3.0 OUTLINE OF HISTORY, INDUSTRIAL PROCESS & DESCRIPTION

The blower House's role in the production of iron is to provide a continuous blast of superheated air through the blast furnace tuyeres, which are spaced around the lower sections of the blast furnace. The blowing engines were driven by steam supplied from the blast furnace boilers, which were situated north east of the Blower House building on the site now occupied by the Blast Furnace offices.

While heated air is blown into the lower section of the furnace, blast furnace gas (a mixture of carbon dioxide and carbon monoxide) is emitted from the top of the furnace. This gas is cleaned and then returned to the boilers, which burn coal and blast furnace gas to produce steam to drive the blowers.

The No.1 Blower House, constructed in 1915, stands between the Blast Furnace Department buildings and the 'new' Blower House, built in the 1940s. It originally housed three piston driven, vertical blowing engines. As noted by Guillame Delprat, BHP's General Manager from 1899 to 1921, "*The blowing engines are three in number - two high-pressure and one low-pressure – two being required at one time to operate the furnace. No less than 35,000 cubic feet of air per minute is required to keep the furnace running*".[2]

The blowers, which were built by Mesta in Pittsburgh, USA, gave a great deal of trouble due to mechanical defects. As a result of these problems, David Baker recommended in 1924 that when the time came to build a fourth blast furnace, consideration should be given to the use of gas-driven blowers, built by another firm.[3]

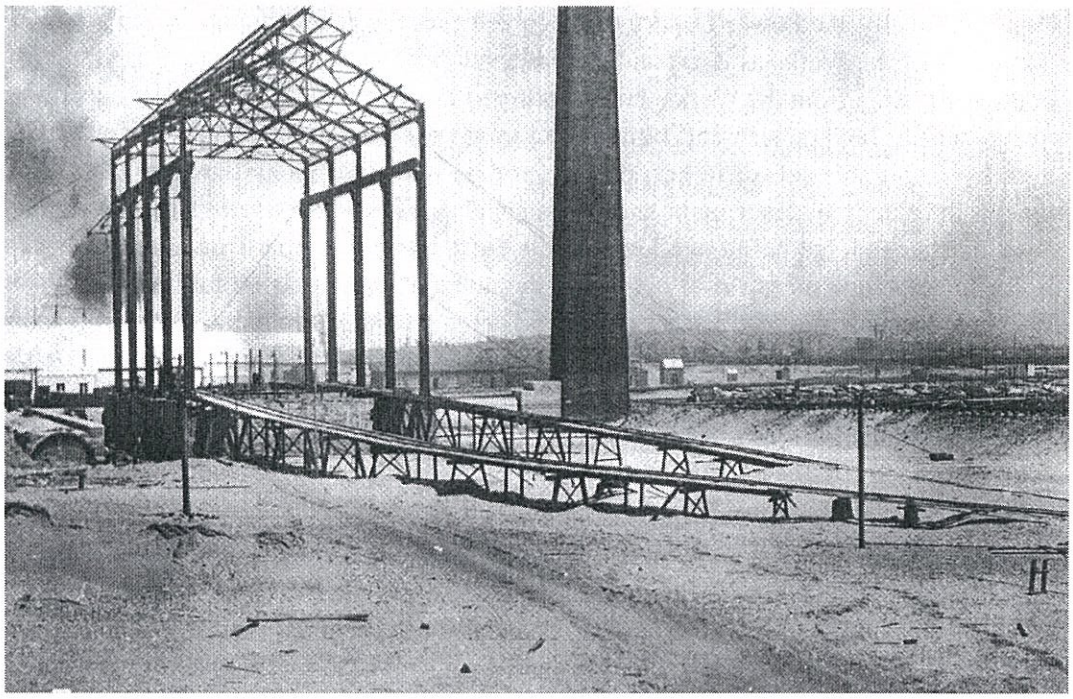


Figure 4.1: Construction of No.1 Blower House, April 1914
Source: Cranney (1999: 72) BHP Archives – N 1398

[2] Cited in P.P. Cranney, *Fuelling the Fires of Steel: A History of the Coke and Energy Department,* Newcastle, 1999. p.73.
[3] D. Baker, "Report", Part 2, Newcastle Steelworks, September 1924. BHPA:W5/1/222

David Baker's recommendations were not followed but later Mesta blowers, installed in the 'new' Blower House, were of a different design to the early blowers, being of horizontal rather than vertical layout.[4] This building was subsequently extended in 1941 to accommodate the first of the turbo blowers.[5]

The vertical engines were gradually phased out, but remained as standby equipment until they were demolished in 1963.[6]

Several uses for the No.1 Blower House building were suggested. In 1959, mention was made of using "the old No.1 Blower House" for the new BOS but this did not eventuate.[7] In 1963 the Chief General Manager agreed that portion of the old building could be used for a Blast Furnace dining room[8], and in the following year the possibility of using the building for the Welding Reclamation Area was raised. [9] Neither of these proposals was adopted, and the building was finally utilised as a workshop for the Power Department's pump services and precipitator maintenance crews until 1987. [10] In 1989 the building was converted for use as a workshop by the Blast Furnace Mechanical Maintenance Department, which remained in occupation until cessation of steelmaking operations in September 1999.[11]

Figure 4.2: View South of the vertical blowers within Blower House from Blast Furnace, 1914
Source: Cranney (1999: 72)

[4] P.P. Cranney, *Fuelling the Fires of Steel,* p.110.
[5] Report for half year ended 31 May 1941, p.159.
[6] General Manager Newcastle Works to Asst. Chief Engineer, 11 October 1963. BHPA:W5/13/4.
[7] General Manager Newcastle Works to Gen. Supt., Engineering, 17 November 1959, BHPA:W5/6/3
[8] General Manager Newcastle Works to Asst. Chief Engineer, 11 October 1963, BHPA:W5/13/4
[9] Chief General Manager's Newcastle Business Sheet, 16-19 June 1964, BHPA:W5/13/4
[10] P.P. Cranney, *Fuelling the Fires of Steel: A History of the Coke and Energy Department, Newcastle,* BHP Newcastle, 1999, p.64.
[11] J. Sansom (ed) *The Blast is Past, A Collection of Stories about the Iron Makers of Newcastle,* Newcastle, 1999, p.14.

