

Southeast Wales Industrial Ironworks Landscapes

Year 1: the core ironworks areas

July 2005

A report for Cadw
by Richard Roberts BA (Hons)

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Southeast Wales Industrial Ironworks Landscapes

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1 Introduction and Acknowledgements

1.1 Introduction

The landscapes of the ironmaking industry of South East Wales represent an increasingly rare and important historic landscape and archaeological resource, which remains under considerable threat from a variety of developments from reclamation and landscape renewal to residential and industrial development. For this reason the current project has been instigated, to assess the current state of survival/preservation of the ironworks landscapes of the northern coalfield rim, and inform conservation, protection and management requirements through providing recommendations for the proactive and long-term management the ironwork areas.

In essence the work will help to ensure that any necessary change to industrial ironworks landscape is accommodated without sacrificing the essential integrity and coherence of the historic environment.

The latter half of the twentieth century saw the wholesale clearance, reclamation and development of many industrial sites in the South East Wales region. Ironworks, in particular have been vulnerable to landscape reclamation and renewal schemes, to such an extent that the vast majority of ironworks have at least in part been affected, and the process is ongoing. Therefore, it is both opportune and welcome that this project has been instigated, commissioned and funded by Cadw as part of an on-going initiative. It is hoped that this report will provide the catalyst for the urgent consideration of the future conservation of ironworks and their associated landscapes.

The current report sets out the results of the project, with a section defining the aims, and methodology. It also summarises the known and potential threats and provides general recommendations and establishes management/conservation priorities.

The main body of the report, Section 6, identifies and describes the 35 identified core ironworks areas. These areas are mapped using a MapInfo Geographical Information System, and figures produced to illustrate the identified areas in the current landscape and against an historic background as depicted by the first edition 1:2500 OS map, Landmark mapping, kindly provided by Cadw under licence agreement.

1.2 Acknowledgements

The project was commissioned by Cadw and undertaken by the Glamorgan-Gwent Archaeological Trust in their remit as the regional archaeological body responsible for the understanding and preservation of much of the archaeological resource in southeast Wales.

The Trust is especially grateful to Richard Turner and Judith Alfrey of Cadw, Stephen Hughes, Royal Commission on Ancient and Historic Monuments in Wales (RCAHMW), and Frank Olding of Blaenau-Gwent CBC. The Trust would like to thank the staff of the Glamorgan Record Offices, Cardiff and Swansea, Gwent Record Office and the National Library of Wales for their assistance and to the staff of the Central Registry of Aerial Photographs, The National Assembly for Wales for their helpful assistance and the staff at the National Monuments Record (NMR), RCAHMW, Aberystwyth.

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The report has been prepared by Richard Roberts, with the assistance of other staff of the Glamorgan-Gwent Archaeological Trust, notably Charina Jones, Claire Davies and Neil Maylan. The fieldwork was undertaken by Richard Roberts and Charina Jones. The aerial photographic illustrations for the project were supplied by the RCAHMW. Other illustrations and digital mapping prepared by Charina Jones, Richard Roberts, and Paul Jones.

2 The Study Area

The project entailed work on the ironworks and related features within the northern coal rim area. These are located within the respective Unitary Authorities: Blaenau-Gwent, Caerphilly, Merthyr Tydfil, Monmouthshire, Neath Port-Talbot, Rhondda Cynon Taff, and Torfaen.

The study was initially limited to the northern coalfield rim, specifically those sites described in L Ince 1993 *The South Wales Iron Industry 1750-1885*, Merton Press. The northern coalfield rim of South East Wales supplied over 30 major blast furnace iron-producing sites.

Whilst Blaenavon and Merthyr Tydfil have undergone intensive study much of the rest of the northern coalfield rim remains are little recorded. The RCAHMW through their upland survey and aerial mapping have studied this area as a priority and a lot of data is and will become available from them. There are many other local historians/archaeologists who have published on different parts of this area and the first edition OS map contains an extraordinary picture of this landscape at the end of its productive life.

3 Purpose of Report – aims and applications.

A number of Industrial Ironworking landscapes are well known and well protected. Notably the World Heritage Designation at Blaenavon, but protection is also afforded through Historic Landscape registration at for example Merthyr Tydfil. In other areas only those elements that are Scheduled or Listed are protected and consequently other elements of the landscape relating to the monument are more exposed to removal or impairment through re-development. Industrial landscape reclamation and opencast is considered to be the main threat to these endangered and rapidly disappearing landscapes and their component elements.

Monuments that are isolated from their context or that are only partially protected (ie where for example the Engine House is Listed, but the coke ovens, casting structure remains are not) are less easily interpreted and understood. More particularly monuments should be understood within their wider context. Ironworks, which have distinctive different monument structures and supply/distribution infrastructure and sourcing points, which often survive in the adjacent landscape, are particularly suitable for such appreciation.

However, whilst additional designation may extend protection this can only be applied where it is merited against defined criteria. Proactive management is needed not only of individual monuments but the surviving elements in the landscape that relate to their use. This can be achieved through local conservation initiatives; the industrial monuments tied in with ecological protection in amenity development.

It was proposed that the study be initially limited to the northern coalfield rim, specifically those sites described in L Ince 1993 *The South Wales Iron Industry 1750-1885*, Merton Press. The northern coalfield rim supplied 30 major blast furnace iron-producing sites. A simple but valuable exercise comprised comparing evidence from depictions of the core ironwork areas on the 1st edition OS map with modern maps and aerial photographic material, with the intention of identifying what survives and is visible, what survives and is buried, and what has been destroyed. The boundaries of the initial study were taken as the limits of the core ironworks areas and did not extend to wider transport links, waterworks and associated extraction sites, which it is intended to cover in the future. Validation was through site visits, consultation with local land reclamation departments and talking to local experts. Each ironworks core area was categorised as archaeologically sensitive areas, areas of archaeological potential or sterile areas. As a separate document a review of the scheduling of these sites could then be undertaken.

Whilst there is this wealth of information Cadw are endeavouring to improve the protection and management of what is perhaps the most important aspect of Wales' history. Cadw would like to see this project attempt at building a consensus and partnership over how to tackle the protection and management issues and assimilate the information gathered into these processes. This may in effect act as a scoping for a larger project to be taken forward in future years.

The study should ultimately provide the information necessary to:

- assess the current state of survival/preservation, conservation and the recording requirements (of the ironworks landscapes of the northern coal rim)
- inform future protection and management issues, including future scheduling proposals (regarding the ironworks landscapes of the northern coal rim)

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- inform the relevant Unitary Authority on industrial ironworks landscape issues in the planning process, including forward planning
- assist in assessing the wider impact of future proposed development on industrial ironworks landscape.
- assist in the evaluation of the aesthetic or amenity value of the industrial ironworks landscape
- assist in measuring the effect of individual development proposals on the overall historic integrity and coherence of industrial ironworks landscapes, with particular reference to the issues of outright removal, severance, fragmentation or dislocation of the historic elements.
- assess the cumulative effects of secondary or piecemeal changes over time.

In essence the work will help to ensure that any necessary change to industrial ironworks landscape is accommodated without sacrificing the essential integrity and coherence of the historic environment.

The report has been presented in such a way that upgrading of information can be considered through the medium of a GIS system, allowing data storage, manipulation, analysis, interrogation, presentation and future update of information. The Information Technology component of this project will therefore be high and will see the creation of a dynamic and multi-layered digital model for the study area.

The project was designed to identify industrial ironworks landscapes, individual monuments within them that would merit further protection, and liaise with conservation and other planning officers in respect of long-term protection and enhancement. In the first year it was intended to identify all potential candidates and examine in detail a representative sample of sites.

4 Methodology

The project involved an in-depth interrogation of the computerised Regional Sites and Monuments Record, supplemented by all the other readily available. The SMR has been adopted by the Unitary Authority for the purposes of the GDO95.

With the enhanced information available to this project, the methodology included a detailed desktop element, including map regression and with a largely 'bottom-up' approach. More general works and articles and other readily available sources were also be consulted and expertise drawn from historians and archaeologists working in the area. While it was not intended to carry out any original research, where this would have a relevant and beneficial approach at some future date this has been identified.

The boundaries of the ironworks areas for the purpose of the study were limited to the core activity areas of the ironworks as far as was discernable from the available information and tied into current extant boundaries on a 'best fit' basis.

The related transportation systems and extractive industries will be considered at a later stage of the project.

The area' boundaries, condition of sites and potential threats were validated through site visits, consultation with local land reclamation departments usually through obtaining and consulting local Unitary Development Plans and talking to local experts (where possible). Each site was then divided into the following categories:

- archaeologically sensitive areas
- areas of archaeological potential
- sterile areas

As a separate document a review of the scheduling of these sites could then be undertaken.

Map regression, based chiefly on available cartographic material (early OS, Tithe and Estate maps), was undertaken to understand and determine the development/phasing and integrity of the industrial landscapes. Available aerial photography at the Central Registry for Aerial photography in Wales was reviewed, however given the quantity of material made available during the initial searches and the number and extent of the wider areas to be viewed, aerial photographic material viewed was limited to between four and five sorties per area spread throughout the available periods. In this way a comparison between the historic cartographic evidence and the modern map/aerial photographs was made. This allowed both the later decline of the industrial ironworks landscapes to be charted and provided evidence of the potential extent of current survival of identified landscape areas and key identified elements.

Final task breakdown:

1. Review and compile baseline documentation

- Review and compile documentation for ironworks landscapes
- Ascertain total outputs from historical sources

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- Obtain copies of 1st edition 1:2500 OS maps for each ironworks
- Review aerial photographic evidence for ironworks landscapes
- Assemble general bibliography for ironworks landscapes of northern coal rim
- Compile source list and bibliography for individual ironworks landscapes
- Collate information on recent and current archaeological survey and investigation
- Compile lists of ironwork landscapes, and key elements within ironworks landscapes
- Revise existing GGAT lists and produce distribution maps

2. Review current state of protection and threats

- Establish current and proposed extent of scheduling / listing
- Investigate details of current UA plans/WDA programmes

3. Undertake selective field investigation

- Determine criteria for the selection of sites for visits (including potential surviving historic landscape quality)
- Select sites for visits
- Visit sites
- Ascertain extent of surviving remains
- Ascertain quality of surviving remains
- Undertake rapid mapping (annotated enlarged 1:2500 base), description and photographic recording sufficient to illustrate extent and quality of surviving remains).

4. Review the assembled data

- Consider and determine the needs and priorities for future recording
- Consider and review methodologies for detailed recording
- Consider development of ranking systems taking into account known historical importance, and relative importance of features
- Discuss conclusions with Cadw

5. Compile report

5.1 Compile text

5.1.1 Briefly review background history of the industrial ironworks of the northern coal rim, historiography, recent research, and significance and importance of individual sites

5.1.2 Review relative historical significance and importance of individual sites

5.1.3 Provide summary description of surviving remains and review significance in relation to 5.1.2 above

5.1.4 Review threats and current management proposals, and assess likely impact

5.1.5 Review and discuss priorities in terms of detailed field recording

5.1.6 Make any additional recommendations

5.2 Format schedules for individual sites, determine and produce appendices and tables, and produce indexes to documentation and field indexes

5.3 Prepare illustrations for report

5.4 Produce report using DTP facilities

5.5 Submit report to Cadw

5.6 Provide copies to interested parties (local authorities, SMR and NMR)

5 The Results

A number of wider ironwork areas, based on the information contained in Ince 1993 and a rapid mapping exercise, including limited map regression, were identified, and defined on modern 1:2500 OS paper map base, and adopted for the initial documentary, cartographic and aerial photographic baselines searches (including SMR, NMR searches).

Thereafter the wider areas were further revised and core ironwork areas defined, primarily using cartographic and aerial photographic information, more detailed map regression, tied into baseline SMR, NMR information. The result was the identification of some 35 core ironworks areas; these are given in table 1, below and are described in detailed in Section 6.

Table 1. Identified core ironworks areas:

Ironworks Number¹	Ironworks Name	Grid Reference
001	Pontypool (Upper Race, Blaendare)	ST 272 997
002	Varteg	SO 265 055
003	Golynos	SO 260 047
004	Abersychan (British)	SO 258 035
005	Pentwyn	SO 265 033
006	Clydach	SO 227 128
007	Blaina (inc. Cwmcelyn)	SO 199 081
008	Coalbrookvale (inc. Trostre)	SO 194 095
009	Nant-y-glo	SO 192 105
010	Ebbw Vale	SO 174 097
011	Victoria	SO 172 076
012	Beaufort	SO 170 115
013	Tredegar	SO 144 091
014	Sirhowy	SO 144 102
015	Rhymney	SO 113 069
016	Dyffryn	SO 071 032
017	Pentrebach	SO 065 035
018	Plymouth	SO 057 048
019	Ynys Fach	SO 046 060
020	Cyfarthfa	SO 037 068
021	Penydarren	SO 058 072
022	Dowlais	SO 065 074
023	Ivor Works	SO 068 080
024	Hirwaun	SN 993 045
025	Llwydcoed	SN 993 045
026	Gadlys	SO 001 031
027	Abernant	SO 006 035
028	Aberaman	SO 015 003
029	Ystalyfera	SN 764 084
030	Ynyscedwyn	SN 785 092
031	Onllwyn	SN 839 103
032	Banwen	SN 868 104

¹ Numbers prefixed by IW in main text

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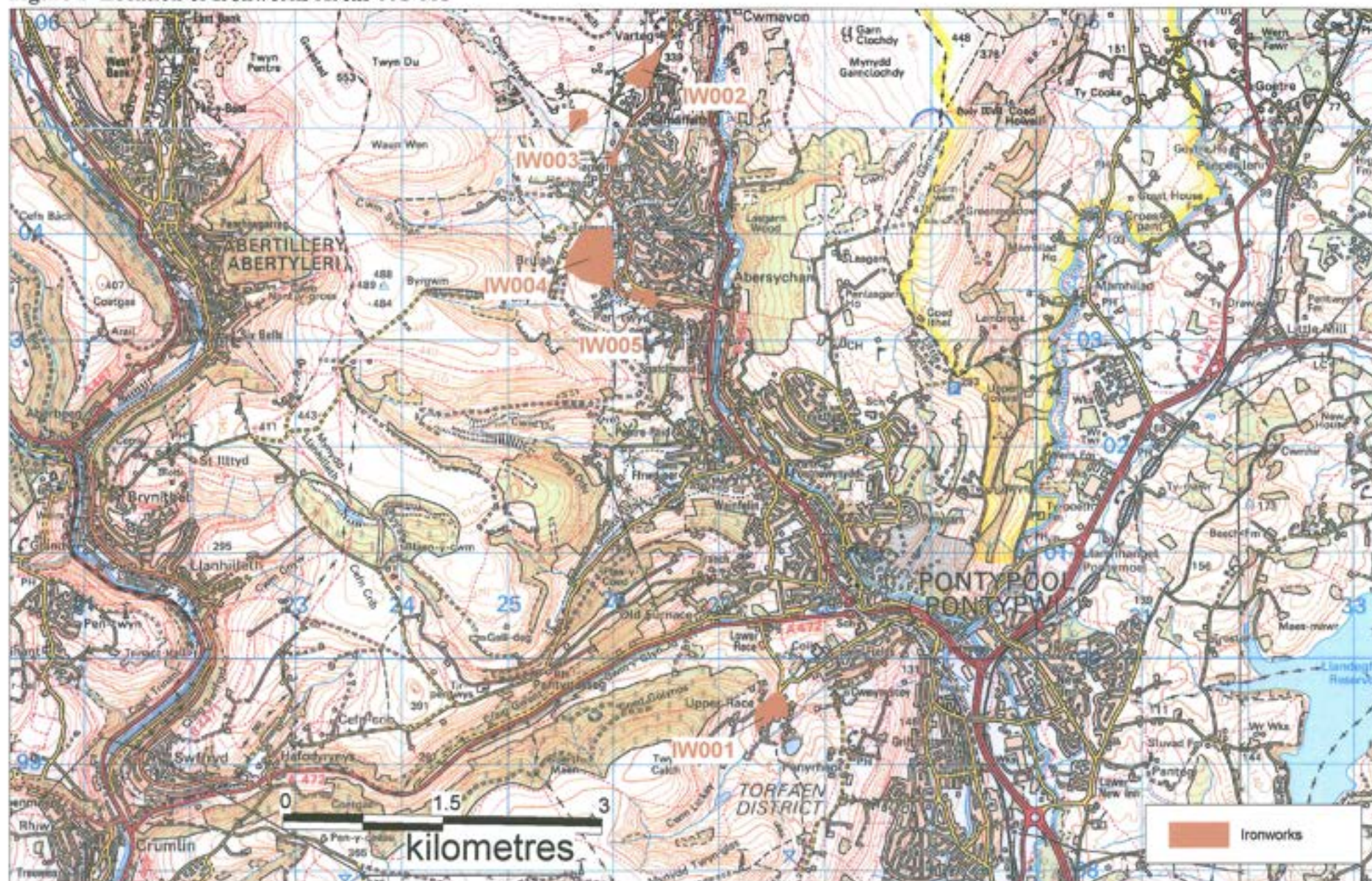
033	Melincwrt	SN 824 019
034	Venallt	SN 863 049
035	Abernant	SN 882 063

It was found that historically, many of the ironworks areas had expanded to take in significant areas of valley landscape; this was particularly the case with the larger ironworks conglomerations within the upper valleys of the Blaenau, such as at Nant-y-glo, Ebbw Vale, Rhymney, Blaina, and Coalbrookvale. Conversely, in the case of some of the less significant ironworks, such as the once jointly operated Varteg and Golynos, in the area north of Pontypool between the British Ironworks and Blaenavon, it was found that the constituent parts of the core area were often spread over some distance, with core activities being shared between different sites.

Whilst 35 Ironworks Areas were identified for the purpose of the present report, the actual number of ironworks is 38, as several ironworks have been combined, because of proximity and development such as IW007 Blaina, which includes the Cwmcelyn Ironworks and IW008 Coalbrookvale, which included Trostre Ironworks.

It should also be noted that several of the more extensive ironwork areas identified, have out of necessity been effectively split up into separate sub-areas. These include Ebbw Vale, which can be sub-divided naturally into three areas, along the lines of the core furnace area, the lower mill site, and the Bessemer Steel works, including, and Rhymney, which comprises the Old Furnace, the main Rhymney Ironworks site itself and the adjacent Bute Works.

Figure 1 Location of Ironworks Areas 001-005



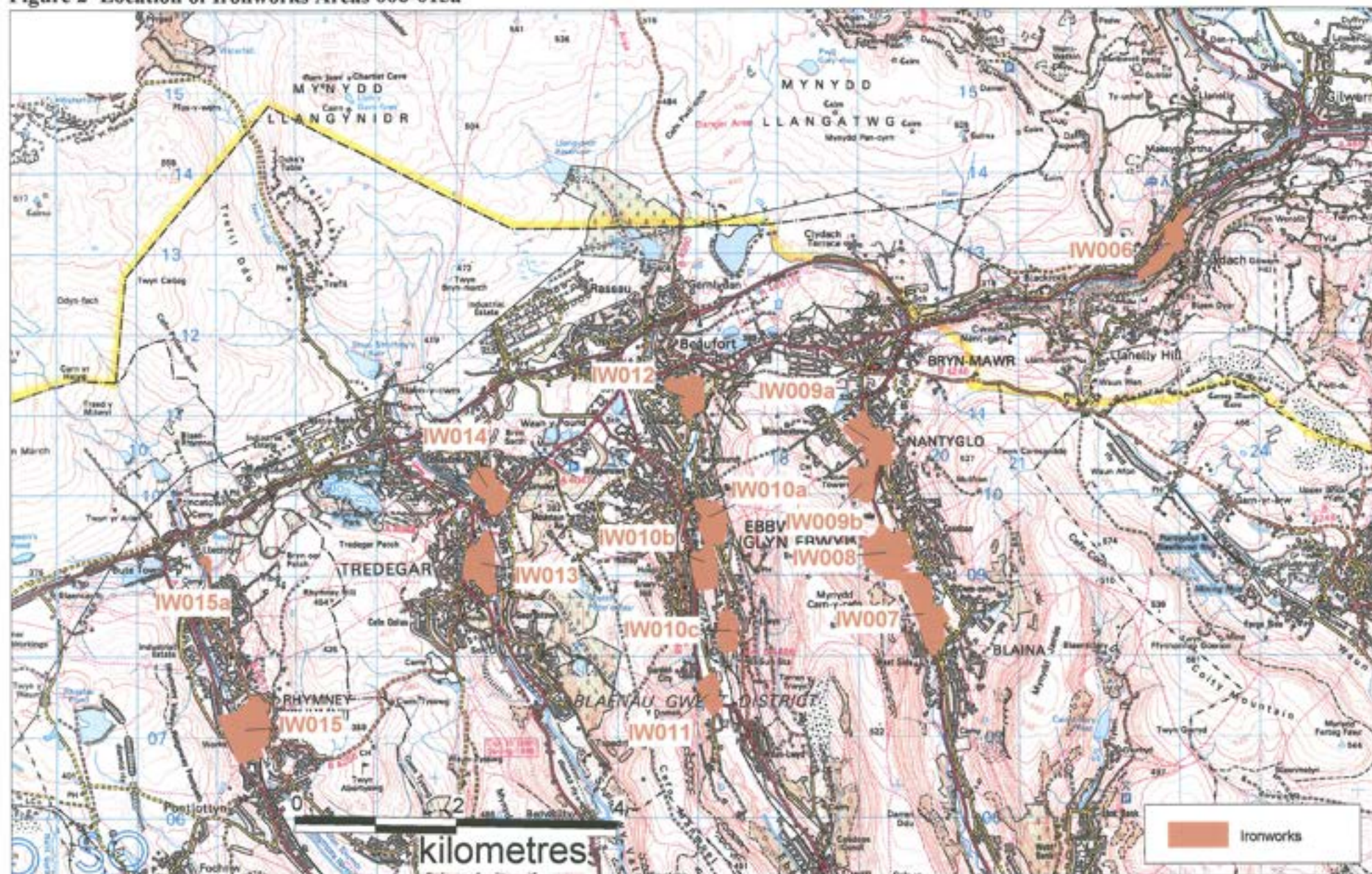
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Mae atgynhyrchu heb ganiatâd yn torri hawlfraint y Goron a gall hyn arwain at erlyniad neu achos sifil. Glamorgan-Gwent Archaeological Trust Ltd 100017916 (2005).

Figure 2 Location of Ironworks Areas 006-015a

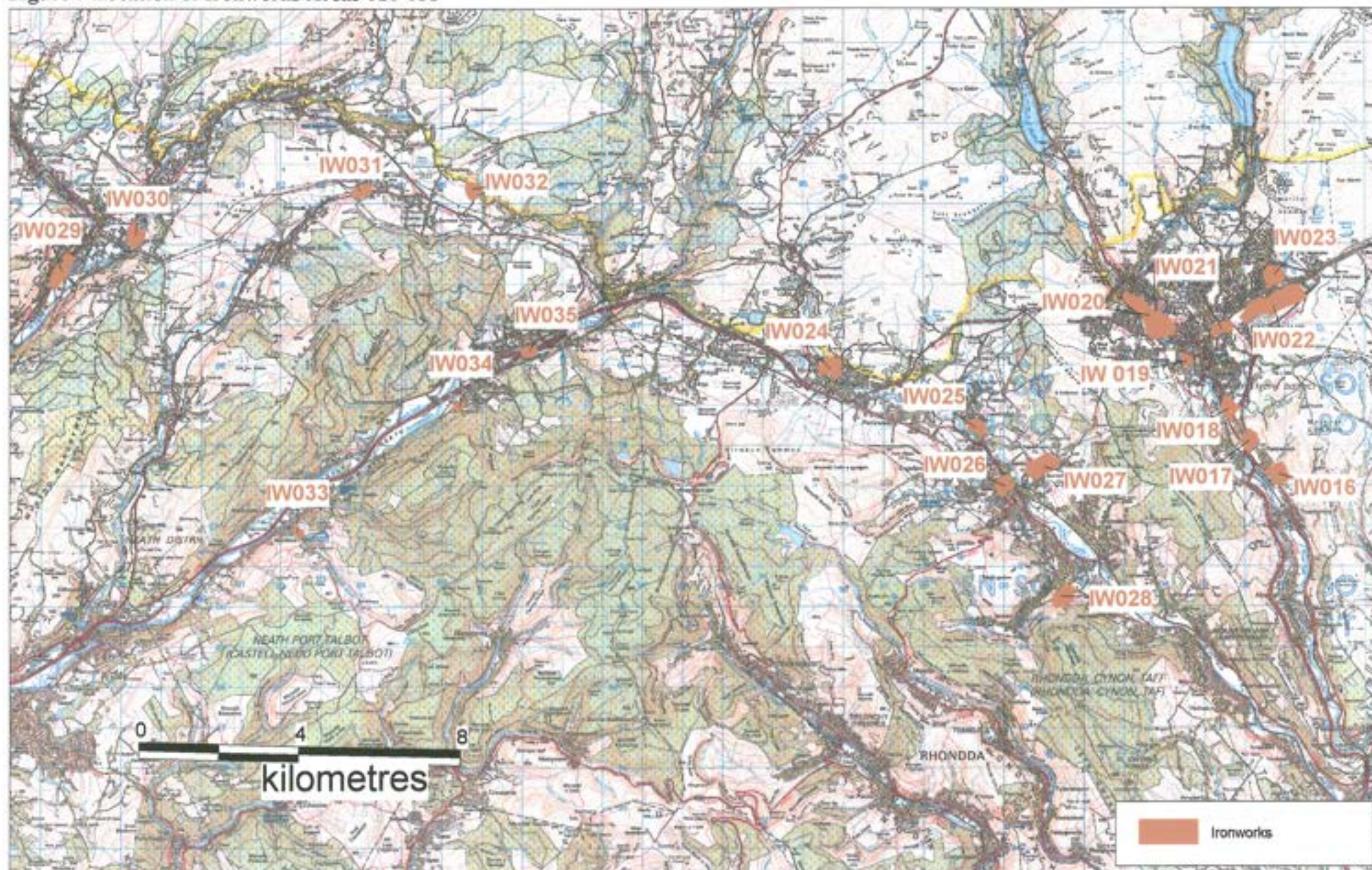


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Figure 3 Location of Ironworks Areas 016-035



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5.1 *Fieldwork (Site Visits)*

A cross-section of ironworks within the study area with the exclusion of the Merthry Tydfil area, which had been extensively covered by recent Historic Landscape Characterisation work, were selected for site visits, with the emphasis being put on sites where current condition/survival was considered to high/potentially high or unknown.

The site visits in conjunction with documentary and cartographic sources were undertaken to validate the ironwork boundaries in their current state and to establish the current condition/survival, potential for survival of the archaeological resource within the identified ironwork areas. To this end a rapid site visit was made to nineteen of the thirty-five identified ironworks. The results, together with unvisited sites are presented in Table 3, below and within the individual ironworks area citations given in Section 6. The visited ironworks areas are given in Table 2, below.

Table 2. Ironworks areas visited during project:

Ironworks Number²	Ironworks Name	Grid Reference
004	Abersychan (British)	SO 258 035
006	Clydach	SO 227 128
009	Nant-y-glo	SO 192 105
010	Ebbw Vale	SO 174 097
012	Beaufort	SO 170 115
013	Tredegar	SO 144 091
014	Sirhowy	SO 144 102
015	Rhymney	SO 113 069
024	Hirwaun	SN 993 045
025	Llwydcoed	SN 993 045
026	Gadlys	SO 001 031
027	Abernant	SO 006 035
028	Aberaman	SO 015 003
029	Ystalyfera	SN 764 084
031	Onllwyn	SN 839 103
030	Ynyscedwyn	SN 785 092
032	Banwen	SN 868 104
033	Melincwrt	SN 824 019
034	Venallt	SN 863 049

² Numbers prefixed by IW in main text

5.2 Condition and Archaeological Significance

The analysis of cartographic, documentary and aerial photographic material not only allowed the boundaries of the core ironworks areas to be identified, but also enabled a general overview of site condition to be established. In this way the archaeological significance or potential of the resource could be estimated and broken down into the following:

- archaeologically sensitive areas
- areas of archaeological potential (low-high)
- sterile areas

The results of this largely desktop process³ are presented within Table 3. The value of the remains in the individual ironworks (IW) areas is considered in terms of certain remains or where not visible potential. In some cases value can be considered with both these aspects.

Table 3. Current condition and archaeological significance:

Ironworks Number	Ironworks Name	General Condition of Site⁴	Archaeological Value	Visited
001	Pontypool (Upper Race, Blaendare)	Reclaimed and landscaped	Low-moderate potential	No
002	Varteg	Cleared and landscaped	Low-moderate potential	No
003	Golynos	Reclaimed and partly redeveloped	Low-moderate potential	No
004	Abersychan (British)	Intact (SAMs/LBs) /partly buried	Archaeologically sensitive area	Yes
005	Pentwyn	Reclaimed and landscaped	Low-moderate potential	No
006	Clydach	Intact (SAM/LBs)/cleared and partly redeveloped	Archaeologically sensitive area	Yes
007	Blaina (inc. Cwmcellyn)	Reclaimed and redeveloped	Low-moderate potential	No
008	Coalbrookvale (inc. Trostre)	Reclaimed and redeveloped	Low-moderate potential	No
009	Nant-y-glo	Intact (009b: LB)/ cleared and redeveloped	Archaeologically sensitive area (009b)/moderate-high potential (009a)	Yes
010	Ebbw Vale	Intact (LB)/ partly cleared and redeveloped	Archaeologically sensitive area (010a)/ low potential (010b & c)	Yes

³ Eighteen of the thirty-five ironwork areas were subject to a site visit which allowed condition and potential to be further assessed. See section 5.2, below.

⁴ Based on cartographic, documentary and aerial photographic evidence alone, where not visited.

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011	Victoria	Reclaimed and partly redeveloped	Low-moderate potential	No
012	Beaufort	Cleared and redeveloped	Low-moderate potential	Yes
013	Tredegar	Cleared and partly redeveloped	Moderate potential	Yes
014	Sirhowy	Intact (SAM/LB)/partly buried	Archaeologically sensitive area/high potential	Yes
015	Rhymney	Intact (015a: SAM/LBs)/reclaimed and redeveloped	Archaeologically sensitive area (015a)/ Sterile/low potential	Yes
016	Dyffryn	Reclaimed and redeveloped	Low-moderate potential	No
017	Pentrebach	Reclaimed and redeveloped	Sterile/low potential	No
018	Plymouth	Tunnel intact/rest reclaimed and partly redeveloped	Archaeologically sensitive area (NPRN 34,853)/ low-moderate potential?	No
019	Ynys Fach	Intact (SAM)/ partly cleared and redeveloped	Archaeologically sensitive area	No
020	Cyfarthfa	Intact (SAMs/LBs)/ partly cleared	Archaeologically sensitive area	No
021	Penydarren	Cleared and redeveloped	Moderate-high potential	No
022	Dowlais	Intact (LB)/ partly reclaimed and redeveloped	Archaeologically sensitive area/moderate-high potential	No
023	Ivor Works	Intact (LB)/ cleared site redeveloped	Archaeologically sensitive area/moderate potential	No
024	Hirwaun	Intact (SAMs/LBs)/ partly cleared	Archaeologically sensitive area/ high potential	Yes
025	Llwydcoed	Intact? / partly cleared	Archaeologically sensitive area/ high potential	Yes
026	Gadlys	Intact (SAMs/LBs)/ partly cleared and redeveloped	Archaeologically sensitive area/ moderate-high potential	Yes

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027	Abernant	Cleared and partly reclaimed	Low-moderate potential	Yes
028	Aberaman	Cleared and reclaimed	Sterile/Low potential	Yes
029	Ystalyfera	Partly cleared and redeveloped	Archaeologically sensitive area/ Moderate-high potential	Yes
030	Ynyscedwyn	Partly cleared and redeveloped	Archaeologically sensitive area/ moderate potential	Yes
031	Onllwyn	Opencasted and reclaimed	Sterile	Yes
032	Banwen	Intact (SAM) / derelict state	Archaeologically sensitive area/ high potential	Yes
033	Melincwrt	Intact (SAM) / derelict state	Archaeologically sensitive area/ high potential	Yes
034	Venallt	Intact (SAM) / conserved	Archaeologically sensitive area/ high potential	Yes
035	Abernant	Reclaimed/ partly redeveloped	Sterile/ low potential	No

5.3 The Resource and Current Protection

The archaeological resource (ie condition, archaeological value, presence of visible remains and buried potential) in relation to the level of current statutory protection has been assessed for each ironwork core area (summarised below in table 4). It was found that of the 35 core ironwork areas (ie or a maximum 38 ironworks) 21 retained visible remains, while 30 were considered to have some level of buried potential.

Fifteen of the core ironwork areas examined were found to have some degree of current statutory protection (ie Scheduled Ancient Monuments or Listed buildings); that is between 40% and 43% of the original resource within the study area limits. The analysis indicates that of the core ironworks areas with visible standing remains, 75% are currently protected to some degree through statutory protection, while just 50% of ironwork areas with buried potential are similarly protected.

Table 4. Summary of archaeological resource in relation to current statutory protection

Ironworks Number Ironworks Name	General Condition of Site ⁵	Archaeological Value	Visible Remains	Buried Potential	Statutory Protection (SAM/LB)
001 Pontypool (Upper Race, Blaendare)	Reclaimed and landscaped	Low-moderate potential	No (worker's housing)	Yes	-
002 Varteg	Cleared and landscaped	Low-moderate potential	No	Yes	-
003 Golynos	Reclaimed and partly redeveloped	Low-moderate potential	No	Yes	-
004 Abersychan (British)	Intact (SAMs/LBs) /partly buried	Archaeologically sensitive area	Yes	Yes	SAM Mm216 and 221; LBs 148770 and 18595
005 Pentwyn	Reclaimed and landscaped	Low-moderate potential	No	Yes	-
006 Clydach	Intact (SAM/LBs)/cleared and partly redeveloped	Archaeologically sensitive area	Yes	Yes	SAM BR161; Bridges: LBs 23,813 and 23,812
007 Blaina (inc. Cwmcelyn)	Reclaimed and redeveloped	Low-moderate potential	No	Yes	-

⁵ Based on cartographic, documentary and aerial photographic evidence alone, where not visited.

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008 Coalbrookvale (inc. Trostre)	Reclaimed and redeveloped	Low-moderate potential	No	Yes	-
009 Nant-y-glo	Intact (009b: LB)/ cleared and redeveloped	Archaeologically sensitive area (009b)/moderate- high potential (009a	Yes (009b)	Yes (009a)	LB II* 17086 (009b)
010 Ebbw Vale	Intact (LB)/ partly cleared and redeveloped	Archaeologically sensitive area (010a)/ low potential (010b & c)	Yes (010a)	Yes (010a)	LB II* 22,531
011 Victoria	Reclaimed and partly redeveloped	Low-moderate potential	No	Yes	-
012 Beaufort	Cleared and redeveloped	Low-moderate potential	No	Yes	-
013 Tredegar	Cleared and partly redeveloped	Moderate potential	Yes	Yes	-
014 Sirhowy	Intact (SAM/LB)/p artly buried	Archaeologically sensitive area/high potential	Yes	Yes	SAM MM185 LB II* 22,496
015 Rhymney	Intact (015a: SAM/LBs)/re claimed and redeveloped	Archaeologically sensitive area (015a)/ Sterile/low potential	Yes (015a)	Yes	SAM Gm403 (015a) LBII 13,549 16,882
016 Dyffryn	Reclaimed and redeveloped	Low-moderate potential	No	Yes	-
017 Pentrebach	Reclaimed and redeveloped	Sterile/low potential	No	No?	-
018 Plymouth	Tunnel intact/rest reclaimed and partly redeveloped	Archaeologically sensitive area (NPRN34,853)/ low-moderate potential?	Yes	Yes	-
019 Ynys Fach	Intact (SAM)/ partly cleared and redeveloped	Archaeologically sensitive area	Yes	Yes	SAM Gm331 LBII* 16,073

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020 Cyfarthfa	Intact (SAMs/LBs)/ partly cleared	Archaeologically sensitive area	Yes	Yes	SAM Gm425 SAM Gm424 SAM Gm479 LBII* 11,408 LBII 11,404 – 11,407
021 Penydarren	Cleared and redeveloped	Moderate-high potential	Yes	Yes	-
022 Dowlais	Intact (LB)/ partly reclaimed and redeveloped	Archaeologically sensitive area/moderate-high potential	Yes	Yes	LBII 11,491
023 Ivor Works	Intact (LB)/ cleared site redeveloped	Archaeologically sensitive area/moderate potential	Yes	Yes	LBII 27,086
024 Hirwaun	Intact (SAMs/LBs)/ partly cleared	Archaeologically sensitive area/ high potential	Yes	Yes	SAM BR157 LB II 26,827
025 Llwydcoed	Intact? / partly cleared	Archaeologically sensitive area/ high potential	Yes?	Yes	-
026 Gadlys	Intact (SAMs/LBs)/ partly cleared and redeveloped	Archaeologically sensitive area/ moderate-high potential	Yes	Yes	SAM Gm438 LBIIIs 10,842 10,843 10,844 10,846
027 Abernant	Cleared and partly reclaimed	Low-moderate potential	Yes	Yes	-
028 Aberaman	Cleared and reclaimed	Sterile/Low potential	No	No?	-
029 Ystalyfera	Partly cleared and redeveloped	Archaeologically sensitive area (PRN 01207w)/ Moderate-high potential	Yes	Yes	-
030 Ynyscedwyn	Partly cleared and redeveloped	Archaeologically sensitive area/ moderate potential	Yes	No?	-
031 Onllwyn	Opencasted and reclaimed	Sterile	No	No	-

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032 Banwen	Intact (SAM) / derelict state	Archaeologically sensitive area/ high potential	Yes	Yes	SAM Gm420
033 Melincwrt	Intact (SAM) / derelict state	Archaeologically sensitive area/ high potential	Yes	Yes	SAM Gm416
034 Venallt	Intact (SAM) / conserved	Archaeologically sensitive area/ high potential	Yes	Yes	SAM Gm423
035 Abernant	Reclaimed/ partly redeveloped	Sterile/ low potential	No	No?	-

The level of statutory protection was further broken down to allow an analysis of the protected resource against surviving monument class (ie furnaces, charging ramps/platforms, calcining ovens/coking oven, casting houses/foundries, rolling mills, engine houses, waterwheels/pits, offices and other buildings), where surviving as visible standing, or positively identified buried remains. This has been specifically undertaken to identify classes of monument that are underrepresented within the current protection regime, but also identify core ironwork areas, which might benefit from the extension of existing protection.

The main features of the ironworks sites are their furnaces and charging ramps/platforms; sixteen core ironworks areas out of 35 within the study area were found to retain visible standing, or positively identified buried remains of furnaces/furnace banks (including a count of 2 for Abersychan – with the scheduled air furnace). The nationally important furnaces (and engine house) at Banwen (SAM Gm420), despite protection through scheduling are in urgent need of conservation. Twelve of the 17 furnaces/furnace banks identified are currently protected by statutory protection: notably the furnace bank at IW010 Ebbw Vale (Listed Building Grade II*, Cadw ref: 22,531) is not scheduled. The furnaces at IW004 Abersychan, IW029 Ystalyfera, IW022 Dowlais (buried) and IW018 Plymouth (buried) are also of particular significance and are currently unprotected through legislation. The number of charging ramps/platforms similarly protected mirrors the figures identified for furnaces with 11 protected out of 18 identified, with that at IW010 Ebbw Vale listed (LBII*, Cadw ref: 22,531) but not scheduled. Significant unprotected charging ramps/platforms survive at IW029 Ystalyfera, IW004 Abersychan, IW021 Penydarren, and possibly also at IW009a Nant-y-glo. Other unprotected remains of charging ramps/platforms might also survive at IW012 Beaufort, IW013 Tredegar and IW025 Llwydcoed.

The survival and protection of ancillary features shows a slightly different pattern to the main ironworks features; in general survival of ancillary features such as calcining ovens/coking ovens, casting houses and foundries, is relatively low within the study area and where these features do survive they are, with a few exceptions, invariably protected. Remains of calcining ovens/coking ovens survive at five ironworks, though in generally in a fragmentary or buried condition. Of the calcining ovens/coking ovens identified four are protected through legislation; that at IW026 Gadlys, which has recently been conserved, is listed (LBII, Cadw ref: 10,846), but not scheduled. The latter in terms of condition is the best surviving example of those within the study area; most remain as ‘sites of’, or buried. Of the five ranks of ovens originally located at

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IW004 Abersychan, one recorded in 1994 (Ironbridge Institute and RCAHMW 1994) survives apparently in poor condition (Riden 1994); this site is currently unprotected.

Casting houses/foundries were identified within 5 ironwork core areas; all are currently protected through legislation. The only unscheduled example is the foundry at IW004 Abersychan, which is a grade II* listed building (Cadw ref: 14,870). Mills and forges are similarly well-protected: these include both the forge/workshop (occupied) at IW015 Rhymney a grade II listed building (Cadw ref: 16,882), and the remains of 2 possible mills within the scheduled area (SAM BR157) at IW024 Hirwaun. Unusually the well-conserved brick-built mill/engine house and adjacent chimney (NPRN 34,037) at IW030 Ynyscedwyn is as yet unprotected through statutory legislation.

The level of protection afforded to surviving ironworks related engine houses is generally high with eight of the ten identified examples adequately protected through listing and scheduling. Those Engine houses, which are listed rather than scheduled (eg Grade II* Listed engine house at IW019 Ynys Fach, and the Grade II Listed examples at IW022 Dowlais and IW026 Gadlys) are occupied and have been found alternative uses. As yet unprotected, in addition to the aforementioned example at Ynyscedwyn, are the buried remains of two identified engine houses at IW010 Ebbw Vale; these located to either end of the grade II* listed furnace. Only three waterwheels/wheel pits have been identified within the study area; these are all protected through scheduling; one at IW014 Sirhowy also being grade II* listed (Cadw ref: 22,496). It should be noted that due to the nature of these features a strong likelihood exists that buried remains might survive elsewhere, as yet unknown.

Of the twenty or so miscellaneous features such as offices and other buildings identified five are currently unprotected by legislation. The more significant are the tramroad tunnel beneath the furnace bank at IW018 Plymouth, the weighbridge and weighbridge house, and the smithy and carpenter's shop at IW032 Banwen, the Company shop/office at IW009 Nant-y-glo (within 009a), the office at IW027 Abernant, and the Company shop and offices at IW034 Venallt; the latter three sites are all now occupied domestic properties. The unprotected features at Banwen have considerable group value with the nationally important features within scheduled area to the north (SAM Gm420), and protection should be considered.

The results of the assessment of surviving monument class and statutory protection on a core ironworks area basis are presented within table 5. This information will be used to inform future scheduling proposals.

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Table 5. Surviving classes of monument (ie where as visible standing, or positively identified buried remains) in relation to statutory protection

Ironworks Number Ironworks Name	Furnaces	Statutory protection (SAMs, LBs)	Charging Ramps / platforms	Statutory protection (SAMs, LBs)	Calcining Ovens / Coking Ovens	Statutory protection (SAMs, LBs)	Casting Houses / foundry	Statutory protection (SAMs, LBs)	Mills / forges	Statutory protection (SAMs, LBs)	Engine Houses	Statutory protection (SAMs, LBs)	Waterwheel / wheelpit	Statutory protection (SAMs, LBs)	Offices and other buildings (eg. water balance towers)	Statutory protection (SAMs, LBs)
001 Pontypool (Upper Race, Blaendare)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
002 Varteg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
003 Golynos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
004 Abersychan (British)	1 (air furnace); 1 (furnace bank – partly buried)	SAM Mm221; -	1 (line of)	-	1 rank out of 5 original (poor condition)	-	1 (foundry)	LB II* Cadw ref: 14870; SAM Mm221	-	-	1	SAM Mm216; LB II Cadw ref: 18595	-	-	1 (offices)	LB II* Cadw ref: 14870; SAM Mm221
005 Pentwyn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
006 Clydach	1 (furnace bank)	SAM BR161	1 (with charging houses and arch)	SAM BR161	-	-	1 (casting house – excavated footings)	SAM BR161	-	-	-	-	1	SAM BR161	2 (bridges, only one in SAM); incline (30% within SAM)	SAM BR161 LBII* Cadw ref: 23,813; LB II Cadw ref: 23,812
007 Blaina (inc. Cwmcelyn)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
008 Coalbrookvale (inc. Trostre)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
009 Nant-y-glo	-	-	1 (?009a)	-	-	-	-	-	-	-	-	-	-	-	1 (fortified farm yard 009b) 1 company shop / office (009a)	LB II* Cadw ref: 17,086 (009b) -

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010 Ebbw Vale	1 (furnace bank; 010a)	LB II* Cadw ref: 22,531	1 (010a)	LB II* Cadw ref: 22,531	-	-	-	-	-	-	2 (known buried remains in 010a)	-	-	-	Office (near 010b)	LB II* Cadw ref: 22,530 (near 010b)
011 Victoria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
012 Beaufort	-	-	1 (?line of)	-	-	-	-	-	-	-	-	-	-	-	-	-
013 Tredegar	-	-	1 (?charging ramp)	-	-	-	-	-	-	-	-	-	-	-	-	-
014 Sirhowy	1 (furnace bank)	SAM MM185 LB II* Cadw ref: 22,496	1	SAM MM185 LB II* Cadw ref: 22,496	-	-	1 (footings)	SAM MM185 LB II* Cadw ref: 22,496	-	-	-	-	1	SAM MM185 LB II* Cadw ref: 22,496	-	-
015 Rhymney	1	SAM Gm403 (015a)	1	SAM Gm403 (015a)	-	-	-	-	1 (forge/work shop)	LBII Cadw ref: 16,882	-	-	-	-	Manager's House	LBII Cadw ref: 13,549
016 Dyffryn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
017 Pentrebach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
018 Plymouth	1 (furnace bank - reduced and buried)	-	-	-	-	-	-	-	-	-	-	-	-	-	Tramroad tunnel beneath furnace bank	-
019 Ynys Fach	1 (furnace bank)	SAM Gm331	1	SAM Gm331	1 (site of)	SAM Gm331	-	-	-	-	1	LBII* Cadw ref: 16,073	-	-	-	-
020 Cyfarthfa	1 (furnace bank)	SAM Gm425	1	SAM Gm425	1 (site of)	SAM Gm425	-	-	-	-	1 (engine house and remains of melting house and boiler)	SAM Gm425	-	-	Iron tramroad bridge; leat	SAM Gm424 LBII* Cadw ref: 11,408; SAM Gm479
021 Penydarren	-	-	1 (? remnant)	-	-	-	-	-	-	-	-	-	-	-	-	-
022 Dowlais	1 (furnace bank – buried)	-	-	-	-	-	-	-	-	-	1	LBII Cadw ref: 11,491	-	-	-	-
023 Ivor Works	-	-	-	-	-	-	-	-	-	-	1 (?)	LBII Cadw ref: 27,086	-	-	1 (Sulphate of ammonia plant)	LBII Cadw ref: 27,086

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024 Hirwaun	1 (furnace bank)	SAM BR157	1	SAM BR157	-	-	-	-	2 (remnant of mills ?)	SAM BR157	-	-	-	-	1 (tramroad bridge & causeway)	SAM BR157 LB II Cadw ref: 26,827
025 Llwydcoed	1? (?furnace bank – base of buried)	-	1?	-	-	-	-	-	-	-	-	-	-	-	1 (later works buildings – recently demolished)	-
026 Gadlys	1 (furnace bank)	SAM Gm438	1	SAM Gm438	1 (bank)	LBII Cadw ref: 10,846	1 (intact)	SAM Gm438 LBII Cadw ref: 10,844	-	-	1 (intact - exterior)	LBII Cadw ref: 10,842	-	-	1 (stone revetting)	LBII Cadw ref: 10,843
027 Abernant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 (office)	-
028 Aberaman	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
029 Ystalyfera	1 or more (furnace bank(s)?)	-	1?	-	-	-	-	-	-	-	-	-	-	-	-	-
030 Ynyscedwyn	-	-	-	-	-	-	-	-	1 mill / forge?	-	1 engine house?	-	-	-	1 chimney	-
031 Onllwyn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
032 Banwen	1 (2 furnaces)	SAM Gm420	1	SAM Gm420	-	-	-	-	-	-	1	SAM Gm420	-	-	1 site of chimney; 1 weigh bridge; 1 smithy and carpenter's shop (not protected)	SAM Gm420; - -
033 Melincwrt	1 (plus 1 small air furnace)	SAM Gm416	1	SAM Gm416	Site of rank of 5 kilns	SAM Gm416	1 foundry/finery	SAM Gm416	-	-	-	-	1	SAM Gm416	Store houses	SAM Gm416
034 Venallt	2 (buried remains + hearth and twin tuyeres)	SAM Gm423	1	SAM Gm416	-	-	2 (1 wall remains above ground)	SAM Gm416	-	-	1	SAM Gm416	-	-	1 chimney base; 1 company shop and offices	SAM Gm416; -
035 Abernant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.4 Threats and Recommendations

A review of the current identified threats was undertaken using Unitary Authority development plans as a basis. Other potential threats, mainly from dereliction were identified in particular from the site visits. These are presented within the body of the report (see Section 6, below) and are summarised in Table 6, along with general recommendations for each area.

Table 6. Current identified threats and recommendations:

Ironworks Number	Ironworks Name	Threat identified from UDP	Other Threat	Recommendation
001	Pontypool (Upper Race, Blaendare)	Land improvement /redevelopment	-	Evaluation of potential buried remains
002	Varteg	Land improvement /redevelopment	-	Evaluation of potential buried remains
003	Golynos	Highway improvements	-	Evaluation of potential buried remains
004	Abersychan (British)	Land improvement/ general development	Dereliction	Management – urgent conservation and consolidation of standing remains/ evaluation of potential buried remains
005	Pentwyn	Highway improvements	-	Evaluation of potential buried remains
006	Clydach	None	Dereliction	Management – conservation of standing remains/ visitor interpretation facilities
007	Blaina (inc. Cwmcelyn)	None	-	Evaluation of potential buried remains
008	Coalbrookvale (inc. Trostre)	Industrial development	-	Evaluation of potential buried remains
009	Nant-y-glo	Housing development (minor)	Dereliction	Evaluation of potential buried remains

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010	Ebbw Vale	Industrial development	-	Management - conservation and consolidation of standing remains/ evaluation of potential buried remains (area 010a)
011	Victoria	Industrial development	-	-
012	Beaufort	None	-	Evaluation of potential buried remains
013	Tredegar	Playing field and housing development	-	Evaluation of potential buried remains
014	Sirhowy	None	-	Extension of excavated, conserved and presented area
015	Rhymney	-	Dereliction (015a) / further light industrial development	Management - conservation and consolidation of standing remains/ evaluation of potential buried remains
016	Dyffryn	Business development/ leisure park	-	Evaluation of potential buried remains
017	Pentrebach	Industrial improvements	-	Evaluation of potential buried remains
018	Plymouth	Business and industrial development	-	Evaluation of potential buried remains
019	Ynys Fach	Adjacent business and leisure development	-	Extension of conserved and presented area – enhanced visitor experience through on site interpretation

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020	Cyfarthfa	Potential development to enhance built heritage – business development	-	Continuing conservation and enhanced visitor experience through on site interpretation
021	Penydarren	Industrial improvements	-	Conservation and consolidation of any standing remains/ evaluation of potential buried remains
022	Dowlais	Economic and business development	-	Management and conservation strategy with excavation of furnace site
023	Ivor Works	Housing and mixed use development, following landscaping	-	Retention of historic buildings/ evaluation of potential buried remains
024	Hirwaun	Land reclamation and housing development	Dereliction, active erosion and vandalism	Management – conservation and consolidation of standing remains (site survey)
025	Llwydcoed	Housing development	Dereliction/ clearance	Site survey (evaluation of potential buried remains)
026	Gadlys	None	Future retail developments	Monitor future development proposals – enhance visitor experience
027	Abernant	Housing development (committed)	-	Record buried remains prior to development
028	Aberaman	Land reclamation	-	Evaluation of potential buried remains
029	Ystalyfera	None	Housing development	Site survey (evaluation of potential buried remains)

Southeast Wales Industrial Ironworks Landscapes

030	Ynyscedwyn	None	-	None
031	Onllwyn	None	-	None
032	Banwen	None	Dereliction	Management – urgent conservation and consolidation of standing remains. Protection of outlying features
033	Melincwrt	None	Dereliction	Management – conservation and consolidation of standing remains
034	Venallt	None	Dereliction	Monitor condition – implement management/conservation programme as required
035	Abernant	None	-	Archaeological monitoring of any ground works in area

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IW Number 001 Pontypool (Upper Race, Blaendare) Ironworks ST 27507 99523

General Description

The Pontypool Ironworks is an eighteenth century foundation, associated with the Hanbury family of Pontypool, converted to coke fuel during the early nineteenth century. The site is depicted on the 1st edition 1:2500 OS map, when during its latter stages under the Ebbw Vale Iron Company. By this date visible features included a bank of four furnaces (ST 27507 99523), adjacent engine houses, calcining kilns and coal level. The site had an extensive coke yard with three ranks of coke ovens (ST 27440 99508), above and to the west of the furnaces and calcining kilns. While these features no longer remain above ground, the possibility of surviving buried remains, particularly relating to the furnace bases, should not be discounted. The only standing remains thought possible to date from the period of the iron works are a row of workers cottages known as five houses (ST 27560 99487), which still stand in the area east of the former furnace site.

