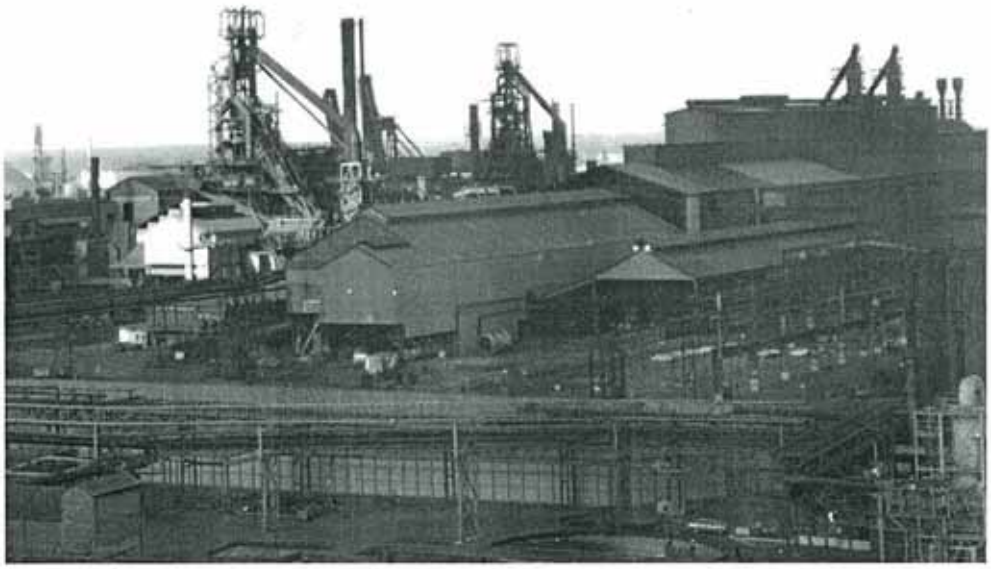


Figure 11.1 Part view of plant looking north-east from the eastern side of the coke ovens tower.
Cropped view shows Open Hearth Building in centre with BOS plant to right and Blast Furnaces behind.

12.0 INVENTORY OF EQUIPMENT, FITMENT & FINISHES

Note: There are no items to record in the Inventory.

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".