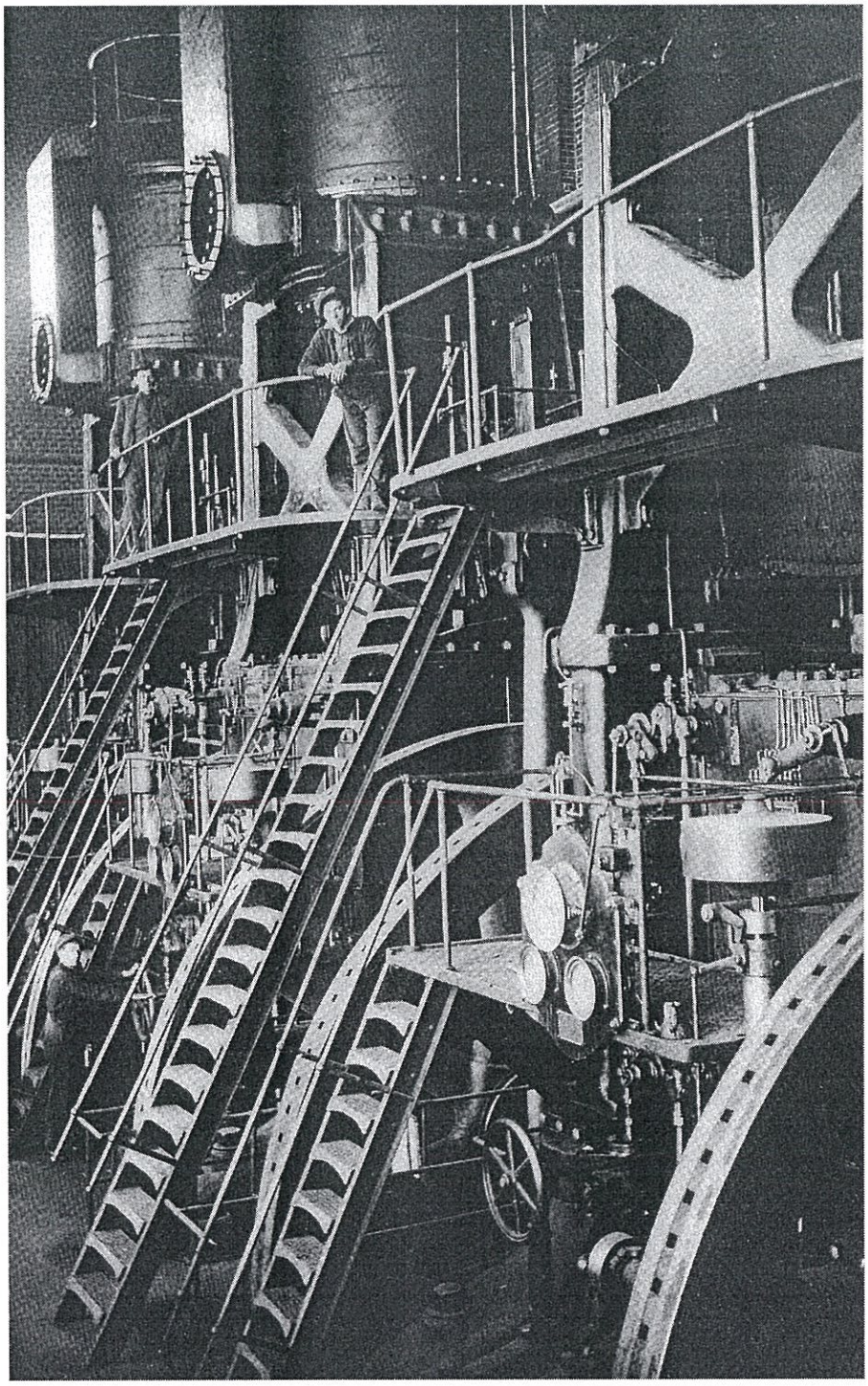


Figure 4.3: 1, 2 and 3 Vertical blowing engines
Source: Cranney (1999: 73) BHP Archives reference unknown

6.0 SELECTED PHOTOGRAPHS

Figure 6.1 West Elevation of "Permanent End"

Figure 6.2 Part South Elevation (West)

Figure 6.3 Part South Elevation (East)