Historical Background

An ironworks is known to have been in operation at Pontypool during the eighteenth century. In 1794 this works consisted of an old charcoal furnace, three fineries, two chaferies, a rolling mill, a slitting mill and a tin mill.

At the start of the nineteenth century the Pontypool Ironworks was being operated by Capel Hanbury Leigh who altered the furnace to be coke fired. Hanbury Leigh took Watkin George as a partner in the works in around 1807. George Watkin, previously a partner in the Cyfarthfa Ironworks brought practical knowledge and skill and was instrumental in the remodelling the Pontypool Ironworks (also known as the Race works). Though the works continued to specialise in the production of tinsplate and wire, George introduced new machinery including a giant waterwheel which was probably used to blow the furnaces like his great wheel at Cyfarthfa. By 1823 there were three furnaces at the Pontypool Ironworks, which produced 3,173 tons of iron, output had increased to 2,421 tons by 1830. The waterwheel method of blowing the furnace was superseded in 1828 when a 52½in. beam blowing engine was purchased from the Neath Abbey Iron Company.

The Pontypool Ironworks continued to successfully produce iron for manufacturing wire, tinsplate and sheet iron with a fourth furnace being constructed during 1839. The works was sold in 1851 to Dimmach and Thompson of South Staffordshire who operated as The Pontypool Iron Company. The company kept four furnaces in blast until the works was later sold to the Ebbw Vale Iron Company in 1864. The Pontypool Ironworks with its own mills and forges were able to process most of the iron produced at their furnaces into wire, sheet and tinsplate. The guaranteed market for Pontypool cold blast iron explains the longevity of the works whose furnaces continued to operate after the closure of the Sirhowy, Pentwyn and Abersychan Ironworks (Ince 1993, pp 112-113).

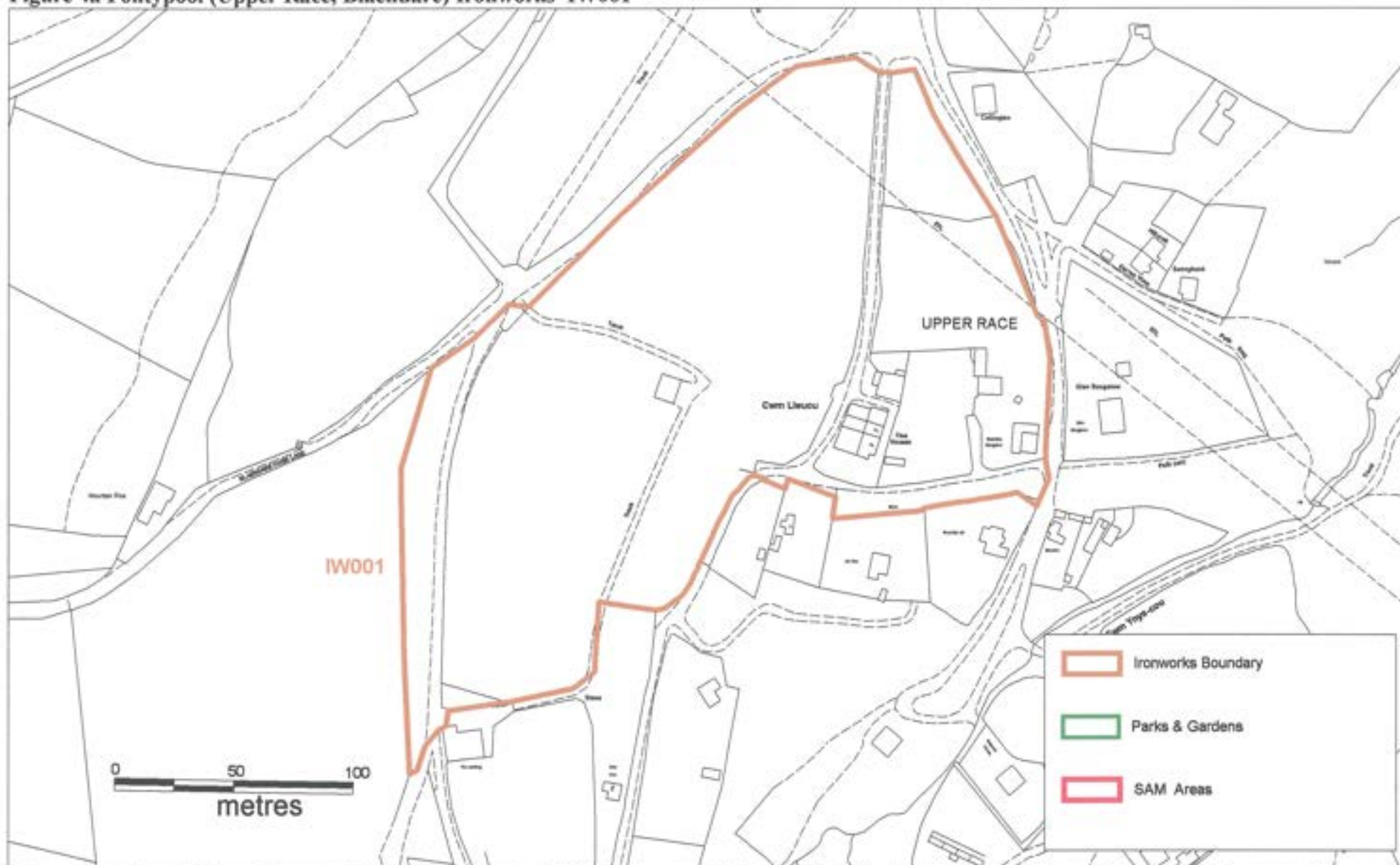
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on plans held at the Gwent Record Office, including a plan of ironworks at Blaendare of 1810 (DGP B JCH.1633) and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of Land improvement and redevelopment: E4/1 removal of dereliction, land reclamation to improve and enhance the quality, character and visual and ecological amenities of the area. S2/1 the British comprises large area of derelict land, major land reclamation needed for mixed use including housing.

Figure 4a Pontypool (Upper Race, Blaendare) Ironworks IW001



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Figure 4b Pontypool (Upper Race, Blaendare) Ironworks IW001 on 1st edition OS map base



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IW Number 002 Varteg Ironworks SO 26298 05498

General Description

The Varteg Ironworks is an early 19th century works, which was generally unsuccessful commercially. Little detailed documentary evidence relating to this ironworks was easily available, though the site, with its two furnaces is depicted on the early 19th century survey undertaken on behalf of the Earl of Abergavenny. The first edition 1:2500 OS plan indicates the 'Old Furnaces' at (SO 26298 05498), adjacent cinder tips (SO 26253 05417) and a reservoir (SO 26405 05675). These features appeared to have survived until the 1960s, with the remains of the furnaces, though partly dismantled, visible as an enclosed area with rectangular structures. However, the area appears to have been subsequently reclaimed and landscaped. Whilst it is considered unlikely that features survive, further fieldwork is advised to check for buried remains. The ironworks at Varteg, however, should be considered in conjunction with that at Golynos (see IW 003), with which it later became inextricably linked. The combined Varteg and Golynos site forms a considerable area (see figures 6c and 6d), the majority of which has been subsequently lost during the 20th century to opencast and reclamation works.

Historical Background

The Varteg Ironworks, which commenced production with a single furnace in 1803, was a generally unsuccessful concern. The works was owned by Knight & Co, the main partner of which was John Knight, a member of an important ironmaster family from the Stour Valley in the Midlands. In 1805 the works was producing 900 tons of iron and by 1823 the works possessed two furnaces and produced 6,513 tons of iron. A third furnace was built in 1824 and a fourth furnace added in 1826. During that year the furnaces were under the control of Kenricks & Co. who produced 7,800 tons of iron at Varteg. A fifth furnace was added in 1830 and during that year 13,536 tons of iron were produced. The furnaces remained under the ownership of Kenricks and Co. until 1837 when the Varteg Iron Company took over the site. By about 1843 the works were disused and in the following year advertised for sale.

In 1854 Williams & Co occupied the Varteg Ironworks; this company also held the Golynos Ironworks giving it a total of seven furnaces of which four were in blast. In 1855 Varteg was reported as being unoccupied and was being plundered for stone. However, Golynos and Varteg were leased to Crawshay Bailey and William Morgan in 1858 when four of the six furnaces were returned to blast. This state of activity did not last for long with both ironworks described as being in a bad state in 1860 although a furnace briefly operated at Varteg in 1861. In the following year the Varteg Ironworks was taken over by Partridge & Jones who put a single furnace into blast in 1863. The works was relinquished by Partridge & Jones in 1864 when G.E Bevan & Co. of Golynos took over and put one furnace into blast until the end of the year when iron making operations at the site were abandoned (Barber 1999; Ince 1993, pp 124-125).

Ironworks Boundary

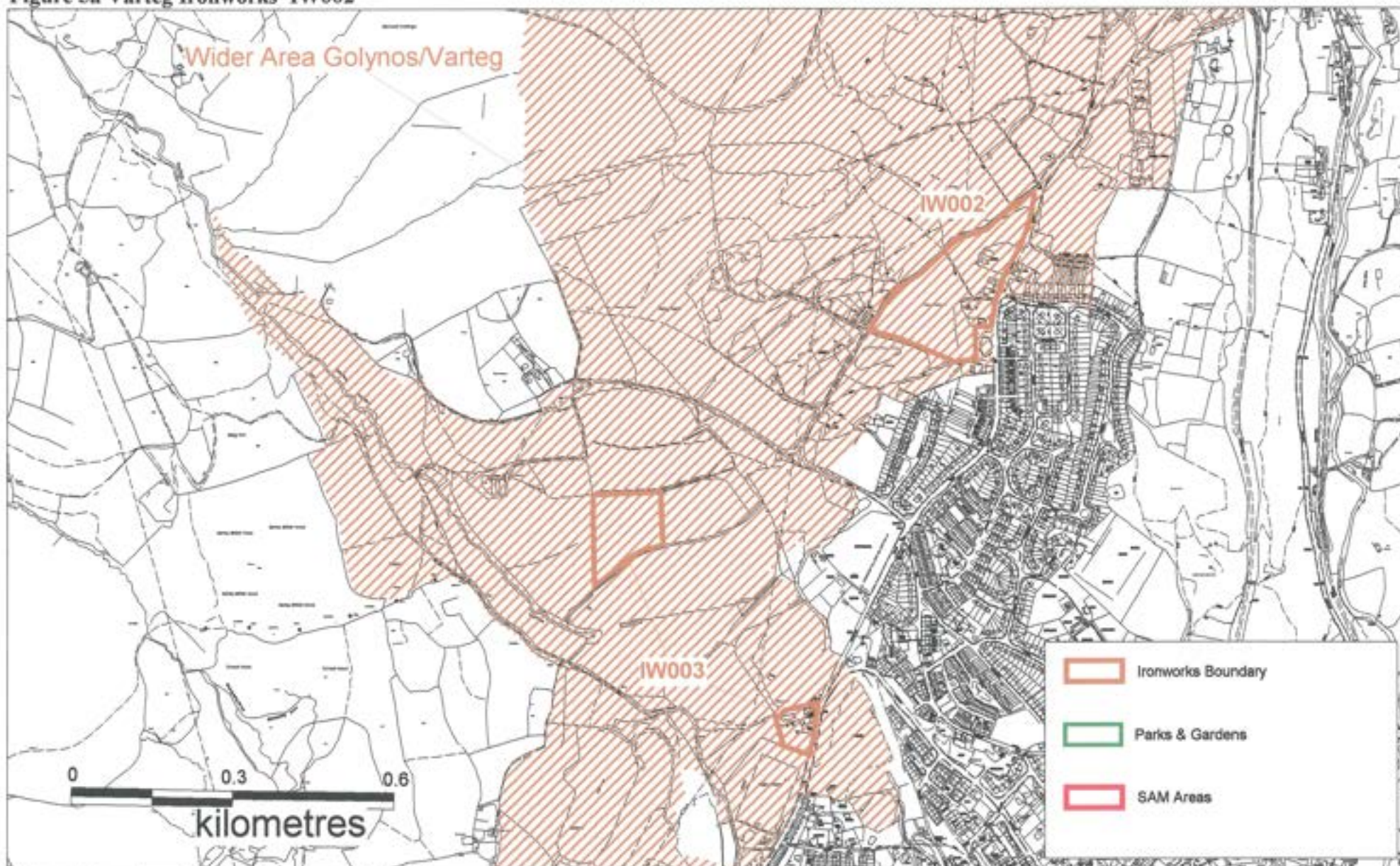
The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on plans held at the Gwent Record Office and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of land reclamation and economic development under the following: E4/3 Land reclamation and environmental enhancement schemes within landscape improvement areas will be permitted where the proposal improves and enhances the quality and character of the area; ED4 Varteg Rd identified for neighbourhood industrial development.

It is recommended that any further reclamation in the core area should be preceded by evaluation to check for any surviving buried remains.

Figure 5a Varteg Ironworks IW002

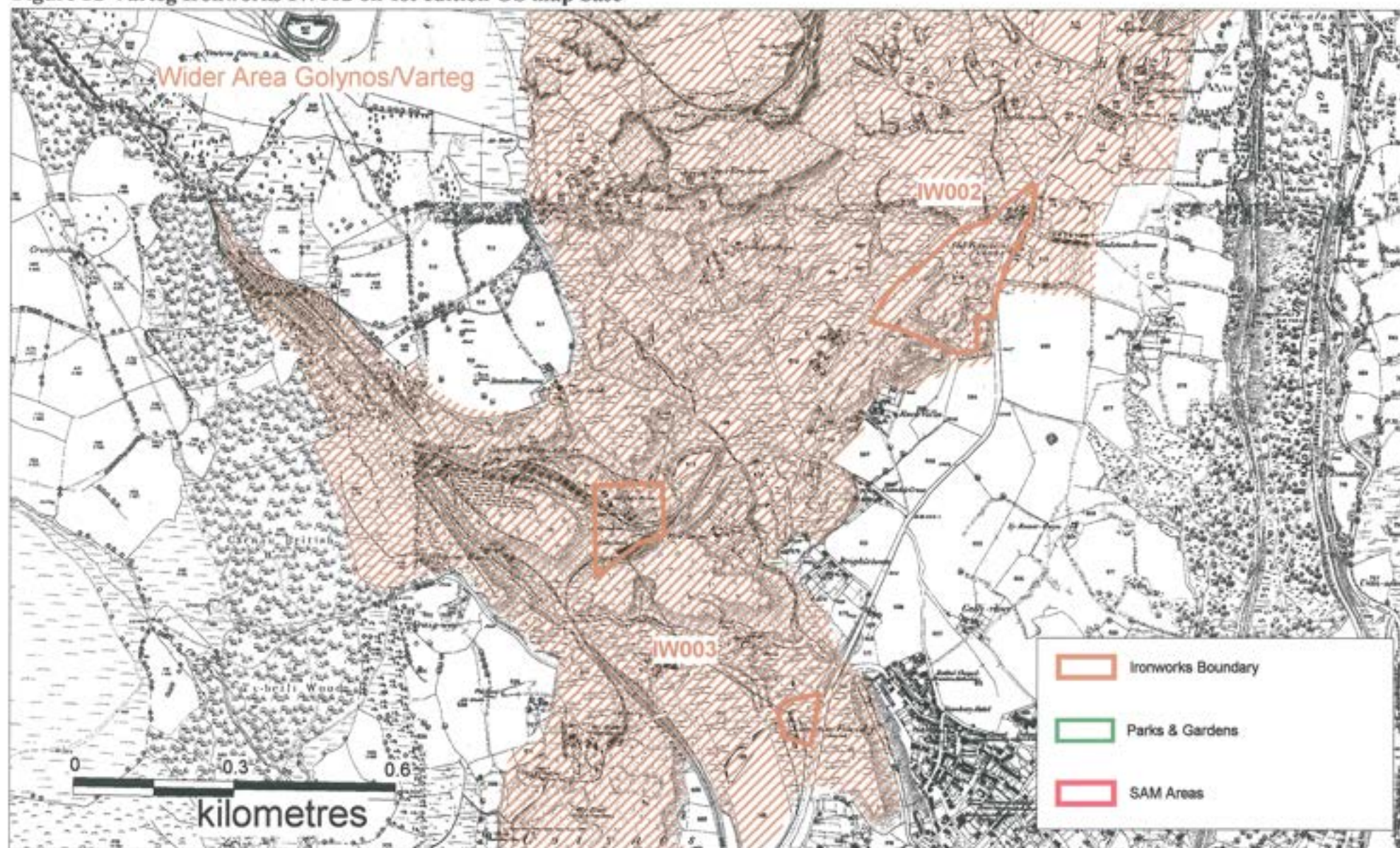


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Figure 5b Varteg Ironworks IW002 on 1st edition OS map base



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IW Number 003 Golynos Ironworks SO 25969 04710

General Description

The Golynos Ironworks appears to be poorly represented in the documentary record. The site was linked to both Pentwyn and Varteg Ironworks during its relatively short period of production and appears to have been small scale, though widely spread out as a result. It is considered that the ironworks area was centred on the Golynos Foundry (SO 25969 04710), and probably an area of coke ovens and limekilns at SO 25655 05087, located just south west of the Lower Varteg Colliery as shown on the 1st edition 1:25,000 OS map. The ironworks at Golynos, however, should be considered in conjunction with the Varteg Ironworks (see IW 002), with which it became inextricably linked. The combined Golynos and Varteg site forms a considerable area (see figures 6c and 6d). Unfortunately most of the area has been subject to opencast and land reclamation activities and the area north of Cwm Ffrwd around the Lower Varteg Colliery has been severely altered with the result that any remains associated with ironworks will have been destroyed. The reclamation works appear to have extended into the area of the Golynos Foundry; which has been partly redeveloped for housing; it is unknown whether any buried remains associated with the works survive.

Historical Background

The Golynos Ironworks started production in 1837 with two furnaces blown by a 52½in. x 8ft. Neath Abbey beam blowing engine. The Golynos Iron Company merged the Golynos and Pentwyn Ironworks after one year of operation. By 1854 the Golynos Ironworks had become linked with the Varteg Ironworks under Williams & Co and in 1858 the two works were under the ownership of Crawshay Bailey and William Morgan. During this period four of the six furnaces at Golynos and Varteg were returned to blast. This state of activity did not last for long with both ironworks described as being in a bad state in 1860, when certain machinery was removed from Golynos and taken to Varteg after an attempt to sell Golynos failed. The Golynos Ironworks with three furnaces, a blowing engine, nine kilns and thirty-two coking ovens had been offered for sale in conjunction with forges and mills at Pontnewynydd.

In 1863 G.E. Bevan & Co. took over the lease of the Golynos Ironworks at a rental of £650 per year. One furnace was put into blast with a second commissioned in 1864. G.E. Bevan & Co. had taken Golynos and later Varteg to prove the worth of their Northampton iron ores; with this achieved they ceased their iron making operations at Golynos in January 1866. An attempt was made to sell the Golynos property in 1867 but no interest was forthcoming (Ince 1993, pp 124-125).

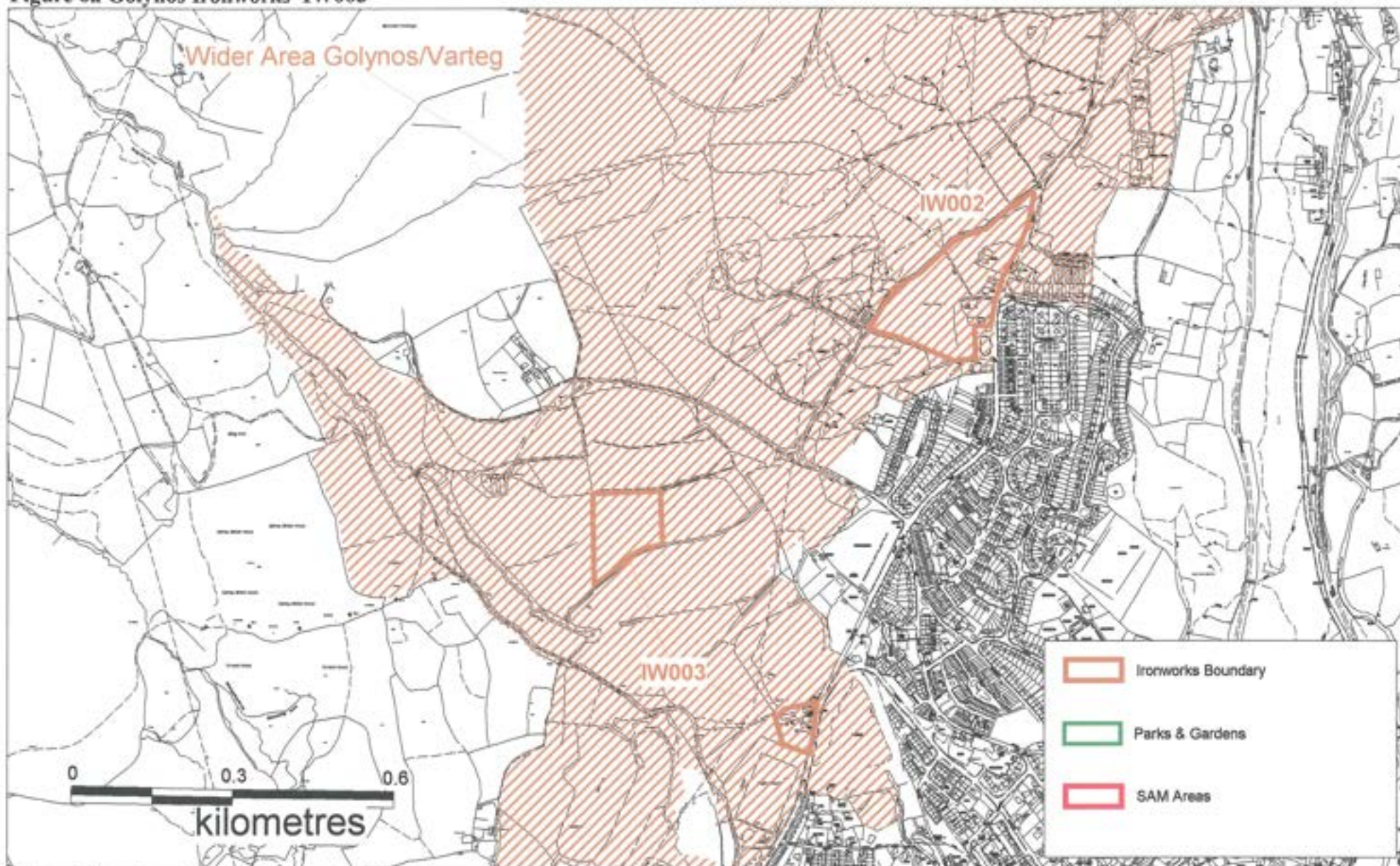
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of Highway improvements. No other threats have been identified. The area appears to have been comprehensively opencasted and reclaimed, little if anything is considered to survive, apart from possible buried features in the area of the later foundry.

Figure 6a Golynos Ironworks IW003

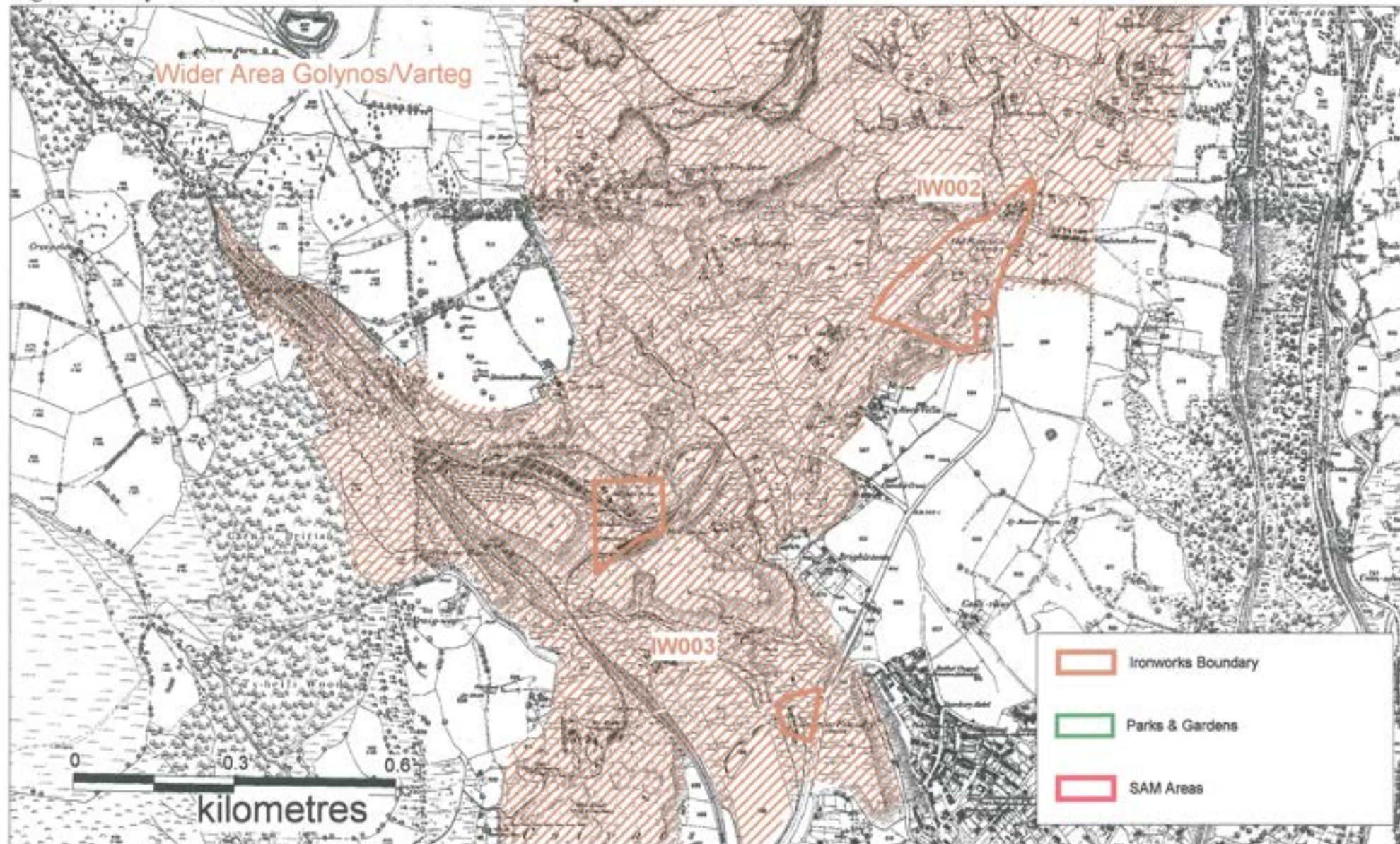


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Figure 6b Golynos Ironworks IW003 on 1st edition OS map base



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IW Number 004 Abersychan (British) Ironworks (04698g; 04699g and 04596g) SO 2575 0365

General Description

The Abersychan or British Ironworks (NPRNs 85,082; PRNs: 04698g; 04699g and 04596g) operated from 1827 to 1883 and was constructed during the period in which South Wales was the leading iron-producing region in the world. After initial difficulties of investment and construction, the ironworks became one of the larger ironworks in South Wales, with six blast furnaces. However, the works continued to have a troubled financial history until its closure in 1883 and the demolition of most of its buildings shortly afterwards.

The site retains impressive and nationally important remains including the Grade II* Listed Former British Ironworks office and foundry quadrangle (PRN: 04596g; NPRN: 85,067; Grade II* Cadw Rec. No: 14870; SO 2572 0362), the scheduled Air Furnace (PRN: 04698g; NPRN: 85,068; SAM No: Mm221, and the listed and scheduled British Colliery pumping engine house (PRN: 04699g; NPRN: 85,065; Listed Grade II: Cadw Rec. No. 18595; SAM No: Mm216; SO 2584 0364).

The Former British Ironworks office and foundry quadrangle is the most prominent building in the area of the former British Ironworks. The buildings form a closed quadrangle and are constructed of coursed sandstone with a slate roof (now largely removed). The whole quadrangle is single-storey apart from the northeast pavilion, which has two storeys and is rendered. The front range of the quadrangle, facing northwest, formerly consisted of two square pavilions with pyramidal roofs and a lower connecting range. The right hand pavilion appears to be unaltered and is consistent with a design of the 1820s or 1830s.

Surviving workshop and foundry complexes at ironworks, such as this, are now extremely rare, and this is believed to be the most complete example in Wales. Listed Grade II* due to rarity, the possible involvement of Decimus Burton in designing the front pavilions, and group value with the nearby Cornish engine house and the air furnace within the quadrangle, both of which are scheduled ancient monuments.

According to the listing description ‘the main ironworks buildings were designed with high architectural pretensions and on a monumental scale. The architect was Decimus Burton (1800-81), near the beginning of his career, who went on to become one of the leading architects of his generation. Construction began in 1826. A map of the ironworks site surveyed in 1826 (i.e. at the time of construction) does not show any of the surviving quadrangle, but the front (north-west) range appears to be shown on the tithe map, surveyed before 1841, and an early engraving of the main facade of the works shows a small building of similar shape, detail and proportions. Given the style of the building, it is probable its front range was built at around the time that the works opened, possibly to Burton’s designs, and was used as offices. The rest of the quadrangle was constructed as a foundry and workshops between c1841 and 1879 and is most likely to date from major new investments in the works by the Ebbw Vale Company in the 1850s. The north east corner pavilion was reconstructed with a first floor on the existing single-storey structure around the turn of the century and was used as a colliery office.’

The air furnace at the British, a type of reverberatory furnace for re-melting cast iron, is extremely rare and the only surviving examples in Wales, while two examples currently known

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in England are fragmentary. Commonly used during the industrial revolution, these were gradually superseded by cupola furnaces. The furnace which comprises a long fire brick hearth held together with iron ties is nearly intact, and retains its elements including cast iron door and chimney at the west end which drew the fire over the hearth.

The British Colliery pumping engine house comprises a Cornish beam pumping engine house built by the British Iron Company in 1845 to drain its mines. Constructed of sandstone with round-arched openings and a slate roof (now stripped), the structure is of considerable architectural quality. The engine house is unusually complete for one of its period, and is of particular importance in retaining several fixtures; including interior timber beams and stairs, and cast iron brackets and plates. The bob wall is to the south end and has a large archway for the beam, typical of engine houses before the mid nineteenth century. No surface remains of the shaft are visible.

An extensive survey of the site was undertaken in the 1990s by the Ironbridge Institute and The Royal Commission on the Ancient and Historical Monuments of Wales (The Ironbridge Institute and RCAHMW 1994). Features recorded within the area include the site of the blast furnaces (NPRN: 85,063) at SO 2571 0372, the Cwmbyrgwm Chimney (PRN: 04017g; NPRN: 85,066) Ventilation Shaft at SO 2585 0367, a Wagon Repair Shed (NPRN: 85,070) at SO 2583 0364, an Electrical House (NPRN: 85,069) at SO 2575 0358, Coke Ovens (NPRN: 85064) at SO 2571 0372.

The first edition 1:2500 OS map also indicated the following: a reservoir at SO 25899 03975, near the northern edge of the core area and a brickworks SO 25899 03764, a limekiln at SO 25885 03789 and an airshaft at SO 25742 03907. Aerial photographs indicate that much of the northern half of the area, including the area of the furnaces and the extensive coke yard was buried by industrial waste; the potential for good survival of buried remains is therefore considered to be high. This was confirmed by the site visit; substantial remains of massively constructed masonry walling were noted projecting from the break of slope at the location of the furnace bank/charging ramp as identified on the 1st edition OS map.

Historical Background

The Abersychan Ironworks was built by the British Iron Company, which had been formed in 1824, with John Taylor, Robert Small and James Henry Shears as managing directors. Construction started in 1826 but the construction problems relating to the furnaces delayed production until 1827; there were six 48ft. high furnaces with a 6,000 cu.ft. capacity, blown by a pair of coupled Neath Abbey beam blowing engines. The ironworks also comprised two refineries, a smiths' shop, a brick yard, a fitting shop, a forge and mills, thirty-six puddling furnaces, twenty three heating furnaces, a rolling train for 18in. merchant bars and a rolling train for 12in. merchant bars.

The British Ironworks, Abersychan produced 10,644 tons of iron in 1830. Production consisted initially of merchant bar iron later converting to the production of rails. In 1839 the six furnaces were in blast being blown by the blowing engines, which also provided the blast for five refineries. After some financial difficulties in the 1840s the company was reorganized under the title of the New British Iron Company. The reorganisation led to some development of the works with hot blast being applied to the furnaces for the first time in 1848. However, the new company fared little better than the old with only two furnaces in blast during 1850 and the

company became bankrupt in 1851. In the following year the Ebbw Vale Iron Company purchased the Abersychan Ironworks and by 1856 all six furnaces were in blast. This state of employment continued until 1860 when two of the furnaces were put out of blast. The drop in demand for iron during the early 1860s resulted in the Ebbw Vale Company putting the Abersychan furnaces out of blast during 1862-63. In 1864 four furnaces were in blast and in the following year the Neath Abbey Iron Company repaired a 40in. engine at the works. Production of rails at Abersychan continued during the remaining years of the decade. In 1869 the works had five of their six furnaces in blast, these furnaces were 48ft. high with 17 to 18ft. across the boshes and were each capable of producing 200 tons of hot blast iron per week. Waste gases from the furnaces were used for heating the blast and firing the boilers. There were fifty-two puddling furnaces serving three forges and twenty-four balling furnaces supplying five mills. A large beam engine powered two forge trains, a rail mill and two other mills for producing iron for rails. Another beam engine powered a forge train and a mill for roughing down iron for the top and bottom of rail piles. A mill for blooming the rail piles was driven by a horizontal engine. These forges and mills were able to produce between 800 and 1,100 tons of rails each week. Also installed at the works was a small inverted engine used for driving two double presses and another of the same type powered two punches for punching and notching rails. Steam for the engines was generated in eighteen boilers.

The Abersychan Ironworks continued to produce rails during the early 1870s. It appears that the Ebbw Vale Iron Company was willing to continue to invest money at Abersychan for one of the beam blowing engines was rebuilt in 1870 and the second blowing engine received similar treatment in 1875. Despite this the drop in demand for wrought iron rails forced the closure of the Abersychan Ironworks in September 1876. However, the works was reopened in April 1877 and two furnaces were put in blast. The works was now producing spiegeleisen for the Ebbw Vale Ironworks. In 1880 there were four furnaces in blast at Abersychan, however the works finally ceased operating the following year (Ince 1993, pp 11-112).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on various plans of the period 1825 – 1884 held at the Gwent Record Office and the 1st, 2nd and 3rd edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of land improvement E4/3, and general development S2/1: E4/3 refers to the removal of dereliction, land reclamation to improve and enhance the quality, character and visual and ecological amenities of the area; while S2/1 states that the British comprises a ‘large area of derelict land’, and that a ‘major land reclamation (is) needed for mixed use including housing’.

The long-term future conservation and management of the industrial heritage aspects of the site will require urgent consideration, given plans for development and reclamation. Any development/land reclamation schemes should seek to minimize impact on the nationally important archaeological resource of the area, which is unique in terms of Wales, if not the United Kingdom as a whole. The preservation of the cultural heritage resource of this area should be paramount and take precedence in any proposed landscape ‘improvements’, and any alternative use/development should be sympathetic to the historic industrial character of the area.

Southeast Wales Industrial Ironworks Landscapes

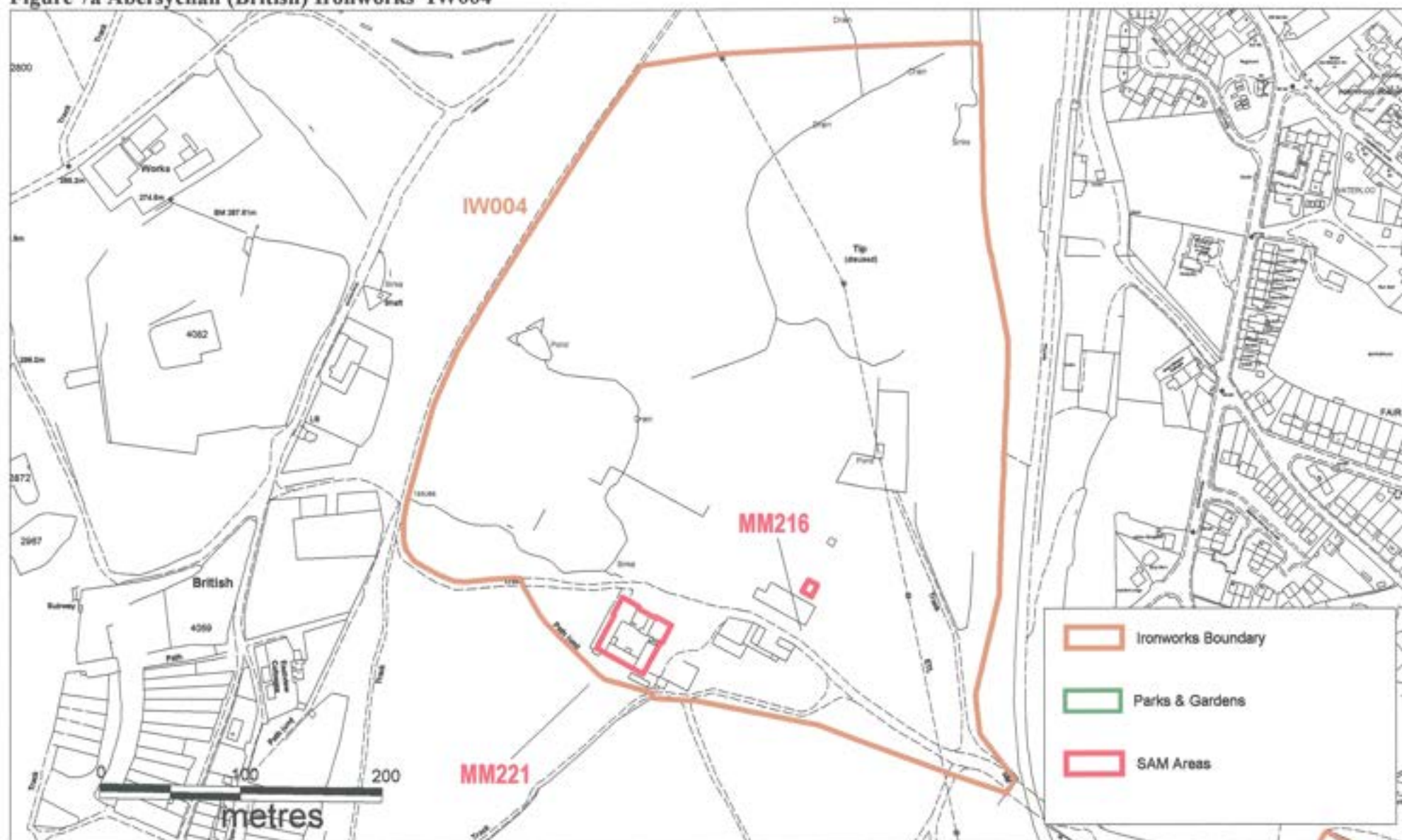
The ironworks area is currently at risk from dereliction, in particular the listed office/foundry complex, which has suffered extensive damage since 1994 and has become very unstable since 1997; the complex is now roofless, and stripped of much of its internal features. The northern wing appears to have been partially quarried for building material. The area of the scheduled air furnace was also found to be in an overgrown state, while the Cornish Beam Engine is also roofless; the entire site is in serious danger from dereliction and vandalism, if unchecked. A programme of emergency consolidation and conservation should be devised and implemented to arrest further damage. Targeted evaluation of buried features should be undertaken as part of this process.

Plate 002 Abersychan (British) IW004



Plate 002: the Grade II* Listed Former British Ironworks office and foundry quadrangle (PRN: 04596g; NPRN: 85,067; Grade II* Cadw Rec. No: 14870; SO 2572 0362), view to the northeast.

Figure 7a Abersychan (British) Ironworks IW004



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Figure 7b Abersychan Ironworks IW004 on 1st edition OS map base



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IW Number 005 Pentwyn Ironworks SO 26291 03379

General Description

The Pentwyn Ironworks was a short-lived venture operating during the period 1825-1868, operating in conjunction with Golynos, and later part of the large Ebbw Vale holdings. Little documentary information is available on the site, but it appears to have remained small-scale, and generally lacks great historic interest.

The area, a north facing slope south of Cwm-sychan Brook to the south of Abersychan now bounded by Foundry Road and the Promenade; appears to have been 'reclaimed' or at least landscaped. The site is depicted on the Earl of Abergavenny's survey of 1825-6, and also on the first edition 1:2500 OS map after the ironworks had been re-established as a Foundry. The bank of three furnaces (SO 26291 03388) still survived at this date, with the main Foundry structure, possibly re-using earlier casting houses, was located adjacent to the north at SO 26311 03401. Two other linear structures, possibly rail mills lay to the west at SO 26222 03436. By the survey of the 2nd edition the site was in use as a mineral water factory, which appears to have occupied the two western buildings; the furnace bank and adjacent structures had been largely demolished by this date. By the 3rd edition the current layout of Foundry Road is in place and the area of the furnaces appears to have been completely landscaped.

A further site was located along the southern edge of the area at SO26200340; this was a 1.25 mile tramroad (05290g) of 1826, which linked the British Ironworks to the Monmouthshire Railway (1854) and facilitated the carriage of iron from the neighbouring British Ironworks to the main Pontypool-Blaenavon railway near Abersychan Farm. The route is now taken by the present tarmac road known as 'the promenade'

The buildings and structures associated with the ironworks have all been demolished, and the site reclaimed and landscaped. However the possibility of buried remains should not be discounted, in particular the massively constructed bases of the furnaces may survive in a buried state.

Historical Background

The Pentwyn Ironworks was constructed by the Hunt brothers in 1825 and initially had three furnaces. The cost of building the works, offices, roads and forty houses had amounted to £35,000. During 1830 the Pentwyn Ironworks produced 5,391 tons of iron but the organisation of this works changed in 1838 when it merged to be jointly run with the Golynos Ironworks. This joint stock company was based at Bath and drew the main funding from investors in Somerset and Devon. However, by 1850 this joint working had been abandoned with the three furnaces at Pentwyn lying idle.

The works was acquired by the Ebbw Vale Iron Company in 1857 but the furnace remained out of blast until 1865. During that year there were four furnaces capable of operation with two being put into blast. The two furnaces remained in blast until 1868 and in the following year the dismantling of the Pentwyn Ironworks commenced (Ince 1993, p 112).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on plans held at the Gwent Record Office dating from 1825 and the

Southeast Wales Industrial Ironworks Landscapes

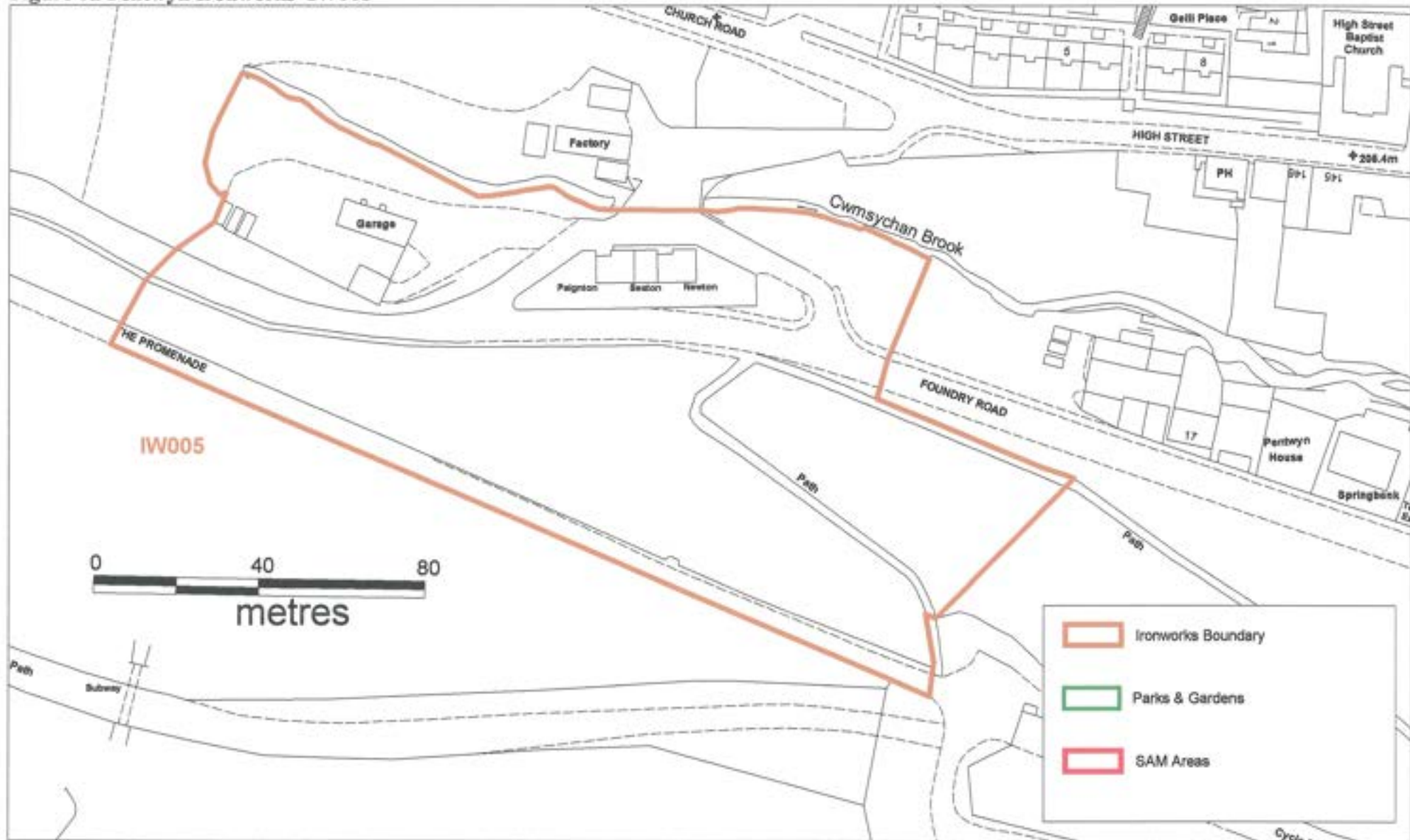
1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of highway improvements.

The current extent and condition of buried remains associated with the ironworks is currently unknown. Any proposed development in the area should take this into account, and it is recommended that targeted evaluation of the area is carried out.

Figure 8a Pentwyn Ironworks IW005



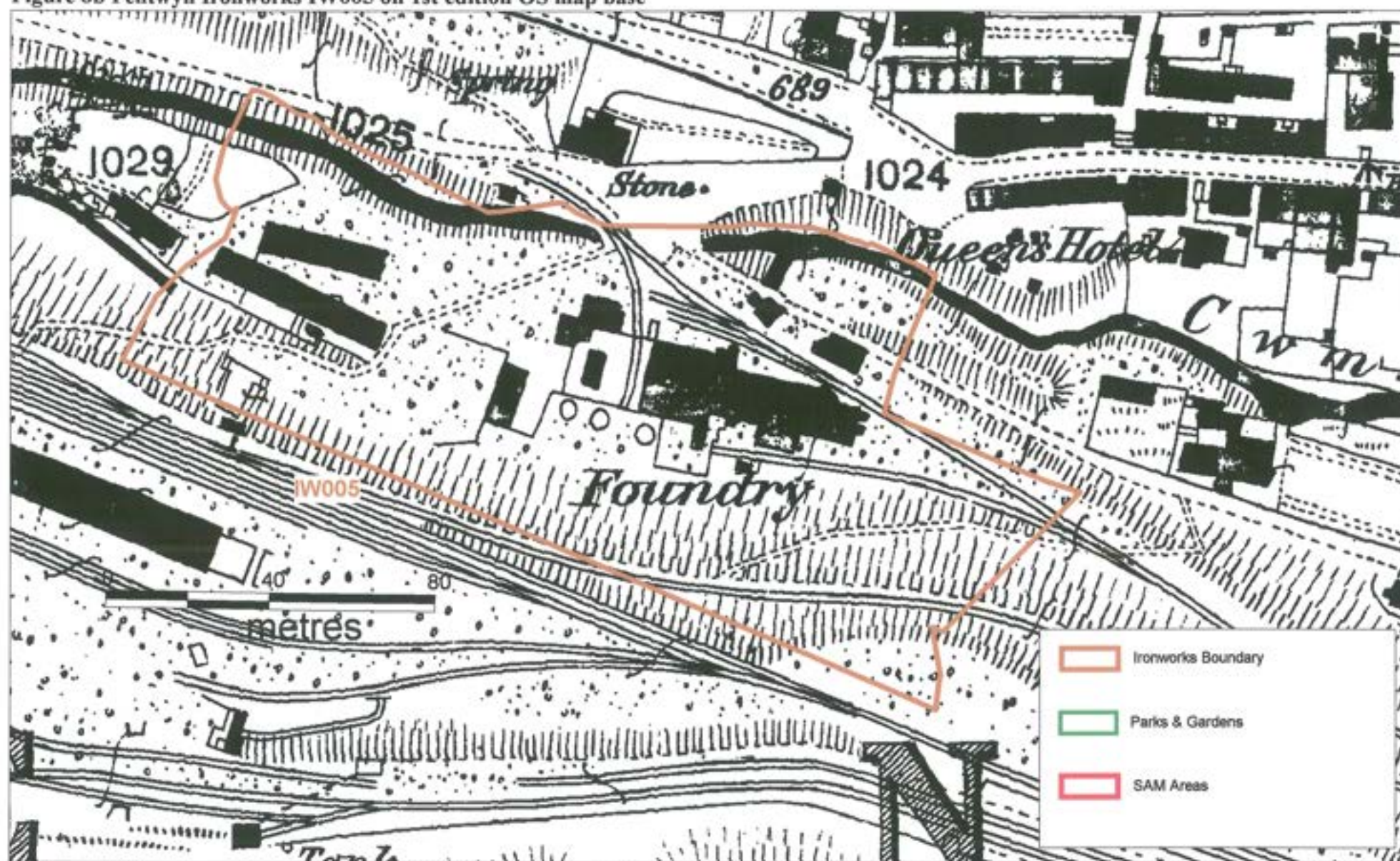
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Figure 8b Pentwyn Ironworks IW005 on 1st edition OS map base



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IW Number 006 Clydach Ironworks (02476g and 03647g; SAM BR161) SO 2290 1325

General Description

The Clydach Ironworks (PRNs: 02476g and 03647g; NPRNs: 34,030 and 306,268; SAM BR161) is a nationally important ironworks of great historic interest and retaining impressive standing remains. The first furnace at the site was constructed in 1793 and the works started well producing 1,660 tons of iron in 1796, and after an initial drop output rose steadily: 2,658 tons in 1816; 6,771 tons in 1830; and 10,038 tons in 1840. Edward Frere and Thomas Cooke with a nominal association with the Kendall family of ironmasters, who lent their name to the undertaking, operated the works, leased from the Duke of Beaufort. The blast furnaces at the site remained in production for over 65 years during which time the works were a focal point for much activity in the valley. In 1813 the site at Clydach boasted two furnaces, by 1833 this had increased to three with the blast supplied by a Boulton & Watt engine and a 42ft. wheel, while four furnaces were recorded for the first time in 1844. The business, however, was never really successful, the works being up for sale in 1813 and again in 1833. Between 1841 and 1845 difficulties continued and the works continued to suffer financial losses, by the 1850s the works was in decline and the furnaces ceased production in 1861. Despite being sold as a 'going concern' in 1864 and again in 1878, the works never returned to production.

The identified core ironworks area mainly comprises the impressive 18th century site of Clydach Ironworks, now a scheduled ancient monument (SAM: BR161(MON)), dominated by the archway of a charging house. An etching of 1811 shows the earliest two furnaces, with a large waterwheel to drive the blowing engines and indicates the original arrangement of a raised wooden 'launder', which formerly supplied water from a pond near the rolling mills. Clydach Ironworks (SO 229132), excavated and partly restored during the 1980s, is currently the property of the Borough Council. The site originally had two blast furnaces (of 1793 and 1797); a third was added c. 1826 (unexcavated), and a fourth 1842-4. Excavation revealed that the circular refractory brick linings survived up to the 'boshes' of the furnace stacks, while the dressed stone casings had been extensively robbed. Other remains on the site include a cast-house, charging-houses, including the high gable wall of one belonging to the 1793 furnace, and the wheel pit for a massive cast-iron water wheel 42 ft (12.8m) in diameter, which drove the blowing-cylinders. Associated remains visible in the area include the formation of a counter-balanced railway inclined plane (built before 1811), which enabled pig iron to be lifted to the higher-level rolling mills. During 1813 the rolling mills were producing approximately 60 tons of rough bars and 80 tons of finished iron per week.

Though little now survives of the furnaces themselves, apart from their bases, enough remains of the site in general to convey the significance of iron production at Clydach. Beyond the surviving charging house was the coke yard where coal was burnt in heaps or ovens to produce the coke used in the furnaces.

The area includes the less obvious site of the later Clydach ironworks site and mills located at Dan-y-coed (PRN: 03647g; NPRN: 306,268); this part of the area is depicted intact on the 1st edition 1:2500 OS map, with its feeder canal forming the southern boundary of the then works. By 1905 the site had been cleared and redeveloped as a Woollen Factory. Subsequently this area was entirely reclaimed and has now lost to housing. Adjacent to the site of the rolling mills is a massive dump of slag from Clydach Ironworks 'the flat', which crosses the valley, the river culverted underneath.

A branch of the Llam-March Tramroad (05985.0g), noted at SO22891305, passes through the area. The Brecon & Abergavenny Canal Company constructed this line following a request by the proprietors of the Clydach Ironworks for a tramroad to transport raw materials to the Clydach Ironworks from the collieries and ironstone mines along the south of the gorge.

A number of bridges also link the ironworks to mineral grounds and supply routes; of considerable interest is Smart's Bridge, dated 1824 and constructed of cast iron with simple lancet tracery in the spandrels of the arch. (PRN: 03204g; NPRN: 34,633; SAM: BR161(MON); Listed Grade II* Cadw Rec. No. 23,813), which is located at SO 2287 1327 and is thought to have carried a tramroad linking the ironworks with the Clydach Railroad to the north. Further north at SO 2292 1330, also on the boundary of the area, is the Grade II listed Pantglas Road bridge (Cadw Rec. No. 23,812). Whilst the RCAHMW also note a service bridge (NPRN: 43,067) for the Clydach Ironworks, much further to the south at SO 226 128.

Historical Background

The Clydach Ironworks was built in c. 1794 by Edward Frere and Thomas Cooke. The narrow valley site was chosen because of the abundant supply of water and waterpower although, with the later development of the works, this situation proved to be a costly disadvantage. Cooke and Frere had both been managers at Crawshay's Cyfarthfa Ironworks. A single coke furnace was put into blast at Clydach during 1794-95 and in the following year it produced 1,625 tons of iron. There was some expansion in the concern during the late eighteenth century when the partners took over the neighbouring Llanelly Ironworks. This provided the Clydach furnaces with a forge to transform the pig iron into wrought iron. A second furnace was built in the early 1800s and in 1805 the two furnaces made 2,802 tons of iron. The Llanelly Forge was also modernised at this time.

An unsuccessful attempt was made to sell the works in 1813 when the property was described as containing two well constructed furnaces each capable of making seventy tons of iron per week and blown by two capital machines worked by water. The company at this time also owned a rolling mill and forge with a mineral ground of 600 acres. The forge at this time was held from Capel Hanbury Leigh and contained a Trevithick engine for occasional blowing. The forge possessed two hammer wheels, a blowing machine, two fineries, three hollow fires, an air chafery, three puddling and balling furnaces, a charcoal house, a smiths' shop, a warehouse, an agent's house and twenty houses for workmen.

The two furnaces produced 5,200 tons of iron in 1823 and a third furnace was built in 1826 and in 1830, when the works was being managed by John Scale, the output of the furnaces was 10,190 tons. When Powell & Co. attempted to sell the works in 1833, the site comprised three blast furnaces, 44ft. high and 14 ft. across the boshes, capable of making 240 tons of iron each week. A Boulton & Watt type engine and a 42ft. high waterwheel supplied the blast. The site also included twenty-six coking ovens, three running out fineries, a foundry air furnace and two cupolas. Included in the sale was the forge for the manufacture of charcoal blooms and puddled bars and a rolling mill, worked by a 42ft high waterwheel, capable of making 120 tons of finished bars each week. No sale was concluded but in 1834 John Powell and John Jones managed to obtain a mortgage and the works continued in operation with Launcelot Powell as the resident managing partner.

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In 1839 four furnaces existed at the Clydach Ironworks and a year later the works were further modernised by the addition of a second steam blowing engine. This was a 52½in. beam blowing engine purchased from the Neath Abbey Iron Company. During the 1850s three out of the four furnaces remained in blast but the general depression in the iron trade forced a complete closure in 1861. The result of this was that the Clydach Ironworks was again put up for auction. At this time the works was described as consisting of four blast furnaces capable of turning out 400 tons of pig iron each week, spacious bridge houses, cast houses, mine kilns, coke yards, seventy three coke ovens, a foundry cupola, an air furnace, two stoves, a crane, a carpenters' shop and a smiths' and fitting shop with slide lathe, drilling and boring machines. The blast was supplied by two beam blowing engines, one was a 52½in. x 8ft. engine with a 104 in. blowing cylinder while the second was a 40in. x 8ft. engine with an 80in. blowing cylinder. Additional blast was obtained from a blowing machine worked by a 42ft. high waterwheel. The works also contained a forge worked by a 42ft. waterwheel with puddling furnaces attached. Also included in the sale were valuable mines and collieries worked by levels, two counting houses, an agent's house, spacious shops and warehouses, a shopkeeper's house, stables, forty eight houses for workmen and a 12in. steam engine to wind materials and iron along an inclined plane between the furnaces and rolling mill. The steam engines at the collieries and mines consisted of two 20in. high pressure winding engines, a 12½in winding engine and a 15in. high pressure pumping engine. No bids were forthcoming, and the Clydach Ironworks was one of the first casualties in the decline of the South Wales iron industry.

In 1863 Jayne and Meadhouse leased part of the Llanelly works to manufacture tinsplate and a company called the New Clydach Sheet & Bar Iron Company (Limited) was formed in 1865 to take over the Clydach Ironworks. No furnaces were put into blast and the operations of the company were suspended in 1866 and the works was again up for sale in 1867. Isaac Lewis of Clydach House bought the works and later disposed of the works to John Jayne but no operations were commenced on the site. The Llanelly Forge was sold out of Chancery in 1870 and in 1872 it was owned by the Llanelly Charcoal Iron company but its ten puddling furnaces and single rolling mill were lying idle. The works was finally dismantled in 1881, when under the ownership of the Brynmawr Coal and Iron Company Limited (Ince 1993, pp 133-135).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on plans held at the Gwent Record Office and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data. The core area excludes the Llanelly Forge site, located to the north on the opposite side of Cwm Clydach.

Identified Threats

There are no identified threats to the area as identified from the UDP. However, despite excavation and subsequent conservation work, the site is now in danger from general dereliction, and would benefit from a management agreement.

Plate 003 Clydach Ironworks IW006



Plate 003: General view of the Clydach Ironworks (PRNs: 02476g and 03647g; NPRNs: 34,030 and 306,268; SAM BR161), view to the southwest.

Figure 9a Clydach Ironworks IW006

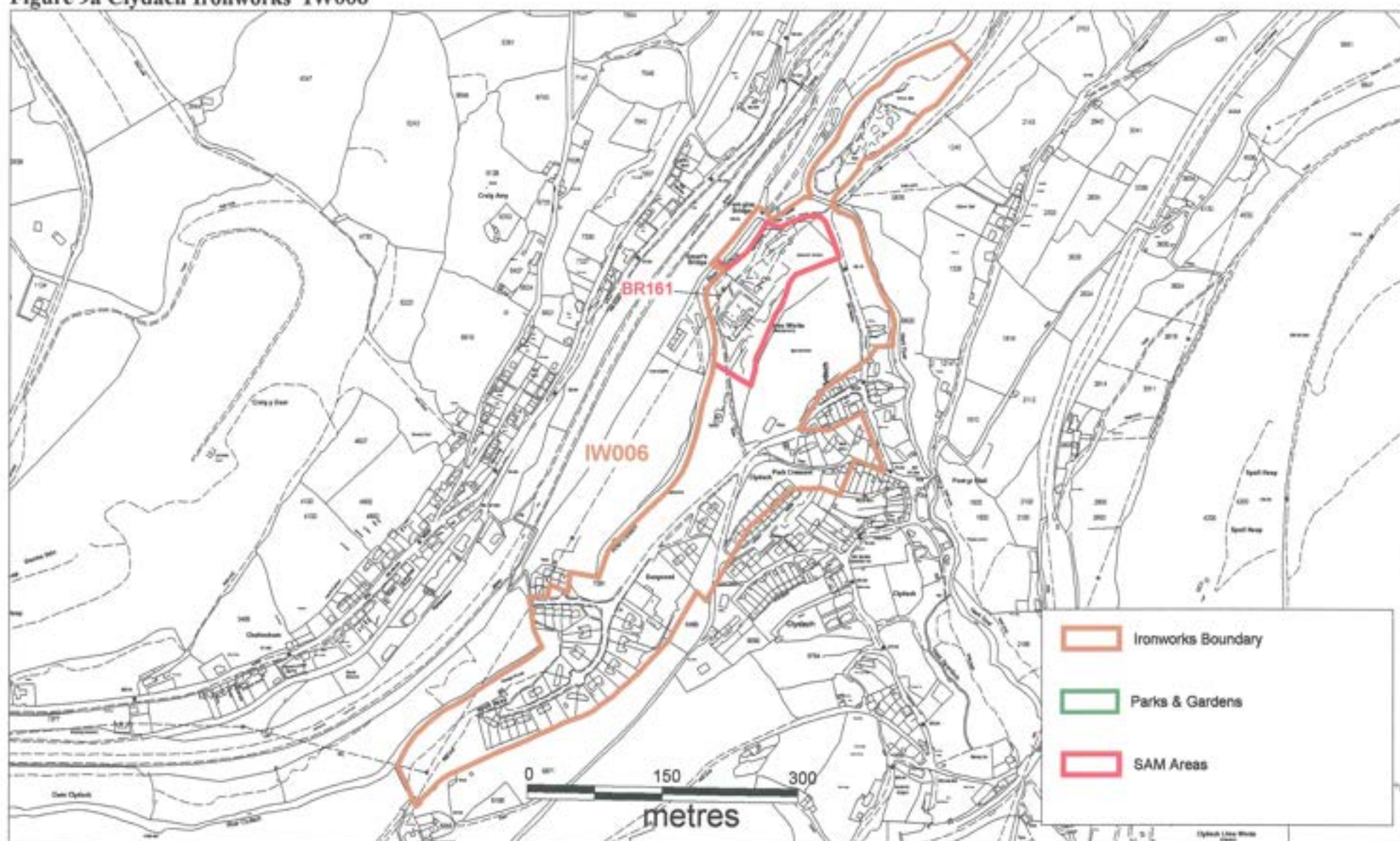
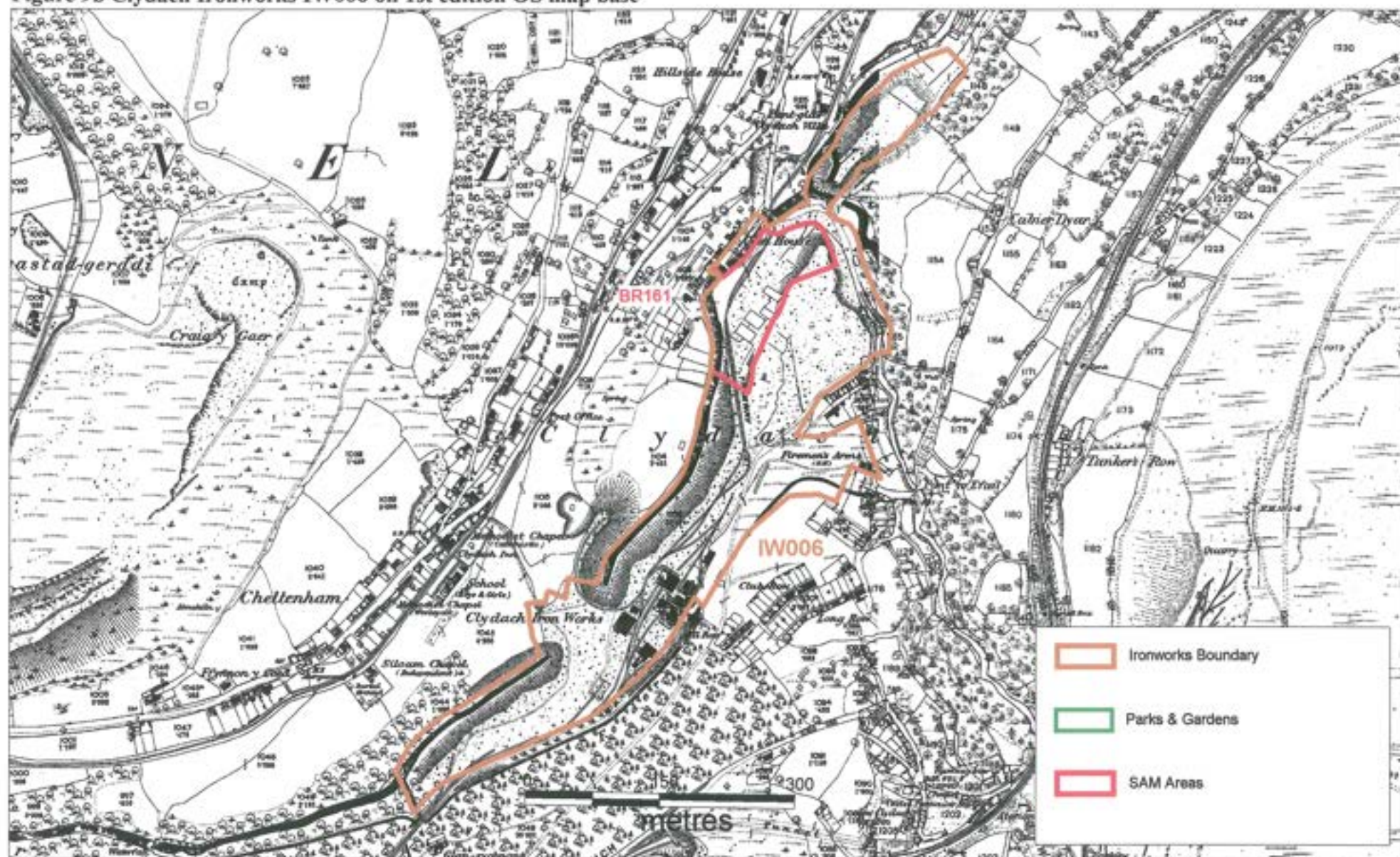


Figure 9b Clydach Ironworks IW006 on 1st edition OS map base



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IW Number 007 Blaina (including Cwmcelyn) Ironworks SO 19862 08334

General Description

The Blaina Ironworks, together with the neighbouring Cwmcelyn Ironworks formed an impressive sprawling area of ironworks of early to mid-19th century date. The site has been comprehensively cleared, reclaimed and redeveloped for housing during the 20th century; however, it is unknown whether the more massively constructed features such as the blast furnaces survive as buried remains.

The works are depicted on a number of plans of the period, giving particular detail were plans of 1880 and 1881, which detailed the blast furnaces, engines, coal washing machine, adjoining coke ovens, mills and forge. The 1st edition shows the full extent of the site and its extensive tramroad network. Also detailed were the following features: blast furnaces (two rectangular and one circular) charging ramp and adjacent limekilns at SO 19849 08404; adjacent to the south a mill with possible blast stoves at SO 19958 08244, and an extensive coke yard upslope and east of the blast furnaces, with coke ovens at SO 19887 08410, SO 19949 08493, SO 20016 08492. To the north of the coke yard at SO 19763 08601 stood a brick works with associated limekilns (SO 19795 08603) and adjacent old coal shaft (SO 19863 08607).

The Cwmcelyn Ironworks site located in the area immediately to the north of the main Blaina Ironworks, appears to have become a foundry (SO 19742 08833) with associated limekilns (SO 19789 08849) by the survey of the 1st edition 1:2500 OS map; this area has been subsequently redeveloped as the Rising Sun Industrial Estate.

Historical Background

The Blaina Ironworks dates from 1823 when George Jones, an ironmaster from South Staffordshire, leased land for the works. The works was completed in 1824 and two furnaces were put into blast. These furnaces produced 4,905 tons of iron during 1830. By 1831 the Blaina Ironworks was under the control of Russell & Co. with John Russell and Thomas Brown being the main partners.

A merger took place in 1839 between the Blaina Ironworks and the newly constructed Cwm Celyn Ironworks with its four furnaces. A new company named the Cwm Celyn and Blaina Iron Company was formed to operate both works. There appears to have been an early involvement in this company by the Stothert family who were engineers in Bath (Stothert & Pitt). Thomas Macauley Cruttwell, a Bath solicitor, also took an important role within the company in its early years.

In 1844 the Cwm Celyn and Blaina Iron Company was bought by a new grouping of nine partners who included John and Henry Stothert and Frederick Levick was employed to manage the ironworks. At the Great Exhibition of 1851, the then owners Cruttwell, Allies & Co. displayed pieces of iron forge and refined metal, puddled, merchant and beat bar iron plus a finished rail. By 1855 the company was operating three furnaces of the Coalbrookvale Ironworks. Frederick Levick became the sole owner of the three ironworks in 1858 when each site possessed two furnaces capable of operation. In 1849, Levick was one of the first managers to successfully utilise waste gases from blast furnaces. At about the same time he increased his iron make to two hundred and seventy tons per week from each furnace.

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In 1867, when the three ironworks were put up for sale the Blaina concern had a single furnace in blast blown by a 45in. x 7ft. 6in. beam engine with a 94in. blowing cylinder. The ironworks also possessed hot blast stoves, calcining kilns and sixty open coke ovens.

The sale was unsuccessful and during 1868 the works were idle. During 1869 the Blaina Iron and Coal Company was formed to resuscitate the Blaina Ironworks and two furnaces and four puddling furnaces were put into production. In 1871 the company purchased the Nantyglo and Beaufort Ironworks and was renamed the Nantyglo and Blaina Iron Works Company (Limited) with John Richardson as managing director. However, the worsening conditions saw all the assets of the company sold off in 1878. The Blaina Ironworks was purchased by Spence and Company of Liverpool who put a furnace into blast in 1880 (Ince 1993, pp 131-133).

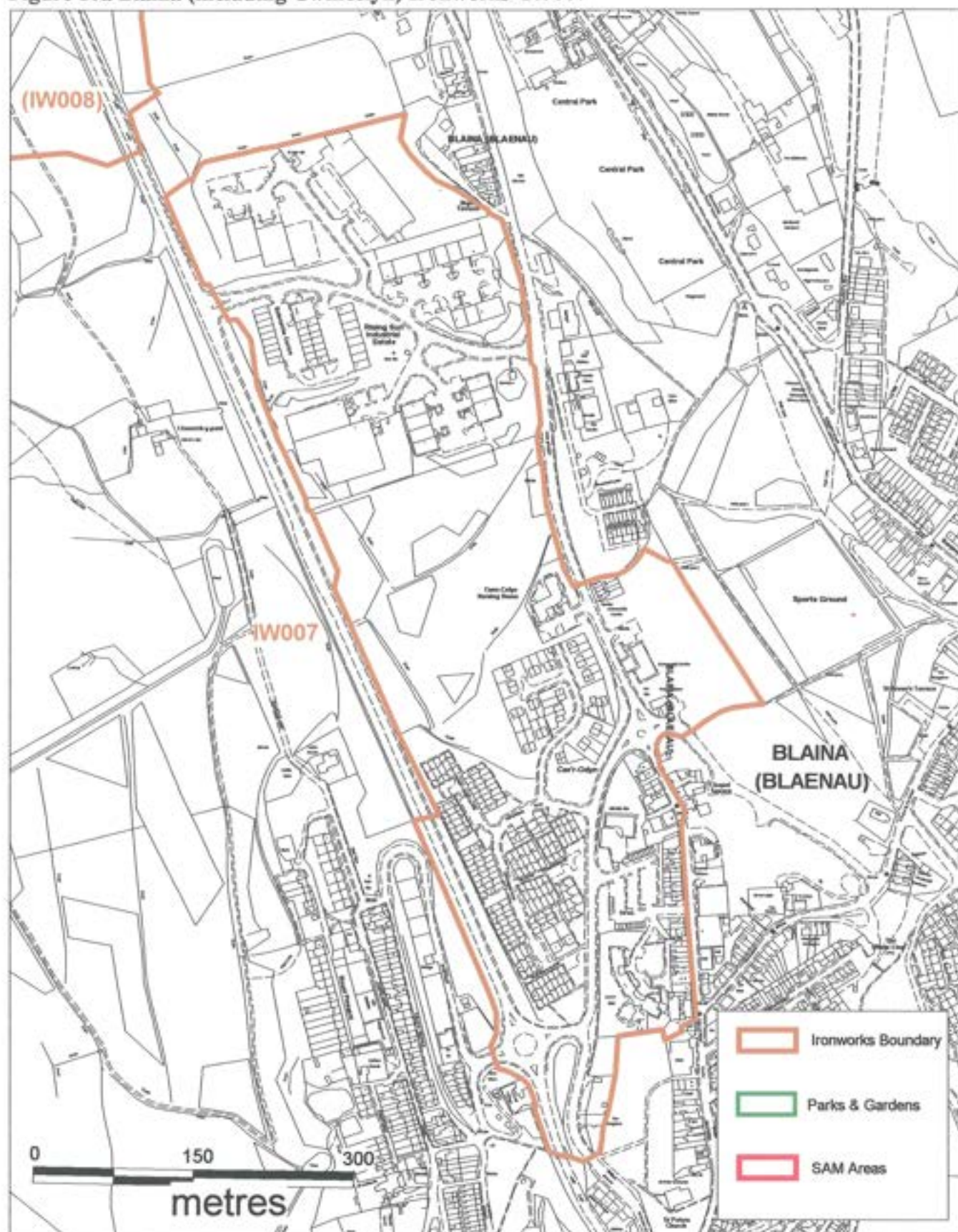
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on industrial plans held at the Gwent Record Office and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

No threats to the area have been identified from the UDP. The area has previously been redeveloped for housing and industrial estates. Any future proposed development should allow for the evaluation of buried remains, such as furnace bases.

Figure 10a Blaina (including Cwmcelyn) Ironworks IW007



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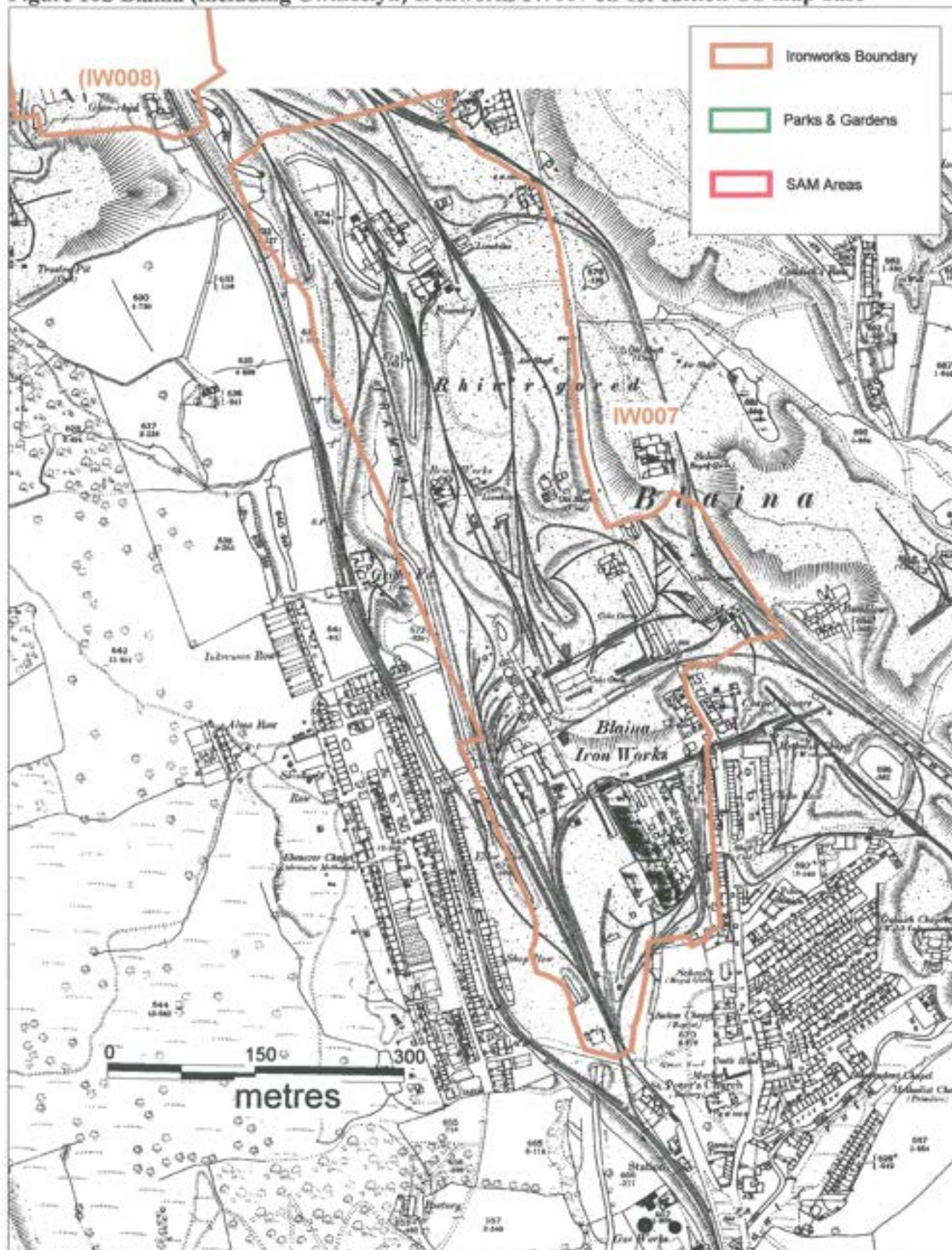
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Figure 10b Blaina (including Cwmcelyn) Ironworks IW007 on 1st edition OS map base



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IW Number 008 Coalbrookvale Ironworks (including Trostre Ironworks) SO 19384 09449

General Description

The Coalbrookvale Ironworks, established on the eastern bank of Ebwy Fechan about half a mile to the south of Nantyglo in 1819 by Messrs. Brewer and Co., appears to have been small-scale at first, with a single furnace and blast-engine. In 1824, an additional furnace was added together with casting houses and refineries and other buildings. The Trostre Works (NPRNs 40,482), located on the western bank of Ebwy Fechan, a little below the Coalbrookvale Works, was constructed from 1836 and belonged to the same company; the site had a single cold blast furnace, and blast-engine house, two refineries and other buildings. (Hanes Aberystroth 1835). The Coalbrookvale site appears to have been an extensive area, east of Coalbrookvale House centred on a group of buildings named as 'Commercial Buildings' (SO 19312 09433) and adjacent ranks of coke ovens (SO 19384 09449). Whilst the Trostre site to the south, is detailed on the 1st edition 1:2500 OS map in its recently dis-used state; shown are the Old Furnaces at SO 19426 09082, adjacent limekilns (SO 19380 09052), possible engine house (SO 19449 09027) and an old coal shaft (SO 19365 09100).

Both ironworks were located in areas subjected to reclamation and redevelopment by the 1980s; nothing now remains above ground at either site, however, buried remains may survive.

Historical Background

The works at Coalbrookvale were founded in 1819-1820 with one furnace being completed in 1821. The Coalbrookvale Ironworks produced 2,704 tons of iron in 1823 and in the following year a second furnace was put into blast. The works was owned from the 1820s to the 1840s by Brewer & Co. and in 1849 there were three furnaces present on the site. By 1850s the three furnaces of the Coalbrookvale Ironworks Coalbrookvale works was being operated by the Cwm Celyn and Blaina Iron Company then under the ownership of Crutwell, Allies & Co.

The Coalbrookvale Ironworks was associated with Frederick Levick, who became the sole owner of the three ironworks in 1858 when each site possessed two furnaces capable of operation. In 1849, Levick was one of the first managers to carry out successfully the utilisation of waste gases from blast furnaces, and the first to roll Barlow rails. He also increased production to two hundred and seventy tons per week from each furnace.

The furnaces continued in operation until 1867, when the three ironworks were put on the market due to financial problems. Sales documents record the details of the Coalbrookvale Ironworks, which had a hot blast furnace blown by a 36in. x 6ft. 6in. beam blowing engine with a 69in. blowing cylinder. At nearby Trostre was a cold blast furnace blown by a 38in. x 8ft. beam blowing engine with a 76in. blowing cylinder. The boilers for these engines were fired by waste heat. The forges and mills at Coalbrookvale were served by fifty two puddling furnaces, two trains of puddling rolls, two squeezers and two shears capable of turning out 900 tons of puddled iron each week. No.1 mill possessed a pair of slabbing rolls with reversing gear, a pair of roughing rolls with reversing gear, a pair of finishing rolls and two pairs of shears all worked by a 40in. x 6ft. beam engine and an auxiliary 26in. x 6ft. horizontal engine. Nine balling furnaces and three heating furnaces served the mill. No.2 mill contained a pair of slabbing rolls with reversing gear, a pair of roughing rolls, a pair of finishing rolls, eight balling furnaces and three second heating furnaces. No.3 mill had a pair of roughing rolls, a pair of finishing rolls, two pairs of shears, four balling furnaces, a guide mill and two heating furnaces for the guide mill. The

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rolls in No.2 and No.3 mill were driven by a 36in. x 6ft. high-pressure beam engine. Also present were two circular saws for cutting iron with their own steam engines, a range of five straightening and four punching benches for No.1 mill with a separate steam engine and a second range of fourteen benches for straightening, punching, shearing and pressing driven by a separate steam engine. This department also contained a large blacksmith's shop. Attached to the Coalbrookvale Ironworks was a large engineering works whose machinery was powered by a horizontal engine, a repair shop with a horizontal high pressure engine and a factory for making coal cutting machines. The three works in the six years ending 30th September 1865 had produced on average 39,000 tons of iron per year.

No bid for the works was received at the sale and during 1868 the works were idle. During 1869 the Blaina Iron and Coal Company was formed to resuscitate the Blaina Ironworks and two furnaces and four puddling furnaces were put into production. In 1871 the company purchased the Nantyglo and Beaufort Ironworks and was renamed the Nantyglo and Blaina Iron Works Company (Limited) with John Richardson as managing director. However, the worsening conditions saw all the assets of the company sold off in 1878 (Ince 1993, pp 131-133).

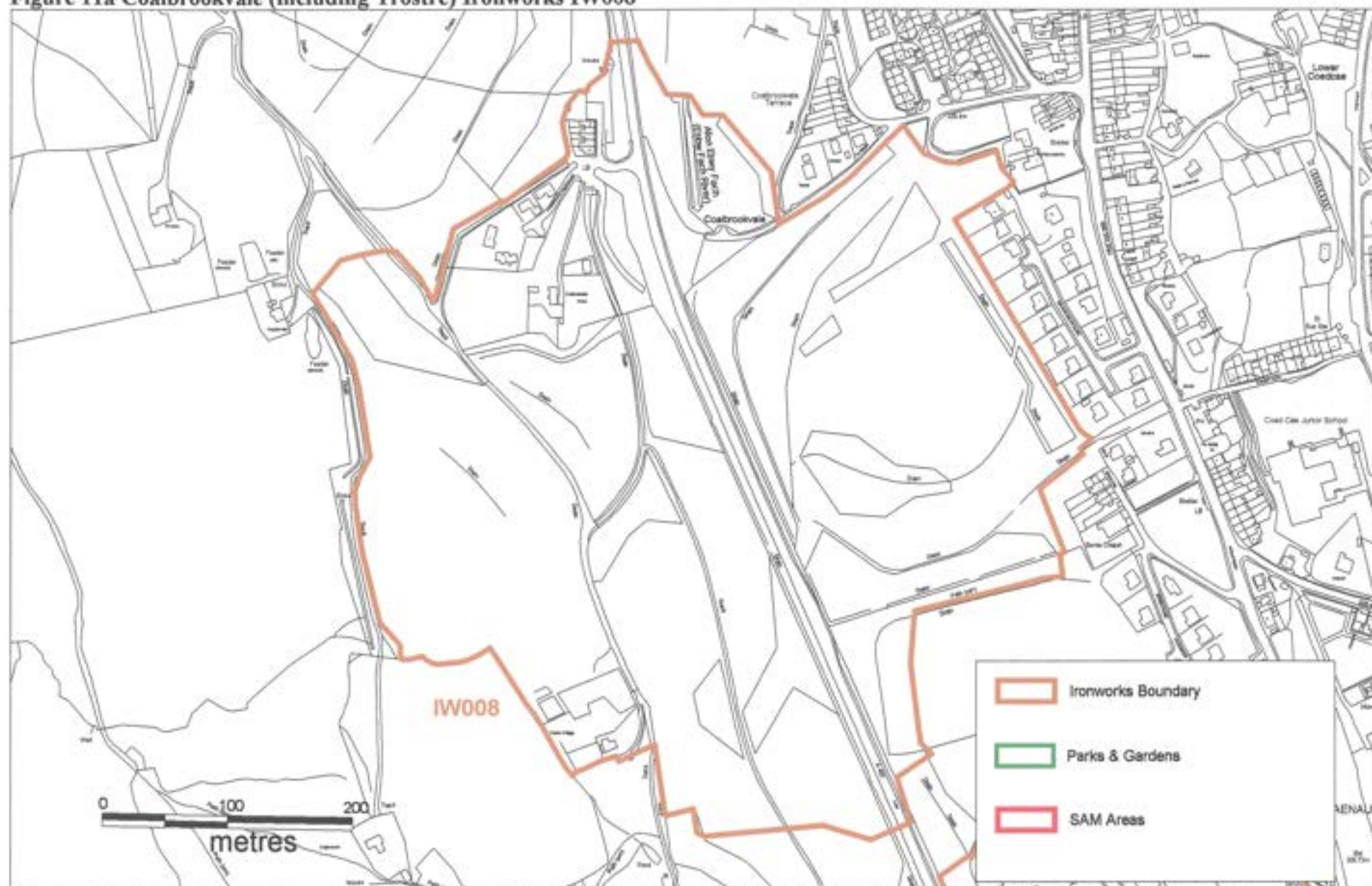
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on plans held at the Gwent Record Office and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of Industrial development: J1 (41) Industrial site north of Rising Sun. While the area has been previously reclaimed, the potential for buried remains should be considered in any future development proposals.

Figure 11a Coalbrookvale (including Trostre) Ironworks IW008

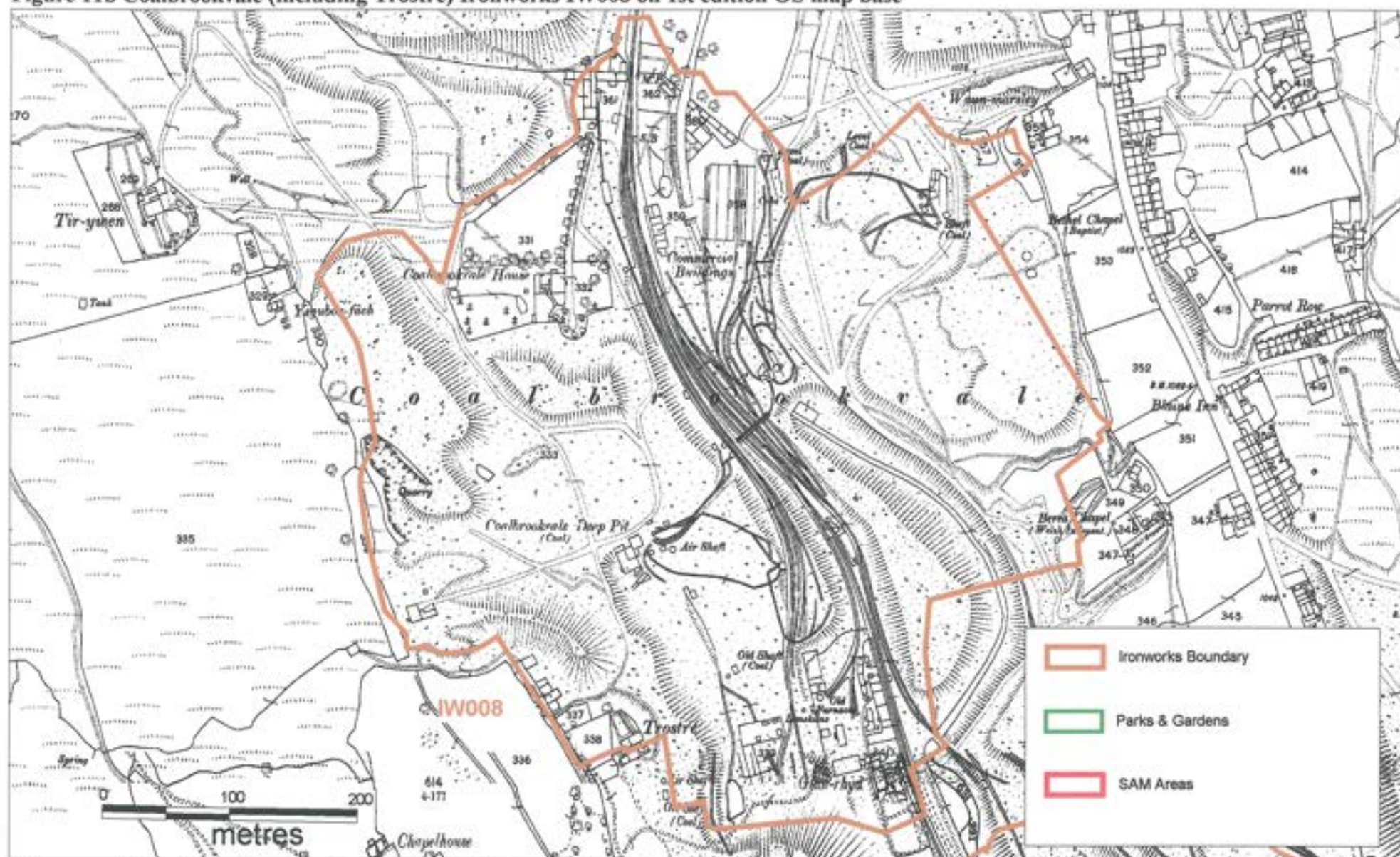


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Figure 11b Coalbrookvale (including Trostre) Ironworks IW008 on 1st edition OS map base



IW Number 009 Nant-y-glo Ironworks SO 19060 10737

General Description

The Nantyglo Ironworks, important historically for its association with early iron entrepreneurs including Crawshay Bailey, Thomas Hill, and Samuel Hopkins, among others, was also associated with innovations in iron production technology; such as the replacement of the solid sand bottom of the puddling furnace with a bottom composed of cast iron plates cooled from below by the circulation of air instigated by Samuel Rodgers of Nant-y-glo in 1818 (Ince 1993). The site comprises two adjacent areas: 009a the core ironworks area itself, and 009b Nant-y-glo Roundhouses and Ty-mawr, an area containing the ironmaster's residence and fortified farm, included here because of its close association with the ironworks itself.

The best preserved and most visible features lie within area 009b; these are the Nant-y-glo Round Houses, a Grade II* Listed structure (Cadw Ref.: 17086; NPRN: 54623; PRN: 02142g, 07861g-07864g and 08863g; NGR: SO 1902 1027), which comprises the standing remains of two fortified round blockhouses with surviving cast-iron fittings and a U-shaped agricultural range of two storeys with the main range aligned north to south and two wings on the eastern side; this range is considered to date in part to c. 1795, and formed part of the Nantyglo Ironworks in before the works were purchased by Joseph Bailey and Matthew Wayne; the whole complex is surrounded by a defensive wall. The demolished remains of the former ironmaster's residence, Ty-mawr (NPRN: 20452 (House), 265932 (Gardens); PRN: 02348g; 08862g; NGR: SO 1907 1025), created in 1816 by Crawshay and Joseph Bailey, were the subject of an archaeological excavation during the 1980s; the site has been sadly neglected since and is in need of a programme of consolidation, conservation and interpretation.

Unfortunately most of the core area, 009a, has been radically altered by infrastructure and housing development during the 20th century. The site of the early furnaces, shown disused on the 1st edition OS map, was located in the area between Market and New Roads, just north of the Hall; the 1821 Abergavenny Survey depicts two furnaces at this site, while three are in place on the 1st edition OS map. This area was partly redeveloped from the early 20th century for housing; however, there is a possibility that buried remains associated with the furnace bank may survive on the site. The works, with its furnaces, mills, stacks, engine house(s) and high level launder are depicted on an engraving of 1810 (S Lacey) and a watercolour of 1830 (Lord 1998, p 136).

To the north of the early furnace site is a block of buildings set at a tangent to Market Road (Nos 27-30), these surviving buildings, are named on a map of 1841 as a shop (possibly also offices), and are those depicted on the 1st edition OS map to the south end of Office Row (PRN 02938g). Office Row itself, and other buildings in place before the publication of the 1st edition OS map, including the nearby Bush Hotel and the housing at Forge Rise have all subsequently been demolished. Immediately upslope and east of the Old Furnaces a terraced row of worker's cottages known as Smoky Row is depicted on several maps including the 1821 Abergavenny Survey and the 1st edition OS; subsequent editions indicate the cottages were later demolished and the site redeveloped. The area to the north, now largely a recreation ground, formed an extensive coke yard with associated coke ovens and coal shaft (1st edition OS map). The area was later the site of the Cokeyard Colliery (2nd edition OS map), which is shown disused by the publication of the 3rd edition.

The 1821 Abergavenny Survey indicates additional structures opposite the Old Furnaces on the west side of the Afon Ebbw Fach; the 1st edition OS map shows this area contained further furnaces, limekilns and coke ovens, as well as possible mills/casting houses. This part of the site has been largely destroyed by the creation of the route of the A467, though the slight possibility of remains surviving in a buried state on the western road embankment should be borne in mind. The site of the coke ovens associated with this part of the ironworks now lie beneath housing at the Round House Close, the condition of the buried remains are unknown.

The northern part of the site comprised a later area of Rail Mills associated with the upsurge in rail manufacture during the 1840s-60s (1st edition OS map); it is this area that was redeveloped in 1879 as the Lion Tin Plate Works, depicted on the 2nd and 3rd edition OS maps. This part of the site has been extensively reclaimed and landscaped in recent years and little of interest relating to the earlier phases is considered likely to survive, even in a buried state.

Historical Background

The early history of the Nantyglo Ironworks began in 1791 when the partners of the Blaenavon Iron Company decided to exploit its mineral grounds and in 1793 a partnership was set up between Hill & Co. of Blaenavon and Harford, Partridge & Co. to erect an ironworks on the Nantyglo portion of the mineral ground with Richard Summers Harford as manager. The Nantyglo Ironworks was completed in 1794 and the furnaces were put into blast in 1795, but there after the works were plagued by disputes and contractual problems and remained idle until 1802 and again between 1808 and 1811. The operating company of the time, the Nantyglo Iron Company sold the works in 1811 to Joseph Bailey and Matthew Wayne. This new partnership immediately invested money in modernising the Nantyglo machinery. There is a possibility that a Neath Abbey engine was installed at Nantyglo in 1811 and certainly a Boulton & Watt engine was purchased in 1812.

Crawshay Bailey replaced Matthew Wayne in 1820 and under the Baileys' management the Nantyglo Ironworks thrived. Five furnaces were in operation by 1823, and additional were added in 1826 and 1827 with 23,883 tons of iron produced in 1830. The success of the works lead to the purchase of the Beaufort Ironworks in 1833 to increase the supply of pig iron to the Nantyglo forges and mills and thereafter the works were run as one concern, iron smelted at Beaufort being conveyed to Nantyglo to be processed at the large foundry they established there (Rattenbury 1980, 47-8). The Baileys exploited fully the demand for wrought iron rails during the 1830s and 1840s with the firm of Bailey Brothers becoming one of the largest suppliers of rails to the home market.

To aid a period of expansion at the two works a 60in. beam blowing engine was purchased from the Neath Abbey Iron Company in 1836 and in 1843 a 45in. rotative beam engine was supplied from the same source. During 1839 Bailey Brothers operated eight furnaces at Nantyglo and six at Beaufort while during the 1850s and 1860s there were seven furnaces capable of production at each site. By this time, the Nantyglo Ironworks had a formidable reputation and was one of the most important iron-making sites in the world - supplying railway lines for the British Empire and American markets. The manufacture of rails continued at Nantyglo but during the late 1860s it became clear that the Bailey family wished to retire from the iron trade. A sale was agreed and in 1871 the Beaufort and Nantyglo Ironworks were transferred to the ownership of the Blaina Iron & Coal Co. This transaction took place at an ideal time for the Bailey family for the early 1870s saw a boom in iron production in South Wales. This increased demand for iron allowed

the Bailey family to sell Beaufort and Nantyglo for a reported sum of no less than £4,000,000. For this money the Blaina Iron & Coal Co. received fourteen furnaces, sixty seven puddling furnaces and four rolling mills.

Poor conditions in the iron trade, coupled with labour problems during the early 1870s heralded the end and in February 1874 the Nantyglo Ironworks was closed and with continued losses it was decided to sell off the assets of the company in 1878. In the following year the ironworks were leased by Spence & Co. of Liverpool who then began the conversion of Nantyglo into a tinsplate works (Ince 1993, pp 129-131).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the Survey of the Barony of Abergavenny, 1821 (among other estate plans) and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

There are no identified threats to the site of the Nant-y-glo Roundhouses and the adjacent Ty-mawr site (009b), beyond continuing neglect. The former is currently protected through listing, and both this and the nearby site of Ty-mawr are currently the subject of a HLF based conservation programme commissioned by Blaenau Gwent CBC. This forms the basis for a proposed alternative use as heritage centre for the Nant-y-glo Roundhouses site.

Additional housing development (HB8 housing site N of Roundhouse Close) has been identified from the UDP as a threat to the central area of the ironworks area 009a, however this is relatively minor.

Plate 004 Nant-y-glo Ironworks IW009a



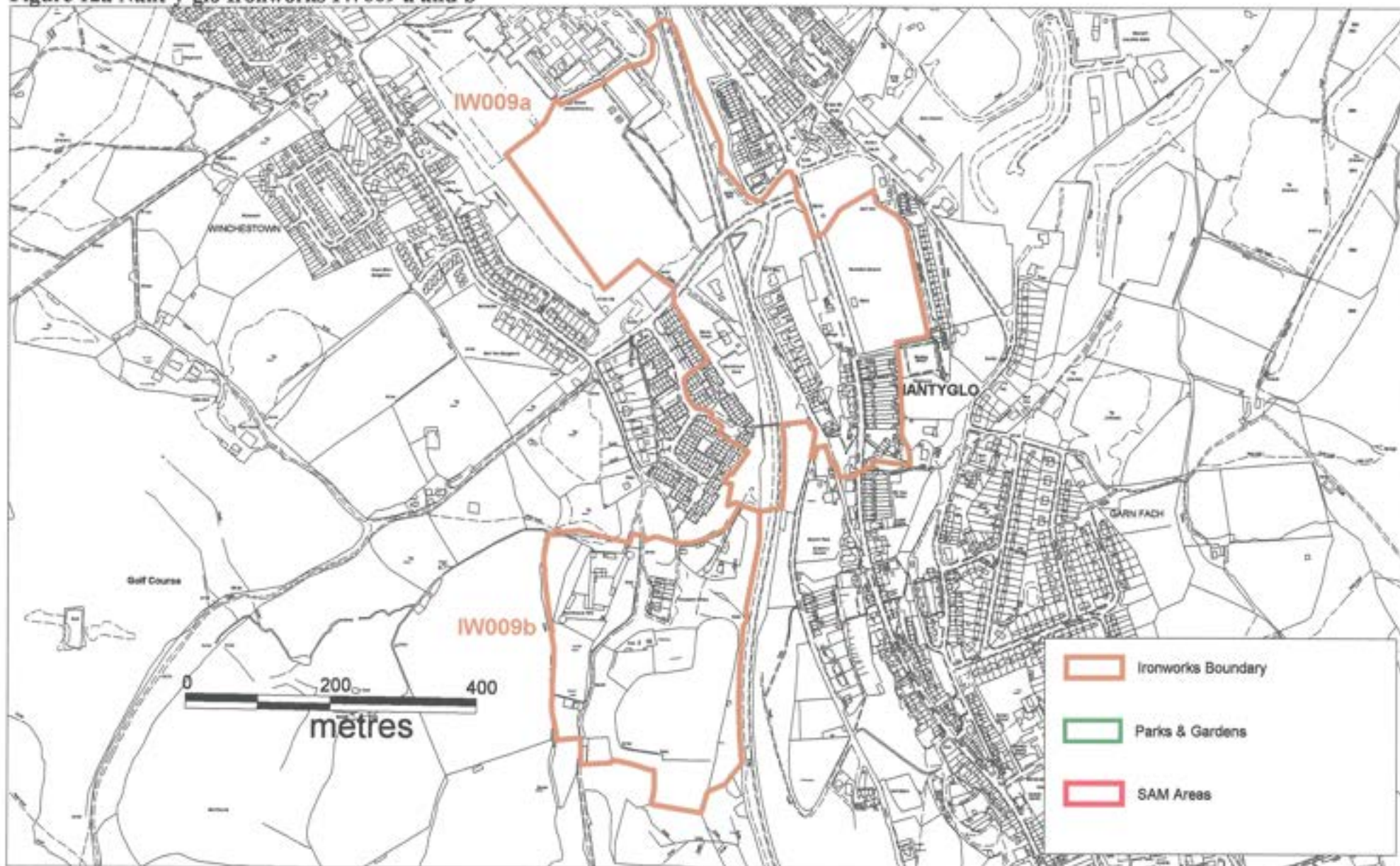
Plate 004: The shop site to the south of the now demolished Office Row (PRN 02938g); the site of the Old Furnaces of the Nant-y-glo Ironworks lie beyond, view to the southeast.