Figure 6.4 and 6.5 Composite East Elevation

Figure 6.6 Northern Elevation Detail

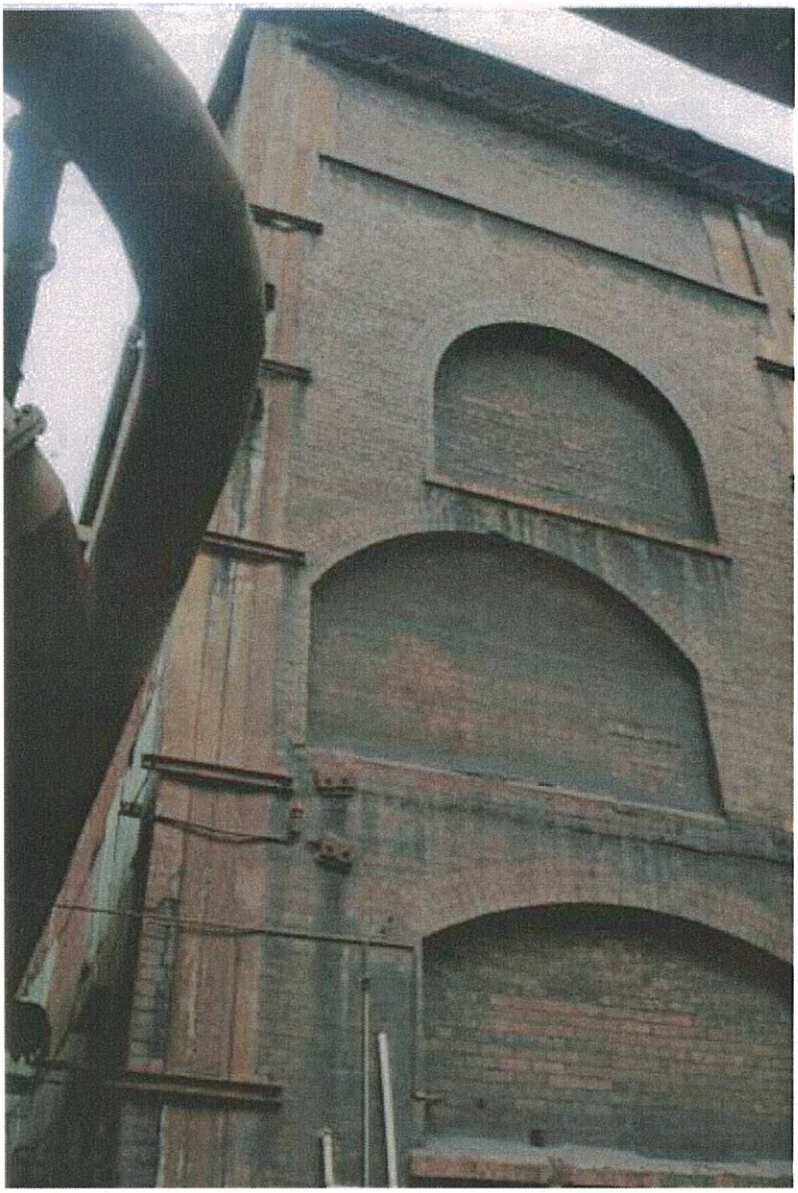


Figure 6.7 North Elevation

Figure 6.8 North Elevation at West End

Figure 6.9 Detail North/West Corner

Figure 6.10 General Internal view of Eastern Elevation

Figure 6.11 Internal West Elevation

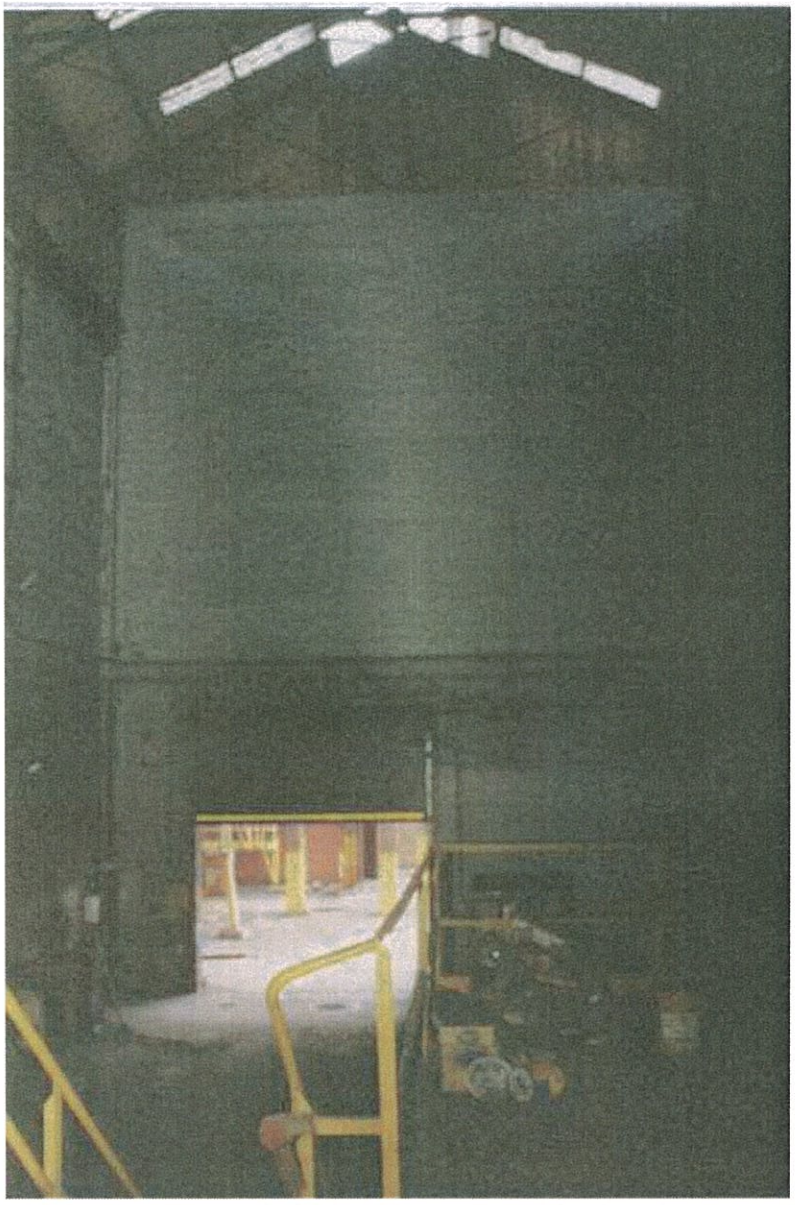


Figure 6.12 Part internal North Elevation at Western End

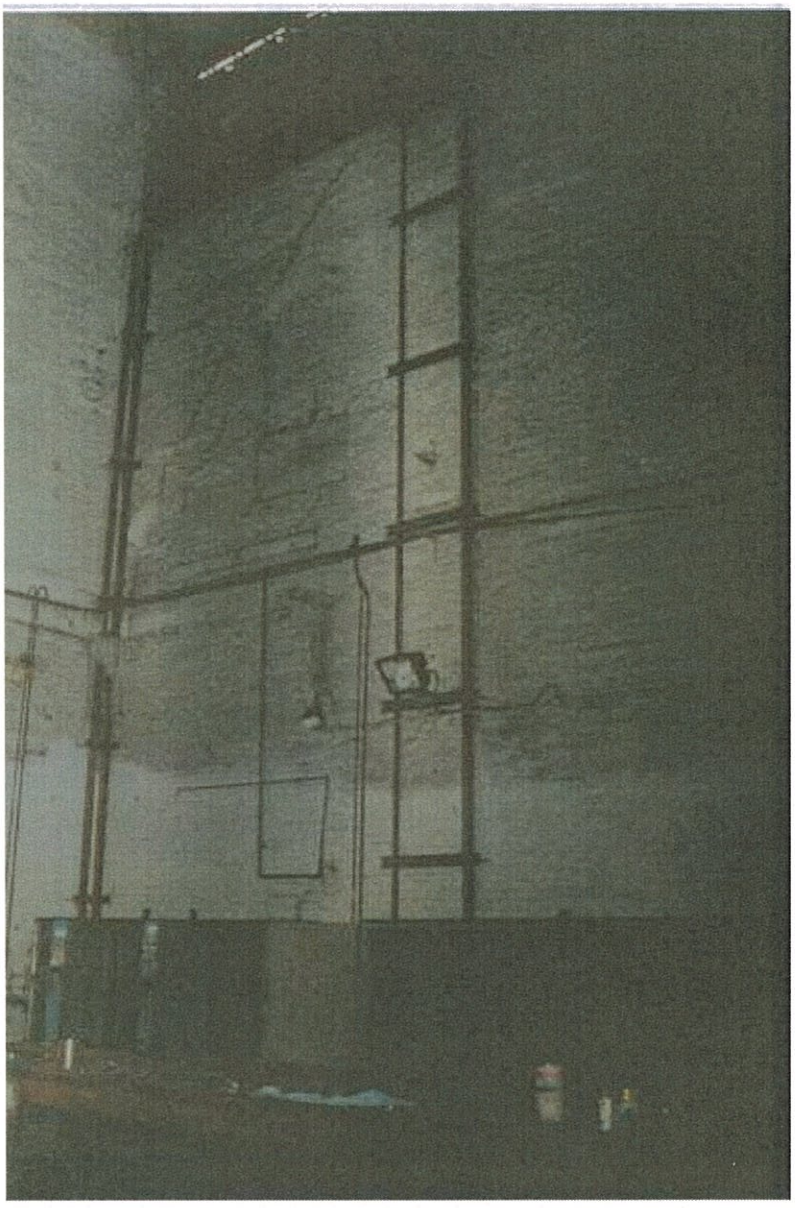


Figure 6.13 Part internal North Elevation and Mezzanine Area

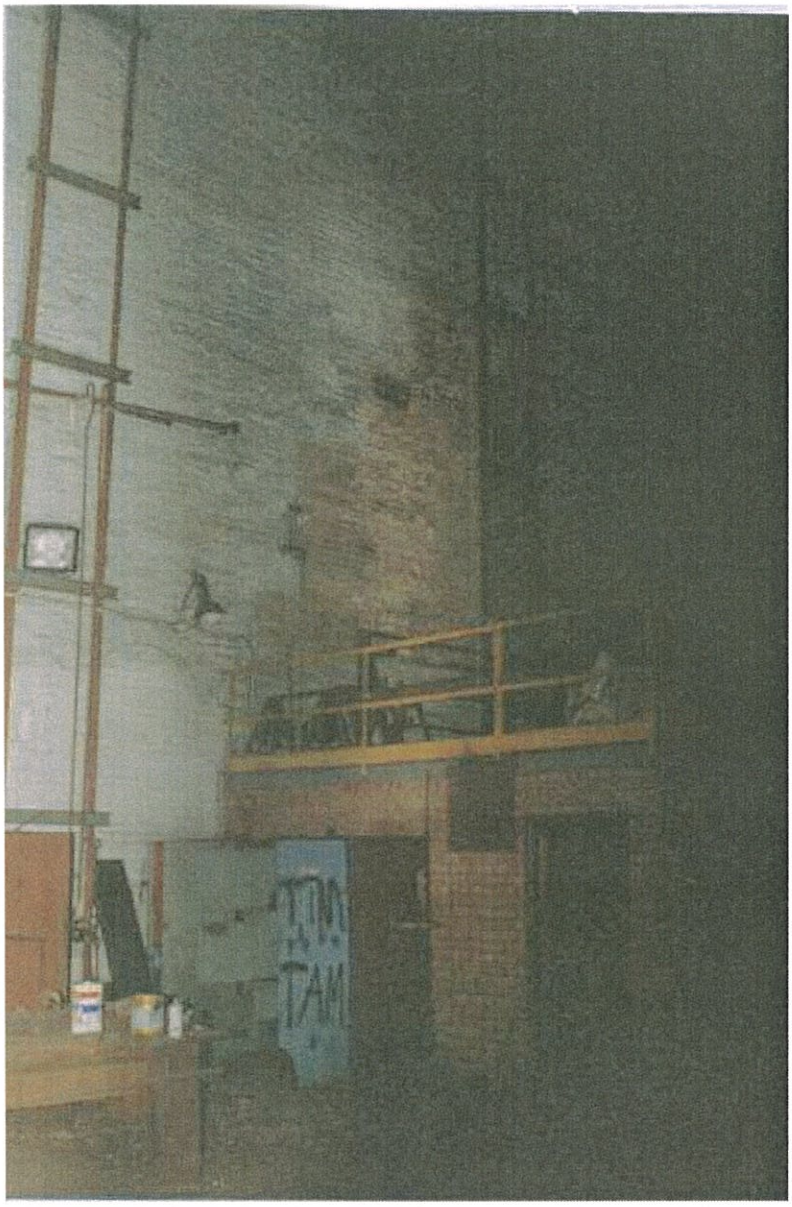


Figure 6.14 Internal South East Elevation – Detail of Crane

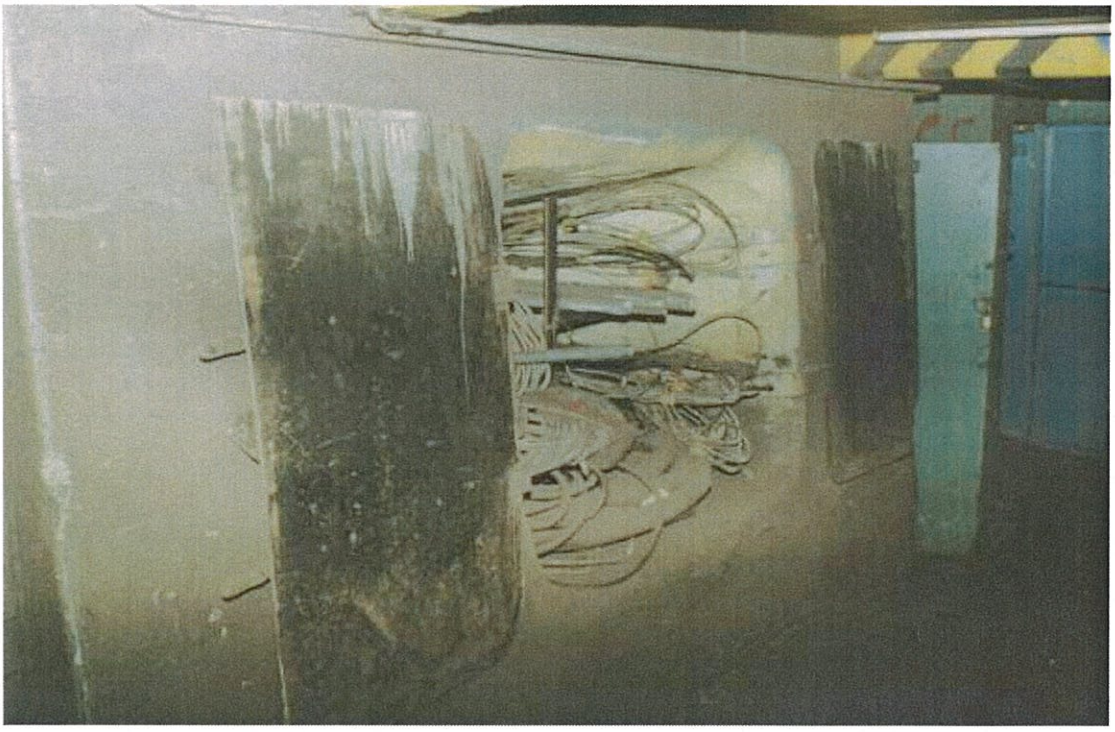
Figure 6.15 Detail of Upper Southern Elevation Eave

Figure 6.16 Detail of Crane Label "*HERBERT MORRIS LTD EMPRESS WORKS LOUGHBOROUGH. LOAD 15 TONS*"

Figure 6.17 Detail of Northern Crane Rail

Figure 6.18 Detail of Shop Floor showing possible line of Blower Flywheel Pit at Western entrance

Figure 6.19 Detail of opening below Mezzanine facing North East Elevation



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 9.0 – photographic reference plan. The numbers in the column titled "Figure No." relate to the selected photographs in section 7.0 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 9741 – 20/03/2000

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

Neg No.	Figure No.	Description
1	-	West elevation of permanent end
2	6.1	West elevation of permanent end
3	-	South elevation (east)
4	6.2	South elevation (east) A
5	6.3	South elevation (west) B
6	6.5	East elevation (North)
7	6.4	East elevation (South)