Plate 005 Nant-y-glo Ironworks IW009b



Plate 005: View towards the NE Roundhouse, Nant-y-glo Ironworks (IW009b) view to northwest.

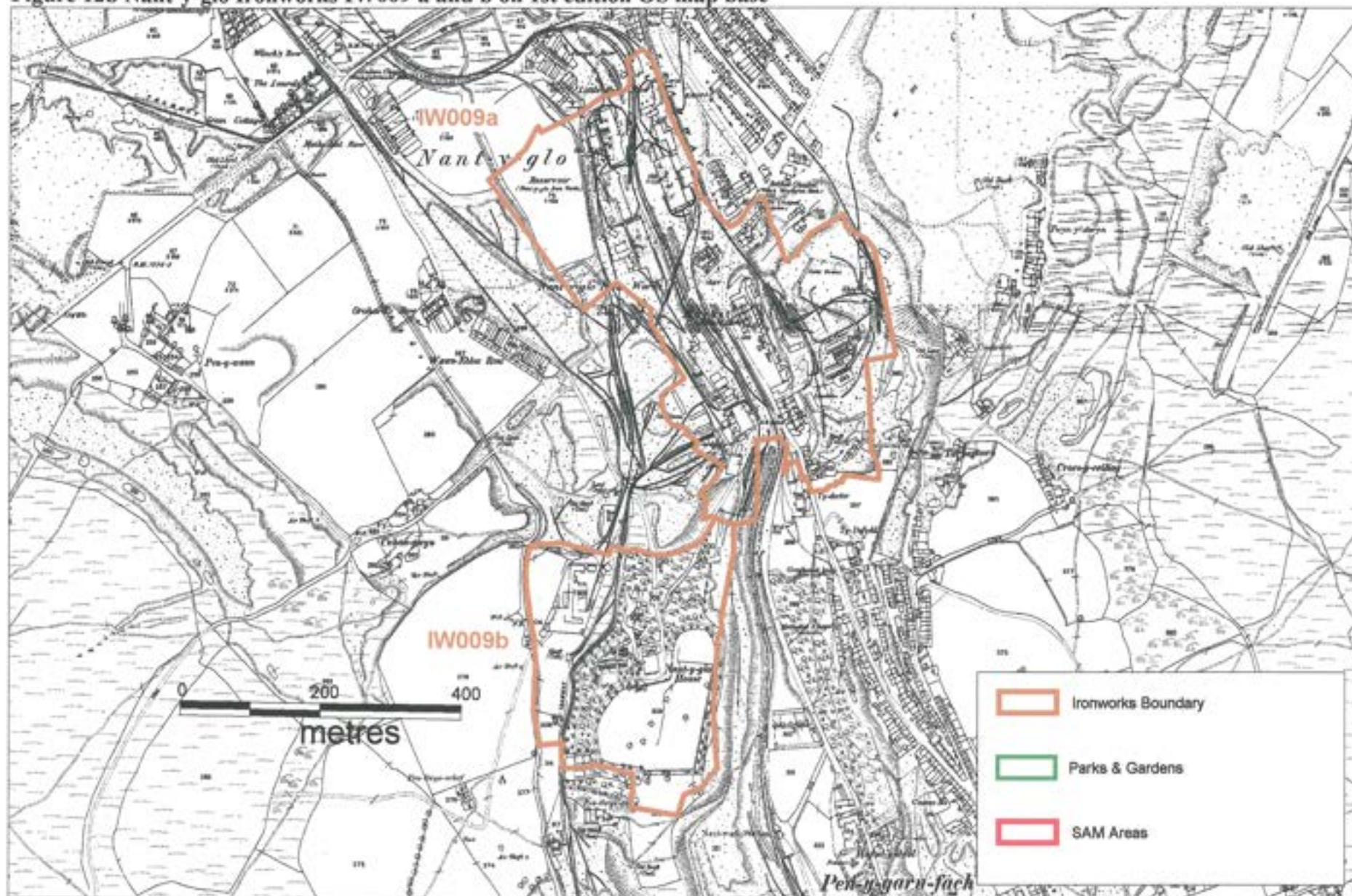
Figure 12a Nant-y-glo Ironworks IW009 a and b



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Figure 12b Nant-y-glo Ironworks IW009 a and b on 1st edition OS map base



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IW Number 010 Ebbw Vale Ironworks SO 17222 09636

General Description

The Ebbw Vale Ironworks was the last upland works to operate in South Wales, due in part to the sheer size and inertia of the Ebbw Vale undertakings. The Ebbw Vale Ironworks is important nationally and internationally for the remains of its furnace bank (PRN 08639g). A Grade II* Listed structure (Cadw ref: 22531) representing an extremely scarce survival of an extensive furnace bank dating in part to the late 18th century; the furnace bank has been preserved largely intact due to its reuse in the later 19th century as a charging bank (within area IW010a). The only the surviving contemporary furnace bank of similar scale is that at Cyfarthfa, which is slightly larger.

Most of the associated features contemporary to the furnace bank were demolished and replaced in c. 1866. The site had two large engine houses erected by Darby, one of 1865 on the south side of the furnaces with a beam of 36ft. and 30ft. 4in. diameter flywheel, the other of 1879 on the north side of the blast furnaces, which contained two 45 inch x 6 foot condensing engines (Ince 1993, 108); these stood until the 1980s.

Apart from the furnace bank, which appears to be in need of further remedial conservation work, little survives above ground in the surrounding area. Despite demolition and subsequent landscaping and development, much of the northernmost part of the Ebbw Vale Ironworks area, IW010a (NGR: SO 17222 09636) retains significant archaeological potential with good survival of the below ground remains of the nineteenth and twentieth century works as it appears to have had relatively light use since the furnaces were cleared. Ground investigations conducted in the area in 2004 (Scott 2004) has indicated a high potential for the survival of buried industrial archaeological features, such as building foundations and other remains associated with industrial processes carried out on the site; much of the area appears to be beneath upwards of 1.3m of made ground. The best preservation of the pre-1866 works appears to lie in the area east of the furnace bank wall, while elsewhere within 010a, buried remains dating from the mid-nineteenth century and later activities are more likely to survive as the operational core of the works remained at the same location until production ceased.

Ebbw Vale House (NPRN 265931; NGR SO 1710 0960) with its ornamental gardens (shown on various maps from 1816), thought to have been built by Jeremiah Homfray c. 1790 (Thomas 2000, 146), is located across the Afon Ebbw from the core area of the Ironworks. Ebbw Vale House, now the Ebbw Vale Works Museum, has been included within area 010a as an important and increasingly rare survival of an ironmaster's residence.

The area 010b (NGR SO 1712 0910) to the west of the British (English) Steel Tinplate General Office (PRN 08867g), Listed Building Grade II* Cadw ref: 22530), contained features relating to the 1860s remodelling of the Ironworks, specifically the site of the Upper Mills, and the adjoining Shaft and Engine House of No. 15 Coal Pit (disused by the publication of the third edition), together with an Engine Shed and Gas Works (1st edition OS map). The detached area 010c (NGR SO 1737 0800), contained the Ebbw Vale Steelworks (NPRN 34135), the Bessemer Steelworks on the 1st edition Os map alludes to the Bessemer Converters constructed during the 1860s. Both these areas, 010b and 010c lie within the footprint of the 20th century British Steel Tinplate works; this area is likely to have been heavily disturbed by the construction of the British Steel works and as a result little of interest is thought to survive in these areas.

Historical Background

An important role was played in the Welsh iron industry during the nineteenth century by the Ebbw Vale Iron Company. The Ebbw Vale Ironworks was a fairly large concern in itself but several other ironworks were taken over by the company as it expanded its interests in Monmouthshire. Much of the capital for this expansion was generated through the joint stock company system and it is a fairly easy task to discern similarities between the operation of the Aberdare Iron Company in Glamorgan and the Ebbw Vale Iron Company in Monmouthshire.

The first furnace at Ebbw Vale was built in 1790 with the partners in this venture being Charles Cracroft, Walter Watkins and Jeremiah Homfray. In 1791 the partnership was dissolved with Homfray becoming sole owner and in the following year Harford, Partridge and Company were admitted as partners. More land was leased, and in 1794-5, a tramroad built to the limestone quarries at Trefil. In 1796 the Ebbw Vale Ironworks was able to produce 397 tons of iron in the year and at this time Homfray was bought out of the partnership. The partners in the company at the end of the eighteenth century were John Partridge of Monmouth, Philip Crocker, Samuel Harford, James Harford and John Tomlinson.

A second furnace was built at Ebbw Vale by 1805 although only one of the furnaces was in blast during the year producing 3,664 tons of iron. In 1818 the company took control of the Sirhowy ironworks and by 1823 the combined works each possessed three furnaces, which produced 20,425 tons of iron during the year. Output rose to 26,020 tons in 1830, of which 18,133 tons (18,424 tonnes) of pig and finished iron was produced at Ebbw Vale, by which time the works were being operated by Harfords, Davies and Company. In 1829, rails were being made for the Stockton and Darlington Railway.

In 1844 the Ebbw Vale and Sirhowy Ironworks were purchased by a partnership consisting of Abraham Darby, Alfred Darby, Henry Dickenson, Francis Tothill, Thomas Brown and Joseph Robinson. At the time the Ebbw Vale Ironworks comprised four blast furnaces of which three were at work each producing 90 to 100 tons of iron per week. The fourth furnace was new and was ready to be put into blast. The furnaces were furnished with hot blast apparatus, cast houses, bridge houses and six mine kilns. Two beam blowing engines provided the blast. Also situated close to the furnaces were various yards, a clay mill with engine, a brick yard, a limekiln, four fineries, a boring mill, fitting up shops, lathes, a smith's shop (23 fires), a carpenters' shop and a pattern makers' shop. The rolling mill yard consisted of twenty-eight puddling furnaces with mills for making rough bars. Reheating was carried out in twenty-eight balling furnaces, which served rolling mills for finishing bars worked by two high-pressure engines. Also present on the site were five annealing and other furnaces, saws and engines for cutting rails, punching engines, a 30ft. waterwheel erected two years previously with lathes for turning rolls, a mill for manufacturing small iron, a 26in. engine with hammer and plating rolls and a sand mill. The Ebbw Vale Ironworks, at this time, produced 26,000 tons of bar and railway iron yearly.

The new partnership was prepared to expand their iron making empire not only by building at Ebbw Vale but also by purchasing other ironworks. In 1849 the neighbouring Victoria Ironworks was bought and three years later the Abersychan Ironworks was taken over. The Pentwyn Ironworks was acquired in 1857 and by the end of the decade the Ebbw Vale Company had eighteen furnaces at their disposal and employed a work force of 12,000.

By 1863, the company had 19 blast furnaces, 192 puddling furnaces, 1200 workmen's cottages,

and 7500 acres (3035 hectares). The amount of investment injected into the Ebbw Vale is reflected in a detailed description of the plant at the forges and mills made in 1863-1864.

In 1864 the Ebbw Vale Iron Company Limited, with Abraham Darby as chairman, was formed with a nominal capital of £4,000,000. The Bessemer process for making steel was introduced in the 1860s by the chief engineer, Edward Windsor Richards, and Ebbw Vale became a noted producer of steel, the works being extensively modernised. A new rail mill was completed in 1865 for the manufacture of Bessemer rails and in 1867 a steel rail works was completed with engines built by Galloway and Sons of Manchester. At this time the Ebbw Vale Iron Company was operating two 5 ton Bessemer converters and a 1½ ton converter. A further pair of converters was installed in 1869 and in the following year the company was operating seven 6-ton converters. The iron-producing department also experienced some investment at the same time for in 1865 the massive Darby blowing engine was constructed at the Ebbw Vale Ironworks. Such was the growth of the company that in 1870 it had sixteen furnaces in blast and in 1872 it was operating 161 puddling furnaces and 12 mills.

In 1873 Darby retired and a new company, the Ebbw Vale Steel, Iron and Coal Company (Ltd.) was constituted. The Ebbw Vale Ironworks was turning out weekly 1,200 tons of steel rails during 1878 with much of the original iron being made from Bilbao haematite. Steel was then being made in four 6-ton converters and two 8-ton converters. A profit in excess of £34,406 was made in the year ending March 31st 1881 and during this year the company kept from thirteen to fourteen furnaces in blast. A detailed description of the Ebbw Vale Ironworks was written in 1884 by which time iron making had ceased at Sirhowy, Pentwyn and Abersychan. The Ebbw Vale Ironworks then possessed four furnaces, which were 60ft. high and topped with iron bands. There were three beam blowing engines at the works, namely the Darby engine and two 45in. x 6ft. condensing beam engines with 90in. blowing cylinders erected in about 1880 by the Coalbrookdale Iron Company. The Bessemer department was situated halfway between the Ebbw Vale and Victoria Ironworks. Two pairs of blowing engines provided the blast for the converters. One pair were vertical 40in. x 5ft. engines with 54 inch blowing cylinders manufactured by Daniel Adamson and Company while the second pair were horizontal 36in. x 5ft. engines with 48in. blowing cylinders manufactured by Galloway and Sons. Situated close to the blowing engines were three pairs of 18in. x 2ft. horizontal hydraulic pumping engines for working the Bessemer converters and rail mills. A pair of 36in. x 4½ft. horizontal blooming engines by Galloway and Sons drove two trains of 36in. rolls. This mill and engine had only recently been completed and were capable of reducing steel ingots from 14½in. square to 6in. square. The feeding rollers were powered by a pair of 10in. x 1ft. 2in. vertical engines and the blooms were transported from the rolls to the shears by a train of live rollers driven by a pair of 6½in. x 10in vertical engines. The shears operating with this mill were powered by a 12in. x 1ft. 4in vertical engine. Two engines provided the works with pumped water, namely 60in. x 6½ft. Cornish beam engine and a 40in x 4ft. engine.

The decline of the early 20th century was arrested when in 1935, Richard Thomas & Co bought the site and built a new steelworks, which by the 1960s, was the most advanced in Britain. The original small site became abandoned. In the later 20th century, the site was much redeveloped as a tinplate works, the majority of the older buildings demolished in favour of a vast complex of metal-sheeted buildings. Until about 1980, two engine houses stood at each end of the furnace bank, since demolished (Ince 1993, pp 105-108).

Ironworks Boundary

The ironworks boundary for area IW010a, is essentially based on the core area of activity shown on various maps dating from 1816 to 1920; including the 1st, 2nd and 3rd editions of the 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Areas IW010b and c relate exclusively to developments of the 1860s and are based on the 1st, 2nd and 3rd editions of the 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats identified from the UDP are limited to the proposed Industrial Site: J1 (8), on Steelworks Rd, within IW010a. This would impact on the general area of the demolished Darby Engine House site (NPRN 40,477; PRN 03221g) as identified in the NMR and SMR. Buried remains associated with this site are known to survive in an area now under between 1.3 and 2.3m of colliery spoil (Wessex Archaeology, 2004).

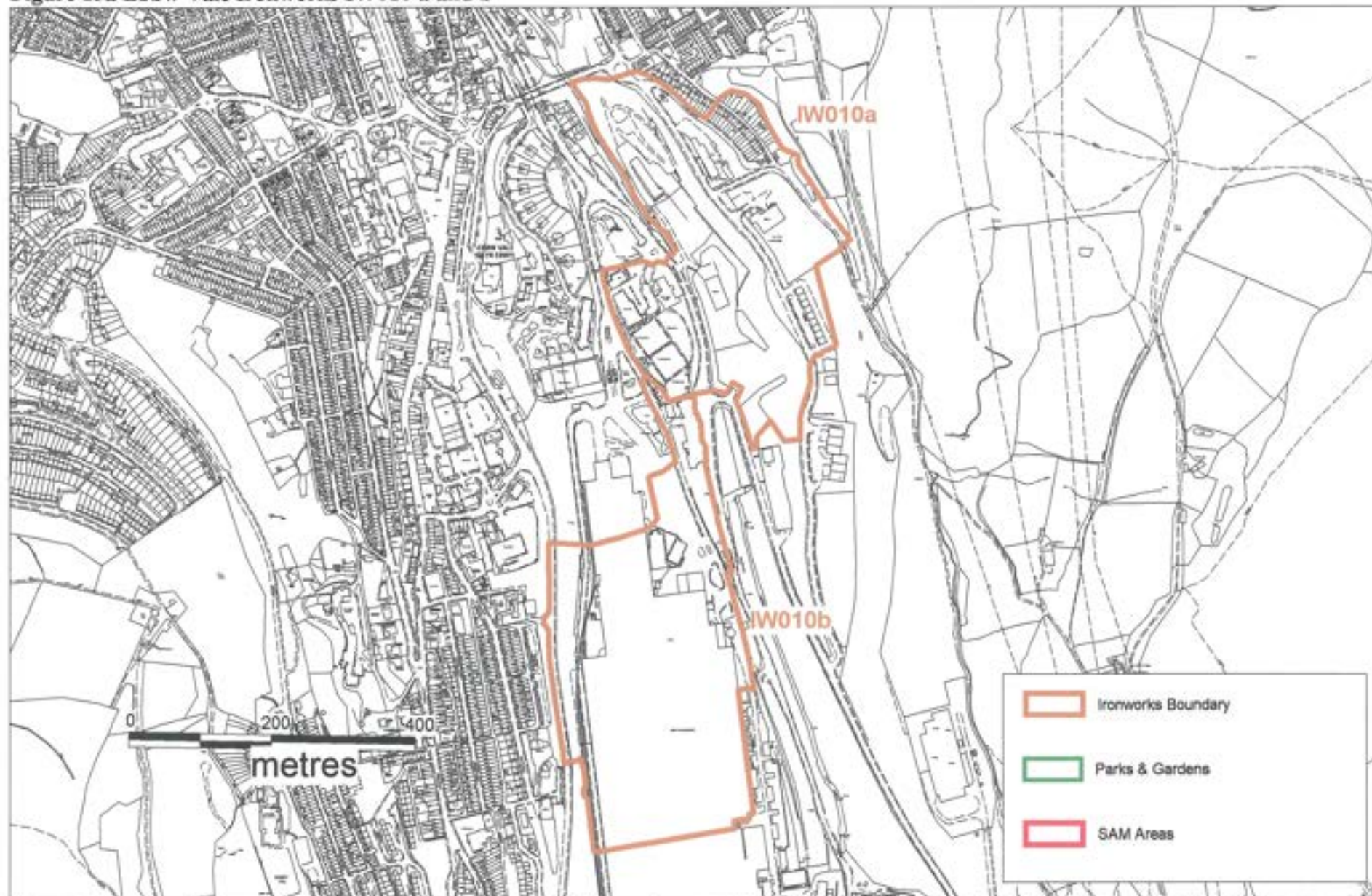
In addition with the recent closure of the British Steel site, the redevelopment of areas IW010b and c is also proposed.

Plate 006 Ebbw Vale Ironworks IW010



Plate 006: The Grade II* listed furnace bank site (Cadw ref: 22531) at Ebbw Vale Ironworks (IW010a) view to east.

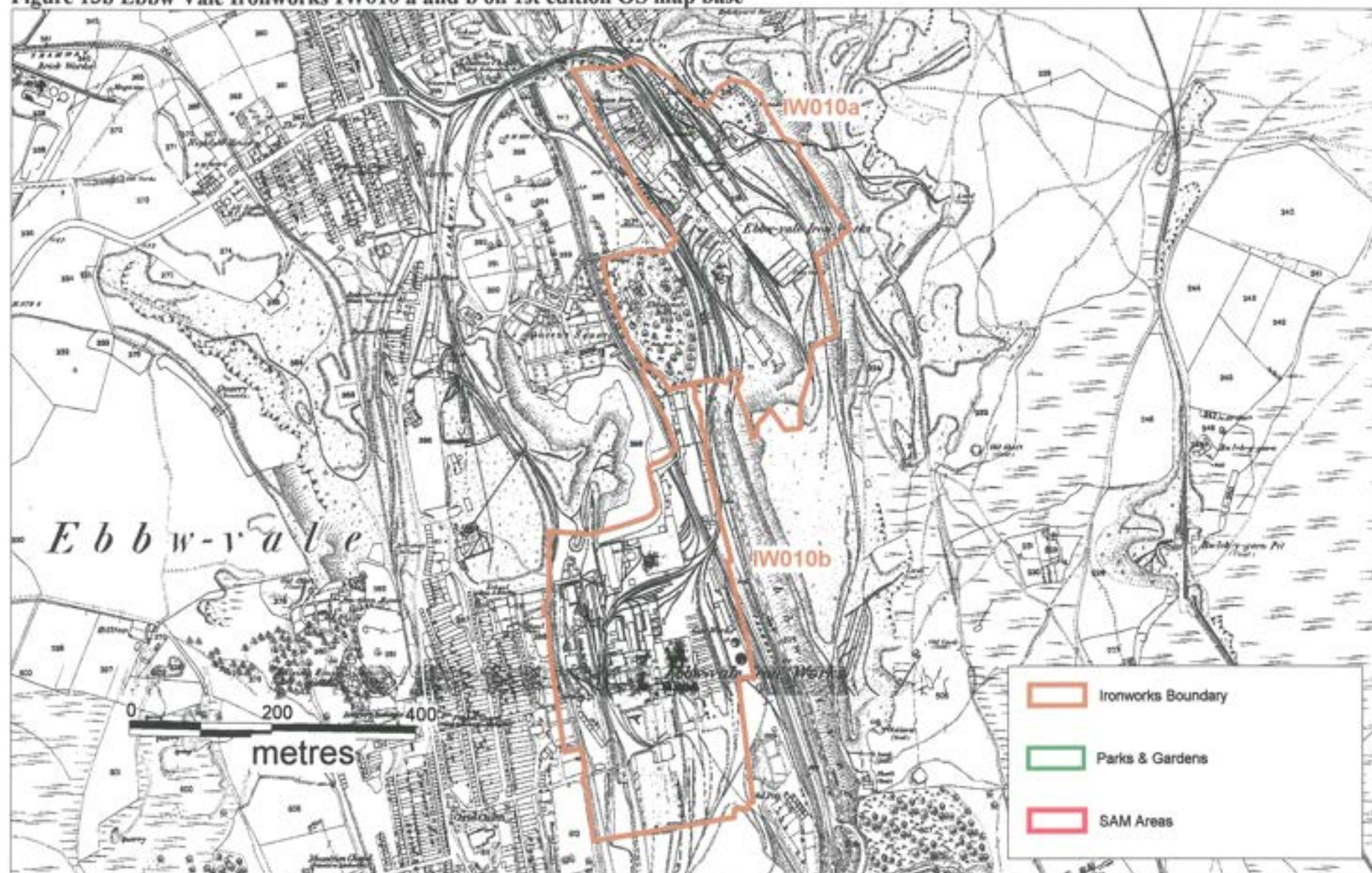
Figure 13a Ebbw Vale Ironworks IW010 a and b



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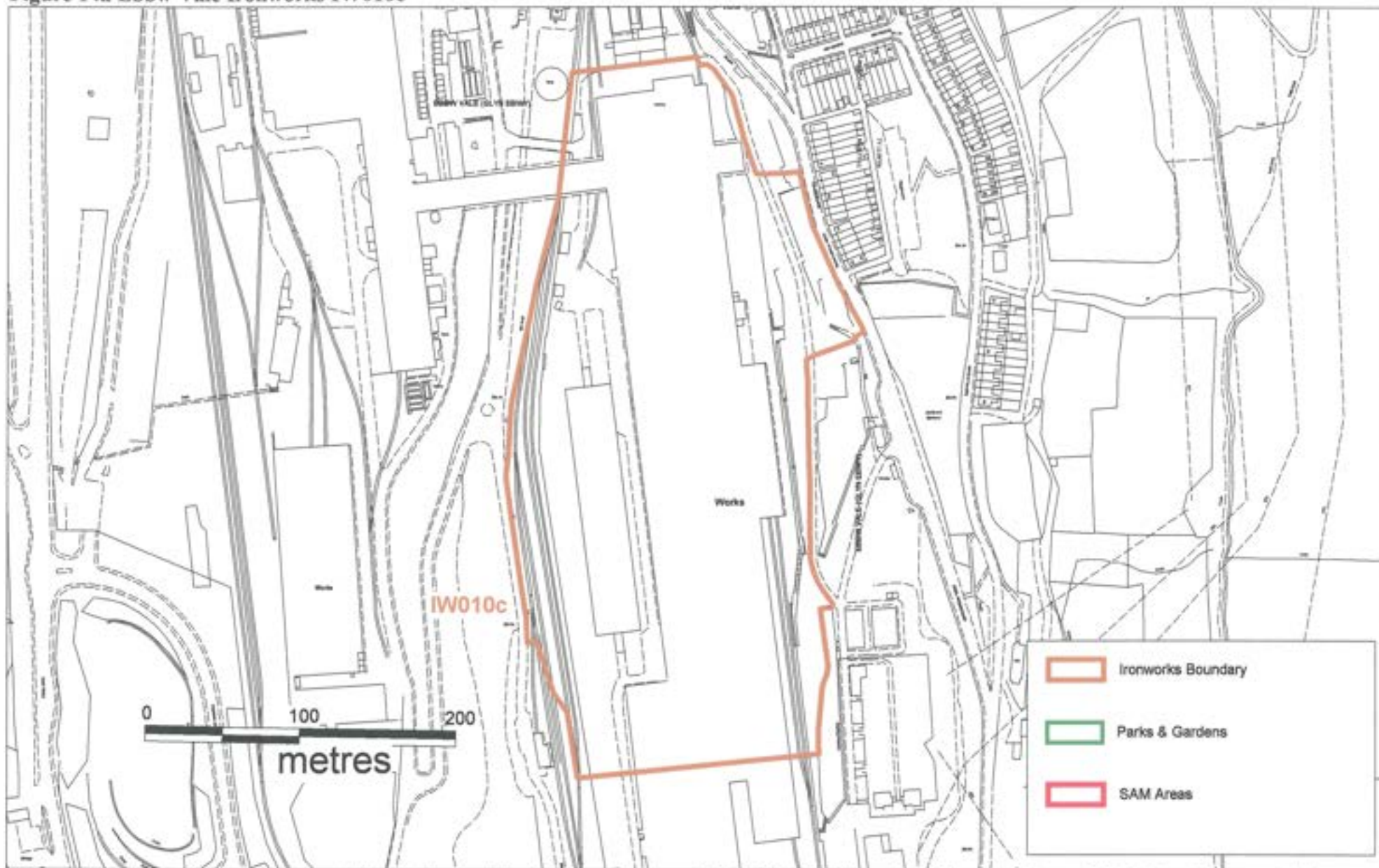
Figure 13b Ebbw Vale Ironworks IW010 a and b on 1st edition OS map base



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Figure 14a Ebbw Vale Ironworks IW010c

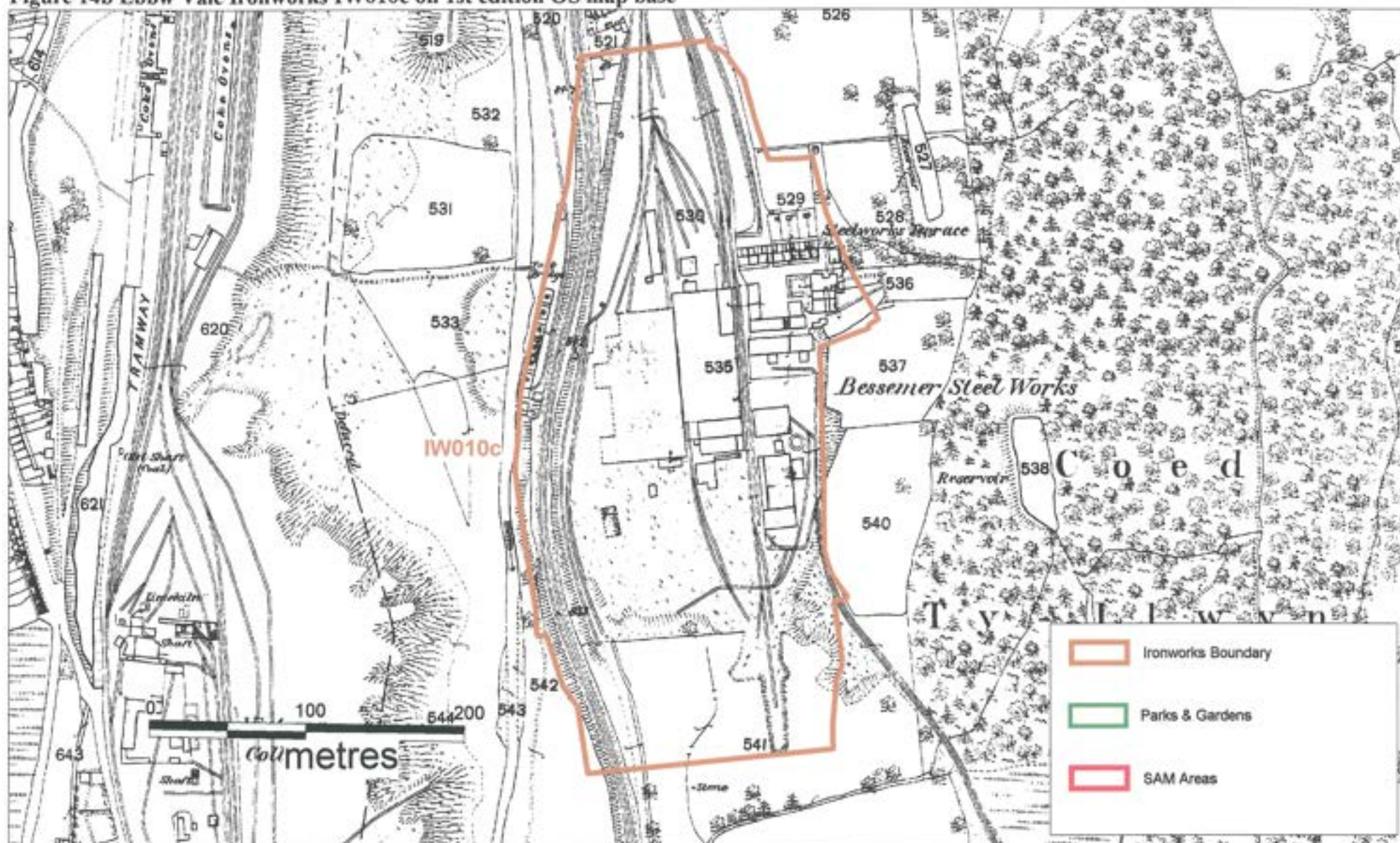


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Figure 14b Ebbw Vale Ironworks IW010c on 1st edition OS map base



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IW Number 011 Victoria Ironworks SO 17146 07529

General Description

The Victoria Ironworks, founded in 1836-38, was built as a complete unit with furnaces, coal and mine pits, five rows of cottages, a truck shop, schoolroom and officials' houses. The later development of the site is largely the result of its close association with the neighbouring Ebbw Vale Ironworks. Only the core area of what is a much more extensive ironworks landscape associated with both the Ebbw Vale and Victoria ironworks is defined for the purpose of this report. The 1st edition OS map depicts the site as it existed during the 1870s; coke ovens and adjacent rank of limekilns (calcining kilns) above and west of the blast furnaces are shown, separated by the lines of the site's internal tramway, while at the northeast and immediately south of the furnaces a number of other structures are indicated. What appears to be a large rail or rolling mill was located to the south. The area, which formed part of the garden festival site, has undergone landscape reclamation and is now given over to light industrial development and infrastructure. Given the thorough redevelopment of the site since closure little of interest is considered likely to survive, though remains associated with the massively constructed furnaces may survive in a buried state under the now landscaped slope, which bisects the site.

With the adjacent area to the south (part of the wider area associated with the former Ebbw Vale steelworks) the site of the former Victoria Ironworks was used for the final garden festival in 1992. The adjacent area to the south is now Victoria Park, Wales' first urban village, which includes 200 homes. Other developments on the site include a designer goods outlet, an owl sanctuary, fitness centre and a school for the visually impaired. Many festival features have been retained, including an ornamental lake, a pavilion and woodland.

Historical Background

The Monmouthshire Iron and Coal Company under Sir Thomas Buckler Lethbridge began construction of the Victoria Ironworks in 1837, and work on the site coincided with the Queen Victoria's coronation. Initially two furnaces were put into blast with two further furnaces being constructed in 1839. The blast was provided by a 60in. x 8ft. beam blowing engine with a 122in. blowing cylinder.

The Ebbw Vale Iron Company bought the Victoria Ironworks in 1849 for £55,000; it was the second works to be purchased by the company. At this date the ironworks consisted of four blast furnaces, which were 45ft. high, 16ft. in diameter across the boshes and 8ft. in diameter across the tops. The blast was provided by the 60in. beam blowing engine with the 122in. blowing cylinder, which produced 20,000cu. ft. of air per minute with the furnaces being blown through a 24ft. diameter air receiver. Also included in the sale were four bridge lofts, extensive kilns for roasting ironstone and a water balance for raising limestone to the furnace tops. The ironworks also possessed a large casting house, three double refineries, a single refinery, a bar iron forge, ten puddling furnaces and a rolling mill making rails or merchant iron from eight balling furnaces. The mill was powered by a 90 h.p. engine and was capable of turning out 10,000 tons of bar iron each year. The sale document also lists a foundry with an air furnace and cupola, a waterwheel for blowing the cupola and turning the bar iron rollers and for turning and boring in general, a smith's shop, a carpenters', pattern makers' and fitting up shop, a punching machine, a brass foundry, a brick yard with two kilns and drying stoves, several reservoirs, seven pits sunk on the property, a shop, houses and two residences for the managers.

Southeast Wales Industrial Ironworks Landscapes

The Victoria Ironworks was altered and extended but by 1870 only three furnaces remained on the site. Two of these remaining furnaces were demolished in the late 1870s leaving only one furnace in blast. This demolition was to make way for two new furnaces, which were completed in 1883. Each furnace was 60ft. high and possessed seven tuyeres. Also constructed at this time were six Cowper stoves. Two vertical blast engines built by Kitson and Company of Leeds with boilers by Adamson blew the furnaces. It was envisaged that after these alterations the Victoria Ironworks would be able to turn out 700 tons of iron per week.

In 1884 the Victoria Ironworks comprised two furnaces, which were 60ft. high with 20ft. diameter boshes. The blast at 5 psi was provided by two vertical engines with 50in. x 5ft. steam cylinders and 100m. blowing cylinders. The mills included a 12in. bar mill driven by a 24in. x 2ft. 6in. engine, an 8in. guide mill driven by a 21in. x 1ft. 8in. engine, an 18in. train for rolling fish bars driven by a pair of horizontal 30in. x 4ft. 6in. engines and a mill train worked by an old beam engine coupled to a horizontal engine. At this time a 36in. blooming mill was being constructed at Victoria powered by a pair of 36in. x 4ft. 6in. Galloway horizontal engines (Ince 1993).

The later configuration of the Victoria Ironworks is closely bound up with developments at its larger neighbour, the Ebbw Vale ironworks, and the development of the site can be charted to an extent by OS maps of the area. The late 19th century (c.1870) layout is depicted on the 1st edition OS map indicated are a series of coke ovens at the west, a bank of limekilns and three blast furnaces, to the south of the furnaces are a number of mill structures. The second edition shows the site as complete in 1884 with the new furnace arrangement, to the south of the previous, including the new Cowper stoves. The most drastic change to the entire site is depicted on the 3rd edition; this indicated a major remodeling had been carried out between 1902 and 1914. The reconstruction affected both the layout and scale of the Victoria Blast Furnaces, and the Victoria Foundry, together with the associated coke ovens, which are named as the Copper's Coke Ovens and Bye Products Plant.

As with Ebbw Vale itself, the decline of the Victoria works during the early 20th century was arrested, when Richard Thomas & Co bought the site in 1935 and built a new steelworks, which by the 1960s, was the most advanced in Britain. During the later 20th century, the site was further redeveloped as a tinplate works, the majority of the older buildings demolished in favour of an extensive complex of metal-sheeted buildings (Ince 1993, pp 110-111).

Ironworks Boundary

The ironworks boundary for area IW011, is essentially based on the core area of activity shown on the 1st, 2nd and 3rd editions of the 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats identified from the UDP are limited to the development of the area for industrial purposes: J1 (25) Industrial site Garden Festival Site.

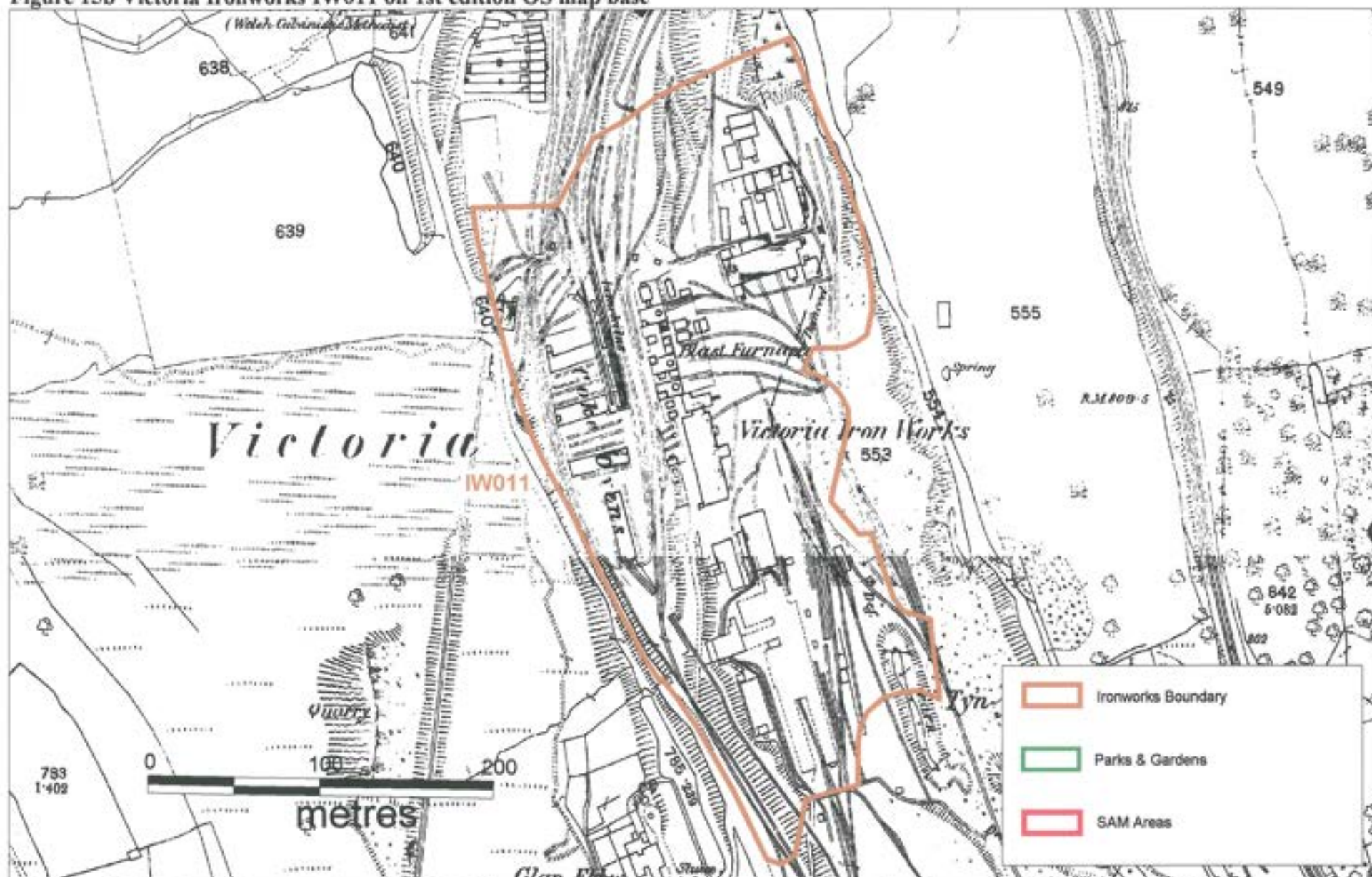
Figure 15a Victoria Ironworks IW011



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Figure 15b Victoria Ironworks IW011 on 1st edition OS map base



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IW Number 012 Beaufort Ironworks SO 16944 11244

General Description

The Beaufort ironworks founded from 1779 was important as one of the oldest iron making establishments on the northern outcrop of the coalfield, with notable associations with the Kendall family one of the most important group of charcoal ironmasters in Britain, who held extensive interests in the Midlands and the Lake District. The Beaufort ironworks was also noted for its Smeaton waterwheel of 1780 and a Smeaton atmospheric steam engine of 1782; neither of which now survive.

Unfortunately the site of the Beaufort Ironworks (IW012) has been progressively developed for housing since the start of the 20th century. The area of the furnaces and associated coke ovens appears to have been redeveloped for housing after 1971; though cartographic evidence indicates that the main features associated with the ironworks, ie the furnaces, coke ovens etc had been largely cleared previously. By the publication of the 2nd edition OS a few industrial features such as tram roads and mine are depicted, as well as associated industrial housing (ie Shop Row, Gantre Row, River Row, Upper Yard Row and Lower Yard Row); the furnaces are no longer shown, their remains presumably having been demolished between 1879 and 1901. The route of a sloping footpath given on later maps (see Plate 005), however, possibly preserves the line of the former charging ramp. By the 1920 edition OS, all the industrial housing associated with the ironworks, apart from (Upper) Yard Row has been either replaced, or is shown to be in a ruinous condition. Beaufort House, the former ironmasters residence, now demolished, is in use as an Isolation Hospital under the Ebbw Vale UD council.

Historical Background

The Beaufort ironworks founded from 1779 was one of the oldest iron making establishments on the northern outcrop of the coalfield. In 1779 land was leased for the works from the Duke of Beaufort after whom the ironworks was named. The original partners were Jonathan Kendall, Henry Kendall, Edward Kendall and Jonathan Kendall. The Kendalls were one of the most important groups of charcoal ironmasters in Britain holding extensive interests in the Midlands and the Lake District. At Beaufort one coke-fired furnace was constructed which was blown by a Smeaton waterwheel erected in 1780. Two years later this was augmented by the building of a Smeaton atmospheric steam engine to return water to the furnace pool. Two melting fineries were added to the works in 1787 and during 1796 the Beaufort furnace produced 1,660 tons of iron.

Between 1801-02 a second furnace was constructed at the site and in 1805 the Beaufort Ironworks produced 4,696 tons of iron. The works grew steadily with three furnaces in blast in 1823 when 5,243 tons of iron was produced. A fourth furnace was built in 1824 and in 1830, the then operating company, Kendall, Bevan & Co., recorded an out put of 7,276 tons of iron. In 1833 the Beaufort Ironworks was bought for £45,000 by Joseph and Crawshay Bailey to supply pig iron to the puddling furnaces and rolling mills of the Nantyglo Ironworks.

By 1839 the Bailey Brothers were operating six furnaces at Beaufort in addition to their eight at Nantyglo, while during the 1850s and 1860s there were seven furnaces capable of production at each site. In 1871 the ownership of the Beaufort and Nantyglo Ironworks were transferred to the Blaina Iron & Coal Co. At this date the site comprised fourteen furnaces, sixty-seven puddling furnaces and four rolling mills.

The end of the boom in the iron trade resulted by the end of 1873 in the closure of the Beaufort Ironworks, then under the Nantyglo and Blaina Iron Works Company (Limited), (Ince 1993, pp 129-131).

Ironworks Boundary

The ironworks boundary for area IW012, is essentially based on the core area of activity shown on the 1st, 2nd and 3rd editions of the 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

No threats have been identified from the UDP.

The ironworks area has been generally developed for housing from the 1920s onwards and no visible standing remains associated with the ironworks are known. However, buried remains associated with the furnaces may survive in back gardens and the adjacent wooded steep slope to the east behind houses along Cambridge Gardens, specifically Nos 58-61, and also in the area of Nos 40-42 Beaufort Terrace. Further furnace remains may survive in a buried state at the break of slope to the west of Bryn Kendall, itself the site of former Coke Ovens.

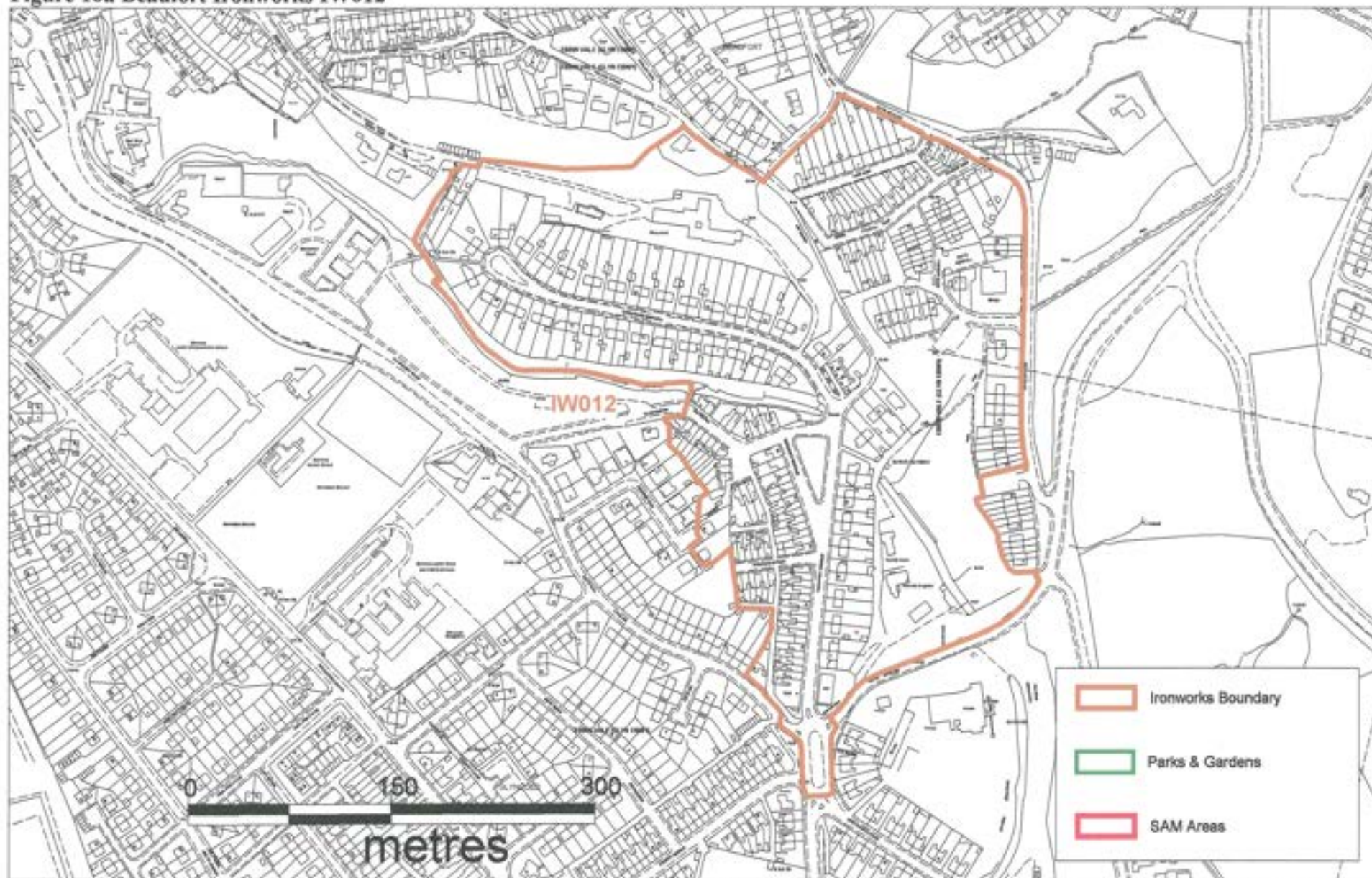
Within the area the survival/condition of buried remains associated with the ironworks is generally unknown.

Plate 007 Beaufort Ironworks IW012



Plate 007: Area of Furnaces Beaufort Ironworks, view to north (site of Furnaces located on steep slopes above and below footpath).

Figure 16a Beaufort Ironworks IW012

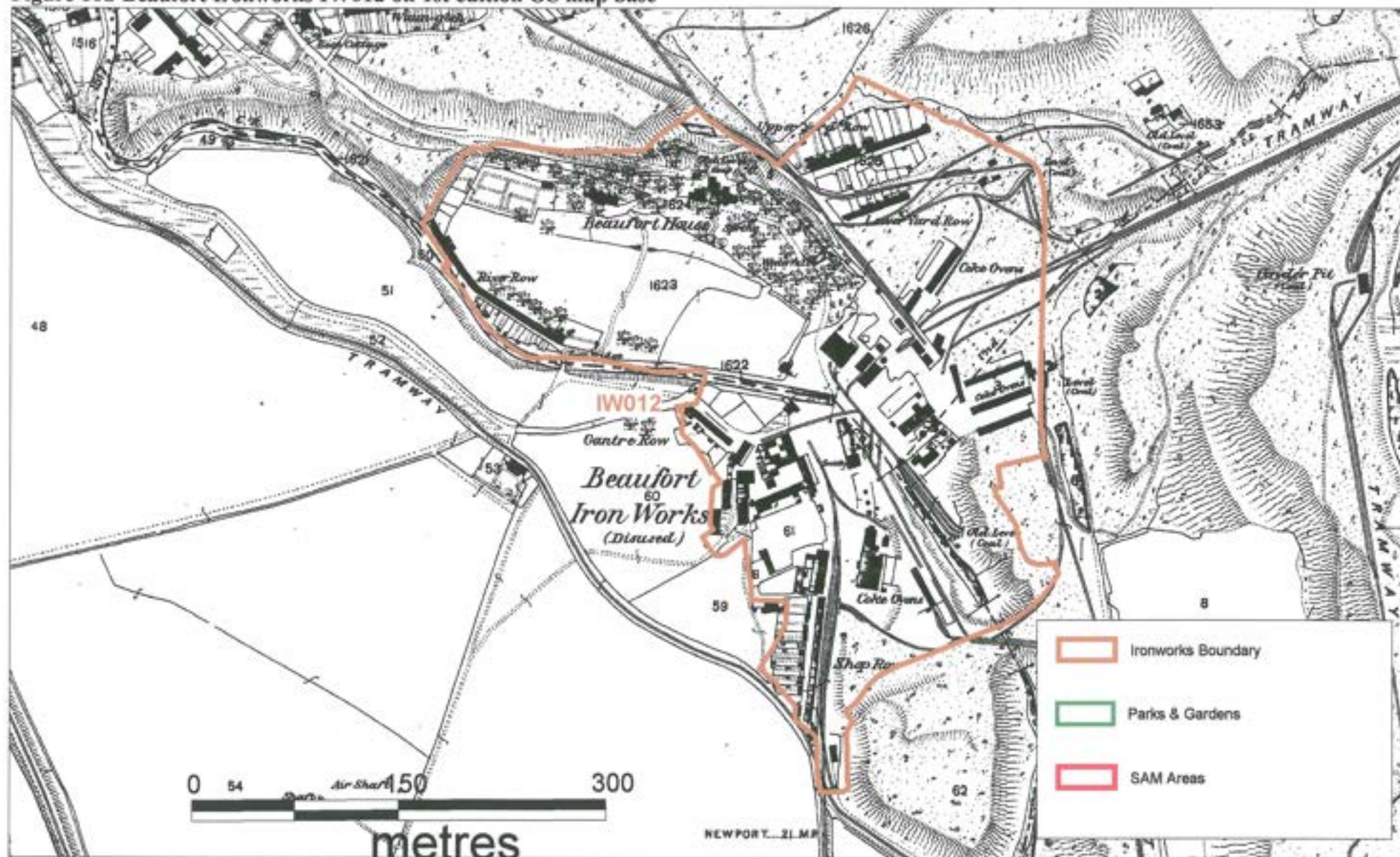


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Figure 16b Beaufort Ironworks IW012 on 1st edition OS map base



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IW Number 013 Tredegar Ironworks SO 14316 09255

General Description

The Tredegar Ironworks site is an early 19th century coke fired ironworks of considerable historical significance. Unfortunately the site, which forms a series of three level terraces located on an east-facing slope extending to the banks of the Sirhowy River, has been extensively cleared and landscaped since closure. The middle of the three successive terraces has a sharp break of slope along its eastern flank overlooking the cleared site of the furnace bank (buried?), below, and appears to represent the remains of the former charging platform/ramp.

The western half of the site, formerly an area dominated by coke ovens and limekilns, is now occupied by the Gwent Shopping Centre. The southeast corner of the site, formerly a complex of large sheds (1st edition OS) and latterly the Deighton Steel Works has been redeveloped as the Bridge Street Industrial Estate, while the northern section, formerly rolling mills, brickworks and Forge houses (1st edition OS) is currently in the process of being developed as a business park (Tredegar Business Park Development); the remainder of the site remains open ground. Whilst remains are largely no longer visible above ground, the survival of buried remains associated with the furnace banks is a strong possibility. Remains relating to other features, such as engine houses may also survive in a buried state. It should, however, be noted that the Tredegar works has undergone several phases of redevelopment, with the result that many of the earlier features of interest, which survived to be depicted on the 1st edition OS map, may have been later removed by this process.

Historical Background

A forge is known to have operated at Tredegar during the 18th century; in 1794 the site, occupied by Harford and Partridge, comprised two refineries and a chafery. Large-scale development, however, dates from 1800, when the Tredegar Ironworks was constructed on land at Bedwellte Common leased from Sir Charles Gould Morgan of Tredegar House, Newport.

Samuel Homfray (the ironmaster of Penyarden near Merthyr) and partners Richard Fothergill of Sirhowy Furnace, Matthew Monkhouse of Sirhowy Furnace, William Thompson and William Forman were responsible for the development of the Tredegar Ironworks at an initial cost of £100,000. The Homfray family were to maintain the dominant holding in the Tredegar Ironworks, the partnership became known as Samuel & Watkin Homfray & Co. in 1834. By 1867, however the dominance of the Homfray family was replaced by the Forman family.

In the early part of 1801 a single coke fired furnace, Furnace No.1, was constructed using labour from the Sirhowy and Penyarden Ironworks, No.2 Furnace was completed a few months later and a steam blowing engine was added designed by the noted engineer Richard Trevithick, who was then with Homfray at Penyarden; this was a Boulton & Watt 40in x 8ft beam blowing engine connected to a 52ft diameter waterwheel which worked hammers and rolls. This engine remained in use as a mill engine up to 1856.

Tredegar was used to convert Pig iron from Sirhowy Ironworks into wrought iron; 1803 a visitor noted several puddling furnaces under construction, in addition to the one furnace in blast. Furnace no. 3 was ready for operation by the end of 1803. The Tredegar ironworks had two furnaces in blast in 1805, producing 4,500 tons of iron and the puddling and rolling mills went into operation in 1807. By 1810, 2 new furnaces had been constructed and the fifth and final

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furnace was added in 1817. By 1823 the five furnaces at the works were producing over 16,000 tons of iron per year, increasing to 18,514 tons by 1830.

The Tredegar Iron Company expanded its undertakings in the late 1830s and early 1840s. A 42in. beam blowing engine with a 122in. blowing cylinder was purchased from the Neath Abbey Iron Company in 1839 and two furnaces were under construction in 1840. At this time the furnaces were producing 440 to 450 tons of iron each week. Expansion continued with nine furnaces in blast at the end of the 1840s and in 1849 a large rolling mill was opened. Developments continued with a large blowing engine being constructed at the Tredegar Ironworks in 1860.

The Tredegar Ironworks was described in some detail in 1869. There were nine blast furnaces on the site with each furnace being 45ft. high with 16-17ft. boshes. Seven of these furnaces were closed and were making hot blast iron using ores from Wales, Northampton, Forest of Dean, Mwyndy and Spain. These furnaces were served by three hundred coke ovens. The furnace blast could be provided by five blowing engines although only three were in operation. The four forge trains were served by eighty puddling furnaces. In the older part of the mills were two rail mills, two blooming mills and a mill for merchant iron, driven by numerous engines. Also in these buildings were thirty-five balling furnaces and a recently added merchant mill and a guide mill. The machinery and plant was completed by a further seven balling furnaces, two small engines for shearing and bending cramp iron and an engine working twelve presses and two large shears. The scale of the operation reflects the output of the works, and some 1,000 to 1,100 tons of railway iron was produced weekly during 1869.

The Tredegar Ironworks continued to sell large amounts of rails, particularly in the export market, with exports to Galveston and Rio de Janeiro in 1872, when the works was operating eighty puddling furnaces and five rolling mills. In 1873 the works was bought by the Tredegar Iron Company Limited. In 1882, conversion to steel production was realized with two 8 ton Bessemer converters built by Davy Brothers put into operation. The manufacture of steel rails guaranteed the survival of the Tredegar Iron and Steel Works into the 1890s (Ince 1993. pp 81, 135-137).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

The area, currently level open terraced area adjacent to and east of the car park for the Gwent Shopping Centre has been identified in the UDP for a playing field and housing development: L1 (9) Playing fields plus major facilities proposed. HT22 Housing development on the British coal Site. This area located immediately west of and above the former blast furnace site, formerly contained a rank of limekilns and the furnace-charging bank. House construction and other development activities have the potential to damage any surviving buried remains associated with the former ironworks.

Plate 008 Tredegar Ironworks IW013



Plate 008: Site of charging ramp at Tredegar Ironworks, view to north (site of Furnaces indicated by red fence line on right side of picture).

Figure 17a Tredegar Ironworks IW013



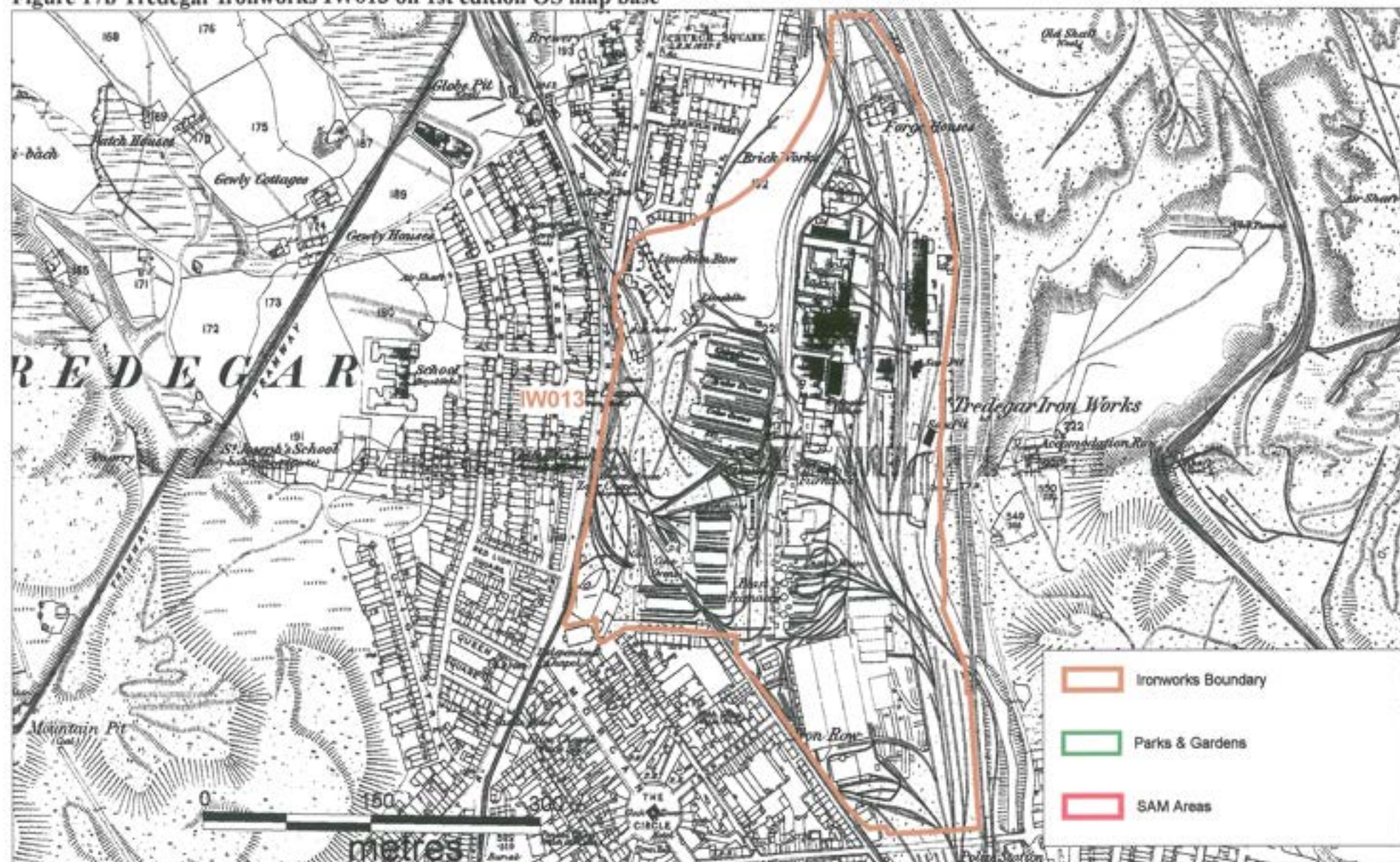
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Figure 17b Tredegar Ironworks IW013 on 1st edition OS map base



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IW Number 014 Sirhowy Ironworks (02220g) SO 1430 1010

General Description

The Sirhowy Ironworks (NPRN 34,341; PRN 02220g; SAM MM185; Grade II* Listed building Cadw ref: 22,496), is a nationally important ironworks of 18th century foundation and is a well presented and interpreted site with good survival of both standing structures and buried remains which extend beyond the area currently protected through legislation (ie beyond the SAM area).

The impressive remains at Sirhowy represent the only 18th century ironworking complex still visible within Blaenau Gwent. The County Borough Council has carried out extensive consolidation and conservation works in partnership with Cadw, the WDA and with the help of Objective One funding to ensure public access and interpretation of the scheduled site.

Established in 1778 and operated from 1794 by William Borrow, Rev Matthew Monkhouse and Richard Fothergill, Sirhowy Ironworks were initially closely associated with the Tredegar Ironworks to the south, and later with Ebbw Vale, when acquired in 1818 by James Harford (Harford, Partridge & Co). Sirhowy pig iron was supplied to Ebbw Vale where it was worked into wrought iron and, from the end of the 19th century, into steel. Even after iron making ceased at Sirhowy around 1882-3 it continued to produce coke for Ebbw Vale until finally closing in 1905. Photographs of the works in the late 1870s (one reproduced in Mines, Mills and Furnaces, Plate 39) show it at its full extent.

For the purpose of the current study the Ironworks site comprises not only the scheduled (SAM no. MM185) area, a large part of which is currently managed and maintained by Blaenau Gwent County Borough Council as a monument open to the public, but also the immediate surrounding area. The scheduled area takes in the remains of the blast furnaces, including an impressive range of arches between the mouths of the furnaces and the casting house and the housing for a waterwheel, which appears on photographs of the 1870s. Beyond the limits of the SAM boundary in an open area set down to grazing, landscaped by the 1950s it is possible that the buried features could survive; such as casting sheds and engine houses, while coke ovens, a smithy, coal shafts, a tram road system and limekilns were formerly located in the area to the north and east of the furnaces. To east of the scheduled area stood other features associated including brickworks (beneath housing on Dukestown Road), offices, stables and a series of down draught kilns (in the area of Grahams Bus Company's compound), to the north on Varteg Place stood a truckshop, now beneath housing, while at the eastern edge of the site (in the area adjacent to Chartists Way) the Fan Pit was located. Also included within the area is Sirhowy House and in part the site of industrial housing known as Ten Houses (Mill Terrace), as depicted on the 1st edition OS map.

The exposed standing remains within the scheduled area are generally in excellent condition, though remedial work to the masonry may be necessary to guard against water ingress. The extension of conserved and presented area, including excavation of furnace area to the south could be considered for the future.

Cadw Description of the SAM area (1987):

The remains of the ironworks stand on the eastern edge of the town, with rough grassland around them. They are built into a steep westward-facing slope. At the

Southeast Wales Industrial Ironworks Landscapes

southern end of the site, on flat ground below the slope, the position of a rectangular building is marked out by stones. The main area of remains, further N, is surrounded by a wire fence, broken down in places. It consists of the remains of three barrel vaulted tunnels, the southernmost one much larger than the other two, and the remains of various other parts of the iron works.

The walls of the tunnels are of closely jointed stonework, and the arches are lined with brick. The northernmost tunnel is 5.5m wide and 7-8, high. At the back of the roof is a small square hole open to the sky. At the back of the tunnel, which is c 7m deep, a narrower tunnel, c 1.8m wide leads back into the hillside. After a short distance this is now blocked A side tunnel leads off on the N side to a cross-tunnel. On the S side a 2m wide tunnel links this one with the middle tunnel. There is some fallen stone and brick at the back, and the back wall is very limey. Outside this tunnel are four parallel low wall footings of yellow brick. The middle tunnel is the same size as the N one. It has a narrower tunnel, c 1.8m wide, at the back which leads to a cross tunnel. Behind this is a blocked shaft. In the roof of this tunnel is a large circular stone-lined hole open to the sky. There is a little fallen stone on the floor. Outside this tunnel is a circular brick structure, 7m in diameter and 0.8m high, with a large lump of slag and other material (the 'bear') inside it. This is the remains of one of the furnaces. The 'bear' is up to 2m high, and on the W side it protrudes outside the brick wall. There are fallen bricks on the ground. The southernmost arch is much larger: 8m across, and much higher. It is 4m deep. In the back wall is a circular opening c 4m high. This tunnel runs into the hillside for 5m. AT the back is a filled-in shaft and arched side openings.

To the S, in the hillside are the remains of another furnace. These consist of a curved section of brick furnace, lined with slag, c 2.2m high and 5.5m across at the top. It tapers slightly towards the bottom, where there is a brick structure, rectangular in plan. Inside it is slightly funnel shaped, with a series of iron-lined holes along its walls. There is fallen brick inside it. The whole is c 4m high.

The walls do not continue above the top of the arches. Above them are some low footings of brick and stone and a shaft opening (protected by bars), blocked after a short distance. An old iron pipe runs along the hillside and through small stone-built tunnels. The hillside is stepped and faced with stone. There are flat roofs over the arches.

In the NW corner of the site, there is a stone building (formerly associated with a waterwheel) with a rounded, arched tunnel. The arch is 2.2m high. The building is built into the natural slope; there is some deterioration of the stonework on the E side, but the rest is in good condition.

Historical Background

The Sirhowy Ironworks venture dates from 1778 when a lease for the land was taken out by John Sealy and Bolton Hudson, Thomas Atkinson and William Barrow and a single water blown furnace capable of producing about 2,000 tons was built. In 1794, when William Barrow and the Rev. Matthew Monkhouse were the owners, Richard Fothergill was admitted into the partnership.

Southeast Wales Industrial Ironworks Landscapes

The Sirhowy Ironworks expanded during the late eighteenth and early nineteenth century. The first part of this development involved the building in 1799 of an unusual Boulton & Watt beam blowing engine; this was a 233'4in. x 5ft. beam blowing engine with a 52in. blowing cylinder. The steam end of the 18ft. beam was connected to an ancillary beam, which worked a 20ft. flywheel. The blowing cylinder was connected to a 6ft. diameter regulator, which also received a blast from one or more 87in. x 2ft. 3in. cylinders worked, by a 38ft. diameter waterwheel. This beam blowing engine provided the extra blast, which was required when a second furnace was built between in 1801 and 1802.

Most of the iron made at Sirhowy in the early 1800s seems to have been sold to the Merthyr iron companies. However, in 1803 the Sirhowy Ironworks was building up stocks of pig iron for puddling at the newly developed Tredegar Ironworks in which Fothergill was a partner. The output at Sirhowy in 1805 was 3,700 tons with most of this iron being sent for processing at the nearby Tredegar Ironworks. This role for Sirhowy as being a producer of pig iron for Tredegar continued until 1818, when the Ebbw Vale Ironworks acquired the works. With the change in ownership the works now switched production of pig iron for puddling at Ebbw Vale rather than Tredegar.

In 1826 there were three furnaces at Sirhowy of which two were in blast producing 7,800 tons of iron during the year. The combined output of Ebbw Vale and Sirhowy rose to 26,020 tons in 1830 by which time Harfords, Davies and Company was operating the works. By 1839 there were four furnaces at work at Sirhowy and during that year a 60in. high-pressure beam blowing engine was purchased for the works from the Neath Abbey Iron Company.

The Ebbw Vale and Sirhowy Ironworks were purchased in 1844 by a partnership consisting of Abraham Darby, Alfred Darby, Henry Dickenson, Francis Tothill, Thomas Brown and Joseph Robinson. At this date the Sirhowy Ironworks comprised five blast furnaces with four of them utilising hot blast. The furnaces were each capable of producing from ninety to one hundred tons of iron per week. Serving the furnaces were cast houses, bridge houses, four mine kilns, coke yards, two limekilns and a clay mill worked by a 22ft. waterwheel. The 60in. beam blowing engine and a 52in. pumping engine were worked together and provided with steam by nine boilers. The site also included four refineries and two winding engines and two tunnels to the rolling mills at Ebbw Vale.

By the 1850s there were five furnaces in blast at Sirhowy but this had been reduced to three by the 1870s. Worsening conditions in the iron trade saw all three furnaces closed down in 1879. Though the works later reopened, final closure came in 1882 (Ince 1993, pp 108-109).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on maps of 1801 and 1844 in conjunction with the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

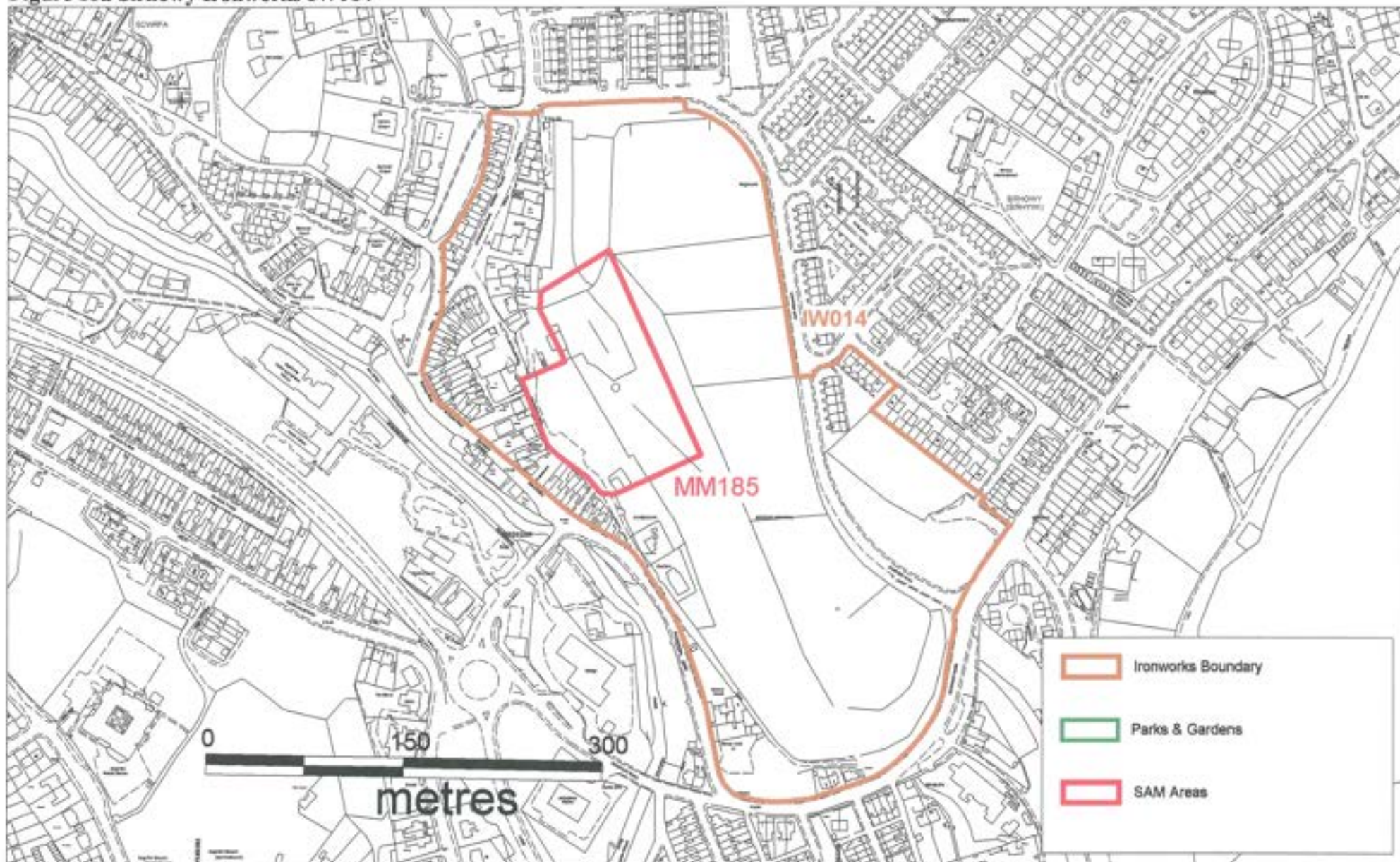
No threats have been identified from the UDP, however future pressure from housing development on the northeastern part of the site should be resisted.

Plate 009 Sirhowy Ironworks IW014



Plate 009: Furnaces Sirhowy Ironworks (SAM MM185), view to north. The fenced area has been the subject of a conservation initiative.

Figure 18a Sirhowy Ironworks IW014

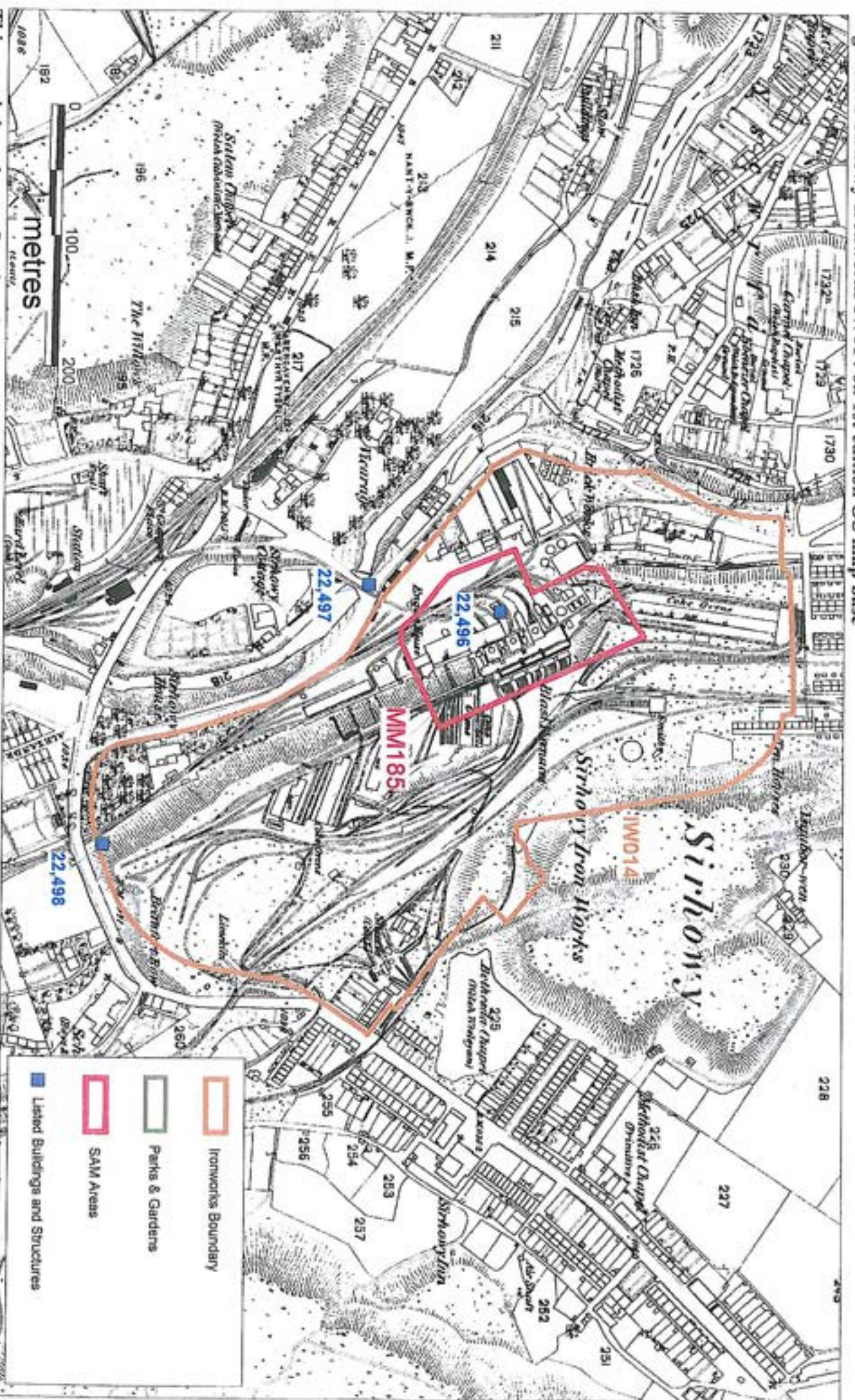


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Figure 18b Sirhowy Ironworks IW014 on 1st edition OS map base



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IW Number 015 Rhymney Ironworks SO 11264 06985

General Description

The Rhymney Ironworks comprises two separate core areas: one, the Rhymney Old Furnace (IW015a) or Rhymney Upper Furnace site, the original Union Ironworks, located to the north of Nant Melyn and Cwm Mawr equates to the first Rhymney furnace of 1801; the other further south namely the dual site (IW015) of the Rhymney Lower Furnace and the Bute Ironworks located respectively on the east and west banks of the River Rhymney equates to the post-1803 development.

The Upper Furnace site (IW015a) is important as a potentially unique survivor of the first generation of single coke fired and presumably water blown blast furnaces in South Wales and represents a link between the single charcoal furnaces of the 18th century and the batteries of coke fired steam blown furnaces of the post-1790 period. The core of the site is now partly protected as a scheduled ancient monument (SAM Gm403). Excavation of this site could throw important light on this transitional phase. The scheduled area lies in field at the foot of a steep west-facing slope, currently set to grazing. The furnace consists of the circular hearth and bowl of the blast furnace, standing 2.3m high on the west side, and sloping down to the ground-level on the east side. The furnace, 3.5m in diameter, is constructed of black vitrified bricks with a massive “bear” or lump of slag from the first firing occupying the interior. The lower part of the furnace is made by corbelling out the courses of brickwork and probably survives roughly to the boshes. There was presumably a circular access gable, between the surviving part and the furnace casing, as on north and south furnace at Blaenavon. A spread of rubble of brick and stone surrounds the structure, while to its west is an area of grass-covered scree, 2.5m wide, 1 m high, of convex shape. A rocky slope to the east and north of the furnace has been cut back vertically to accommodate the furnace and enable it to be charged from above, so that it has the appearance of standing in a small quarry, and further south there is slag in the scree below the bank (SAM descriptions). The demolished remains of Old Furnace Row are located along the western boundary of the site.

The northern part of the ironworks core area contains Rhymney House (now the Rhymney House Hotel; Grade II Listed building Cadw ref: 13,549), a house of c 1800 of some architectural quality, thought to be an iron master’s house, and a range of industrial buildings, Granary Row (a possible forge and/or workshop with two dwellings at end, now known as Old Furnace Farmhouse; Grade II Listed building Cadw ref: 16,882) with a date stone of 1802. (This is also the date of the nearby Butetown houses). The latter two listed sites lie beyond the boundary of the scheduled area itself.

The dual site (IW015) of the Rhymney Lower Furnace and the Bute Ironworks was the subject of oil paintings by Penry Williams in 1825 and John Petherick c. 1830 (Lord 1998). These works depict the No.2 Furnace Rhymney and the striking furnaces of the Bute Ironworks, which were designed by McCulloch in the Ancient Egyptian Revival style for the proprietors William Thomas Foreman and Thomas Johnson, based on temples recently excavated at Danhydra in Upper Egypt. Unfortunately none of the spectacular structures depicted now survive above ground, as the area was totally redeveloped during the 20th century; the site is currently in use for light industrial purposes. Contemporary paintings by Penry Williams, c 1825 and John Petherick, c. 1830, depict the Ancient Egyptian inspired buildings of the Bute Furnaces with two impressive stacks designed as minarets. Petherick also painted the No.2 furnace on the opposite

side of the river (Lord 1998, pp 58-60). The western half of the site, ie the Bute Ironworks now forms part of the Capitol Valley Industrial Park, while the eastern (Rhymney Lower Furnace) has been developed as the Lawns Industrial Estate. While no above ground remains associated with the ironworks survive in this area, the survival of buried remains, in particular relating to the furnace banks should be born in mind. Buried remains relating to other features, such as puddling furnaces, mills, coke furnaces and ovens may also survive. It should however be noted that the site of the Rhymney Lower Furnace and the Bute Ironworks has undergone several phases of redevelopment, with the result that many of the earlier features of interest, which survived to be depicted on the 1st edition OS map, were altered by this process, with possible removal during later reclamation and redevelopment for modern light industrial purposes.

Historical Background

The Rhymney Ironworks has an interesting but complicated early history. The first ironworks to be built in the Rhymney Valley was the Union Ironworks (IW015a), which dates from 1800. The works received its name because the furnace was constructed at a point where the counties of Brecon, Monmouth and Glamorgan met. The partners in this enterprise were David Evans, Thomas Williams, John Ambrose and Richard Cunningham, this company being a Bristol based concern. One furnace was constructed and a 24in. x 5ft. Boulton and Watt beam blowing engine with a 55in. blowing cylinder was purchased to provide the blast. This engine was rated at 20 h.p. and was provided with a wooden beam.

In 1803 Richard Crawshay, Watkin George, Benjamin Hall, Richard Cunningham and Thomas Williams owned the works. At that time new furnaces (IW015) were being constructed further down the valley. It was intended that the output of these furnaces would supply the forges and mills of the Crawshays works at Cyfarthfa. In 1804 the Rhymney Ironworks, as it came to be known, was being operated by Crawshay, George and Hall, with Hall becoming the sole owner in 1810.

In 1825 Foreman & Co. purchased the ironworks for £147,000. Forman & Co. had earlier in 1824, constructed the Bute Ironworks (IW015) with three furnaces on the opposite bank of the River Rhymney. The Marquis of Bute, who was the landowner, had actively encouraged this development on a site opposite the Rhymney Ironworks. The partners in this enterprise had been William Forman, Thomas Seton Forman and Thomas Johnson.

From 1825 Forman & Co. operated both concerns as one works with the six furnaces producing 7,608 tons of iron in 1830. A second lease for the land that the ironworks stood on was granted to the Rhymney Iron Company in 1837. A further lease was obtained and a large-scale expansion programme was embarked upon by the company, which included the purchase of a 25in. x 8ft. beam engine from Harvey & Co. of Hayle and in the following year two 34in. beam engines were supplied from the same source. Over the following years a number of engines were purchased from the Neath Abbey Iron Company: an 18in. beam engine; two 15in. x 2ft. 6in. high-pressure beam engines; two 52 1/2in. beam blowing engines; a 38in. 'A' frame beam engine. This expansion included the construction of two further furnaces in 1839, and it thought that several rail mills formed part of the plans.

Furnace output at Rhymney increased to 106.4 tons each week in 1847 and by the end of the decade the Rhymney Ironworks operated ten furnaces although this was reduced to nine in the mid 1850s. For most of the 1860s seven furnaces were kept in blast with further machinery being

Southeast Wales Industrial Ironworks Landscapes

added to the works in 1865~67. In 1865 the St. Blazey Foundry, Cornwall, supplied a 70in. beam engine to the Rhymney Iron Company.

Rails were the main product of the Rhymney Ironworks with much of the output being exported. In 1872 ninety-two puddling furnaces and seven mills, were producing these rails. The title of the company was changed in 1874 to the Rhymney Iron Company Limited and in 1876 the decision was made to produce steel rails.

Bessemer converters were installed in 1877 with the machinery being built by Tannett & Walker of Leeds, the boilers constructed by Adamson and Company of Hyde and the engines built by Galloways of Manchester. It was estimated that the works would be able to turn out five hundred tons of steel rails each week. The Rhymney Ironworks was listed in 1878 as working three 7 ton Bessemer converters and two further converters were built in the following year to work with the Gilchrist Thomas process. To deal with the increased steel making capacity new reversing mill engines from Belgium were installed at the works in 1880. In 1884 the Rhymney Iron Company ceased making wrought iron.

A visit to the works by members of the Institution of Mechanical Engineers in 1884 records the works during this period of transition: three furnaces were noted at work on the Monmouthshire side of the river, blown by two engines. These masonry furnaces had been 42ft. in height but had been raised by 13ft. for the production of Bessemer pig. Materials were brought up to the furnace tops by means of two steam lifts. The site included rolling mills with a cogging mill, roughing down mill, and a finishing mill. On the Glamorgan side of the river were six furnaces whose height ranged from 45 to 60ft. Only two furnaces were in blast and these could be blown by three engines. On this side of the river stood an old rail mill containing a 30in. blooming mill, among other mills and structures.

The move to steel production however was unsuccessful and in around 1891 the Rhymney Ironworks gave up making steel rails with the furnaces and plant being dismantled. The company, however, did continue in operation but only as a coal mining enterprise (Ince 1993, pp 137-139).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the Rhymney Iron Company's Plans of 1837-53 (GRO D/D Rh1/1 and D/D Rh1/2) and the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

The core of the Rhymney Old Furnace, or Upper Furnace site (SAM Gm403) is protected by scheduling. However, the current overgrown state of the Furnace site itself indicates a potentially worsening threat from dereliction.

Further light industrial development is a potential threat to any surviving buried remains at the Rhymney Lower Furnace and Bute Ironworks site; future development within the area should be monitored and dealt with through the planning system.

Plate 010 Rhymney Old Furnace IW015a



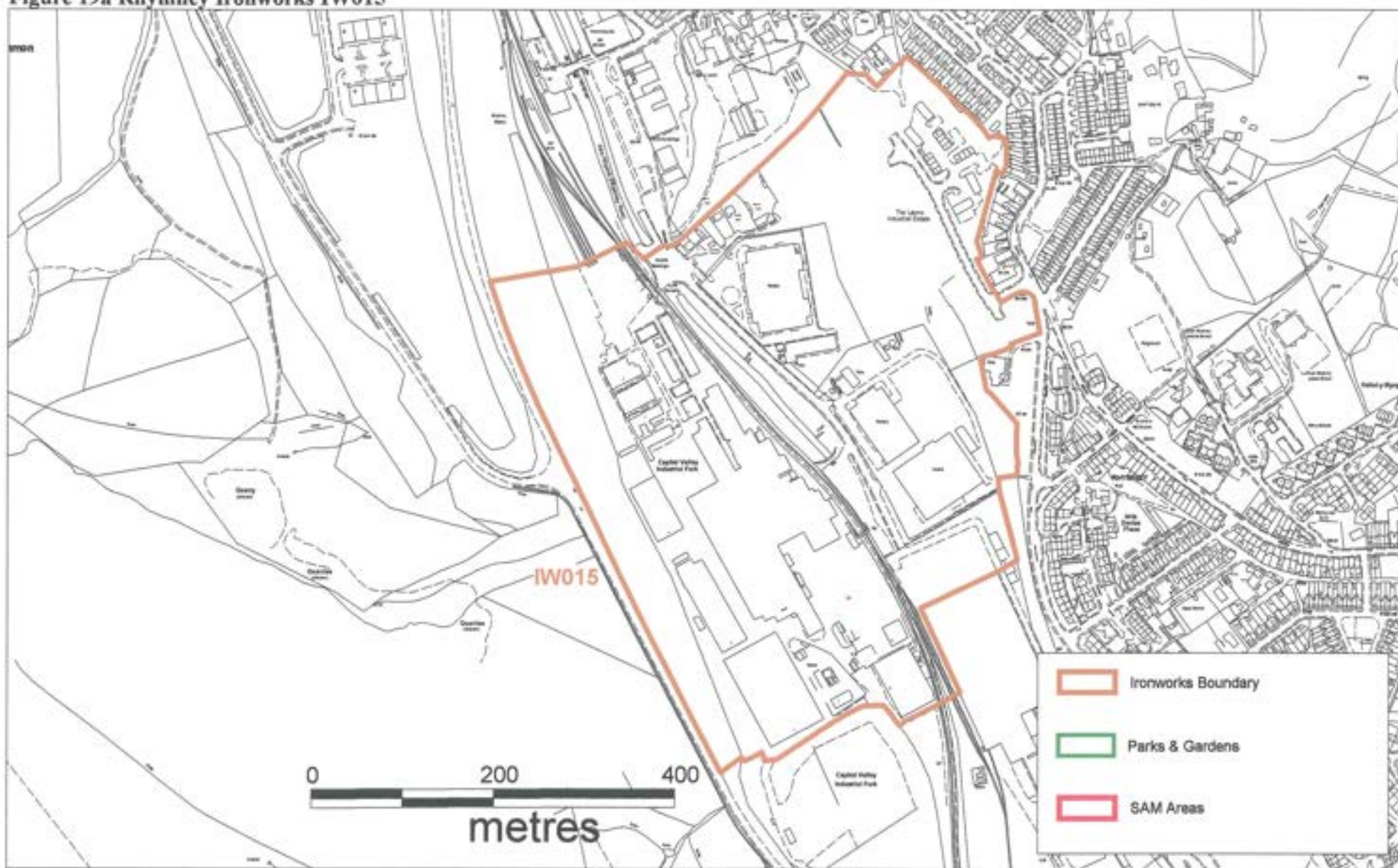
Plate 010: The scheduled Furnace site (SAM Gm403) at Rhymney Old Furnace (IW015a) view to northeast.

Plate 011 Rhymney Ironworks IW015



Plate 011: View across Rhymney Ironworks (IW015) view to southwest. Furnace bank site of the Rhymney Lower Furnace centre left.

Figure 19a Rhymney Ironworks IW015

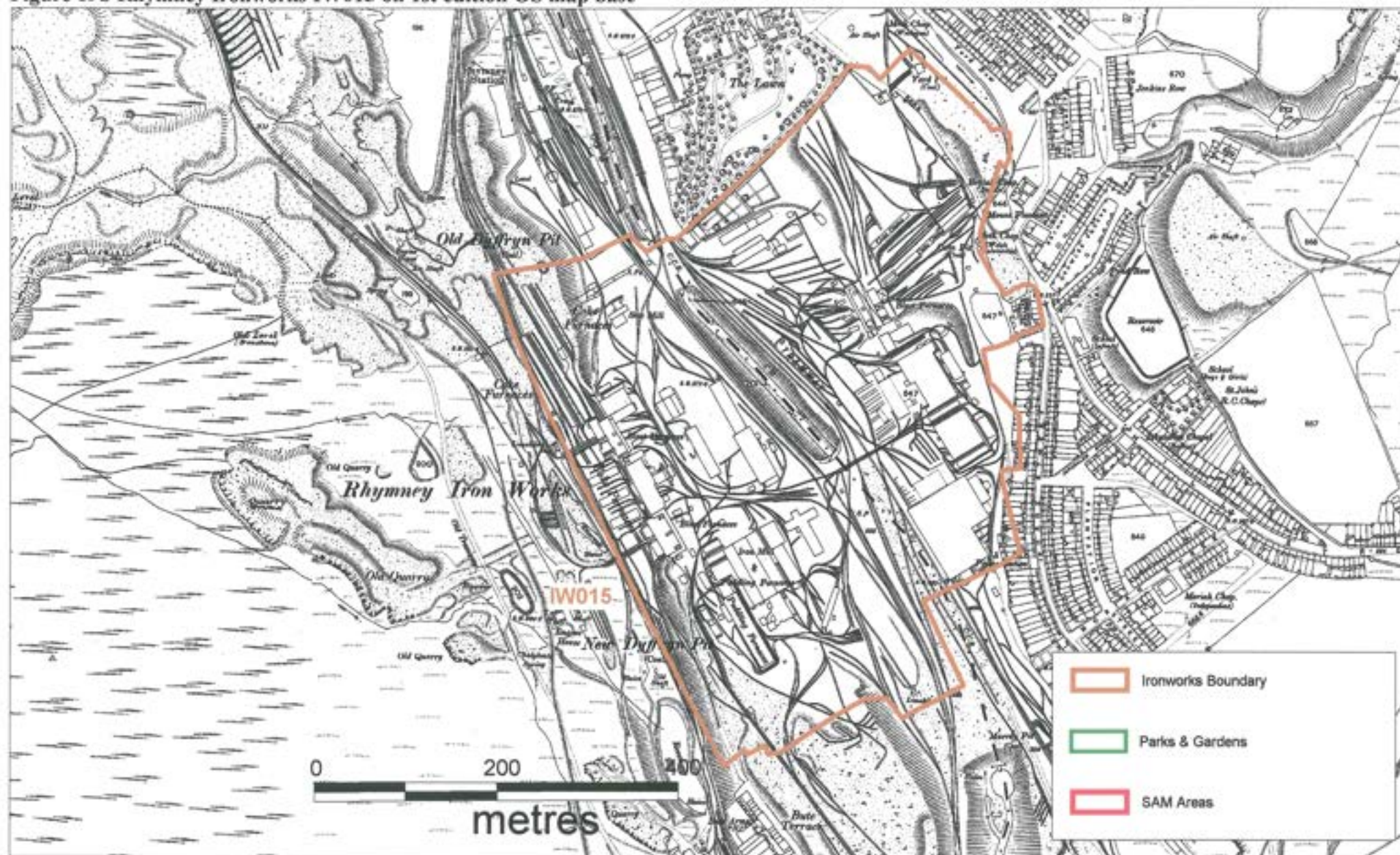


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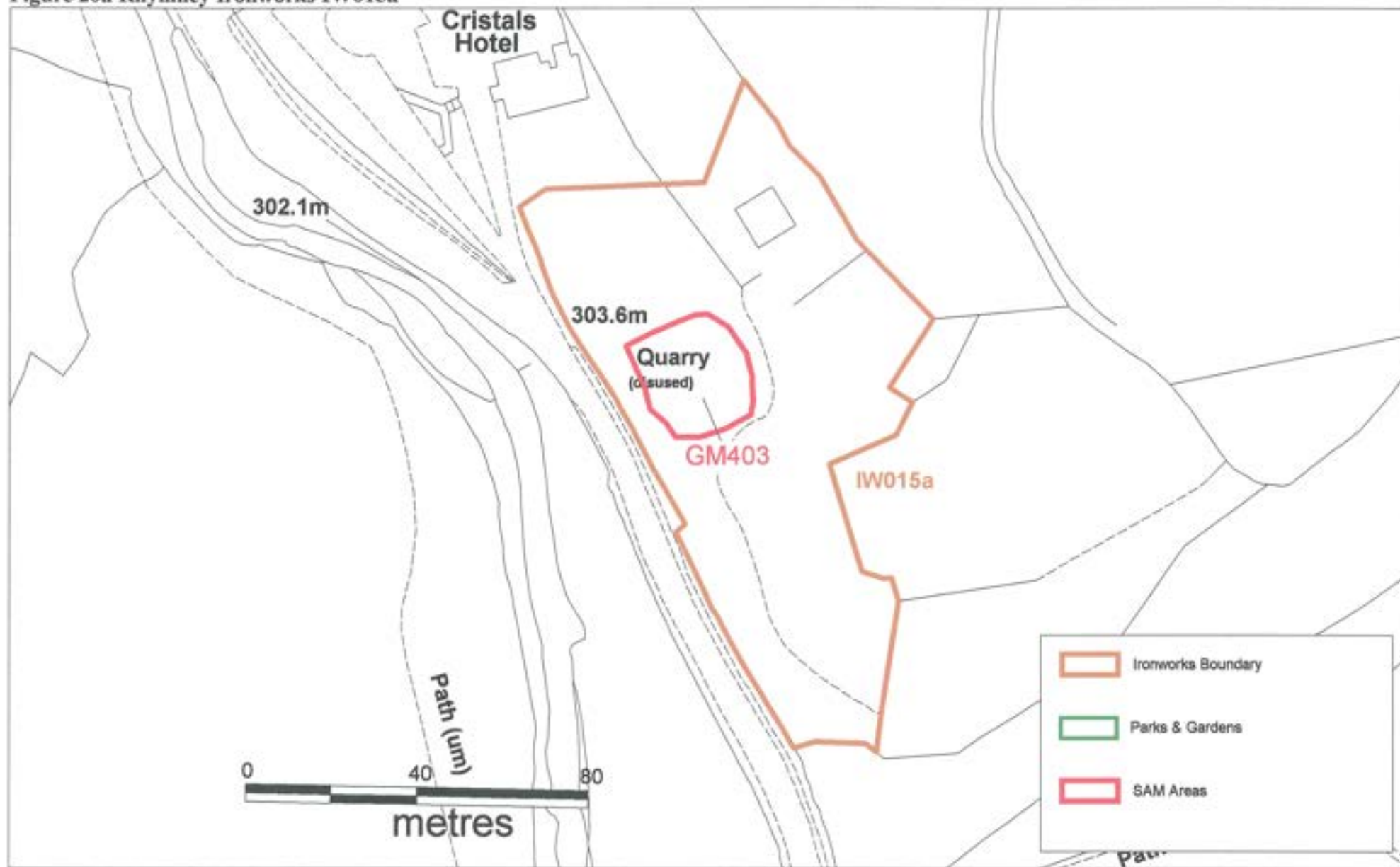
Figure 19b Rhymney Ironworks IW015 on 1st edition OS map base



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Figure 20a Rhymney Ironworks IW015a



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Figure 20b Rhymney Ironworks IW015a on 1st edition OS map base



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IW Number 016 Dyffryn Ironworks (01137m) SO 0690 0320

General Description

The Dyffryn Ironworks (PRN 01137m; NPRNs 40,447, 34,086 and 34,091) formed part of Anthony Hill's early 19th century expansion of the Plymouth Ironworks. While generally of historical interest, the works were notable for having some of the largest furnaces of its day and having two out of only four horizontal engines used for furnace blowing in South Wales. Unfortunately, the ironworks was dismantled in 1883, and its site redeveloped, cleared and landscaped during the 20th century. Currently the site forms the Linde Industrial Park, part of a wider area of Taff Vale Industrial and Business Parks.

The Dyffryn Ironworks area defined for the purpose of the current study comprises a core area containing the blast furnaces (four shown), engine house, smithies, shafts and industrial tramroads, as depicted on the 1st edition OS map. The area also includes the sites of the North Dyffryn and South Dyffryn Pits (part of) with their engine houses and shafts.

The Plymouth Works relied on waterpower, long after it had become obsolescent elsewhere and in order to reuse the water supply the works was forced to expand into three separate plants, the Plymouth Ironworks itself, Pentrebach Forge and Dyffryn furnaces being added. Steam power was finally introduced leading to a dramatic increase in output following the dry summers of 1843 and 1844. During the second half of the 19th century, obsolete technology and economics combined to the disadvantage of the works. A lack of capital to convert to steel production finally lead to closure in 1880s. By the survey date of the second edition OS map the ironworks is disused and its furnaces are depicted in a partly dismantled state. By 1919 the site of the former ironworks had been put to alternative uses: the Dyffryn Furnaces were now the Dyffryn Boiler Works, a single furnace at the south end of the former furnace bank remains, though the company continued to mine its vast reserves of coal, from the South Dyffryn and other pits.

The entire area was subject to reclamation during the 1970s and no standing remains associated with the ironworks are now visible, consideration should be given to the possibility that remains, such as the massively constructed furnaces bases, may survive in a buried state. Further work, however, will be required to establish this with any certainty.

Historical Background

The Dyffryn Ironworks was constructed as a subsidiary site to Anthony Hill's Plymouth Ironworks with its furnaces erected in 1819. Positioned along the River Taff like his other works, water was likewise extracted from the river and taken to each works through a feeder. The water was thus able to power waterwheels at each of the sites. While efficient use of water allowed Anthony Hill to postpone the adoption of steam power at his main works, he purchased a 52 1/2in. beam engine from the Neath Abbey Iron Company to provide the blast for the Dyffryn furnace.

In 1823 the three Plymouth furnaces produced 6,387 tons of iron. An additional furnace was built at the Plymouth Ironworks in 1825 and in 1826 the four furnaces produced 11,440 tons of iron with the two furnaces at Dyffryn producing 5,460 tons. An increase in production after 1825 was helped by mineral land speculation by the two younger Hill brothers in Cumberland, ensuring increased production with a third furnace being built at Dyffryn in 1827.

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The seven furnaces at Plymouth and Dyffryn were able to produce 18,852 tons of iron in 1830. A sale document for the works from 1834 gives us a detailed description of the Hill undertakings, which included seven furnaces, four at Plymouth and three at Dyffryn, these being capable of producing 500 tons of iron per week. At Plymouth the blast was provided by two waterwheels about 8ft. wide with a 28ft. head of water from the Taff. The Dyffryn furnaces received their blast from a 14ft. wide waterwheel with a 24ft. head of water and also a double acting 52½ in. x 8ft. beam blowing engine with a 122in. blowing cylinder. These sites also boasted thirteen running out fineries, a foundry with air furnaces, a cupola, stoves, a crane, a carpenters' shop, a smiths' shop, a lathe and two hundred workmen's houses. The brothers also owned a rolling mill and puddling forges worked by two waterwheels of 10ft. and 6ft. widths with a 24ft. fall of water and capable of producing three hundred tons of finished bars per week.

Expansion continued with a fourth furnace being built at Dyffryn during 1839. The furnaces at Dyffryn were a great attraction to visitors as they were some of the largest at work in South Wales. They were each 40ft. high with an 18ft. diameter in the boshes and a capacity of 7,000cu. ft. Each of these furnaces and the Plymouth examples were capable of producing 120 tons of iron per week. The Plymouth product was expensive but readily found a market because of the high quality of the iron manufactured by the Hills. Much of the iron produced was sold to chain and cable manufactures, The Plymouth Ironworks also produced large amounts of rail with no less than 40,000 tons being completed in 1846.

The reputation and successful marketing of the products from the Hill concerns allowed the partners to undertake a programme of expansion during the 1850s. In the early part of the decade two blowing engines were purchased. These were two out of only four horizontal engines used for furnace blowing in South Wales. Additional furnaces were also built, for the two works were operating nine furnaces by 1854, ten in 1856 and eleven in 1862. At this time the works were producing 40,000 tons of iron yearly.

Following the death of Anthony Hill, the works were sold to Fothergill, Hankey and Bateman, the principal partners of the Aberdare Iron Company in 1863, and later the Plymouth Ironworks and its subsidiaries were linked with Fothergill's Aberdare works. By 1865 Fothergill had modernised some of the plant at the works, although the furnaces continued to be blown by cold blast. Fothergill had reduced the number of furnaces in blast to ten, increased the number of puddling furnaces by eight, added more steam power, increased the speed of the blowing engines and purchased two steam hammers for the works.

There was some reduction in output during the late 1860s for in 1867 only seven out of the ten furnaces were in blast. The extent of the Plymouth undertakings can be gauged from a description of the works written in 1869. All the Plymouth Company's furnaces were about 40 to 50ft. high with 16ft. being the greatest diameter in the boshes. Weekly pig iron production was 90 to 110 tons per furnace using Welsh mine and haematite. The iron ore was calcined in kilns behind the furnace tops while the coal was coked in open clamps.

At the Dyffryn Ironworks were five blast furnaces and two refineries. The furnaces received a cold blast from two waterwheels, a 45in. horizontal engine with a 90in. blowing cylinder and a 52½in. beam blowing engine with a 122in. blowing cylinder (the Eolus engine). During the early 1870s the furnaces were modified for hot blast.