8	6.6	North elevation (East) A
9	-	North elevation (East) B
10	6.7	North elevation – upper portion
11	6.8	North elevation – upper portion at Eastern end
12	-	North/ West corner detail showing closed up circular opening
13	6.9	North/ West corner detail showing closed up circular opening
14	-	Detail of western door ramp and line of original door opening
15	-	Detail of interior of Eastern wall
16	-	Detail of steel ties at South/West corner
17	-	Detail at South/West corner showing vertical crack to brickwork

ROLL 9812 – 23/03/2000

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

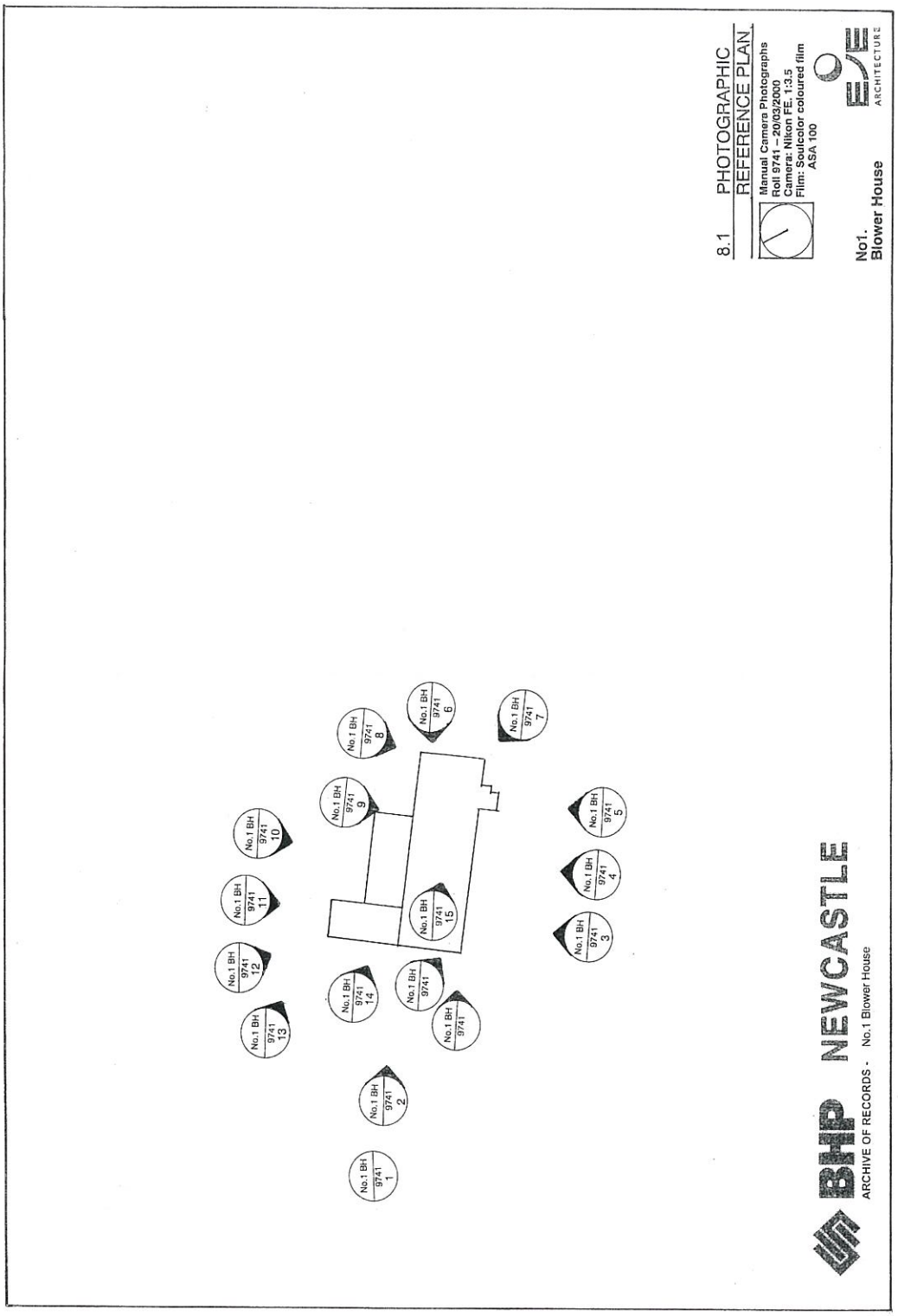
Neg No.	Figure No.	Description
0	-	Interior of South elevation (part) from Mezz'
1	6.11	Interior of West elevation taken from Mezz'
2	-	Interior south wall elevation facing Eastern end from Mezz'
3A	-	Interior of East elevation from Mezz'
4A	-	Interior North elevation (part) towards East from Mezz'
5A	6.12	Interior partial North elevation toward west elevation
6A	6.13	Interior partial north elevation and Mezz'
7A	6.19	Interior detail of opening located below Mezzanine facing North and East elevations
8A	-	Interior detail looking towards East elevation
9A	-	Interior detail looking towards East elevation
10A	6.14	Interior detail of crane towards South/East elevation
11A	6.15	Interior detail of steelwork and eaves toward South elevation
12A	6.16	Interior detail of crane label - "HERBERT MORRIS LTD. EMPRESS WORKS LOUGHBOROUGH. LOAD 15 TONS"
13A	6.17	Interior detail of crane rail at North/Eastern elevation
14A	6.18	Interior of shop floor towards west elevation from Mezz'