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During the period rail orders continued to be placed with the Plymouth Ironworks: large contracts were completed in 1872 for India, Canada and the Great Western Railway. However, the number of furnaces in blast was reduced to four and by 1874 only two furnaces were being worked. In 1875 the Aberdare and Plymouth Ironworks Company collapsed with the ironworks side of the business never to be reopened. The works were put up for sale in 1882 but no purchaser was found and in the following year the dismantling of the buildings at Dyffryn as elsewhere over the immense Plymouth undertakings, commenced (Ince 1993, pp54-57).

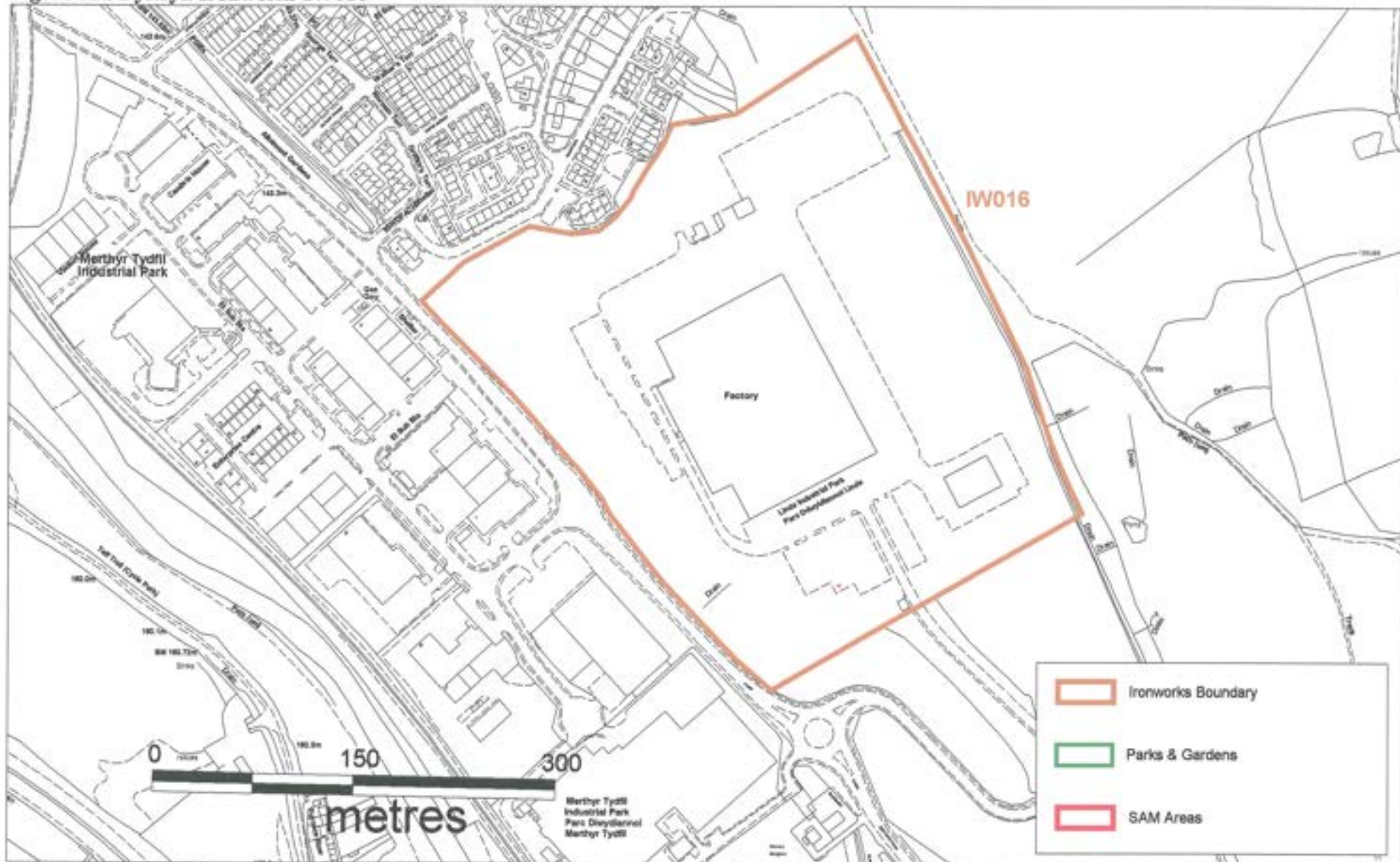
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of business development and leisure park, known as Lower Pentrebach (Site PD12).

Figure 21a Dyffryn Ironworks IW016



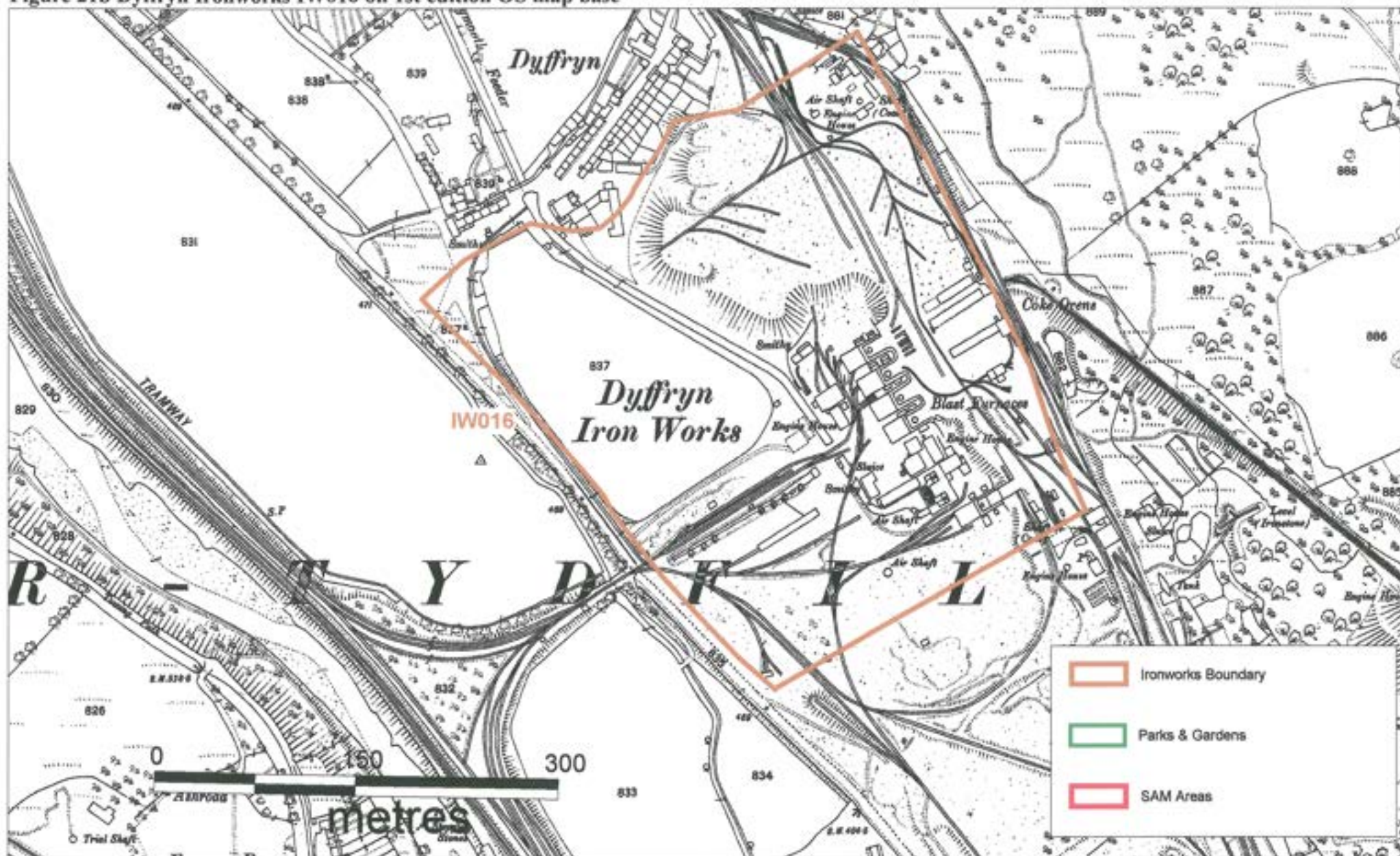
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Figure 21b Dyffryn Ironworks IW016 on 1st edition OS map base



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IW Number 017 Pentrebach Ironworks SO 06100 04100

General Description

The Pentrebach Ironworks (NPRNs 91,542 and 91,544) formed part of Richard and later Anthony Hill's expansion of the Plymouth Ironworks during the early 19th century. The site, of historic interest for being an integral part of the Plymouth Ironwork associated with the Hill family, comprised a large scale complex of puddling furnaces and rolling mills associated with the Plymouth Ironworks. Also within the area was part of the Plymouth feeder (91,542) and industrial railway/tramroads associated with the works. The complex was cleared after being dismantled in the 1880s, and a brick works constructed over the northern part of the site (1919 OS map). The entire area was subject to further reclamation from the 1970s when much of the surrounding industrial landscape was reclaimed including the Triangle, a group of significant industrial housing, and the Plymouth Works themselves. The area subsequently has been thoroughly reclaimed and redeveloped with new infrastructure and has been given over light industrial and retail use and now forms part of the Triangle Business Park. No standing remains are visible and the quality of any buried remains in the area is unknown; however, the likelihood of good survival is considered low.

Pentrebach House (Grade II Listed Cadw ref: 11503 and 11504), Now Old People's Home, is located just to the south of and beyond the area identified for the purpose of the current report; this associated site was built c. 1850, for Anthony Hill, owner of Plymouth Ironworks and is one of three remaining ironmaster's houses in South Wales.

Historical Background

The Pentrebach Ironworks was constructed as a subsidiary site to Anthony Hill's Plymouth Ironworks and appears to have been purpose built as a puddling and milling complex. The Plymouth Works relied on waterpower, long after it had become obsolescent elsewhere and in order to re-use the water supply the works was forced to expand into three separate plants, the Pentrebach Forge and Dyffryn furnaces being added. Steam power was finally introduced leading to a dramatic increase in output following the dry summers of 1843 and 1844.

In 1803 Anthony Hill went into partnership with John Nathaniel Miers and Amos Strutt; Miers, and new investment financed the construction of the subsidiary works at Pentrebach to the south of Plymouth where puddling furnaces and a rolling mill were erected.

The works were expanded and by 1830 there were seven furnaces at Plymouth and Dyffryn, with an annual production of 18,852 tons. Expansion continued with a fourth furnace being built at Dyffryn during 1839. Though the Plymouth product was expensive it readily found a market due to the high quality of the iron manufactured. Much of the product was sold to chain and cable manufactures, though the ironworks also produced vast quantities of rail with 40,000 tons being completed in 1846. During the 1850s further expansion was facilitated through successful marketing; additions included horizontal blowing engines and additional furnaces at the main works, increasing the number of furnaces in stages to eleven in 1862. At this time the works were producing 40,000 tons of iron yearly. Anthony Hill died in 1862 and in the following year the works were sold to Fothergill, Hankey and Bateman, principal partners of the Aberdare Iron Company. By 1865 modernisation had increased the number of puddling furnaces by eight, and the works employed 4,000 people and 360 horses. There were four forges and nine mills at the

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three sites capable of turning out bar iron of a diameter from 3/16 to 6in. There was some reduction in output during the late 1860s for in 1867 only seven out of the ten furnaces were in blast.

The scale of the Aberdare and Plymouth Ironworks Company's concern at Pentrebach can be gauged from a description of the works written in 1869. At Pentrebach there were seventy-four puddling furnaces, four forges and seven rolling mills. A 20ft. diameter waterwheel, which was 16ft. wide, provided power at the forges and a pair of 22in. steam engines was used for auxiliary power when water was short. Also the forges possessed a 27in. engine driving direct to rolls and a 60in. x 8ft. engine driving two pairs of forge rolls and two bar mills. There were present three steam hammers for beating the puddle balls, one being of Condie's patent design and also a squeezer. Two more hammers were in the course of erection. The seven rolling mills at Pentrebach were capable of producing 850 tons of finished iron per week. These included a rail and bar mill driven by a 27ft. diameter waterwheel. When water was scarce these mills were powered by a pair of 20in. x 2ft. inverted vertical engines installed and built by the Neath Abbey Iron Company in 1865. A 16in. engine powered a slitting mill and an 18in. x 2ft. engine powered bar mills. Two small mills were powered by a 23in. oscillating engine and there were several small engines for driving saws, presses, punches and shears.

Rail orders continued to be placed with the Plymouth Ironworks and its subsidiaries with large contracts being completed in 1872 for India, Canada and the Great Western Railway. However, the number of furnaces in blast was reduced to four and by 1874 only two furnaces were being worked. In 1875 the Aberdare and Plymouth Ironworks Company collapsed with the ironworks side of the business never to be reopened. The works were put up for sale in 1882 but no purchaser was found and in the following year the dismantling of the buildings commenced (Ince 1993, pp 54-57).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

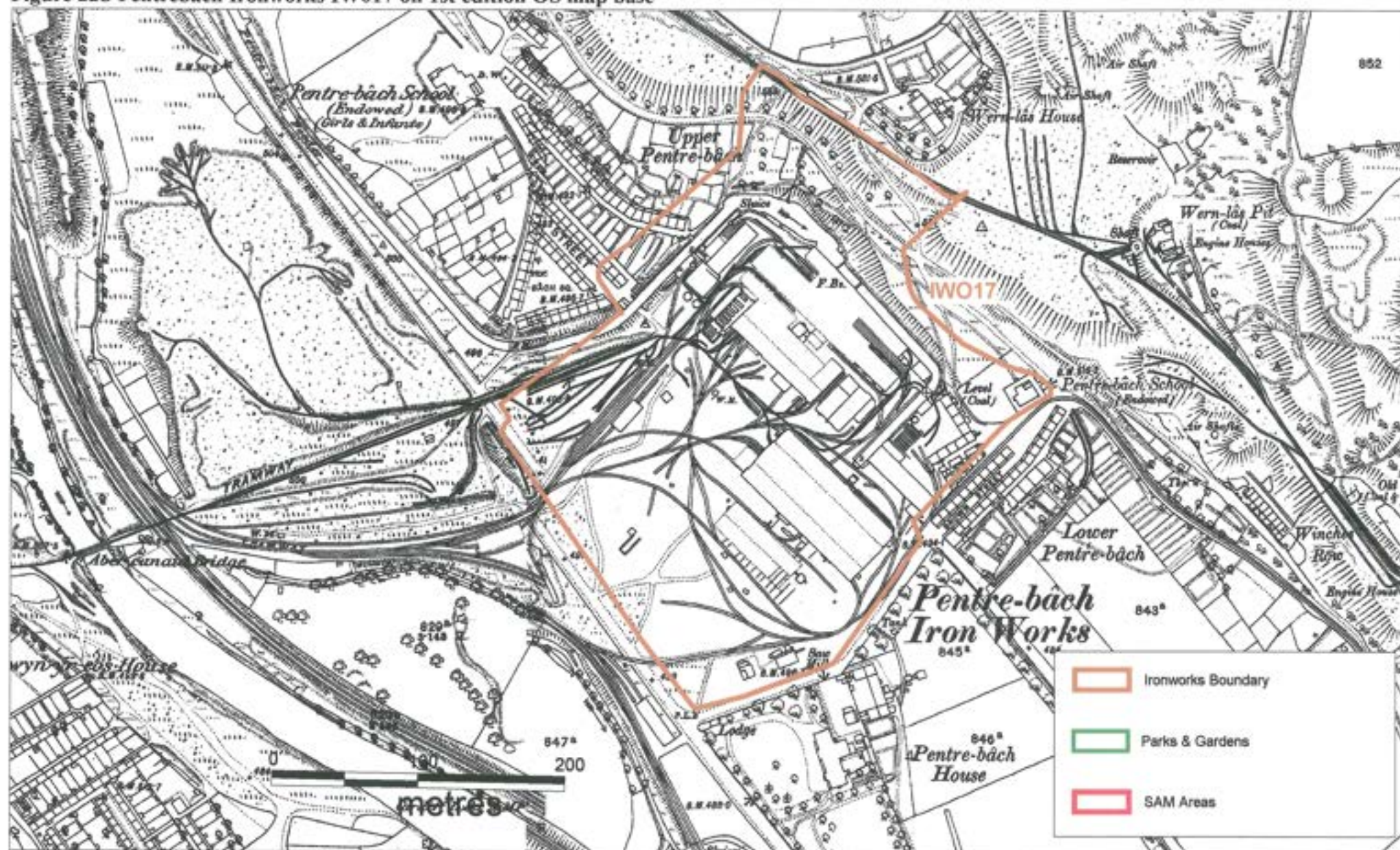
Threats to the area as identified from the UDP are in the form of Industrial improvements, known as Lower Pentrebach (Site PD12).

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Figure 22b Pentrebach Ironworks IW017 on 1st edition OS map base



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IW Number 018 Plymouth Ironworks SO05530500

General Description

The Plymouth Ironworks (NPRNs 34,853, 34,114, 34,105), the second ironworks built in the Merthyr Tydfil area, is of national and international historical significance not least for being developed by pioneering ironmasters such as Isaac Wilkinson and John Guest, and later Richard and Anthony Hill, but also for its association with Richard Trevethick and the first steam powered journey by rail on the Merthyr Tramroad (NPRN 91,513).

The Plymouth Iron Works, the northernmost and the earliest of the three Plymouth Iron Works sites, was founded in 1763 by Isaac Wilkinson and John Guest on land leased from the Earl Plymouth, and two years later sold to Anthony Bacon following an initial lack of progress. Control of the works fell to Richard Hill (d. 1806) following Bacon's retirement in 1783. The works remained in the Hill family until the death of Anthony Hill in 1862, when bought by Messers Fothergill, Hankey and Bateman. The Plymouth Works relied on waterpower, long after it had become obsolescent elsewhere and in order to re-use the water supply the works was forced to expand into three separate plants, the Pentrebach Forge (IW017) and Dyffryn Furnaces (IW016) being added to the south. Steam power was finally introduced leading to a dramatic increase in output following the dry summers of 1843 and 1844. During the second half of the 19th century, obsolete technology and economics combined to the disadvantage of the Plymouth Iron Works. The lack of capital to convert to steel production finally leads to closure in 1880; though the company continued to mine its vast reserves of coal.

Little is visible today of the main Plymouth Ironworks site (NPRN 34,114), the site, dismantled in the 1880s, was largely reclaimed and landscaped during two major reclamation schemes carried out in 1974. The major exception being the tramroad tunnel also known as Trevethick's Tunnel (NPRN: 34,853; NGR SO05600482), which carries the former Merthyr Tramroad (NPRN 91,513) under the site of the ironwork's charging bank. This was the first railway tunnel used by a railway locomotive; the original tunnel has been extended to the south. The northern end is buried and both tunnels are currently inaccessible, but the south portal of the later tunnel has been retained as a feature and 'restored', with new stonework, steel grille, mosaic blocking wall and flooring.

Though reclamation has removed much of the standing structures on the site, it is considered that buried remains relating to the furnace bank may also survive, albeit in reduced state, in particular the bases of the furnaces themselves, which were of substantial construction. In addition to the furnace charging bank site (NPRN: 34,853) with its Railway Tunnel for the Merthyr Tramroad (NPRN 91,513), the Ironworks area also contained the site of the earlier Nant Cwm Blacks Furnace (NPRN: 34,105; NGR SO05550505), the original ironworks founded in 1763 by Isaac Wilkinson and John Guest on land leased from the Earl of Plymouth. While the site of Penyard Row (NPRN: 19,262; PRN 02459m; NGR SO 057049); a terrace of early industrial housing dating to before 1803 (originally 8 single storey houses) and associated with Plymouth and Pen y Darren Works, has also been included in the area. The latter two sites, like the main furnace bank (NPRN 34,853) have been demolished, their sites reclaimed and in part redeveloped. The existence/quality of any buried remains associated with these features is unknown.

Historical Background

The Plymouth Ironworks was founded in 1763 by Isaac Wilkinson and John Guest on land leased from the Earl of Plymouth. This was the second ironworks to be constructed at Merthyr Tydfil. The enterprise did not prosper although it was calculated that the furnace could produce 14 tons of pig iron per week. For each ton of iron produced it was calculated that it would take 5 tons of coal and 3.5 tons of ironstone. In 1766 the Plymouth ironworks was sold to Anthony Bacon who used it mainly to supply pig iron to his Cyfarthfa ventures. On the death of Anthony Bacon in 1788 the lease of the works was granted to Richard Hill. When Hill took over the works it consisted of a small furnace blown by bellows and a waterwheel.

By the mid 1790s the furnace at the Plymouth Ironworks could produce about 2,200 tons of iron in a year with most of this being sold to the Cyfarthfa Ironworks. The main works was enlarged as a result and in 1805 there were three furnaces at the Plymouth Ironworks, which produced 5,789 tons of iron during the year and 5,928 tons in the following year.

Despite the furnaces remaining waterwheel blown, output at Plymouth was pushed up to 7,800 tons of iron in 1815. In 1823 the three Plymouth furnaces produced 6,387 tons of iron. An additional furnace was built at the Plymouth Ironworks in 1825 and in 1826 the four furnaces produced 11,440 tons of iron.

The seven furnaces at Plymouth and Dyffryn were able to produce 18,852 tons of iron in 1830. The sale document from an attempted sale of 1834 provides a detailed description of the Hill undertakings at the time. The main Plymouth property comprised four furnaces, capable of producing 500 tons of iron per week, the blast was provided by two waterwheels about 8ft. wide with a 28ft. head of water from the Taff. The combined Plymouth and Dyffryn sites also boasted thirteen running out fineries, a foundry with air furnaces, a cupola, stoves, a crane, a carpenters' shop, a smiths' shop, a lathe and two hundred workmen's houses. The brothers also owned a rolling mill and puddling forges worked by two waterwheels of 10ft. and 6ft. widths with a 24ft. fall of water and capable of producing three hundred tons of finished bars per week.

The reputation and successful marketing of the products from the Hill concerns allowed the partners to undertake a programme of expansion during the 1850s. In the early part of the decade two blowing engines were purchased. These were two out of only four horizontal engines used for furnace blowing in South Wales. Additional furnaces were also built, for the two works were operating nine furnaces by 1854, ten in 1856 and eleven in 1862. At this time the works were producing 40,000 tons of iron yearly.

From 1863 the Plymouth Ironworks and its subsidiaries were linked with Fothergill's Aberdare works through sale. By 1865 Fothergill had modernised some of the plant at the works, although the furnaces continued to be blown by cold blast. Fothergill had reduced the number of furnaces in blast to ten, increased the number of puddling furnaces by eight, added more steam power, increased the speed of the blowing engines and purchased two steam hammers for the works. There were four forges and nine mills at the three sites capable of turning out bar iron of a diameter from 3/16 to 6in. Nearly the whole of the mineral ground was drained by an engine, which was built in around 1852. This was an 85in. x 11ft. Cornish beam engine built by the Perran Foundry, which in 1865 was working at 25 psi making 3 to 6 strokes per minute while raising 134 gallons each minute.

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There was some reduction in output during the late 1860s for in 1867 only seven out of the ten furnaces were in blast. The extent of the Plymouth undertakings can be gauged from a description of the works written in 1869. Six locomotives conveyed materials at high level from the pits to the works while on the lower level six tank engines on a 4ft. 8½in. gauge line transported materials to the Taff Vale Railway siding. All the Plymouth Company's furnaces were about 40 to 50ft. high with 16ft. being the greatest diameter in the boshes. Weekly pig iron production was 90 to 110 tons per furnace using Welsh mine and haematite. The iron ore was calcined in kilns behind the furnace tops while the coal was coked in open clamps. At the Plymouth Ironworks there were five furnaces with three of them in blast. The furnaces were blown with a cold blast provided by two waterwheels working four 66in. blowing cylinders, a 45in. horizontal engine with a 90in. blowing cylinder and a 52½in. beam engine with a 122in. blowing cylinder. There was no blast regulator as the blast was equalised by the number and size of the blast pipes.

Rail orders continued to be placed at the Plymouth Ironworks with large contracts being completed in 1872 for India, Canada and the Great Western Railway. However, the number of furnaces in blast was reduced to four and by 1874 only two furnaces were being worked. In 1875 the Aberdare and Plymouth Ironworks Company collapsed with the ironworks side of the business never to be reopened. The works were put up for sale in 1882 but no purchaser was found and in the following year the dismantling of the buildings commenced (Ince 1993, pp 53-57).

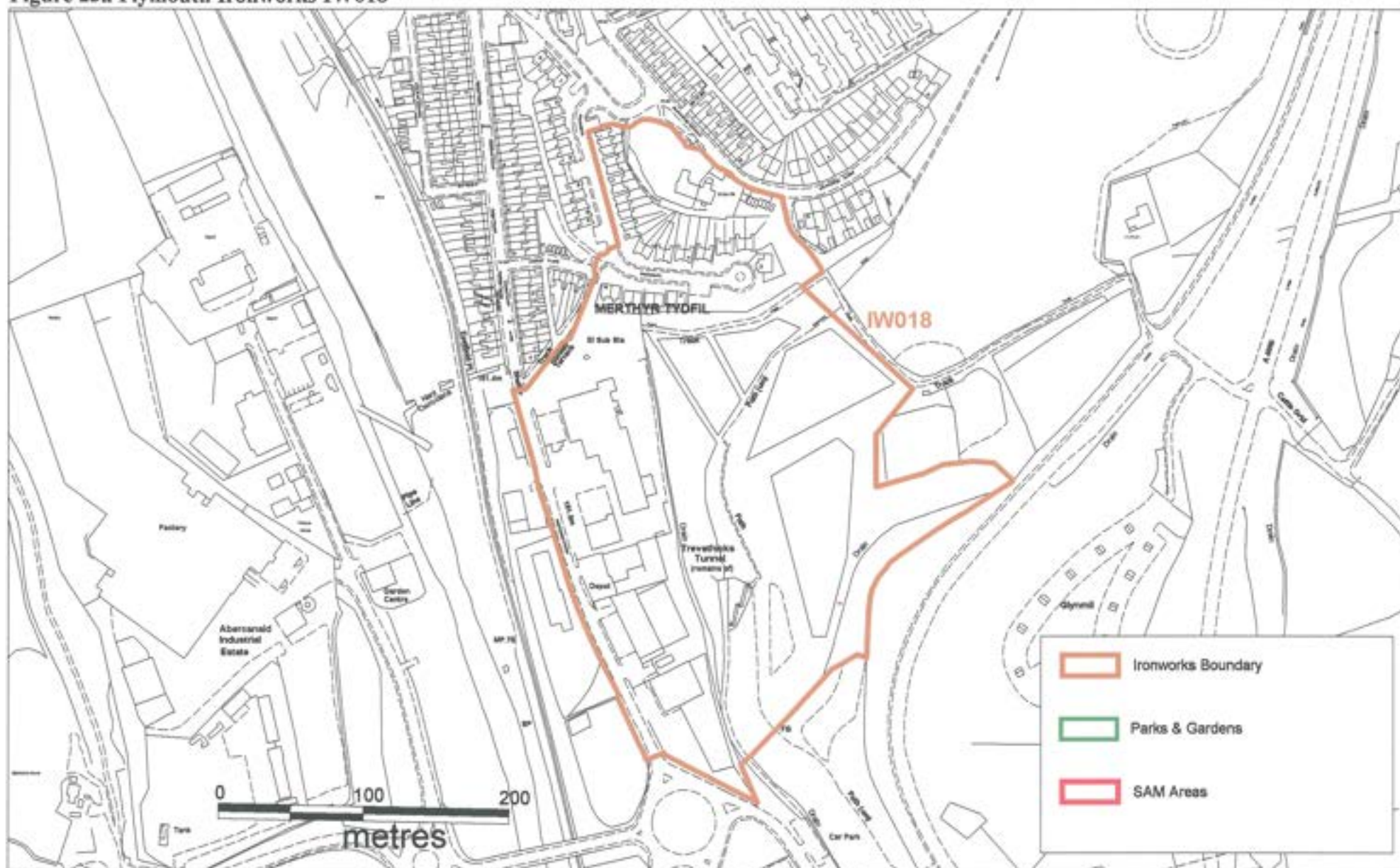
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on estate and other plans, including the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of Business development and industrial development specifically known as E4 and E4a Reclaimed land site for the Dragonparc development.

Figure 23a Plymouth Ironworks IW018

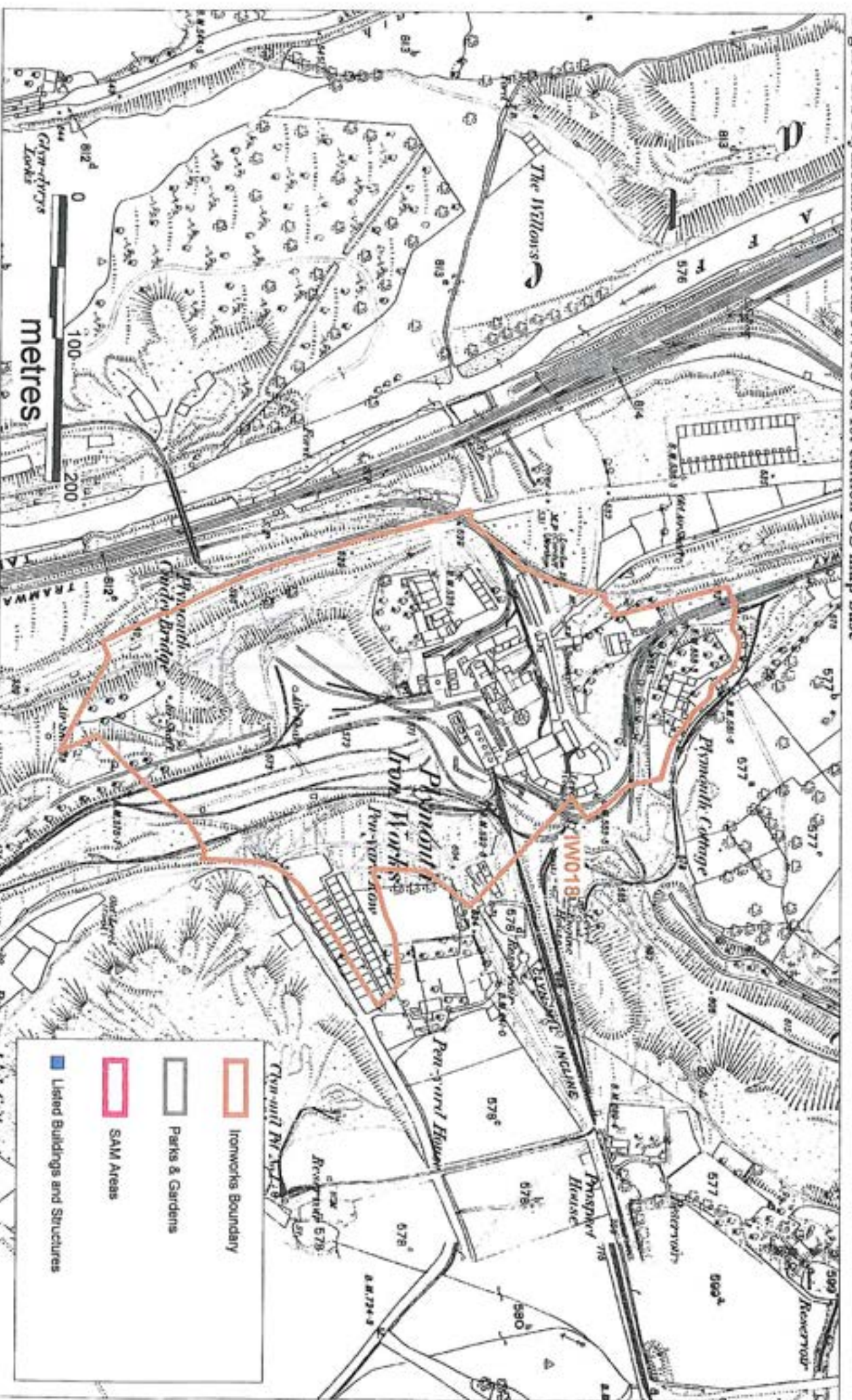


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Figure 23b Plymouth Ironworks IW018 on 1st edition OS map base



metres

- Ironworks Boundary
- Parks & Gardens
- SAM Areas
- Listed Buildings and Structures

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IW Number 019 Ynys Fach Ironworks (00964m and 01263m) SO04550605

General Description

The Ynys Fach Ironworks (NPRNs 31; 33,724; and 34,122; PRNs 00964m and 01263m; SAM Gm331), is a nationally important ironworks of early 19th century foundation and is a well presented and interpreted site with good survival of both standing structures and buried remains which extend beyond the area currently protected through legislation (ie beyond the SAM area).

The impressive remains at Ynys Fach represent one of the better-preserved 19th century ironworking complexes still visible within the Merthyr Tydfil area. The site is noted for its association with the early ironworking dynasties of Merthyr Tydfil and experienced expansion under Richard and William Crawshay. It is also noted for being the second in the area to employ steam-blowing engines. However, the site has always played a secondary role to the main works at Cyfarthfa.

For the purpose of the current study the Ironworks site comprises not only the scheduled (SAM Gm331) area, but also the immediate surrounding area. The scheduled area takes in the remains of the blast furnaces (PRN 01263m), a block of 4 furnaces with an engine house freestanding at the N end. The arches have been blocked with brick. Over the third from the engine house is a cast iron plaque inscribed 'WC 1836'. The Furnace block survives in generally good condition, though further remedial work to the masonry of may be necessary to guard against water ingress. The extension of the previously conserved and presented area might be considered for the future. The educational and tourism potential value of the area would benefit from enhanced presentation, perhaps through on site information panels and improved access.

The other main standing structure within the core area is the impressive listed engine house (Grade II* Cadw ref 16073; PRN 01623m; NPRN 33,724), currently in excellent condition, having been restored by the Merthyr Heritage Trust. This engine house was built c. 1836 to replace an earlier one depicted in c. 1815 by an important local artist, Penry Williams. Merthyr College of Further Education (modern five-storey concrete slab structure of 1950-2, by Yorke, Rosenberg & Mardall) is located over much of the remainder of the area.

Historical Background

The initial development within the historic landscape area of Ynys Fach Iron Works Area emerged as direct result of the American War of Independence (1776-1783), when a foundry was established to cast cannon and cannonballs. Francis Homfray leased the foundry in 1782 to cast cannon from pig iron supplied by the nearby Cyfarthfa Furnace, but was soon after succeeded by Richard Crawshay of Normanton, Yorkshire, who later gained control of the Cyfarthfa Works themselves. The Ynys Fach Iron Works opened as an extension to Crawshay's Cyfarthfa works in 1801 and despite being the second in the area to employ steam-blowing engines, after Dowlais, it generally played a secondary role to Cyfarthfa.

Two furnaces put in blast in 1801, increasing to four in 1805, when it produced 10,460 tons of iron. Expansion continued for in 1807 there were six furnaces at the two sites, two rolling mills and four steam engines (50h.p., 40h.p., 12h.p. and 7h.p.) During the period, Cyfarthfa was the largest of the Merthyr Ironworks and by all accounts the largest ironworks in the world. Crawshay's partner Watkin George supplied much of the necessary engineering expertise for the development of the Cyfarthfa, and its subsidiary Ynys Fach Ironworks. Both Cyfarthfa and Ynys

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Fach suffered following the end of the Napoleonic Wars, though conditions gradually improved from around 1817. By 1823 there were eight furnaces in blast at the Crawshay's concerns producing 24,200 tons of iron. A ninth furnace was added in 1824 and in 1830 the nine furnaces produced 29,000 tons of iron. Expansion continued during the 1830s and in 1839 work commenced on the construction of two more furnaces at Ynys Fach and in 1840 a 52 1/2in. beam blowing engine was bought from the Neath Abbey Ironworks to provide the blast.

When steel production started at neighbouring Cyfarthfa in 1884, the four blast furnaces at Ynys Fach were relined and kept in reserve, in case of a renewed demand for iron. However, it is considered unlikely that the furnaces were ever put back in blast (Ince 1993, p 63).

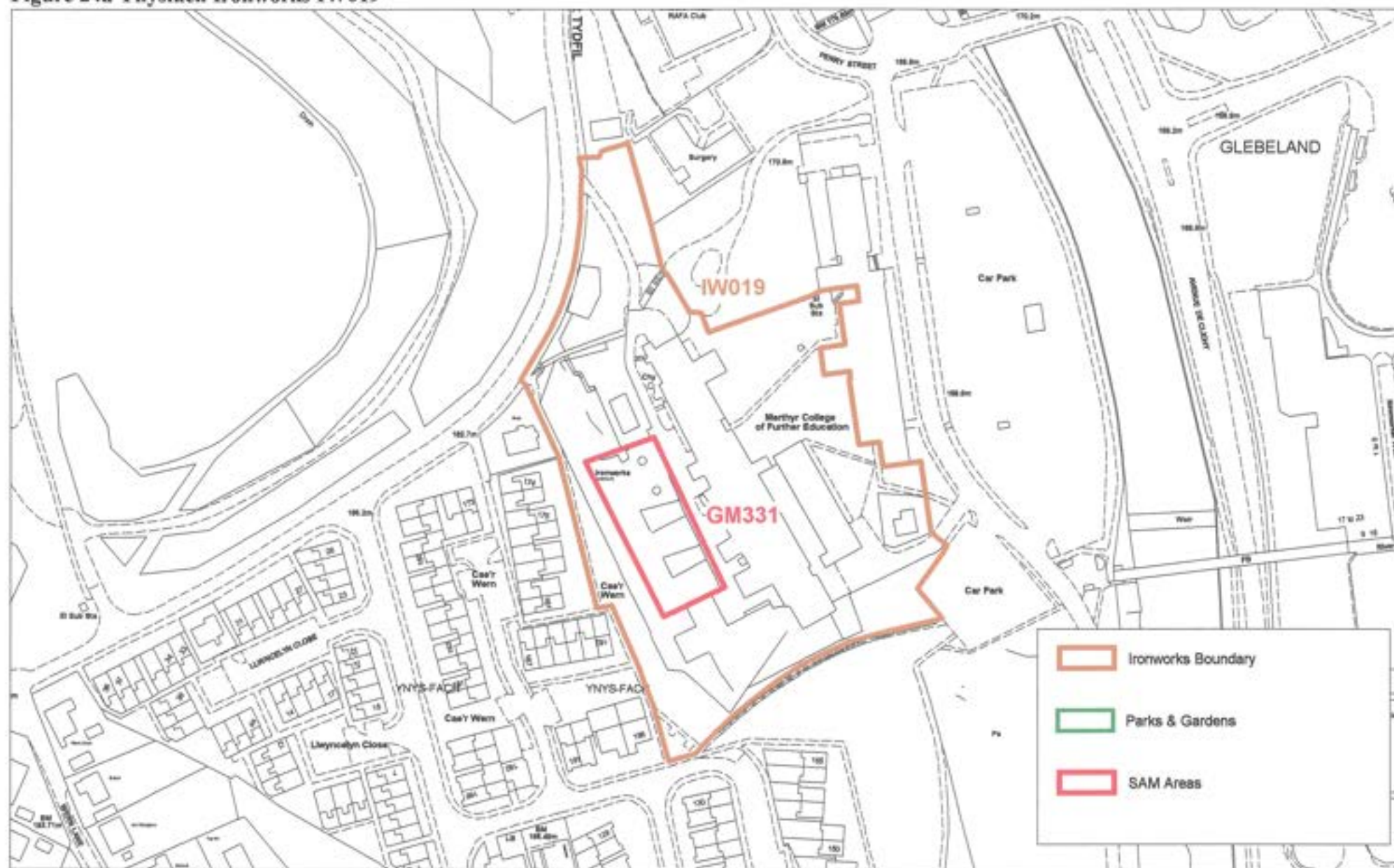
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on estate and other plans, including the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of development proposals for business and leisure use, this relates mainly to the adjacent area to south, the Rhydycar Site, rather than the ironworks core area itself: the Rhydycar area is to be reclaimed and recontoured and developed for business use (PD1).

Figure 24a Ynysfach Ironworks IW019

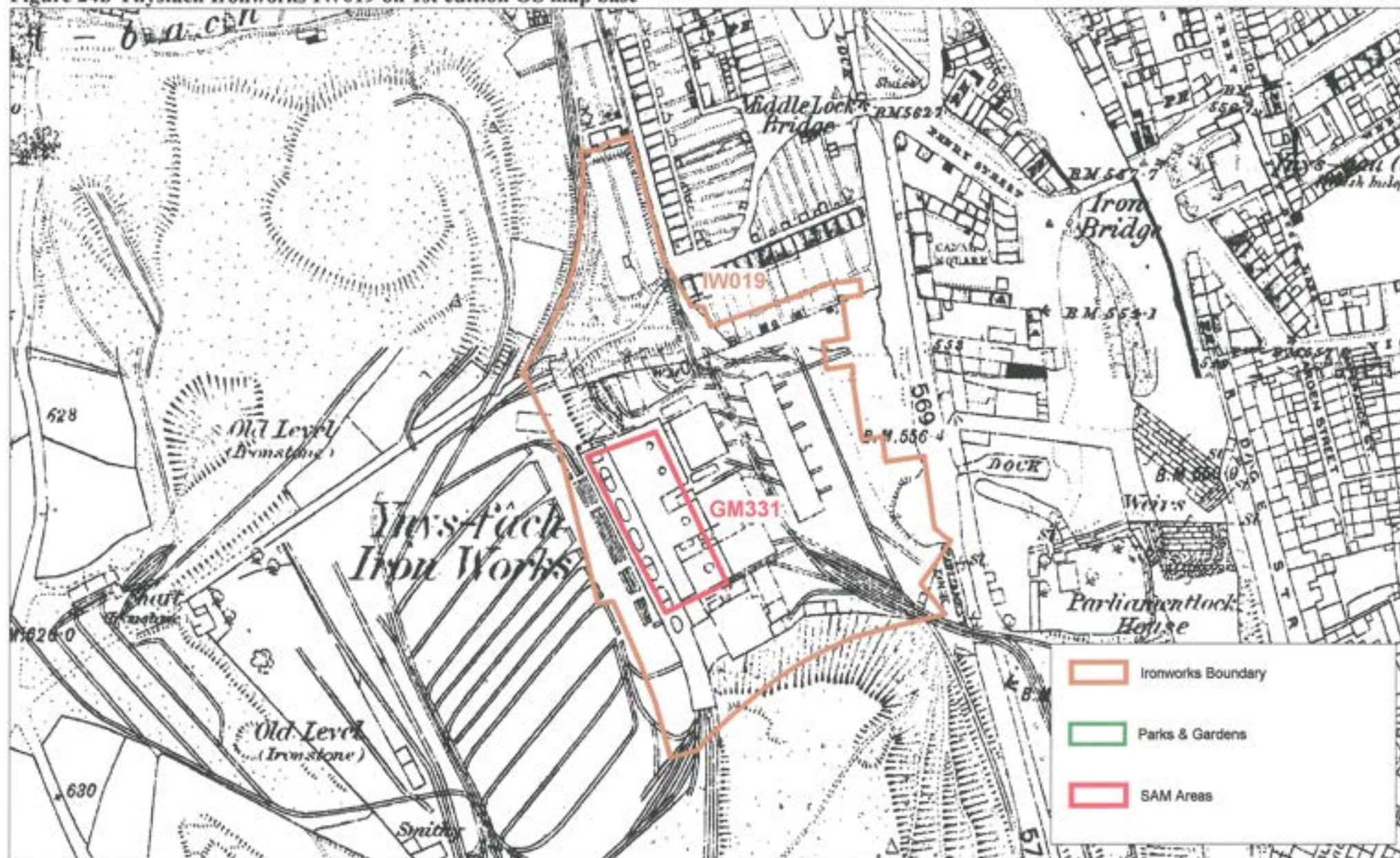


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Figure 24b Ynysfach Ironworks IW019 on 1st edition OS map base



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IW Number 020 Cyfarthfa Ironworks (01169m) SO 038069

General Description

The Cyfarthfa Ironworks (NPRNs: 34,078–34,080; PRN: 01169m) is a nationally and internationally important ironworks site, a large section of which is protected by legislation. These include the recently restored furnace bank, water management features and associated transport network. The main ironworks area contains the remains of the furnace bank (PRN: 04960m; NPRN: 275,868), a run of six stone blast furnaces, first blown in 1765 and in use until 1872, notable for their size and extent, brick kilns (PRN: 02370m; NPRN: 34,081), and engine house (PRN: 02372m; NPRN: 34,082), together with the remains of the melting house (PRN: 02373m; NPRN: 34,083) and boiler (all within SAM Gm425). Also included in the area is the Tai-mawr leat (SAM Gm479; PRN: 02435.0m; NPRN: 275,881) to the northwest of the furnaces and Pont-y-Cafnau Iron Bridge (SAM Gm424; PRN: 01090m; NPRN: 34,860; Grade II* Listed Building: Cadw ref: 11,408), a cast iron tramroad bridge, thought to be of c1794, and possibly the world's first iron railway bridge.

The Grade II Listed structures (Cadw refs: 11,404 – 11,407) of the associated Pandy Farm (Farmhouse, clocktower and barn: PRNs 01987m; 01988m and 01989m, respectively; NPRNs: 19,563; 19,564; and 37,630, respectively) have also been included within the area, as have the coke ovens and yard (PRN 04961m), smithy (PRN: 04962m), and a tramroad bridge (NPRN: 300,263) over the river Taff at SO 03930686, all of which are outside the currently scheduled areas.

Adjacent related features include the scheduled Cyfarthfa Feeder Canal and the Gurnos Tramroad (SAM Gm478) located to the north; these have been excluded from the core ironworks area, as part of a wider extensive ironworks landscape comprising transport, water management, and extractive features.

Cyfarthfa, the fourth coke-fired ironworks to be founded in South Wales, is recognized as being a nationally and internationally important for its historic associations and having played a key role in the development innovations in iron production technology, such as Cort's puddling process. The site is generally well presented and interpreted with good survival of both standing structures and buried remains, which may extend beyond the area currently protected through legislation (ie beyond the SAM area).

The exposed standing remains within the scheduled area are generally in excellent condition, though remedial work to the masonry may be necessary to guard against water ingress. A programme of conservation and presentation, including excavation is currently being devised for the main scheduled area.

Cyfarthfa Iron Works is the site of the ironworks founded in 1765 by Anthony Bacon, a native of Cumberland, and his partner William Brownrigg. The works initially operated a single furnace and concentrated on the production of pig iron. Following Bacon's retirement in 1783, Richard Crawshay gained control of the Cyfarthfa Works. Thereafter the works remained in the Crawshay family, passing from Richard Crawshay, who died in 1810 to William Crawshay I, who directed operation from his London office, while the day to day management, including the great expansion of the works fell to William Crawshay II, and was responsible for the building of the nearby Cyfarthfa Castle in 1825.

The works at Cyfarthfa was the first in the area to change to the production of bar iron, which ultimately led to Cyfarthfa becoming the largest Ironworks in the world by 1806. Instrumental in adopting Cort's puddling process soon after it was patented in 1784 were William Crawshay in partnership with George Watkin, foundry manager, perhaps most notable for his involvement in the design of several of the area's early cast-iron bridges, including the surviving Pont-y-Cafnau. Cyfarthfa was forced to buy in supplies of pig iron from both Dowlais and Plymouth for refining to maintain its production of bar iron.

The layout of the works at the time is detailed in a view drawn c. 1800 by William Pamplin; this shows four furnaces and associated charging houses and casting sheds used in the production of pig iron, and the 48ft diameter waterwheel which powered the bellows. Immediately to the north is a large building with numerous chimneys housed the puddling furnaces and rolling mills. The early 19th century layout of the works and its associated features appears on OS maps and surveyors drawings of the period. Also detailed are tramroads leading to the Glamorganshire Canal.

The works benefited from the upsurge in railway construction during the 1830s and 1840s, and in 1833 a new mill was built as a result, however shrinking export markets, among other difficulties were to effect the second half of the 19th century. Robert Thompson Crawshay could see no future in the iron industry by 1864 and only with great reluctance renegotiated the Cyfarthfa lease. Though production reached a peak in 1871, the period was marked by boom-bust and labour relations problems. One strike in particular begun in April 1874 over wage reductions lasted over a year, while the furnaces remained out of blast until 1879 and death of Robert Thompson Crawshay.

The ironworks was shown in detail on the OS maps of 1875 and 1878 located either side of the river Taff connected by two tramroad bridges, in addition to Pont-y-Cafnau. Notable features extant at the time, apart from the blast furnaces, were casting sheds, a smithy, and a coke yard (similar to that illustrated by Pamplin in 1800) with extensive coke ovens to the rear of the charging bank and the Tai-mawr leat to the northwest of the works.

The conversion to steel began shortly afterwards with the construction of four new iron clad furnaces, and steel production started in 1884 under Robert Thompson Crawshay's three sons, trading under the name of Crawshay Brothers (Cyfarthfa) Ltd. Cylindrical iron clad furnaces were erected before the former ironworks blast furnaces. An important feature of the period was the linear slag tip leading northwest along the west bank of the Taff Fawr dating to c. 1884. Other changes included a new range of coke ovens with alterations to the configuration of the coke yard. In 1902, an ailing Cyfarthfa works was acquired by GKN. In spite of additional investment, the works proved unprofitable and production ceased in 1910, with a brief reprieve during the First World War.

The need for both water and limestone at the Cyfarthfa Ironworks necessitated the construction of a combined packhorse or plateway bridge and aqueduct, Pont-y-Cafnau, during the 1770s this would have been of wood; sketches by JMW Turner in 1797 depict the elevated wooden aqueduct, which formerly fed a great water wheel known to have been in use from 1796. A lease of 1771 secured the right to quarry limestone from the Gurnos Quarry and the Gurnos Tramroad had been built by 1792-3. The present Pont-y-Cafnau Iron Bridge, depicted in a painting of c.

1819/20 by Penry Williams, is thought to date from this period, or shortly after, c. 1793. The layout of the features of the area is detailed by 1875 OS map which also depicted the Cyfarthfa Feeder Canal and the leat approaching from a weir (possibly that built in 1766-77) on the Taff Fechan, outside the ironworks area to the north.

Historical Background

The foundation of the Cyfarthfa Ironworks dates from a lease granted in 1765 to Anthony Bacon and William Brownrigg. A furnace was completed in 1767: some 50ft. high and 38ft. square. A forge was also erected at Cyfarthfa to make wrought iron using the stamping and potting process. There was also a boring mill at Cyfarthfa, which was used for making cannon.

An important development occurred in 1782 when Bacon leased part of the Cyfarthfa Ironworks to Francis Homfray of Stourton, Staffordshire. Homfray was granted the mill for boring cannon and a foundry. It is probable that the land leased by Homfray included the forge. Homfray did not occupy the property for long and in 1784 the forge and mill were taken over by David Tanner. Also associated with this Venture were James Cockshutt, Thomas Treharne and Francis William Bowzer. Thomas Treharne acted as manager along with Cockshutt until 1786 when the property was sold to Richard Crawshay and Company. In the same year Bacon died and a lease of the furnace at Cyfarthfa was granted by the Court of Chancery for nine years to Richard Crawshay, William Stevens and James Cockshutt. The new owners of the furnace now enlarged their forge and mill and an additional furnace was built. These improvements cost the partnership no less than £50,000. Cockshutt, Stevens and Crawshay operated the Cyfarthfa Ironworks for five years before the partnership was dissolved with Richard Crawshay and Watkins George taking over the works from 1792 onwards. In 1794 Crawshay and George were able to gain a full lease of the Cyfarthfa property and purchase the ironworks.

Under Crawshay's direction the Cyfarthfa Ironworks expanded to become the largest of the Martyr works during the early years of the nineteenth century. The production of cannon proved to be so successful that the boring mill had to be supplied with iron not only from the Cyfarthfa furnaces but also from the Dowlas and Plymouth furnaces.

The Cyfarthfa Ironworks was one of the first concerns to make wrought iron using Cort's puddling process, which was adopted by Crawshay in 1787. Cort visited the Cyfarthfa Ironworks and supervised the installation of eight of his puddling furnaces. The advances in the use of puddling came following the development of a preliminary refining.