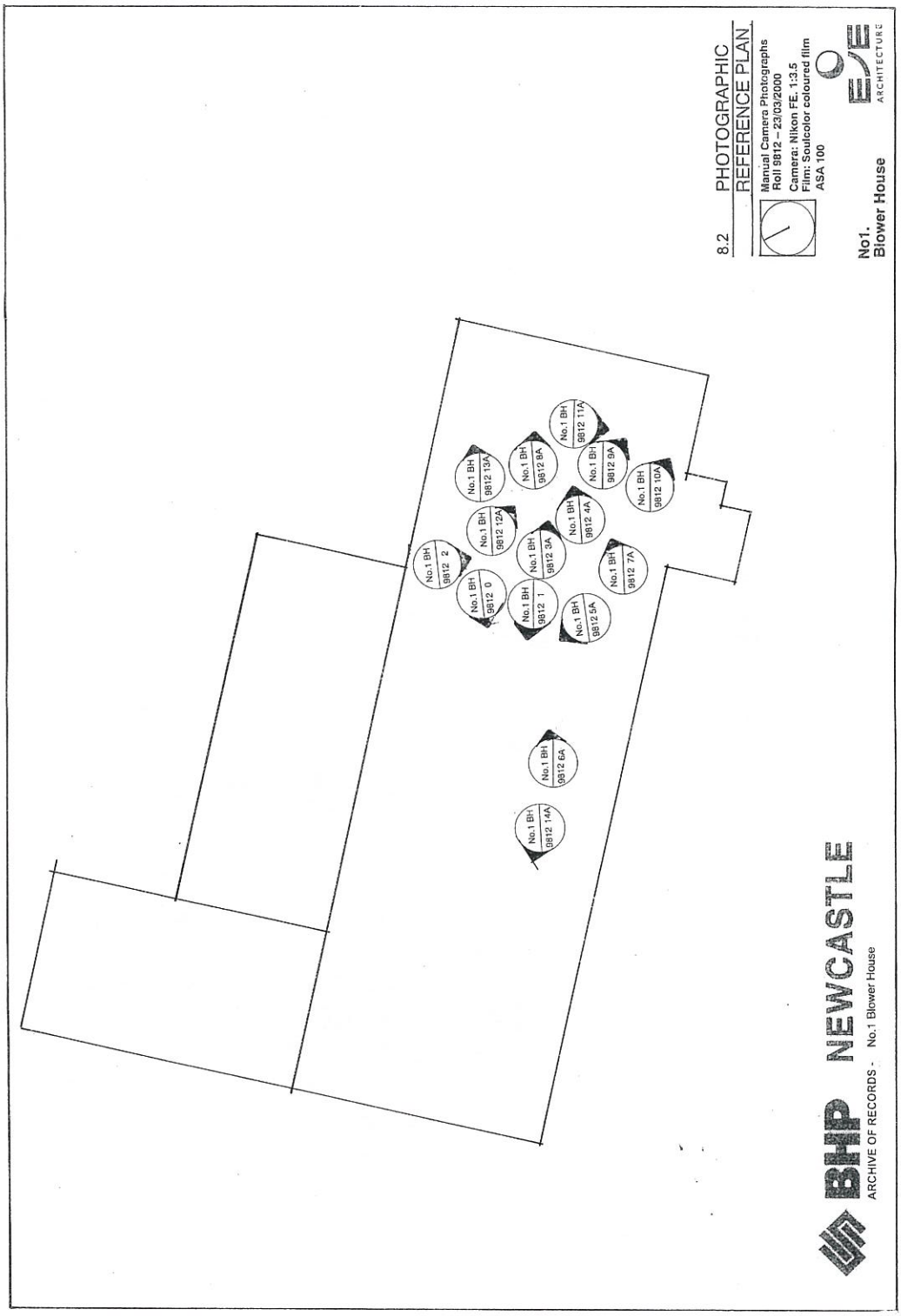
Digital photographs

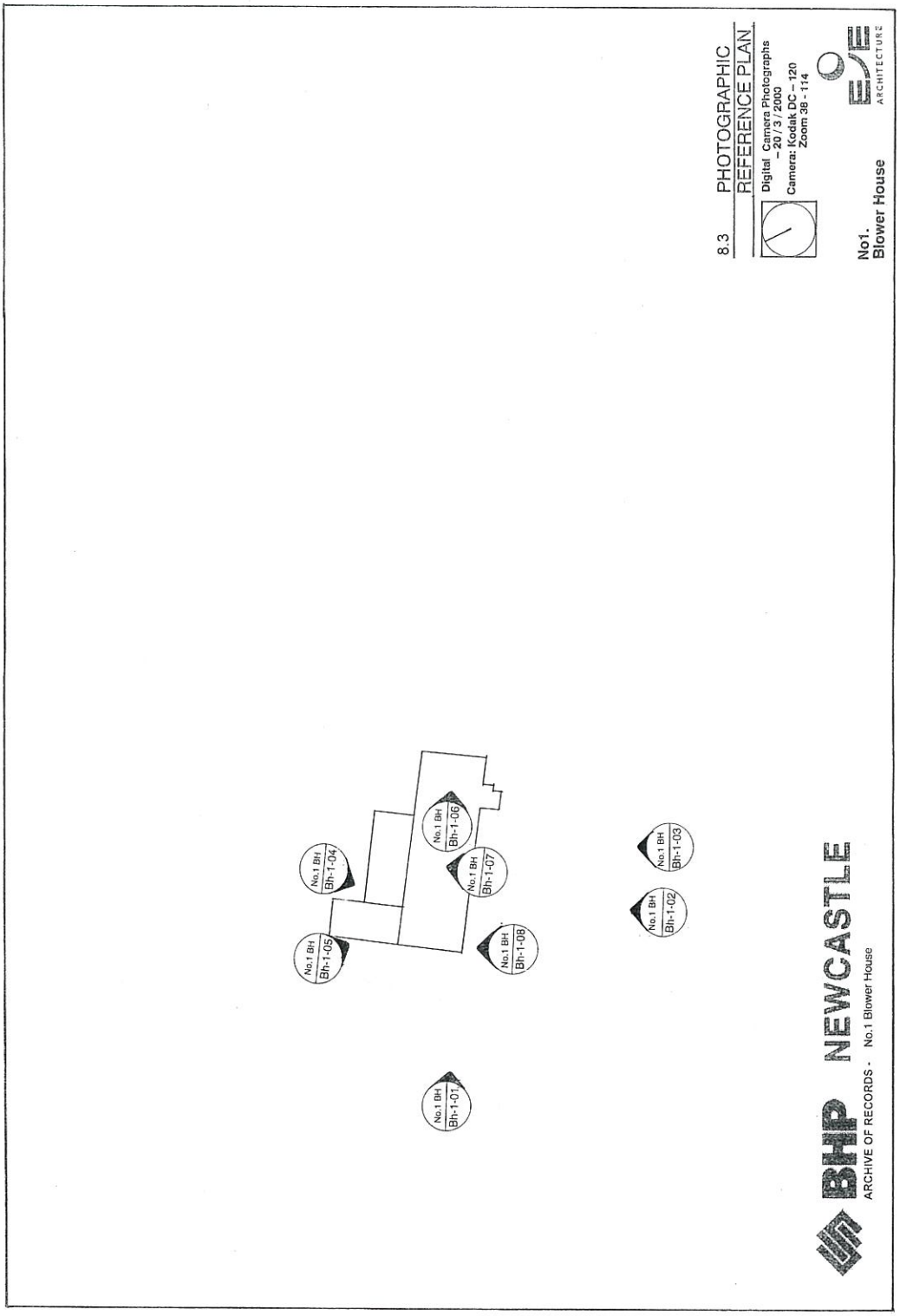
20/03/00
Camera: Kodak DC-120 Zoom 38 – 114