Despite initial problems, the early adoption of puddling gave Cyfarthfa an advantage in the wrought iron trade and this financed further expansion within the works. In 1794 the Cyfarthfa Ironworks consisted of two coke furnaces, eight puddling furnaces, three refineries, three balling furnaces and a rolling mill driven by a 20ft. diameter waterwheel. The three furnaces were able to produce 7,204 tons of iron in 1796 and a fourth furnace was added in 1797. Parallel development of the forges and mills, also took place. The expansion of the works during the 1790s can be gauged from the following description of the Cyfarthfa plant made in 1798:

Upper Works.

Great waterwheel, 56 ft. diameter, 6ft. wide working four blowing cylinders 52in. diameter, 5ft. stroke blows two furnaces with 1 3/4lb with 4in. pipes and four double refineries with 2in. pipes. Waterwheel 25ft. diameter, 3 ft. wide works four pairs of rolls, a pair for roughing down blooms,

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a pair for bars, a pair for rolling balls into blooms and a pair for planishing. Rolls working at 40 revs, per minute. A waterwheel 20ft. diameter and 6ft. wide works a shingling hammer, a waterwheel 38ft. diameter and 4ft. wide for turning rolls, a steam engine 50in. cylinder, 9ft. stroke for blowing in case of scarcity of water.

Lower Works.

A 20ft diameter, 7ft. 5in, wide waterwheel working two pairs of rolls, 35 to 40 turns per minute, a 20ft. diameter, 6ft. wide waterwheel works a shingling hammer and a second 20ft. waterwheel works a planishing hammer.

It is obvious from this description that the two old furnaces at Cyfarthfa had been decommissioned and demolished. Svedenstierna only saw two furnaces at the main Cyfarthfa site in 1803 and these were blown by the great waterwheel coupled to a 70-80h.p. steam engine. The Swedish tourist noted that the wheel was 52ft. in diameter and 7ft. wide.

The success of Crawshay's undertakings allowed further expansion during the early 1800s. The works was to remain in Crawshay family hands from this date until the early years of the twentieth century.

In 1805 the four furnaces were in blast and produced 10,460 tons of iron for the year. Expansion continued for in 1807 there were six furnaces at the two sites, two rolling mills and four steam engines (50h.p., 40h.p., 12h.p. and 7h.p.) Cyfarthfa was now the largest of the Merthyr Ironworks and by all accounts the largest ironworks in the world.

Watkin George was responsible for the design of the great waterwheel and the steam blowing engine, and supplied engineering expertise for the development of the Cyfarthfa Ironworks. The depression in the iron trade at the end of the Napoleonic Wars affected Cyfarthfa like all the other British ironworks. Yearly production for 1814 was only 9,600 tons and at times during the year only three furnaces were in blast. Conditions gradually improved and in 1817 Cyfarthfa produced 14,191 tons of iron. Expansion continued during the 1820s commencing with the purchase of a 52 1/2in. beam blowing engine from the Neath Abbey Iron Company in 1820. By 1823 there were eight furnaces in blast and in that year they produced 24,200 tons of iron. A ninth furnace was added in 1824 and in 1830 the nine furnaces produced 29,000 tons of iron.

A pair of high-pressure beam engines was purchased from the Neath Abbey Ironworks in 1833 but instead of being used directly to drive rolling mills they were used to return water for the mills' waterwheels. This adherence to waterpower was to continue at Cyfarthfa up to the 1870s by which time the works was clearly lagging behind the modern practices of ironworks such as Dowlais. However, further steam power was added when the works purchased in 1835 an 18in. high-pressure beam engine from the Neath Abbey Iron Company.

In the mid 1840s a large steam powered rail mill was constructed powered by a condensing beam. In the period 1856-61 all eleven of the furnaces were in blast and in 1857 a new mill was constructed. Output reached a yearly total of 50,000 tons in 1864 and in the following year a detailed description of the works was published. At that time a fifty year old beam blowing engine made at Cyfarthfa was being replaced by a new engine of greater power. The hot blast was being applied to five out of the eleven furnaces with waste gas being used for the generation

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of steam. The forges and mills, which were powered by five waterwheels and several steam engines, were able to produce 1,200 tons of puddled bars per week.

Production at Cyfarthfa appears to have been divided between rails and merchant bar iron. Much of this was exported for the Crawshays had built up important trade links with Eastern Europe, particularly Greece, Turkey and Russia. In 1872 the works was operating seventy-two puddling furnaces and seven mills but still the Crawshays relied heavily on waterpower. The members of the Institution of Mechanical Engineers visited Merthyr in 1874 and at Cyfarthfa they saw seven furnaces available for iron production although only four were in blast during the year. The furnaces were 52 1/2ft. high with 14 1/2ft. diameters across the boshes. Cold blast and two with hot blast could blow five of the furnaces. All except one had closed tops with bell and hoppers. Two waterwheels and two non-condensing engines drove the puddling mills. The bar mills were driven by two condensing beam engines and an oscillating non-condensing engine. The power produced by the waterwheels could be aided by a 30in. x 8ft. non-condensing beam engine, which pumped water from the river back to the mills.

Problems with the unions, the decline of the wrought iron trade and the old fashioned nature of the works prompted Robert Thompson Crawshay to close down Cyfarthfa. The works was slowly run down during 1874 and one furnace was in blast during the first three months of 1875 before complete closure took place. This closure sparked off much controversy within the Crawshay family. The death of Robert Crawshay in 1879 allowed his sons to reopen the Cyfarthfa Ironworks and in the following year 900 tons of iron was being produced weekly. However, owners and managers realised that the works had to be modernised. The Cyfarthfa Ironworks was again closed in 1881 but this time the closure took place to carry out a complete rebuild of the furnaces and for the installation of a steel works. The work was completed during 1884 with the first batch of steel being produced in February 1885.

The steel works was designed by Edward Williams of Middlesbrough. During 1884 three plate-encased furnaces were erected and the foundations of a fourth laid. Three vertical engines built by J.C. Stevenson of Preston with 33in. steam cylinders and 72in. blowing cylinders both with 4ft. 5in. strokes, provided the blast. These engines worked at 25 to 30 strokes per minute producing a blast at 5-6 psi. Later the blowing capacity was increased by the addition of three 44in. x 5ft. Davy vertical blowing engines with 96in. blowing cylinders. The blast was heated up to 1,400⁰F by seven Cowper stoves. Steel was manufactured in two 5 ton Bessemer converters which could be worked up to 10 tons. The converters received their blast from vertical compound blowing engines with 42in. high-pressure cylinders, 78in. low-pressure cylinders and 55in. blowing cylinders, all working to a 5ft. stroke. Also at this time two new reversing cogging mill engines with 40in. cylinders were installed together with a pair of Davy reversing mill engines with 50in. cylinders. The Bessemer machinery was constructed by Tannett, Walker and Company.

The Cyfarthfa Iron and Steel Works under the title of Crawshay Brothers, Cyfarthfa, Limited continued in operation until 1902 when it was bought out by Guest, Keen and Nettlefold of the Dowlais works. The Cyfarthfa works continued in production until closure in 1910. The works was reopened in 1915 but final closure came in 1919 (Ince 1993, pp 60-64).

Southeast Wales Industrial Ironworks Landscapes

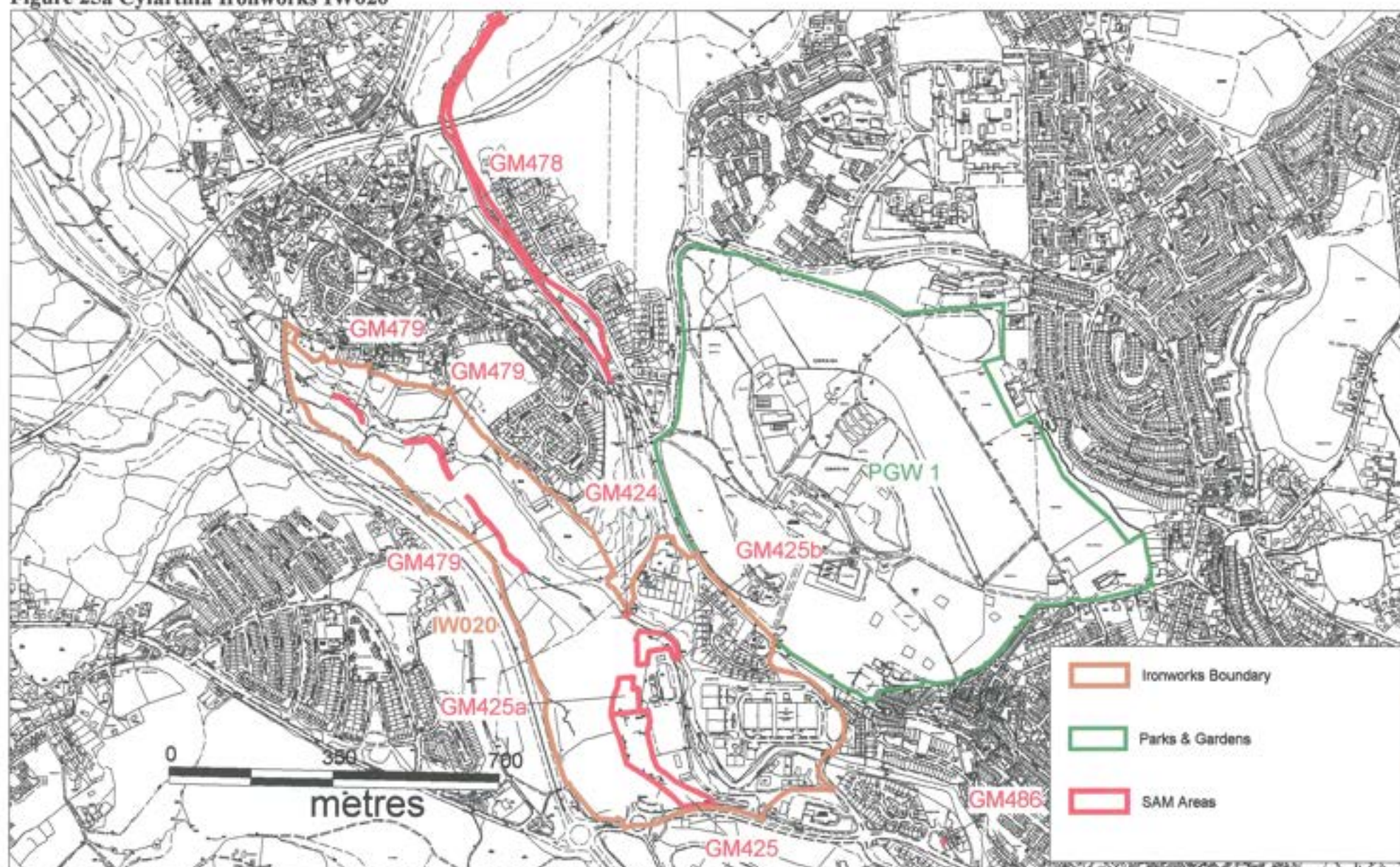
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on estate and other plans, including the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are as follows: a potential development to enhance built heritage, derelict land within Cyfarthfa Heritage area: PD3 Swansea Rd site provision of business land.

Figure 25a Cyfarthfa Ironworks IW020



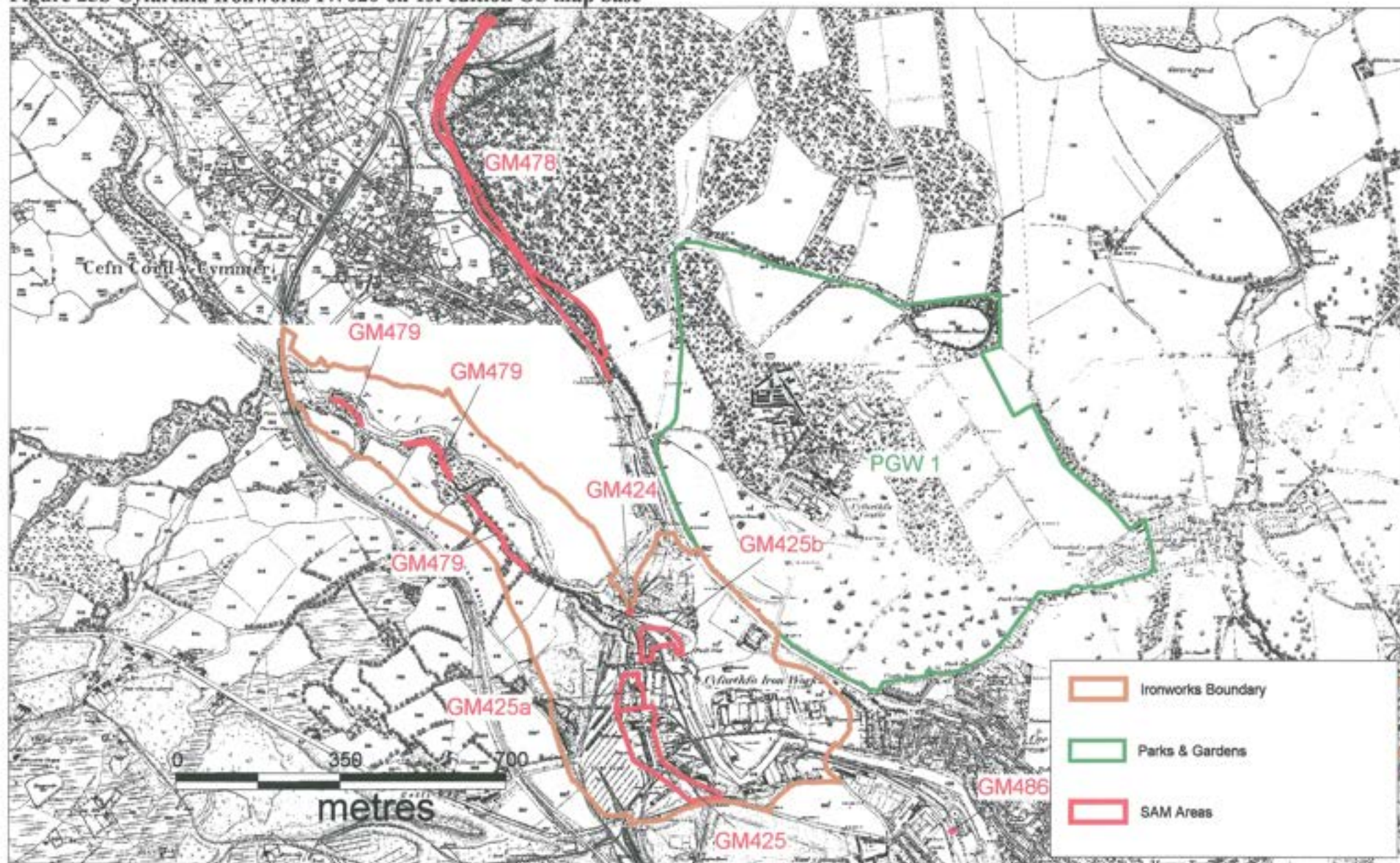
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Figure 25b Cyfarthfa Ironworks IW020 on 1st edition OS map base



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IW Number 021 Penydarren Ironworks (01170m) SO 0690 0320

General Description

The Penydarren Ironworks (NPRNs 34,113; 40,460; PRN 01170m) is an important ironworks of 18th century foundation with nationally and internationally significant historic associations, in particular associated with Trevithick and the Penydarren Tramroad and technological advances, such as the use of and development at an early date of puddling processes, together with the use of an intermediate refinery stage. Penydarren was the second Merthyr ironworks to begin production of bar iron from 1788, and was also one of the earliest concerns to enter the wrought iron rail trade.

The core ironworks area identified for this study encompasses the main area of the ironworks founded in 1784 by Francis Homfray as based on available cartographic evidence, including the 1st edition OS maps. Although the site is of great historical significance little now remains visible on the site that is intelligible. The only features to survive to any extent above ground are the fragmentary remains of the charging bank adjacent to the site of the blast furnace rank. The latter, depicted in an Albumen print by Robert Thompson Crawshay c. 1870 was extensive (Lord 1998). These remains are located within a small industrial area on the south-eastern corner of the area at SO 05573 06880. The western end of the ironworks area as it appears today is taken by a development of 19th century/early 20th century terraced housing. Although the extent of the condition/survival of buried remains over the site is as yet unknown, it is likely that the massively constructed blast furnace bases survive in a buried state.

The development of the ironworks is traceable through cartographic material: in the late 18th century two blocks of Ironwork buildings and a “waggon way” approaching Penydarren Ironworks from coalmines to the south are in evidence (1799 Yates). The works developed numerous trackways and tramways over the following period and by 1814 the mineral area to the south and east was already heavily quarried. The Homfray family’s association with the works ended with the death of Samuel Homfray in 1822. Thereafter the works continued under the partnership of Thompson and Foreman. The Penydarren iron works engaged in rail production at an early stage, supplying the Liverpool and Manchester Railway. However severely competitive markets of the 1850s caused increasing difficulties and production ceased in 1859, under Messers Fothergill and Hankey. The works and its associated vast mineral deposits were later sold to Dowlais for almost £60,000. Cartographic sources indicate the Ironworks, including its blast furnaces, casting houses, rail network and ancillary plants still survived in 1875-78, while contemporary photographs show the works in ruins and partly dismantled. The area of ironworks was subsequently cleared and by 1919, the tramway depot and the electric power station of the Merthyr Electric Traction and Lighting Co. occupied the furnace area. The western part of the ironworks was later redeveloped for housing; by 1905 the southern side and part of the northern side of Trevithick Street and a short row at Gwynnes Close were in place, and completed by 1919. The cartographic evidence also showed a short row dating from before 1850, opposite the entrance to Penydarren Park.

Historical Background

The Penydarren Ironworks was founded in 1784 by Samuel and Jeremiah Homfray. By 1786 the partners of the company consisted of Jeremiah Homfray of Penydarren, Thomas Homfray, Samuel Homfray and Richard Forman, and was later expanded to include other members of the Foreman family.

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By 1794 the site comprised one furnace blown by cylinders and pistons, two chaferies, three melting fineries and four balling furnaces. Two years later the company was operating two furnaces, which produced 4,100 tons of iron that year. The Penyarden Ironworks experimented with puddling at an early date and the management were pioneers in the use of an intermediate refinery stage. By 1802 that there were three blast furnaces operating at Penyarden coupled with three refineries and twenty-five puddling furnaces producing about 8,000 tons of iron yearly. Samuel Homfray also developed an interest in steam power and in 1798 two Boulton & Watt engines were constructed at Penyarden. One was a 40in. x 8ft beam blowing engine with an 84in. blowing cylinder and this engine was notable as being one of the first Boulton & Watt engines to be built with an iron beam, no doubt Homfray had a part to play in the adoption of this innovation. The second engine was a double acting 33 1/3in. x 7ft. beam engine to power rolling and slitting mills. Samuel Homfray already had a wealth of experience with steam power as he had already operated several Newcomen engines on the Penyarden property. Homfray's interest in steam power led him in 1803 to become a partner with Richard Trevithick in the development of his compact high-pressure steam engine. Several Trevithick engines were built at Penyarden including the world's first steam locomotive, which made successful journeys along the Penyarden Tramroad in 1804. Another Trevithick engine was used at Penyarden to provide a blast, probably for the refineries.

William Forman and William Thompson were the partners operating the works from 1819, expansion occurred during the early 1820s. A 52½in. beam blowing engine was purchased from the Neath Abbey Iron Company in 1819 and after this date additional furnaces were constructed. By 1823 there were five furnaces in blast and during that year they produced 15,547 tons of iron. One important customer for Penyarden iron was Robert Stephenson and Company who purchased £1,252 of iron during the period 1826-30. Some of the engineering products of Stephenson's works were purchased by the Penyarden Iron Company possibly in part payment for the iron.

The Penyarden Ironworks was one of the earliest concerns to enter the wrought iron rail trade for in 1830 they produced rails for the Liverpool and Manchester Railway. In that year the works produced 17,025 tons of iron. Further expansion of the Penyarden Ironworks took place in the late 1830s. A 38 ½in. Neath Abbey beam blowing engine was installed in 1837 and by 1839 the company had six furnaces in blast. In 1845 the number of furnaces in blast had risen to seven and production had increased to 25,600 tons of iron.

In 1859 William Forman attempted to sell the concern, and whilst the Dowlais Iron Company showed a serious interest the final purchase was limited to the mineral ground. A detailed inventory of the Penyarden ironworks was made at the time:

Cinders Incline - a pair of 14in. x 2ft. high-pressure engines with two boilers.

Rail Shed - four presses, two punches plus one small punch, a new 2lin. engine nearly ready with a boiler.

Brick Yard

New Mill - a 33in. x 6ft. 6in. high pressure beam engine with three boilers, twenty-four heating furnaces for this and old mill.

Old Mill - a 30in. x 6ft. 6in. high-pressure beam engine with three boilers.

New Puddling - a 36in. x 6ft. 9in. high-pressure beam engine with three boilers and

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thirty-one puddling furnaces.

Roll Lathes - a 24in. x 4ft.6 in. engine, one boiler, five roll lathes, new machine for cutting rail ends (cost £70) and stock of rolls.

Fitting-Up-Shop - a 10in. x 1ft. 7in. engine with one small boiler, five lathes, two screwing machines, one drilling machine, one old boring mill and one old chuck lathe.

Blast Engines - an old low pressure beam engine with 50in. steam cylinder and 96in. blowing cylinder, working 14 stokes per minute (in bad repair), a high pressure beam engine, 38½in. x 8ft. with 122in. blowing cylinder working at 17 strokes per minute.

Blast Furnaces - six in blast, 45ft. high, 16ft. in boshes, one out of blast for repairs, six hot blast stoves and six refineries.

Smiths' Shop - eleven fires, two fires for chain makers, one fire for boiler makers and one furnace for heating plates.

Foundry - two old wood cranes, one small cupola, one small foundry with an air furnace, one small furnace for brass and one old wood crane.

Also a new engine not yet erected, 36in. x 6ft. 9in., a stable engine, 10in. x 1ft. 7in., two donkey engines, 10in. x 10in, and one donkey engine, 7½in. x 7½in,

Estimated value of plant - £18,140

The Penyardarren Ironworks remained unoccupied until 1863 when the enterprise was taken over by Davies, Williams and Phillips. In the following year this partnership was working a blast furnace, a rolling mill and a puddling furnace. However, the production of iron turned out to be a most expensive venture because the partners did not own any mineral ground. This led to the sale of the ironworks to the Aberdare Iron Company in 1865. This sale was to result in a long court case for Richard Fothergill brought an action against the previous partners. Fothergill claimed that between the time he had initially inspected the works and when his company occupied it some demolition had taken place, which damaged buildings and machinery.

When the case was resolved Fothergill began to rehabilitate the works. Puddling commenced in 1869 and in 1870 repairs were undertaken and refineries put to work. Fothergill fully intended to put some of the Penyardarren furnaces into blast for the Neath Abbey Iron Company was called in during 1871 to repair the 122in. blowing cylinder of No.1 engine. At this time the company was operating thirteen puddling furnaces but no rolling mills were listed as being on the site. Presumably the rolling mills had been removed at an earlier date. However, conditions in the iron trade worsened and the furnaces were never relit.

In 1873 a steam hammer was erected in the forges but the little activity that took place on the site ended with the collapse of the Fothergill undertakings in 1875. The Penyardarren Ironworks remained in a derelict state until 1883 when the remaining plant was sold off (Ince 1993, pp 77-80).

Ironworks Boundary

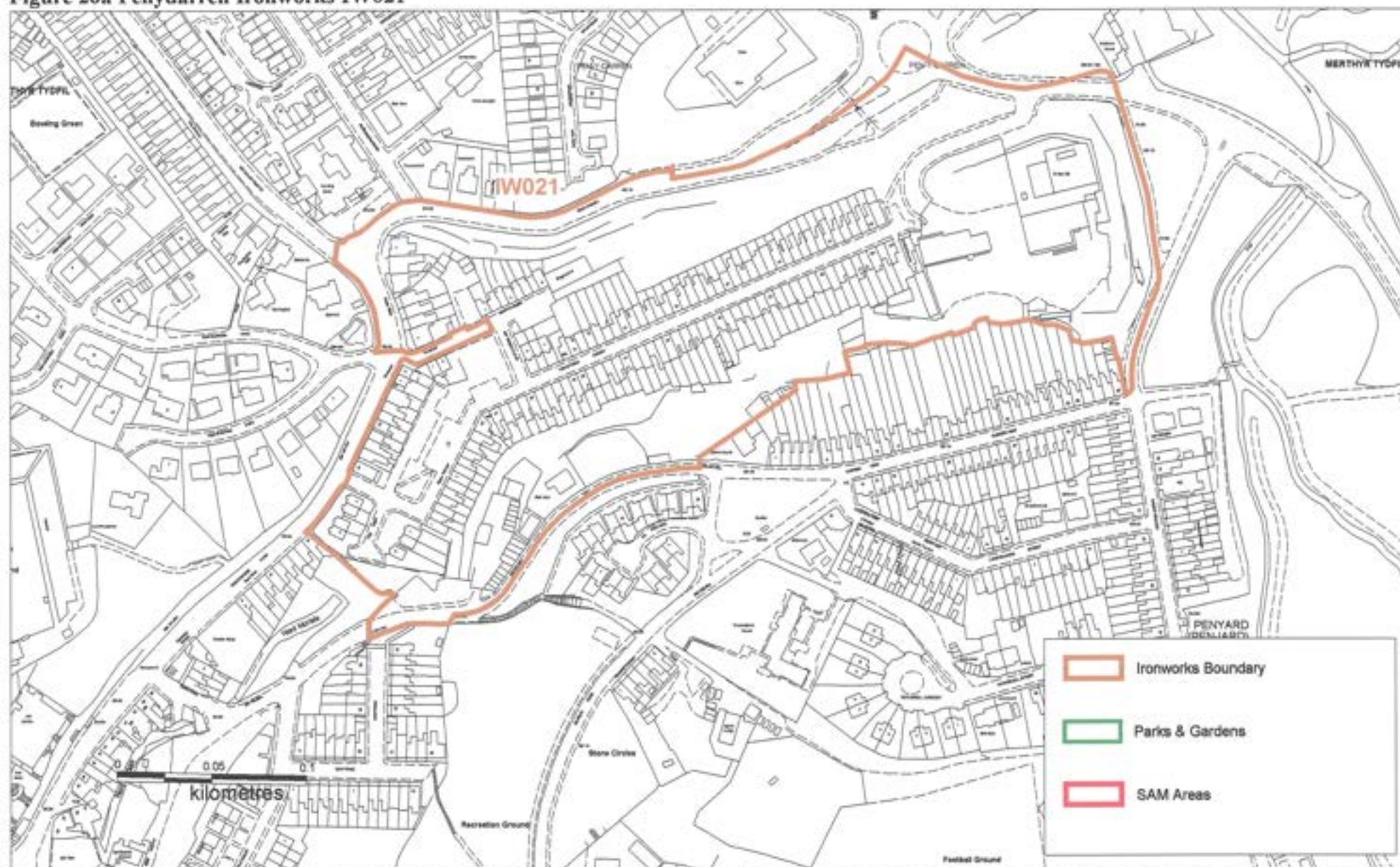
The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on estate and other plans at the Glamorgan Record Office, including a plan of 1832, the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 held at the Glamorgan Record Office and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of industrial improvements, no further details are given.

Below ground remains may survive in the area of the charging ramp/blast furnaces and the possibility of excavation could be explored. A programme of conservation should be devised to ensure the preservation of the above ground remains associated with the charging bank and blast furnaces. This could include an awareness campaign through designation as an area of industrial archaeological importance and the provision of information, eg display panels, to help ensure the long term survival of any surviving remains.

Figure 26a Penyardarren Ironworks IW021

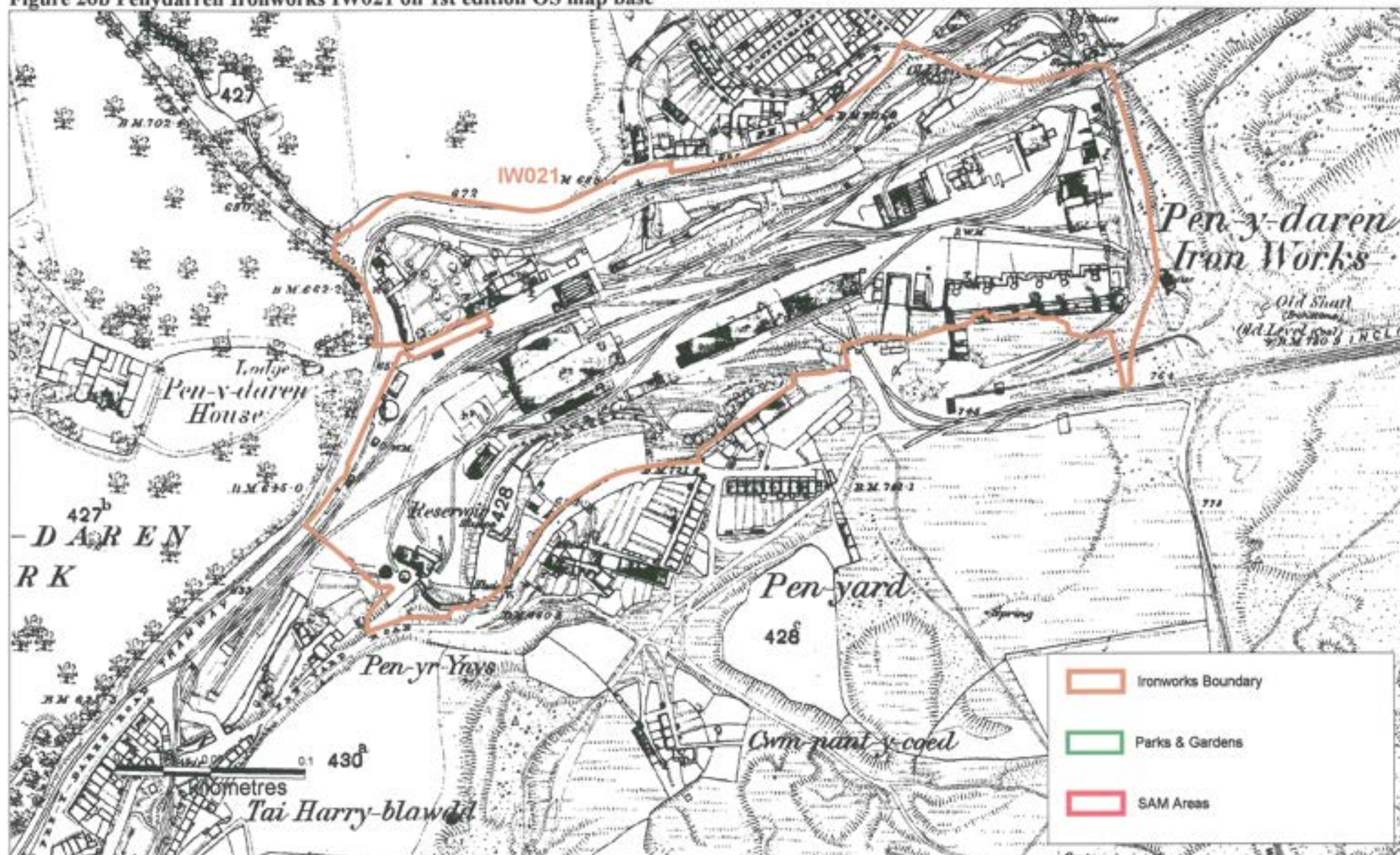


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Mae atgynhyrchu heb ganiatâd yn torri hawlfraint y Goron a gall hyn arwain at erlyniad neu achos sifil. Glamorgan-Gwent Archaeological Trust Ltd 100017916 (2005).

Figure 26b Pen-y-darren Ironworks IW021 on 1st edition OS map base



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IW Number 022 Dowlais Ironworks (01666m) SO 06948 07645

General Description

The Dowlais Ironworks (NPRN: 34,084; PRN 01666m) is an important ironwork site of nationally and internationally significant historic, technological, and artistic associations with surviving standing structures and buried remains. The ironworks, now in use as an industrial park, was founded during the 18th century, however the surviving standing remains are later. The main surviving industrial structure in the area is the red brick Blast Engine House of 1909 (Listed Grade II: Cadw ref no. 11,491; NPRN: 33,697), currently used by the OP Chocolate Factory. The furnace bases and other potential features are thought to survive under massive banks of reclaimed soil, however their current condition is unknown. The area includes the site of Dowlais House re-built 1818 for JJ Guest (1785-1852), demolished c. 1960. Other sites include the Dowlais Ironworks Offices (NPRN: 88,063), the site of industrial workers terraced housing at 28-33 Cae Harris, Pond Street (PRN: 0893m; NPRN: 18,195), and the extensive lines of the Dowlais Iron Company Railway (NPRNs: 85,626; 85,638; and 85,653) and the Dowlais Iron Company Tramroad (NPRNs: 85,627 and 85,655).

The core ironworks area encompasses site of the ironworks founded in 1759 by a partnership headed by Isaac Wilkinson, an ironmaster from Bersham, Clwyd. The change over to the production of bar as opposed to pig iron was comparatively late at Dowlais. The lack of success in applying Peter Onions' puddling process dissuaded all but John Guest from investing in the technology during the 1780s and Dowlais continued to supply pig iron to Penydarren and Cyfarthfa. The Dowlais works was the first in Merthyr Tydfil to install Steam blowing engines, replacing waterwheel-powered bellows in 1798.

The Dowlais Ironworks has strong historic associations with the Guest family; first John Guest, then his son, Thomas Guest (1787) and in turn by his son Josiah John Guest (1807), a liberal who advocated free trade and was Merthyr's first MP, following the 1832 Reform Act. It was a result of the latter's vision and business acumen that Dowlais became the largest ironworks in the world. The rails for the Stockton and Darlington Railway were produced at the Dowlais works in 1821 heralding the rewards to come of the railway boom years of the 1830s and 1840s. Technological advances such as the adoption of the 'hot blast technique', patented in 1828, which substantially reduced the amount of coke required for smelting, enabled Dowlais to maintain its competitive edge. Further mills were constructed to produce rails: the Big Mill in 1830, supplemented by the Little Mill in 1840. The extent of the Dowlais Ironworks during the period was strikingly illustrated in a series of watercolours painted in 1840 by George Childs (Lord 1988).

William Menelaus was appointed general manager in 1856 and soon after the Dowlais works began experimenting with a new process developed by Henry Bessemer. Menelaus was to oversee the conversion to steel production, which began in a limited fashion in 1865. The local ironstone was unsuitable for the production of steel, due to its high phosphorous content and by the 1870s ironstone mining had ceased altogether in the Merthyr area. Based on imports, chiefly from Spain, steel production would ultimately transfer to coastal sites, such as the new steelworks built by the Dowlais Company at East Moors in Cardiff in 1891. In 1905, under GKN a new blast Furnace complex, which included two American designed 'Yankee' furnaces and a new mill was added. However, after a period of prolonged decline, in 1930 the production of steel at Dowlais finally came to an end.

The early development of the works can be charted from cartographic sources, including estate maps and early OS maps and surveyor's drawings, the Tithe map of 1850 and unpublished map of 1851, among others. The extent of the ironworks development is well demonstrated by the 1878 6-inch OS map, which in part reflects the conversion of the works to steel production in the years after 1865. Numerous features were recorded within the area including charging bank, furnaces and brick kilns among other industrial features southeast of Dowlais House. Other features shown are engine houses, levels, a brickworks, the reservoir to the south of Dowlais House, Cae-Harris Pond, adjacent cottages on Pond Street (now demolished), the Dowlais Railway and numerous railway sidings and tramroads. Goat Mill, Coed Cae pond, and an adjacent row of cottages (demolished by 1905) were located to the south the area.

Significant changes occurred in 1905 when the plant was remodelled under GKN: additional reservoirs and extensive coke ovens were built in the area to the north of the brickworks, which itself had been extended. The Goat Mill was enlarged and Cae-Harris station had been constructed; this included a goods shed, an engine shed and cattle pens. Further alterations indicated by 1919 were primarily in the area to the southeast of Dowlais House and the blast engine house (now listed grade II), and included additions to the furnaces.

Historical Background

The Dowlais Ironworks was the first and longest lived ironworks constructed at Merthyr Tydfil. The partnership, which built the Dowlais Furnace in 1759, consisted of Thomas Lewis of Newhouse, Llanishan, Monmouthshire, Thomas Price of Watford, Glamorgan, Richard Jenkins of Cardiff, a Mercer, Thomas Harris of Bristol, John Curtis of Bristol, Nathaniel Webb of Bristol, John Jones of Bristol, Ironmaster, Isaac Wilkinson of Plas Gronow, Denbigh and Edward Blakeway of Shrewsbury.

The coke-fired furnace at Dowlais is known to have produced 18 tons of iron weekly during 1760. At this time the furnace was blown by cylinders and pistons worked by a waterwheel. In 1767 John Guest of Broseley was appointed manager, and later in 1782 joined the partnership. During 1782 there were two furnaces in blast at Dowlais, this had increased to three by early 1790s. Unlike some ironworks in the locality Dowlais was not producing wrought iron. Pig iron produced by Dowlais was often sold to other ironworks for manufacturing into wrought iron as in 1796 when an agreement was signed with the Cyfarthfa partners for Dowlais to supply them yearly with 2,000 tons of iron.

In 1801 the important decision was made at Dowlais to manufacture wrought iron using Cort's puddling process. In order to increase production the company had invested in a Boulton and Watt beam blowing engine. This engine was built at Dowlais in 1798 and had a 40in. x 8ft. steam cylinder with a 90in. x 7ft. blowing cylinder. The engine certainly seems to have had the desired effect for in 1805 the three furnaces at Dowlais produced 6,800 tons of iron with 8,148 tons produced in the following year. To aid the manufacture of wrought iron the company was also operating rolling mills powered by Boulton and Watt engines; the first of these a 36½in. x 8ft. beam engine was built in 1803, the second, a 31½in. x 7ft. beam engine, was installed in 1808.

In 1808 a fourth blast furnace, capable of producing 50 tons of iron per week, was built and put into blast in 1810. At the same date a 50in. x 8ft. beam blowing engine with an 84in. x 8ft. blowing cylinder was purchased from Boulton and Watt. At that time the works also comprised

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four refineries, twenty puddling furnaces and ten balling furnaces. A fifth furnace was added in 1815 with the Dowlais Ironworks being able to produce 15,600 tons of iron per year.

The works suffered in the general trade depression, which accompanied the end of European hostilities in 1815. However, this set back was to be of a fairly short duration and in 1817 three additional blast furnaces were built at Dowlais. A beam blowing engine was also constructed in that year. By 1823 the Dowlais Ironworks possessed ten furnaces, which made in that year 22,287 tons of iron. In the following year another beam blowing engine was constructed at the works. This engine was still working in the 1840s. A further blast furnace was added in 1828 together with a fifth blowing engine. This was a non-condensing, high pressure beam blowing engine with a 54in. x 9ft. 3in. steam cylinder which was working in the 1840s with a 144in. blowing cylinder making 13 strokes per minute and blowing 27,476cu. ft. of air per minute. This was the first of Dowlais' beam blowing engines to be supplied with a flywheel, which was 15ft. in diameter. During 1830 the Dowlais Ironworks had twelve furnaces in blast, which produced 32,611 tons of iron. Certainly, by this date, Dowlais had become the largest of the South Wales ironworks.

The expansion of the works was partly due to Dowlais' successful entry in the late 1820s into the wrought iron rail trade. To cater for the production of rails the rolling capacity of the works was improved with the opening of the Big Mill in 1830. After this event output of rails steadily rose reaching 20,000 tons by 1835. The Dowlais ironworks continued to expand during the 1830s when two further blast furnaces were constructed and an additional beam blowing engine was installed in 1838. This engine was a high pressure example with a 40m. x 8ft. steam cylinder and a 122in. blowing cylinder. This engine was built for the Dowlais Ironworks by the Neath Abbey Iron Company at a cost of £3,894. In the 1840s this beam blowing engine was making 16 strokes per minute and discharging 20,687 cu ft. of air per minute. Like beam blowing engine No.5 this engine was provided with a flywheel, which was 10ft, in diameter. Further expansion was undertaken by the company but at a subsidiary concern called the Ivor Ironworks built slightly to the north (see IW023).

Dowlais was now the largest ironworks in the world and in 1845 its eighteen furnaces produced 74,880 tons of iron with 7,300 people being employed. The Big Mill alone turned out 400 tons of rails per week and in total the mills produced monthly 2,000 tons of rails and 2,000 tons of bars. The Dowlais Ironworks was now pre-eminent in the wrought iron rail trade and had also built up an extensive export trade in this product. Large foreign orders were common as in 1844 when the works won a contract for 50,000 tons of rails for Russia.

The works experienced some difficulties during the late 1840s when the problem of the renewal of the Dowlais lease faced the Guest family. The eventual renewal of the lease prompted a new period of expansion with the modernisation of the blowing engines undertaken. Two of the old beam blowing engines were sold off in 1849 in preparation for the building of a new large blowing engine, the 'mighty Merthyr Guest' engine, in the following year to designs of Samuel Turan, the works' engineer.

This 55in. x 13ft. beam engine had a blowing cylinder of 144in. diameter working with a 12ft. stroke. Each minute the engine made twenty strokes producing 44,000 cu. ft. of air at a pressure of 3¼ psi. The air blast was discharged into a 5ft. diameter pipe, which was 140 yards long and acted as a regulator. This non-condensing engine was worked up to 650 h.p. with a steam

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pressure of 60 psi at one third cut off. The beam was 40ft. 1in. long and cast in two parts, each part weighing 16½ tons. The 22ft diameter flywheel weighed 35 tons and there was a further 75 tons of cast iron framing under the steam cylinder. For a period this powerful blowing engine supplied the blast to eight furnaces but later it was used with three other blowing engines to provide the blast for twelve furnaces. At that time some of the Dowlais furnaces were making 235 tons of forge iron per week.

Josiah John Guest gained complete control of the Dowlais in 1851 and a year later the management of the works fell to his widow Lady Charlotte Guest with trustees being appointed when Lady Charlotte remarried in 1855. The trustees employed William Menelaus to act as works' manager. At that time the enormous size of the Dowlais Ironworks can be gauged by the number of steam engines on the site for they included four pumping engines draining collieries, iron ore workings and supplying the works with surface water, sixteen engines winding at coal and iron ore pits, fourteen engines working inclined planes, eleven locomotives, two engines driving clay and pug mills, five blowing engines, ten forge and mill engines and two engines driving lathes and shearing cold iron. These engines gave a total of 7,308 h.p. Details of the puddling mill engines in the early 1850s are known and these engines consisted of:

- No.1 - 45in. x 7ft. low pressure condensing beam engine working at 22 strokes per minute.
- No.2 - 36in. x 7ft. low pressure condensing beam engine working at 22 strokes per minute.
- No.3 - 42in. x 6ft. high pressure beam engine working at 20 strokes per minute.
- No.4 - 37in. x 7ft. high pressure horizontal engine working at 23 strokes per minute.
- No.5 - 26in. x 4ft. high pressure vertical engine working at 30 strokes per minute.

In 1856 sixteen furnaces out of Dowlais' eighteen were in blast with the works continuing to dominate Britain's wrought iron rail trade. To enable Dowlais to continue in its pre-eminent position in the rail trade the building of a new mill was started in 1857. This was the legendary Goat Mill. The mills inside this building were powered by a pair of 45in. x 10ft. coupled high pressure beam engines. They worked at 24 strokes per minute with a one third cut off with six Cornish boilers 14ft. long and 7ft. diameter supplying the steam. The two beams were supported upon eight columns and each beam was constructed in two parts and weighed 37 tons. The flywheel was 21ft. in diameter and weighed 30 tons. These engines were capable of driving one rail mill turning out 1,000 per week, another mill capable of turning out 700 tons of rails or roughed down iron per week and one bar or roughing down mill capable of making 200 tons per week. Two blooming mills and two hammers were also worked by the same engines. The roof of the Goat Mill was 240ft. by 210ft. and was supported by lattice girders of an average length of 45ft. The covering of the roof was made up of corrugated iron plates and the floor of the mill was constructed of one inch cast iron plates.

Within two years the Goat Mill was in full production and it was probably in this building that special bars were rolled for the 1862 exhibition. In 1865 the weekly production at Dowlais was 1,400 tons of rails and 600 tons of bars, plates, angles and girders. At this time two 5 ton Bessemer converters were being put into commission with four others approaching completion. This development allowed Dowlais to manufacture steel rails and steel headed rails. The blowing machinery for the steel plant was manufactured by Hick and Son of Bolton. Ores being used at Dowlais in the mid 1860s were from Wales, Whitehaven, Barrow, Cornwall, Forest of Dean,

Northampton and Spain. When the Dowlais Ironworks was inspected in 1865 it was operating seventy balling furnaces and one hundred and fifty puddling furnaces with all the steam in the works being generated by waste gases.

A detailed description of the Dowlais Ironworks was made in 1869 when sixteen out of the seventeen furnaces were in blast. All the furnaces were fed with raw coal and were blown at a pressure of 3-3¼ psi. The works employed 9,000 people and produced yearly 150,000 tons of iron. Each furnace had evolved into the characteristic shape of being square at the base and taking a cylindrical shape at half its height. Output from each furnace was 180 tons weekly with tapping taking place three times in twenty-four hours. The furnaces were blown by six beam engines namely (a) the Merthyr Guest engine, (b) the Ivor works' engine with a 144in. blowing cylinder, (c) an engine with a 50in. x 6 ft. blowing cylinder, and (d) three engines with 120in. x 8ft. blowing cylinders. There were six forges at the old works and three at the Ivor works with the puddling furnaces receiving their draught from eighteen Lloyd's fans driven in groups of two or three by independent engines. The Dowlais works had seven mills consisting of a 24in. steel mill, a four roll 21in. girder mill, two 20in. rail mills and three 18in. bar mills. In the steel department there were six 5 ton converters blown by vertical 36in. Hick engines with 54in. x 5ft. blowing cylinders although more blowing capacity was to be added with installation of a pair of beam blowing engines. For hammering steel ingots the works had recently installed a duplex steam hammer. In 1869 there were just under one hundred steam engines working at Dowlais and Ivor including six blowing engines, twenty seven mill engines, four large pumping engines and thirty winding and underground engines.

Dowlais built its first Siemens steel furnace in 1871 and also during that year a new cogging mill was opened: This mill was designed for rolling down steel ingots and was driven by a pair of 30in. horizontal engines without flywheels. The mill engines and additional small engines for working the rollers were built by Kitson and Company of Leeds with the rolling machinery being designed and built by the ironworks itself. During this period the works had sixteen furnaces in blast and possessed one hundred and fifty puddling furnaces serving fourteen rolling mills. To improve the steel making capacity at the works a new furnace was put into blast in 1874, which was 55ft. high with an 18ft. diameter across the boshes. This furnace was capable of turning out three hundred tons of Bessemer pig iron per week. It had a closed top and was blown with hot blast at 1,200⁰F. The materials were raised to the furnace top by means of a water balance. By this date the Dowlais Iron Company was operating four regenerative gas furnaces on the Siemens-Martin steel process and six Bessemer converters.

The works increased its steel making capacity by enlarging their Bessemer converters in 1881 so that they possessed four 8 ton converters and two 6 ton converters. The mills also received new investment during the mid 1880s for in 1884 a new set of reversing mill plant was installed. This mill was powered by a pair of 60in. x 5ft. horizontal engines made by Kitson and Company. These were piston valve engines driving on one shaft and they produced 120 revolutions per minute. In the following year two new foundries were constructed, one in the upper works for moulding steel and one in the lower works for ingot moulds. A new cogging mill was also built at this time on the site of the old centre Goat Mill.

In 1888 construction started on a new works situated at Cardiff. Production of iron at the new site commenced in 1891 and the two works continued to work in tandem until iron making ceased at Dowlais in 1930 (Ince 1993, pp 47-53).

Ironworks Boundary

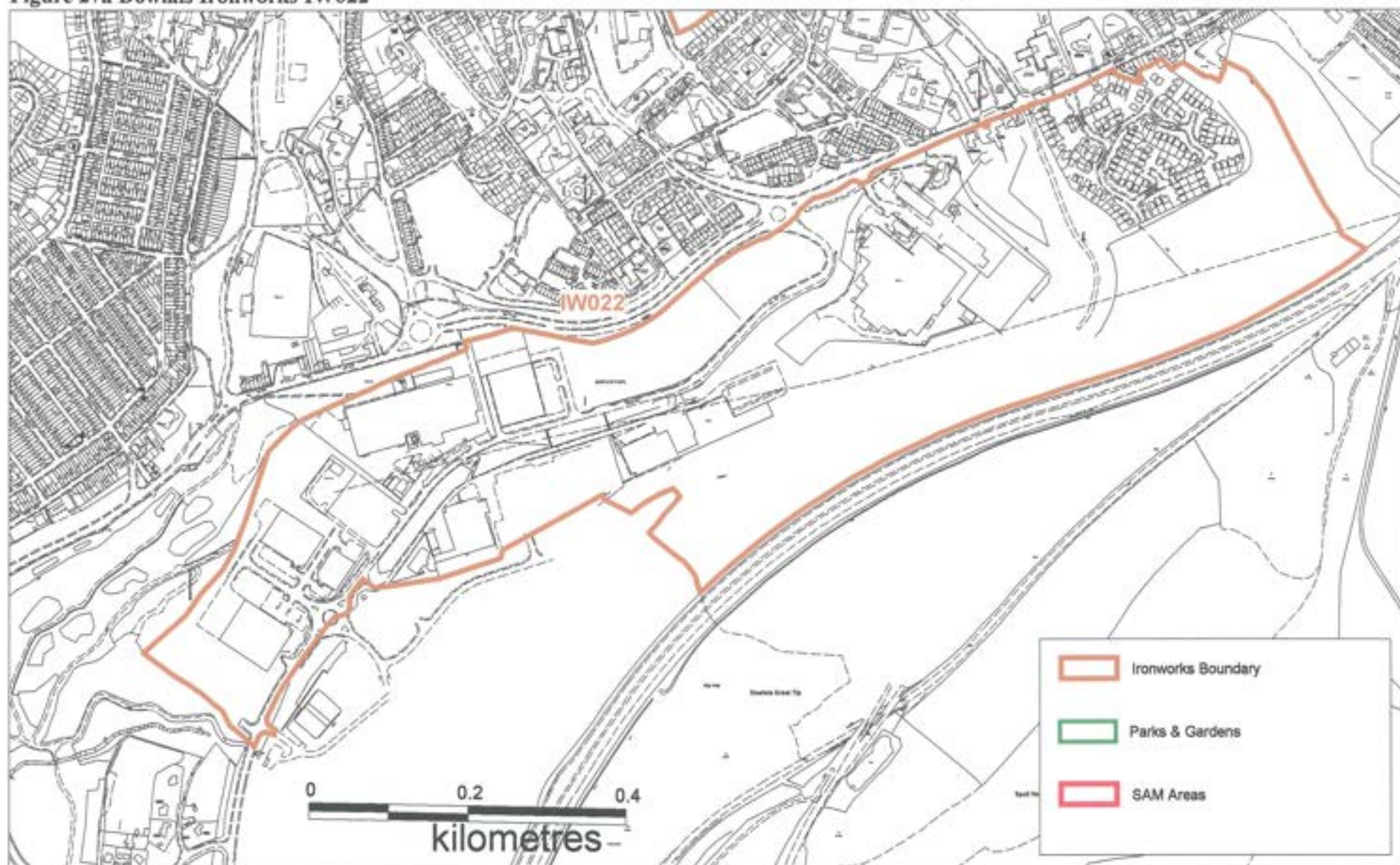
The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity extensively shown on estate and other plans at the Glamorgan Record Office, including the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of economic and business development.

Below ground remains may survive in the area of the blast furnaces; a conservation/management programme should be devised to ensure the preservation of the buried blast furnace remains, to include the possibility of excavation of the furnace site. An awareness campaign, including designation of the site as an area of industrial archaeological importance and the provision of information, eg display panels, to help ensure the long-term survival of any surviving remains should form part of the management strategy.