Photo No.	Figure No.	Description
Bh-1-01	-	West elevation general view
Bh-1-02	-	South elevation part A Western end
Bh-1-03	-	South elevation part B Eastern end
Bh-1-04	-	Western end of Northern elevation
Bh-1-05	-	North west corner
Bh-1-06	6.10	Interior detail of Eastern wall
Bh-1-07	-	Interior detail of North wall
Bh-1-08	-	Detail of South West corner

8.0 PHOTOGRAPHIC REFERENCE PLAN




8.2 PHOTOGRAPHIC REFERENCE PLAN
Manual Camera Photographs
Roll 9812 – 23/03/2000
Camera: Nikon FE. 1:3.5
Film: Soulcolor coloured film
ASA 100
No1.
Blower House
EJE ARCHITECTURE
No.1 BH 9812 2
No.1 BH 9812 0
No.1 BH 9812 1
No.1 BH 9812 12A
No.1 BH 9812 13A
No.1 BH 9812 3A
No.1 BH 9812 5A
No.1 BH 9812 4A
No.1 BH 9812 8A
No.1 BH 9812 11A
No.1 BH 9812 9A
No.1 BH 9812 10A
No.1 BH 9812 7A
No.1 BH 9812 6A
No.1 BH 9812 14A
BHP NEWCASTLE
ARCHIVE OF RECORDS - No.1 Blower House


8.3 PHOTOGRAPHIC REFERENCE PLAN
Digital Camera Photographs
- 20 / 3 / 2003
Camera: Kodak DC - 120
Zoom 38 - 114
No1.
Blower House
EJE ARCHITECTURE
No.1 BH Bh-1-01
No.1 BH Bh-1-02
No.1 BH Bh-1-03
No.1 BH Bh-1-04
No.1 BH Bh-1-05
No.1 BH Bh-1-06
No.1 BH Bh-1-07
No.1 BH Bh-1-08
BHP NEWCASTLE
ARCHIVE OF RECORDS - No.1 Blower House

9.0 DIAGRAMMATIC RECORD & DRAWINGS

Figure 9.1: Blower House plan and sections
Source: BHP Archives. ref- W005/053/2804

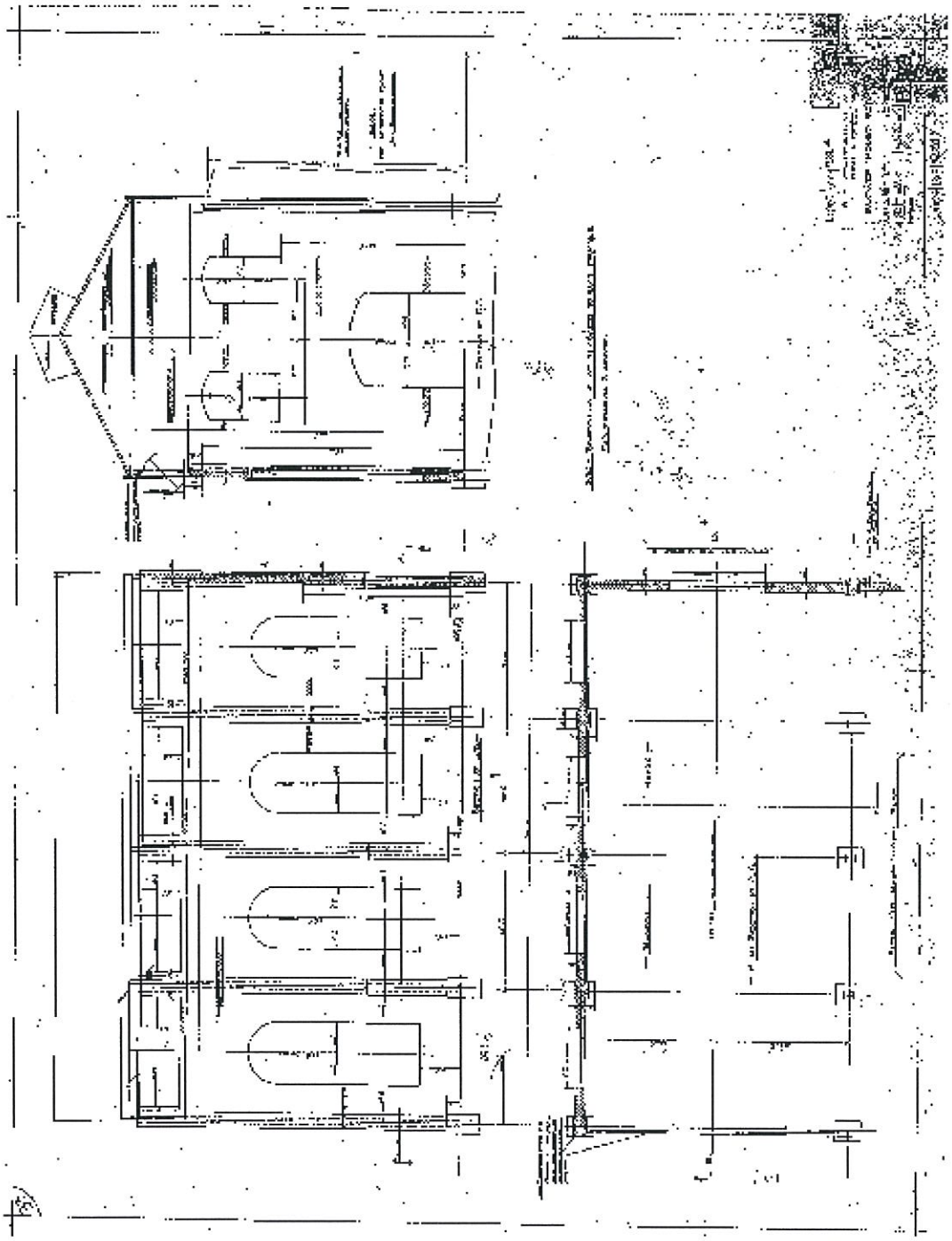
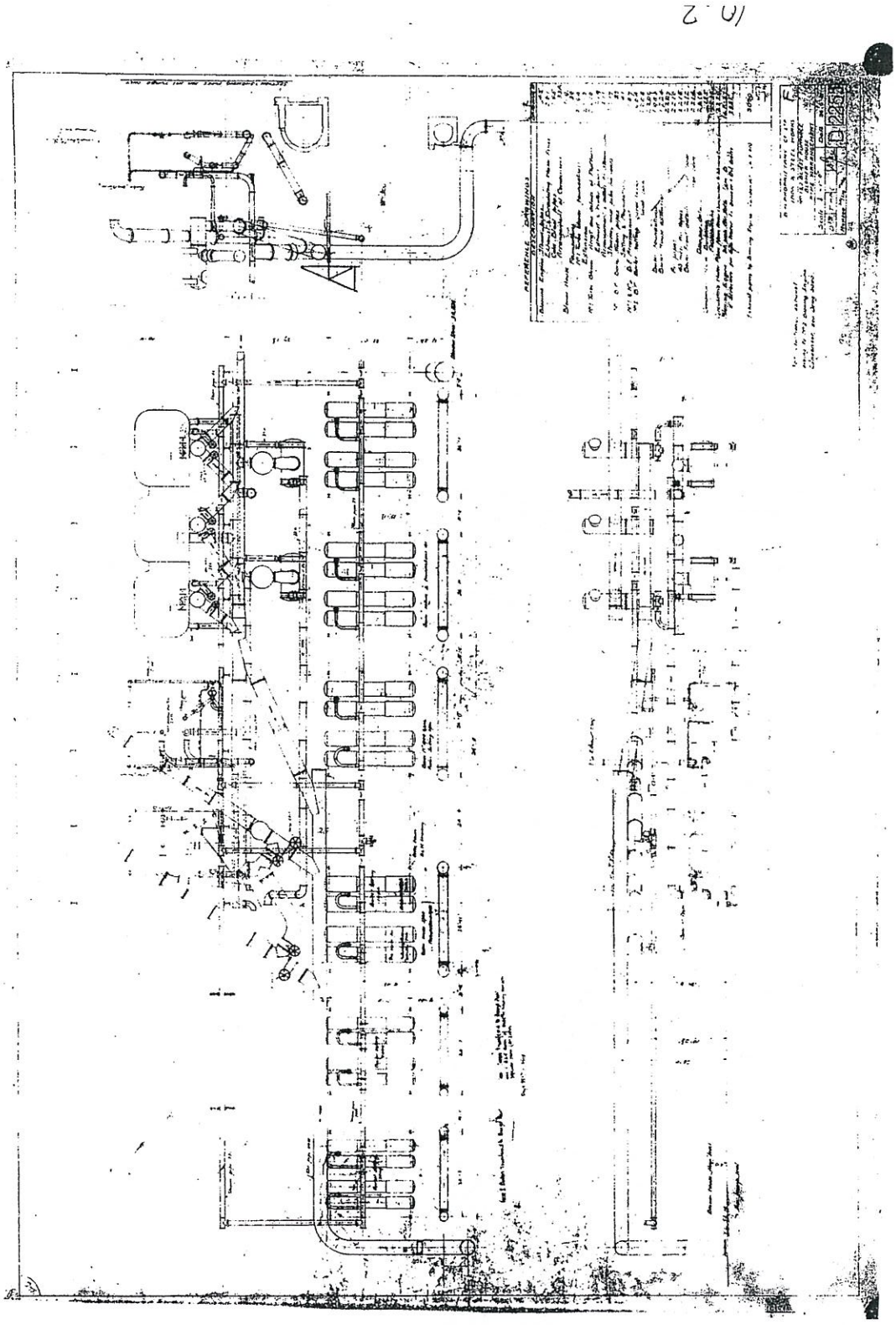


Figure 9.2: Blower House pipe arrangement
Source: BHP Archives. ref- D 2255



10.0 HISTORIC PHOTOGRAPHIC RECORD

Figure 10.1 No.1 Blower House with No.1 Blast Furnace & Boilers to the right, 1914
Source: Cranney (1999: 74)

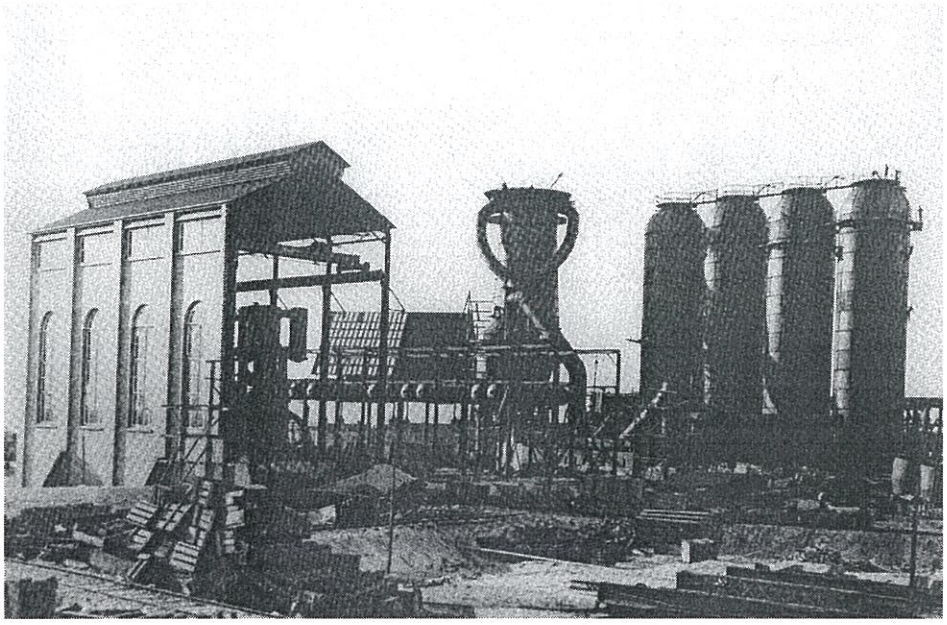


Figure 10.2 No.1 Blower House, No.1, 2, 3 Ver6tical Blowing Engines.
Source: Cranney (1999: 110)

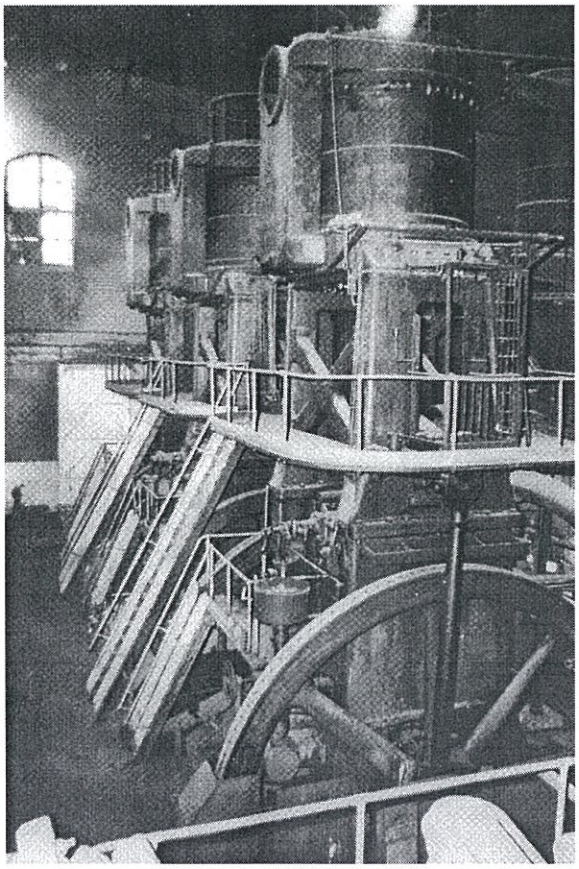
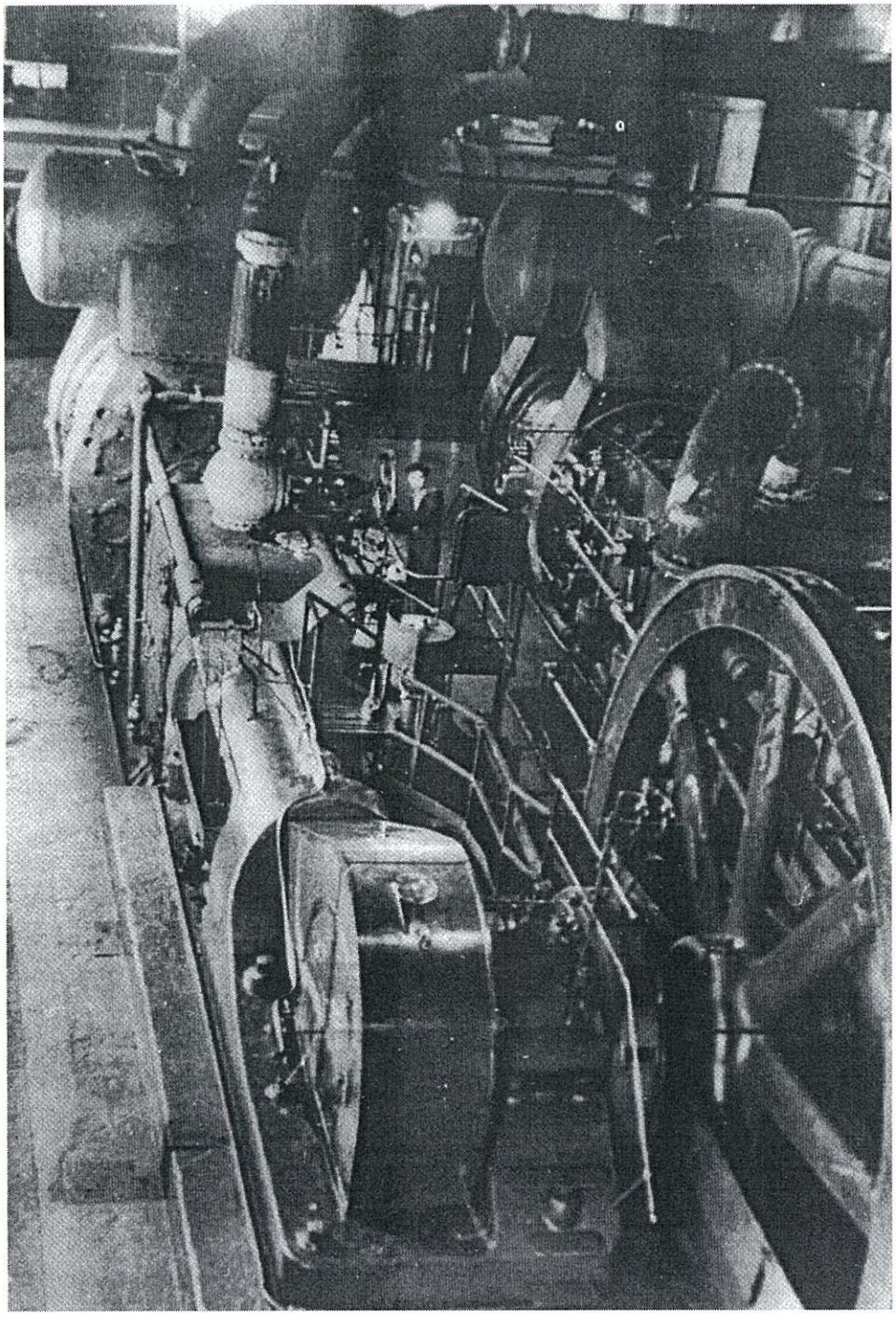


Figure 10.3 No.4 Horizontal (steam) Blowing Engine.
which replaced original vertical blower engines.



11.0 FULL FORMAT PHOTOGRAPHC RECORD

Note: there are no full format photographs for this item.

12.0 INVENTORY OF EQUIPMENT FITMENTS AND FINISHES

ITEM	DESCRIPTION	ORIGIN DATE
Building Envelope	The building is steel framed, with brick infill cladding and is of original period construction. Identifiable features of the building include; a ridge ventilation system, bricked up fenestrations (including bricked up circular openings which once allowed large pipes to pass through the walls) and a corrugated sheet metal clad eastern facade. Typical exterior brickwork is identified as a modified "English Bond" pattern. The brickwork has been typically reinforced and tied to the steel structural columns with evenly spaced horizontal steel brackets Also noted are the high level (eaves line) trusses. The trusses are approximately 800mm deep lattice steelwork and are open along the south and north elevations.	1915
Building Floor	The ground level floor is of concrete construction and is elevated off the ground. Access to the ground floor level is via a concrete ramp through the front door in the west elevation. At the west end of the building noted are rectangular jointing cracks, indicating possible location of the fly wheel pits of the vertical blowing engines. However due to the condition of the floor construction it is impossible to trace the whole of the pit form.	C1963
Mezzanine Floor	The size of the mezzanine in floor area is approximately one third of the size of the building's floor area. It is situated at the eastern side of the building. The mezzanine floor is clad in plate steel sheets while the walls up from ground level are clad in common brick. It is most likely the mezzanine was added during the transition of steam powered blower engines to turbo blowers. (c.1941) However, considering the vertical blowers were not decommissioned until 1963 the mezzanine addition may have occurred during transitional periods after 1963; In 1987 (when the Blower House became the Power Department's station for pump services and precipitator maintenance.) or in 1989 (when the Blast Furnace Mechanical Maintenance crew occupied the building). Apart from various mechanical parts storage and staff rooms, of interest beneath the mezzanine is a large horizontal concrete shaft (1.0 x 1.8m) with double steel plate doors hinged at the sides. The shaft inclines slightly down then after approximately 2.5m in depth, turns upward into a vertical shaft.	Post 1941

	Also beneath the mezzanine floor is a cable trench covered with plate metal sheets, running east/west along a passage leading to a rear door in the eastern facade.	
Crane	The crane beam is supported by two rail beams on the north and south elevations approximately 2m from eaves level. The crane manufacturer is noted as follows: Herbert Morris Ltd. Empress Works – Loughborough Load 15 tons The crane ran along the east/west axis of the building. The riveted rail steel work at the 1915 portion of the building has only two web stiffeners while the rails of the c.1941 addition consists of evenly spaced web stiffeners. The crane is accessed via a ladder from the mezzanine level to a steel-framed platform.	1915 & c.1941
Ancillary Equipment	The equipment listed is relevant to the use of the building at later stages notedly for the workshop of the blast furnace mechanical maintenance department.: Large steel UB framed worktable with plate metal tabletop. Metal lockers (at ground & mezzanine level) Air compressor stations Large bench drill. Workbench stations with built in lighting. Assortment of industrial tools including circular bench grinders, drills and vices.	Post 1963

13.0 APPENDICES

Appendix A: Manual camera negatives and photos

Appendix B: Digital images Proof Page and disk

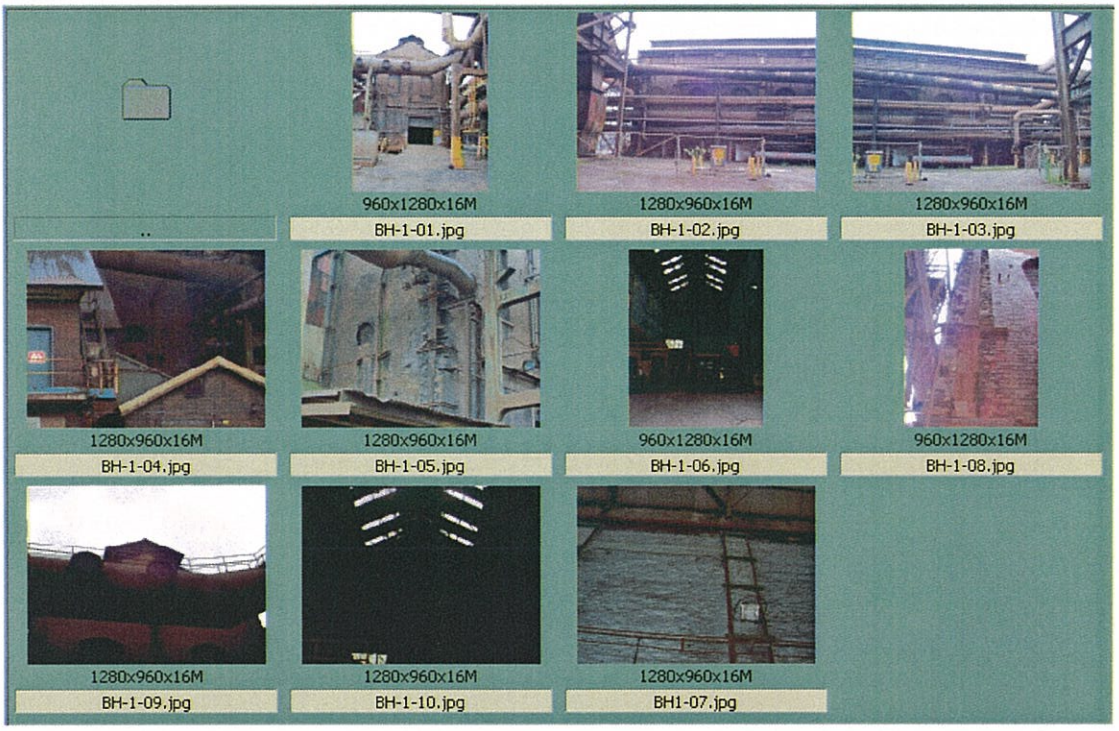
Appendix C: Archive drawing register disk

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".