Figure 27a Dowlais Ironworks IW022



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Figure 27b Dowlais Ironworks IW022 on 1st edition OS map base



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IW Number 023 Ivor Ironworks SO 06794 08120

General Description

The Ivor Ironworks (NPRN: 34,093) is currently a largely disused industrial area with surviving remains associated with Dowlais's subsidiary ironworks, the Ivor Works. Visible standing remains on the site are few and relatively late in date. The survival of buried remains at the site relating to the earlier phases of the works has yet to be confirmed, though remains a possibility. Opened in 1839 initially with four blast furnaces, the works formed part of a major expansion of Dowlais Ironworks between 1830s and 1860s and though relatively late, is as such of historic interest. During the second half of the 20th century the site of the Ivor Works was given over to a foundry (SO 06714 08144) operated by British Steel. The closure of the foundry in 1987 ended Merthyr's association with the iron industry, an association that had lasted more than 200 years. Most of the site was subsequently cleared and remains as a level open area.

Of particular note is a post-1915 industrial building (Grade II listed Cadw ref no. 27,086), the last remaining structure of the former Ivor Iron Works from the pre-British Steel period. This industrial building is of red brick with slate eaves roofs, comprising two sections both of 2-storeys, the taller E range of 5 bays and the lower W range of 6 bays. Bays divided into sunk panels by raised piers, the E range with panels each floor, the W range with full height panels. Stepped brickwork at top of each panel. Raised plinth broken forward over piers.

According to the listing details this building was possibly built as a blast engine house but more probably the sulphate of ammonia plant completed in 1928 as part of the coke and by-product plants constructed 1922-28. The building is not shown on the OS map of 1900 or a plan of the Ivor Works of 1910 but is marked on a plan of 1928 as a sulphate house. Sulphate of ammonia was one of the by-products of coke production, crude benzyl and tar being others. The building was converted some time between 1930 and 1949 to a general and electrical stores. Included for its special historical interest as the last remaining industrial building of the former Ivor Iron Works from the pre-British Steel period, probably a sulphate of ammonia processing plant.

Historical Background

The Ivor Ironworks was built as a subsidiary works to the main Dowlais Ironworks, completed in 1839 it consisted of four furnaces, forges, fitting shops and a foundry. The furnaces received their blast from a high-pressure beam-blowing engine with a 53in. x 9ft. steam cylinder and a 144in. blowing cylinder. This engine had a 22ft. 6in. flywheel and worked at 14 strokes per minute discharging 28,476 cu. ft. of air during the same period. Except for the 144in. blowing-cylinder, the engine was constructed by the engineers at Dowlais. In 1839 Harvey and Company of Hayle, Cornwall supplied Dowlais with two 24in. beam engines and an 80in. x 10ft. beam engine.

A detailed description of the Dowlais Ironworks was made in 1869; at this date it is recorded that the furnaces at the Ivor works were blown by a 144in. blowing cylinder engine and the works had three forges with puddling furnaces receiving their draught from eighteen Lloyd's fans driven in groups of two or three by independent engines. The Ivor Ironworks also possessed six mills, comprising a 24in. plate train, an 18in. rail mill, two 12in. trains and two 8in. guide mills (Ince 1993, pp 49-53).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on estate and other plans at the Glamorgan Record Office, including the Ordnance Survey Public Health Maps of Merthyr Tydfil, 1851 and the 1st and later editions of 1:2500 OS maps, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of Housing development H20 and proposed development PD11: this would see the former Dowlais Foundry Site restored and re-graded leaving relatively flat even site for a mixed-use environment. Some industrial premises and office accommodation and remainder used for affordable housing.

The surviving historic industrial building(s), and pre-existing boundaries of the area, should be considered in any land-use reappraisal, and preferably retained. Sympathetic and sensitive alternative uses should be found for the surviving standing building(s), where possible.

Figure 28a Ivor Ironworks IW023



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Figure 28b Ivor Ironworks IW023 on 1st edition OS map base



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IW Number 024 Hirwaun Ironworks (01109m) SN 9577 0592

General Description

The Hirwaun Ironworks (NPRN: 40,381; PRN 01109m) is an important ironworks of national and international significance; as the first coke-fired ironworks in South Wales, being founded in 1757. The site is also notable for its historic associations with numerous ironmasters associated with the early development of the South Wales coke fired iron industry.

The site comprises four ruinous blast furnaces (NPRNs: 85,173-6), protected by inclusion in a scheduled area (SAM BR157); these furnaces survive as overgrown earthen mounds showing variable amounts of outer brickwork, both in *situ* and fallen. Aligned WNW-ESE they are separated from the charge bank by a blast passage, which runs the full length to their rear and a blast passageway. The furnaces, like much of the site are in an overgrown state of disrepair and dereliction.

In addition to the ruins of the blast furnaces, the site retains the former manager's house, Ty-mawr, a massive tramroad causeway and two limekilns. The Tramroad causeway (NPRN: 34,847) and bridge are notable as an early example of railway engineering; the latter is a Grade II Listed structure (Cadw ref no. 26,827) and lies within the scheduled area (SAM BR157). This high single-track causeway is approximately 100m in length and is carried over the Afon Cynon by a single span bridge with segmental arch and narrow dressed-stone voussoirs and coursed rubble revetments. The flat deck is a footpath retaining some stone sleeper blocks (overgrown at the time of inspection). This structure was built 1806-8 by the engineer George Overton to replace an earlier bridge, sited immediately south of the present bridge, of a tramroad built in 1793, upon which raw materials were carried to the furnaces of Hirwaun ironworks and limestone was brought from the quarries at Penderyn.

The ironworks area identified for the purpose of this study extends beyond the area currently protected through legislation (ie beyond the SAM area) and includes the standing buildings of the managers house Ty-mawr, and the site of the works tramroad and locomotive shed, as well as the site of associated tips and a row of now demolished terraced worker's housing to the west at SN 96601 06039 (probably those identified as PRN 01801m). These features are all depicted on the first edition 1:2500 OS.

Historical Background

The Hirwaun Ironworks dates from 1757 when John Maybery leased land at Hirwaun to erect a furnace. The furnace at Hirwaun was initially constructed on a site just outside Bute land but a new lease in 1760 incorporated the land on which the single furnace stood. The partners, John Wilkins, John Maybery and Mary Maybery passed the Hirwaun Ironworks to John Wasse and William King in 1775. Their lease was to run for fourteen years and this new partnership agreed to repair the waterwheel and cylinders that blew the furnace. These and other conditions were unfulfilled and the lease was terminated in 1777.

In 1780 the concern was leased to Anthony Bacon of Cyfarthfa. It is unclear as to whether Bacon was responsible for the conversion of the works from charcoal to coke, or whether this change in fact dated to the previous occupiers, the Mayberys. However, it is known that Bacon put the works in repair and continued the production of iron on the site until his death in 1786. The lease of Hirwaun then passed to Samuel Glover of Abercarn. Although the ironworks was assessed as

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producing 1,050 tons of iron in 1796, production seems to have seldom risen to over 10 tons per week.

In 1805, when under the control a new partnership (Francis William Bowzer, Simon Oliver, Lionel Oliver and Jeremiah Homfray, later George Overton) the ironworks remained a single furnace affair, producing 450 tons of iron. The site is thereafter developed and when the Hirwaun Ironworks was put up for sale in 1813 it comprised of two well constructed furnaces each 40ft. high, two cast houses, one 45ft. by 40, the other 36 by 33ft, an air furnace and two fineries, a blast engine on Boulton & Watt's principle 38in. x 6ft. 8in, with a 78in. blowing cylinder working through a water regulator, a forge 157ft. by 44ft. at one end and 34ft. at the other with ten puddling furnaces and five balling furnaces and a Trevithick steam engine working with a 6ft. stroke, two pairs of puddling and a pair of finishing rollers capable of rolling 80 to 100 tons weekly, (this engine was obviously put in during Homfray's involvement with the works as he and Birch were building Trevithick type engines for sale at their Abernant Ironworks, Aberdare). Other property in the sale included a counting house, a further forge, pattern room, drying sheds, carpenters' and smiths' workshops, a waterwheel for turning a lathe for the rollers and grinding clay, a brick kiln, four calcining kilns, mineral yard, coke banks, two counting houses, three limekilns, four collieries, iron ore levels, cottages and tenements.

The site was unoccupied between 1814 and 1819, when William Crawshay of Cyfarthfa took over the lease. The two furnaces were rebuilt and a powerful 52½in. beam blowing engine (Neath Abbey Iron Company) was constructed. Output was improved, some 4,160 tons of iron being produced in 1823, and the site developed with more furnaces built in 1822. Output continued to rise with 7,020 tons of iron being produced in 1826 and 9,370 tons in 1830. The four furnaces continued in blast during the 1830s and 1840s and Ince suggests a second Neath Abbey 52½in. blowing engine was installed in 1839 and certainly a 24in. x 1ft. high pressure engine was purchased by the Hirwaun Ironworks from Neath Abbey in 1849.

Hirwaun was never a very profitable concern for any of its owners and during the mid 1850s relations between the Marquis of Bute, who owned part of the site, and Francis Crawshay became strained with severe consequences for the works; the blast furnaces and mills were on Bute property with the furnace yard and limekiln on Crawshay property. The Crawshays were thereafter intent on abandoning Hirwaun in favour of their Trefforest plant.

The furnaces were in blast for the first six months of 1859 and then the Crawshays abandoned the site. The works reverted to the landowner, the Marquis of Bute, and later in 1864 was leased to Handel Cossham and Thomas Challender Hinde who put two furnaces in blast. Between 1865 and 1866 when the works was under the control of the Hirwaun Iron and Coal Company the remaining two furnaces were repaired. However, operations were short lived and in 1867 the word iron was dropped from the title of the company. When the Hirwaun Ironworks was advertised for sale in 1870 it was described as having four furnaces with a powerful blast engine, arrangements for utilising waste gases, hot air stoves, a spacious forge and mills with powerful engine, trains of rolls, nineteen puddling furnaces, forges and steam hammers. No interested parties came forward and the Hirwaun Coal Company was wound up.

The ironworks site remained unoccupied until 1880 when the Stuart Iron, Steel and Tin Plate Company took it over. The Hirwaun Ironworks was renamed the Stuart Ironworks and some work was carried out on the furnaces. These were altered to make them 54ft. high and 16ft. in

diameter across the boshes with six tuyères. It was thought that the efficiency of a furnace could be improved if the volume of air thrown into the structure could be increased, hence the multiplication of the tuyères. However, the result of adding more tuyères at Hirwaun is not known as little production of iron took place and the works later became a general foundry (Ince 1993, pp 33-35; Rees 1969, p74; NMR information).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st and 2nd edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP for the area are in the form of Land reclamation URPB1a, housing development HP2, HP1L HP1Kt: HP1L offsite water main and trunk sewer before housing development dependant on construction of Penyard link. HP1K Boundary of Hirwaun ironworks reclamation scheme, improvement to sewers first. URPB former ironworks subject of draft development brief to reclaim area for mixed use.

The majority of the site, including the scheduled area, is currently in an overgrown state and dereliction poses an obvious and serious threat to the survival of the remains. Part of the threat to the site comes in the form of erosion from off-road vehicular activities (motorcycles), but also from active vandalism, including the removal of facing stones from standing structures.

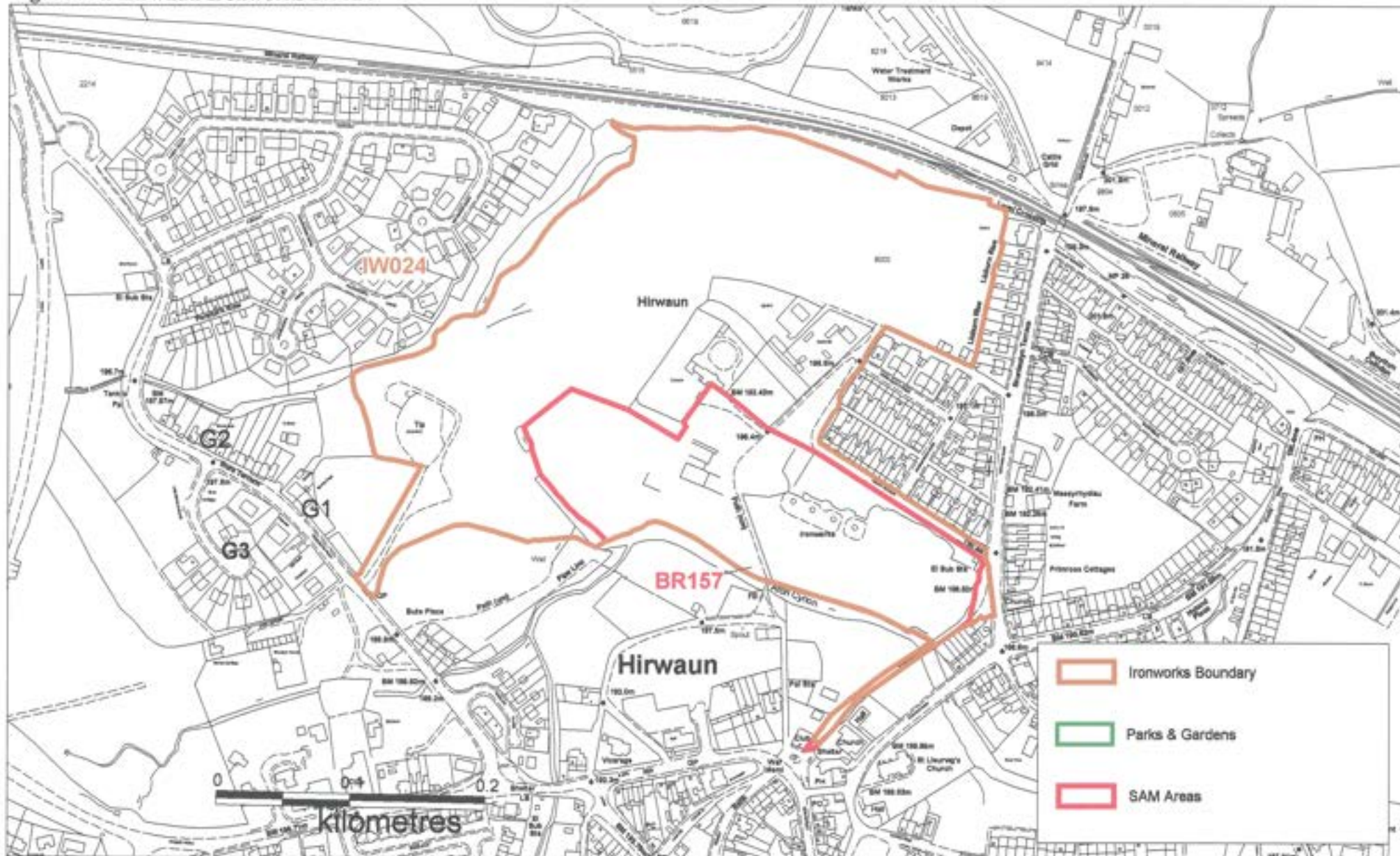
The area would benefit from an increased level of management/conservation to include a programme of archaeological work, a full survey of surviving remains and remedial conservation work to above ground remains, ie selective vegetation clearance and consolidation of standing remains under archaeological supervision.

Plate 012 Hirwaun Ironworks IW024



Plate 012: Furnace bank site Hirwaun Ironworks (SAM BR157), view to northeast. The entire area including the scheduled remains is in an increasingly derelict and overgrown state.

Figure 29a Hirwaun Ironworks IW024



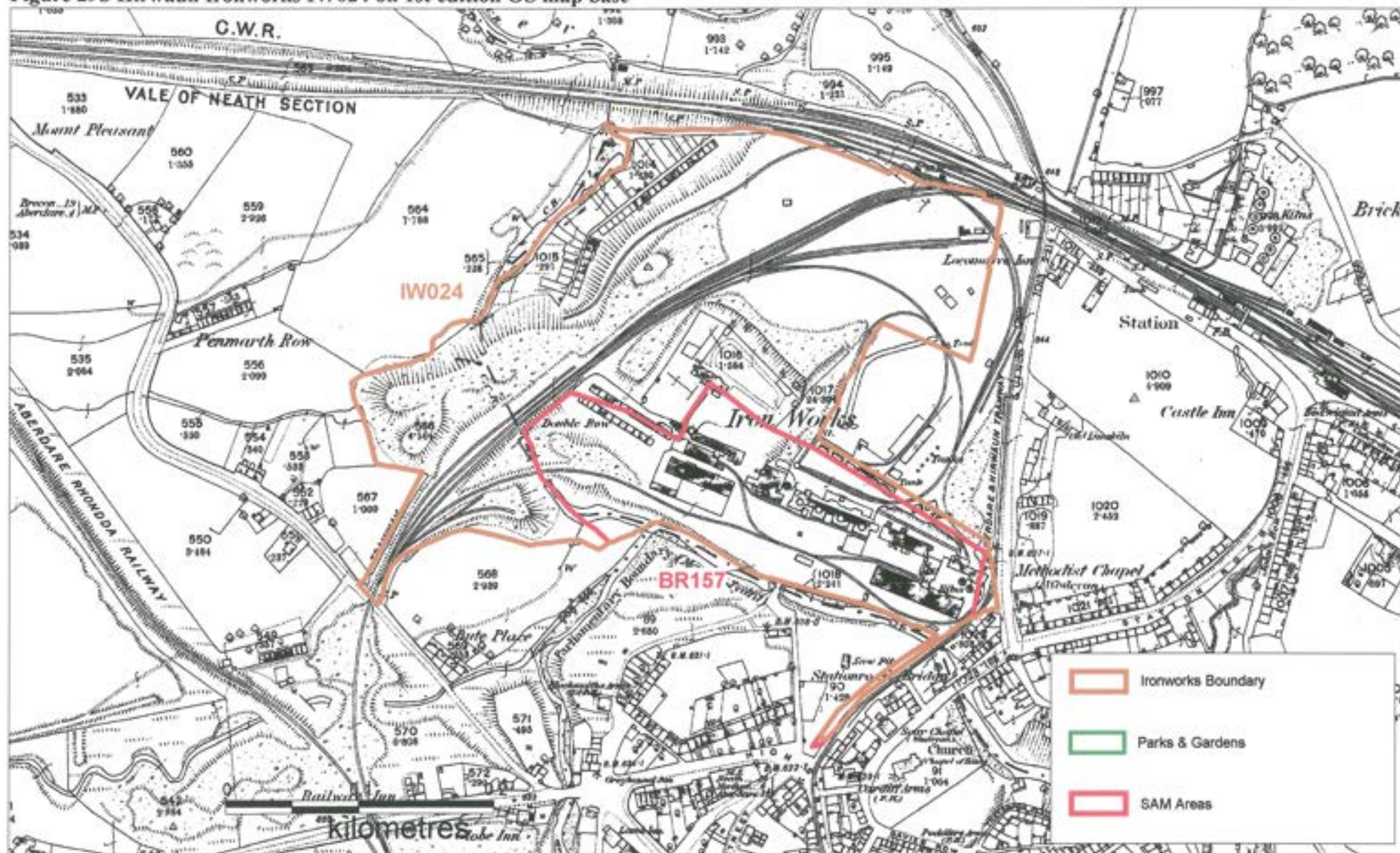
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Figure 29b Hirwaun Ironworks IW024 on 1st edition OS map base



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IW Number 025 Llwydcoed Ironworks (01393m) SN 9930 0440

General Description

The Llwydcoed Ironworks (NPRN: 40,454; PRN: 01393m), comprises the as yet undeveloped site of an early 19th century ironworks, founded in 1800, of regional if not national significance, part of a wider conglomeration of works under the auspices of the Aberdare Iron Company including at first through purchase Abernant (1819), and thereafter the Penydarren, Plymouth and Treforest ironworks.

The first edition 1:2500 OS map shows a bank of three furnaces (SN 99319 04419) at the then disused Llwydcoed Ironworks site, the construction of two of which date to the pre 1805 period, the third to c. 1823. In the area east of the furnaces is a linear bank of three limekilns (SN 99348 04396), a long rank of possible calcining kilns, a large coke yard with two parallel ranks of coke ovens (SN 99418 04428) aligned east-west and a reservoir at SN 99352 04470; the sites of the latter two features now lie beneath a playing field and recently constructed housing. The second edition OS shows the disused works in a partly cleared state, the three furnaces in place as well as limekilns (partly dismantled) and coke ovens. By the survey of the third edition the site is in use as the Aberdare Brickworks with its five circular kilns, while the coke ovens, and limekilns now appear to have been demolished, the northern two of the three furnaces still appear to stand at this date. The site of the furnace bank is now densely wooded: the exact condition of any standing remains associated with the furnaces themselves is unknown; buried remains of the furnace bases, however, are considered likely to survive.

Also included in the ironworks area from the first edition OS are Founders' Row (SN 99359 04342), a terrace of early 19th century ironworkers' cottages, the nearby old balance pit and level (ironstone and coal) at SN 99416 04292, the site of a sawpit at SN 99238 04429, and the site of the internal works tramroad. The current condition of these features, apart from Founders' Row, which appears to be in good condition though altered, is unknown.

Historical Background

The Llwydcoed Ironworks (also known as the Aberdare Ironworks) was founded in 1800 following the formation of the partnership comprising John Thompson, John Hodgett and George and John Scale. Two furnaces were built initially, each 40ft. high with a diameter across the boshes of 14ft. The furnaces were waterwheel blown the machinery constructed by Hazeldines's Foundry at Bridgnorth for £12 a ton. In 1805 the two furnaces produced 3,586 tons of iron.

In 1823 the company was operating three furnaces at each site and produced 5,676 tons of iron, which had risen to 11,440 tons in 1826, and 12,571 tons in 1830. There were two steam engines operating at Llwydcoed in 1837. When in 1846 the company was sold to settle a dispute, the site comprised three blast furnaces, two engines and two large waterwheels for blowing, mine kilns and suitable workshops. Under the Aberdare Iron Company managed by Rowland Fothergill and later Richard Fothergill, puddling furnaces were added and the works modernised. The chief engineer, Thomas Hosgood formerly of the engineering works of the Neath Abbey Iron Company, appears to have been responsible for the addition in 1852 of two 12in. horizontal engines and a 9 1/2in. inverted vertical engine both from Neath Abbey.

Southeast Wales Industrial Ironworks Landscapes

In 1860 the Llwydcoed ironworks comprised three blast furnaces, twenty hot blast stoves, fifty-six coke ovens, six mine kilns, three limekilns, three blowing engines and two waterwheels of 40ft. diameter and 4ft. breadth. Expansion continued at Aberdare with a very large furnace being put into blast in 1861. In the week ending 4th July 1863 the production figures of the company's furnaces at Llwydcoed alone were:

Aberdare No.1 - 287 tons.

Aberdare No.2 - 300 tons.

Aberdare No.3 - 214 tons.

Output was again improved in 1865 when a new blowing engine and blast furnace were put into operation at Llwydcoed. Investment in this joint stock company was continuing to finance expansion with the concern becoming one of the largest suppliers to the wrought iron rail trade. A full picture of the extent of the Aberdare Iron Company is revealed in a description of its works published in 1869. At that time Llwydcoed had three blast furnaces each 42ft. high with a diameter of 18ft. across the boshes, two of these furnaces were in blast. The coking of the coal for Abernant and Llwydcoed was achieved using 168 coke ovens. The blast at Llwydcoed was partly supplied by two waterwheels probably built at Hazeldine's Foundry; these were 40ft. diameter and 5ft. wide positioned one above the other and operated two 54in. blowing cylinders. Four additional beam blowing engines provided the blast, one engine with an 84in. x 6ft. blowing cylinder, one with a 64in. x 7ft. blowing cylinder, one with a 78in. x 7ft. blowing cylinder and one engine having two blowing cylinders each 54in. x 6ft. All the engines blew into one large blast pipe. At Llwydcoed the iron was processed in three double refineries but all the puddling took place at the company's other works at Abernant.

Despite contraction in the early 1870s, the company retained a major share in the rail export market, supplying rails, for example, to New Orleans, New York, Montreal and Pacasmayo and in 1874 large orders were supplied to Alexandria and France. However, the collapse of the wrought iron rail trade led to the closure of the Aberdare iron Company's works including Llwydcoed during 1875 (Ince 1993, pp 35-39).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on a plan of 1846 (GRO D/D X 835/1/1,2) and on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of housing development HP11 mixed residential scheme.

At the time of the site visit it was noted that the area was the property of a developer (Jarvis Property) and that some site clearance activity appeared to be underway. According to the planning office at Rhondda Cynon Taff CBC no planning application had been submitted (13/9/04).

The site lies on private property, and access for the purpose of the initial site visit was made along an adjacent public right of way, which afforded a limited view of the area. A visit and survey with permission of the owner will be required to ascertain the extent of surviving/standing

Southeast Wales Industrial Ironworks Landscapes

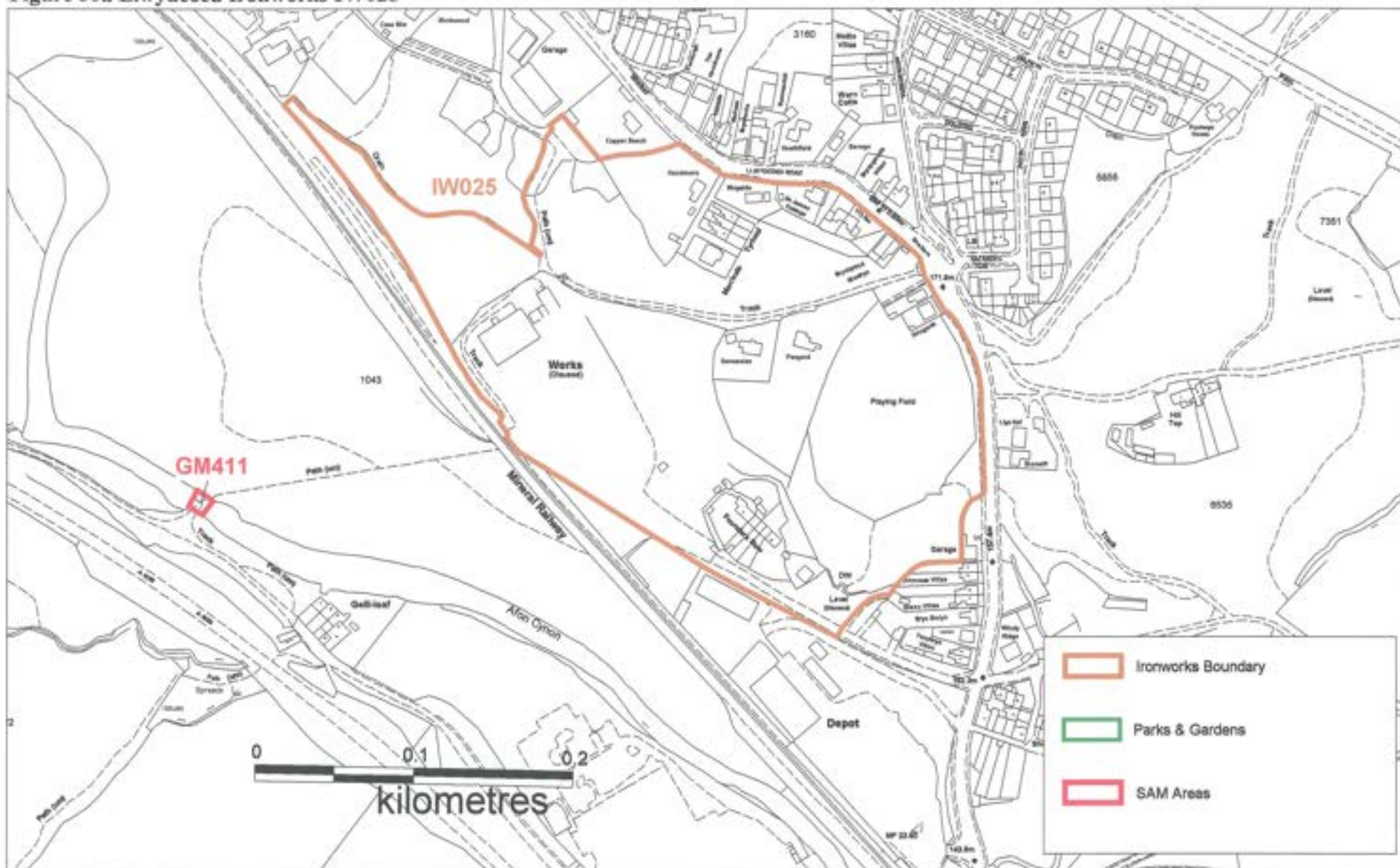
remains, in particular those of the furnaces. Once this has been carried out further recommendations might be formulated.

Plate 013 Llwydcoed Ironworks IW025



Plate 013: Llwydcoed Ironworks site with clearance activity in progress, view to northwest. Furnace site lies within wooded area beyond redbrick structure on right hand side of the picture.

Figure 30a Llwydcoed Ironworks IW025

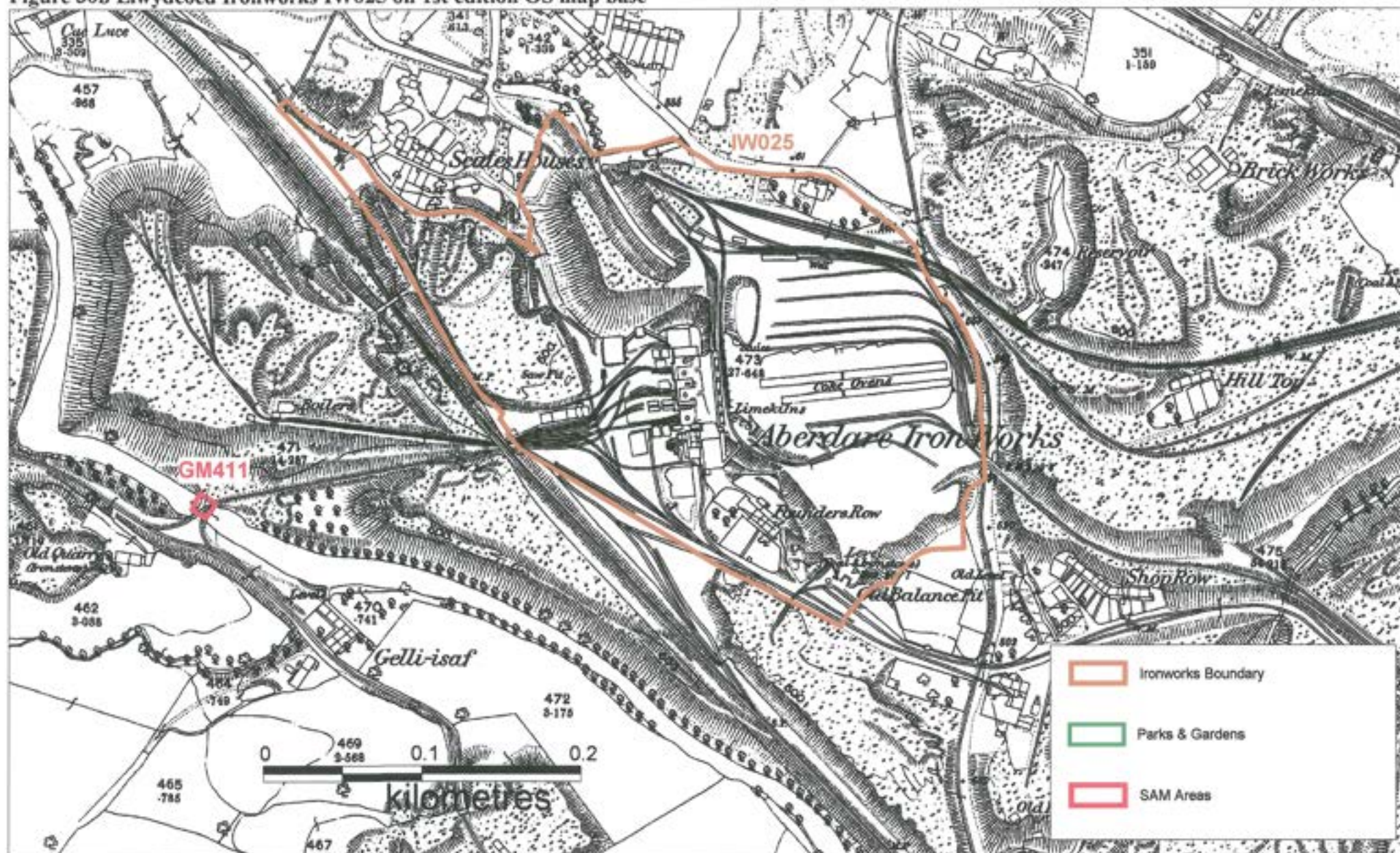


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Figure 30b Llwydcoed Ironworks IW025 on 1st edition OS map base



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IW Number 026 Gadlys Ironworks (02162m and 02344m) SO 001 030

General Description

The Gadlys Ironworks (NPRN: 34,088; PRN: 02162m) is a nationally important ironworks of early 19th century foundation, noted for its quality casting product and engine parts during its day. The site retains rare surviving features in excellent condition, including furnaces, casting sheds, blast engine house and calcining furnaces; these are currently protected by scheduling and listing. Buried remains of other features may also survive. The site has sustained some loss with the area above and to the west of the furnaces, which included the coke yard and coke ovens was developed for housing during the early 20th century, while the level area to the east has recently been developed for retail use.

The first furnace was built by Mathew Wayne in 1827-8; a second was in blast by 1854, while two further furnaces were added in 1855-6. The furnaces were blown out in 1875, following the depression of the early 1870s. By the 1880's the company restricted operations to coal extraction, while the buildings in front of the furnaces formed a brick and wagon works by the survey of the second edition 1:2500 OS map.

The furnace area of the Gadlys Ironworks (PRN: 02162m; NPRN: 85,109) located at SO 000 030, has been scheduled (SAM Gm438). The site comprises the intact remains of the charging bank built against a steep scarp, located to the rear of the former Stores Building (PRN: 02042m; NPRNs: 34,884 and 40,450). The former Stores Building (Listed Grade II Cadw ref: 10,844), a twin gabled ranges of dark rubble with brick facings, currently in use as a museum, is itself of interest as it possibly incorporates the remains of the casting house thought to date to 1855-6. This building appears to have been reused as one of the Wagon Repair Shops (NPRN: 85,107) at SO00030301.

Other standing structures of note include an imposing intact Grade II Listed (Cadw ref: 10,842) engine house (PRN: 02344m; NPRN: 33,707) to the south of the furnaces at SO 001 030, adjacent stone revetments (Grade II Cadw ref: 10,843) and the former Calcining Furnaces situated to the rear of no. 17 Elm Grove (Grade II Cadw ref: 10,846). Additional sites identified by the RCAHMW in the area are an Electrical Power House (NPRN: 85,106) at SO00060297 and a Refuse Destructor (NPRN: 85,108) at SO00070300.

Other features identified on the first edition OS 1:2500 map include the following: the Works Internal Tramroad Network, Stables (SO 00123 02981); Coke Ovens (SN 99951 03010); Boilers (SO 00037 02919); a Kiln (SO 00199 02967), and the Works Office at SN 99942 02894, the site of which is now partly taken by the Gadlys Higher Standard School, (NPRN: 310,035).

Historical Background

The Gadlys Ironworks was the third ironworks to be built in the Aberdare area, founded in 1827. The partners who set up this single furnace ironworks were George Rowland Morgan, Edward Morgan Williams and Matthew Wayne. Wayne had been a furnace manager at the Cyfarthfa Ironworks and then was involved in the development of the Nantyglo Ironworks. The furnace was first put into blast in 1828 and was blown by a 34 in. beam blowing engine supplied by the Neath Abbey Iron Company. When the works was advertised for sale in 1835 it comprised 350 acres of mineral property with an ironworks employing 150 people. The single furnace was described as being able to make 1,700 to 2,000 tons of iron annually, blown by an engine, which

also supplied the blast to a refinery. Other property on the site included a cast house, stove room turning room, cupola, smiths' shop, weighing machine, bridge house, carpenters shop, office, punching machine and turning lathe. There were also three calcining kilns for burning off the impurities in the iron ore. The iron produced at Gadlys was praised for its strength in castings and for engine parts. No less than 5,600 yards of tram plates weighing 200 tons were present in 1835 in and about the works. A coal pit was situated close to the works and was drained by two 8in. pumps, one worked by a 24ft. diameter waterwheel and the other by a high-pressure steam engine. A sale of the ironworks does not appear to have been negotiated for the concern remained in the hands of a company headed by Matthew Wayne (1780-1853) and after his death Gadlys was managed by his son, Thomas Wayne (1810-1867).

During the latter part of the 1840s the works was expanded: in 1845 a 24in. beam engine was supplied by the Neath Abbey Iron Company, followed in 1847 by a 12in. engine. By 1850 there were three furnaces in blast and a further engine with a 30in. cylinder had been supplied by the Neath Abbey Iron Company. The number of furnaces at Gadlys had risen to four by 1854 but in that year only two were in blast. The Gadlys Iron Company concentrated on producing cold blast iron for tinplate bars or ductile armour iron. Production was diversified when, in 1861, a small rail mill was built which could roll merchant bars or rails. One of the furnaces at Gadlys was rebuilt in 1869 and a further rail mill was constructed giving the works the capacity to produce 500 to 600 tons of rails per week. The Gadlys Ironworks was listed in 1872 as operating fifteen puddling furnaces and two rolling mills and in that year the owners reorganised under the title of the Gadlys Coal and Iron Company Limited which was later changed to Wayne's Merthyr Steam Coal and Iron Works Limited. The ironworks continued to produce cold blast iron until its closure in 1876 and in the following year it was put up for sale. No prospective purchasers came forward and the furnaces were never put into blast again although the associated collieries continued to be worked (Ince 1993, p 40).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

There are no identified threats to the area as identified from the UDP, however the area to the west and above the furnace site is now housing, while the area to the east of the furnace and adjacent former casting house has been developed for retail use and car parking. Any future proposals to add to this development will need to be monitored.

It was noted during the field visit that the Listed Calcining Furnaces (Grade II) located west of and outside the current scheduled area of the Furnaces are in excellent condition, and appear to have recently undergone restoration.

Plates 014-015 Gadlys Ironworks IW026

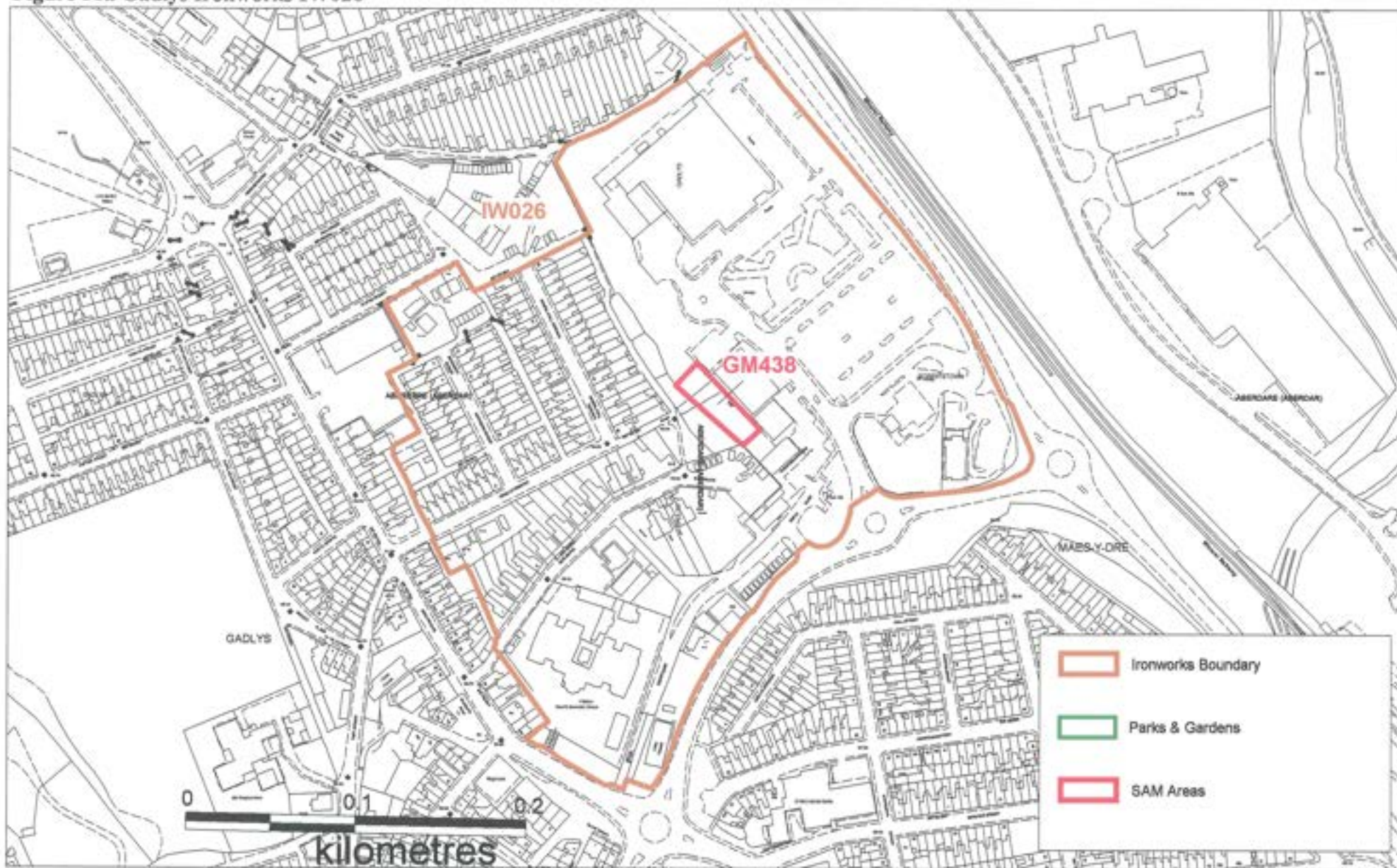


Plate 014: Former stores building or casting shed, Gadlys Ironworks (Listed Grade II), view to northwest.



Plate 015: Calcining Furnaces Gadlys Ironworks (Listed Grade II), view to northeast.

Figure 31a Gadlys Ironworks IW026

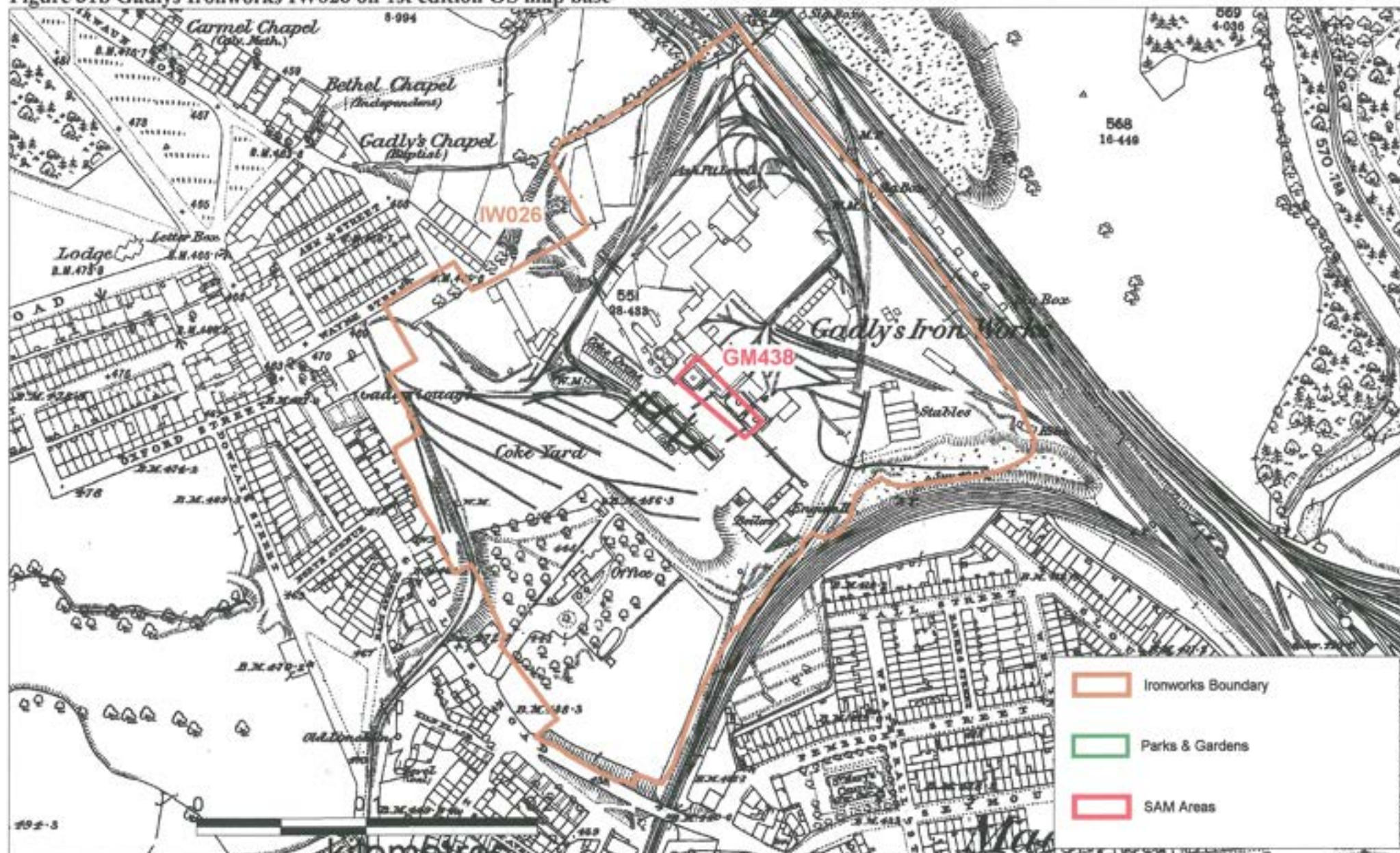


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Figure 31b Gadlys Ironworks IW026 on 1st edition OS map base



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IW Number 027 Abernant Ironworks (01264m) SO 0090 0340

General Description

The Abernant Ironworks (NPRNs: 34,069 and 40,441; PRN: 01264m) is an early 19th century ironworks, founded in 1801, of regional if not national significance. The Abernant Ironworks later became part of a wider conglomeration of works under the auspices of the Aberdare Iron Company following its purchase in 1819. The Ironworks comprised three furnaces constructed between 1801 and 1807, and numerous forges, mills and puddling furnaces.

The first edition OS 1:2500 map depicts numerous features within the area, none of which survive today above ground. These included the following: two furnace sites at SO 00940 03475 and SO 01011 03433 and a probable third at SO 01062 03443, an extensive coke yard to the north of the furnaces with groups of ovens at SO 00929 03564, SO 00853 03516 and SO 01083 03504; Limekilns at SO 01018 03496, SO 00923 03503 and SO 00883 03499, a mine kiln (SO 01011 03503), smithy (SO 01063 03563) and Pumping Engine at SO 00816 03391, a several reservoirs such as Furnace Pond.

The 1st edition OS map also names the Abernant Ironworks Offices; this building appears to still stand and has been converted to domestic use, currently 1-4 Office Houses. The area also contained former industrial workers' housing just within its southern boundary: Long Row, and Arch Row, all of which have been subsequently demolished.

During the 1970s the Abernant Ironworks site was extensively cleared, though the general landform appears to have been retained, and for this reason it is considered that buried remains may survive. The Ironworks and its associated Forge Mills formed an extensive area; for the purpose of the current project the Forge Mill, the site of which has been previously developed for housing, has been excluded from the core ironworks area itself.

Historical Background

The Abernant Ironworks was founded following the lease of the Abernant property in 1801 for 99 years to Jeremiah Homfray of Llandaff and James Birch of Aberdare. Three furnaces were constructed by 1807. An expansion on the original two furnaces identified from the lease conditions was enabled when the three Tappenden brothers join the partnership in 1802. During the initial period of operation the works was involved with the development of high-pressure steam engines and several Trevithick type stationary engines were known to have been constructed at this time by the Abernant Iron Company.

Homfray and Birch retired from the company in around 1807. In 1819 the Abernant Ironworks was sold to the Aberdare Iron Company, following a costly dispute between the Tappendens and the Neath Canal Company, which had ended in bankruptcy in 1814.

In 1823 the Aberdare Iron Company was operating three furnaces at each of its sites (Abernant, Llwydcoed and Aberdare) and was producing 5,676 tons of iron; this rose to 11,440 tons in 1826 and 12,571 tons by 1830. The enterprise continued to expand and by 1837 five engines were in operation at Abernant. Despite success and expansion, the company was sold to settle a dispute in 1846. Sales catalogues record that Abernant at the time comprised three blast furnaces, two blowing engines, a foundry, brick stove and kiln and a waterwheel for grinding clay and working lathes. Also at the Abernant site were fineries with a blowing engine.

Purchased by a new company, the Aberdare Iron Company; under the management of Rowland and later Richard Fothergill. During the period puddling furnaces were added and the works modernised.

In 1860 the puddling furnaces at Abernant were increased in number, however, by 1862 the Abernant Ironworks was only operating two furnaces. At this time the production of iron by the company's furnaces was at about the 800 tons per week mark. Some production figures are available for the early 1860s and from these we find that No.1 furnace at Abernant produced 349 1/2 tons of iron in the week ending November 7th 1862 while during the same period No.2 furnace at Abernant turned out 278 tons. These furnaces served seventy puddling furnaces, a large rolling mill and two smaller mills. In the week ending 4th July 1863 the production figures of the company's furnaces at Abernant were:

Abernant No.1 - 287 tons.

Abernant No.2 - 343 tons.

A full picture of the extent of the Aberdare Iron Company works at Abernant is revealed in a description of its works published in 1869. At that time the coking of the coal for both Abernant and Llwydcoed was achieved using 168 coke ovens. While the iron was processed in three double refineries at Llwydcoed, all the puddling was carried out at Abernant, the two sites being connected by rail. The furnace in blast at Abernant in 1869 was 40ft. high and 19ft. in diameter across the boshes, another furnace ready to be lit was 52ft. high and 18ft. in diameter across the boshes. The furnaces were closed with bell and hoppers and were blown with a hot blast at 850⁰F. The blast was supplied by five beam blowing engines, one engine with a 78in. x 7ft. blowing cylinder, one with a 68in. x 6ft. blowing cylinder, one with a 52in. x 5ft. blowing cylinder and two engines working four 30in. x 2ft. blowing cylinders.

The forges and mills at Abernant covered a very large area with the buildings consisting of iron roofing carried on cast iron columns. There were seventy-eight puddling furnaces at Abernant supplying four trains of 19in. puddle bar rolls driven by four steam engines. The puddling furnaces received their draught from eight 48in. Lloyd's patent noiseless fans driven by two 10in. engines. There were also twenty-seven balling furnaces and twenty-one of these received a draught from six 48in. Lloyd's fans. The mills included two large rail mills and others for blooming fish-plates and Russian chair plates; these mills were driven by three engines. There were also thirteen engines for driving saws, presses and punches including two 10in. engines for driving fans. One pair of shears was actuated by a single cylinder engine making 150 strokes per minute and was used to cut cold bars for the top and bottom of rail piles. Fifteen boilers provided steam for the engines at the mills and forges. There was also present a Lilleshall double acting steam hammer used for special orders and another was being made for the company. The forges produced 1,200 to 1,300 tons of puddled bars per week, which supplied the mills at Abernant and Treforest. These mills were capable of producing 1,150 tons of railway iron per week. Also at Abernant were extensive foundries, smiths', carpenters' and fitting shops with the capability of making steam engines up to sixty horse power.

There seems to have been some contraction in the capacity of the company in the early 1870s, and the collapse of the wrought iron rail trade finally lead to the closure of the ironworks at Abernant during 1875 (Ince 1993, pp 36-39).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on a plan of 1846 (GRO D/D X 835/1/1,2) and on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

Threats to the area as identified from the UDP are in the form of development for housing (committed site).

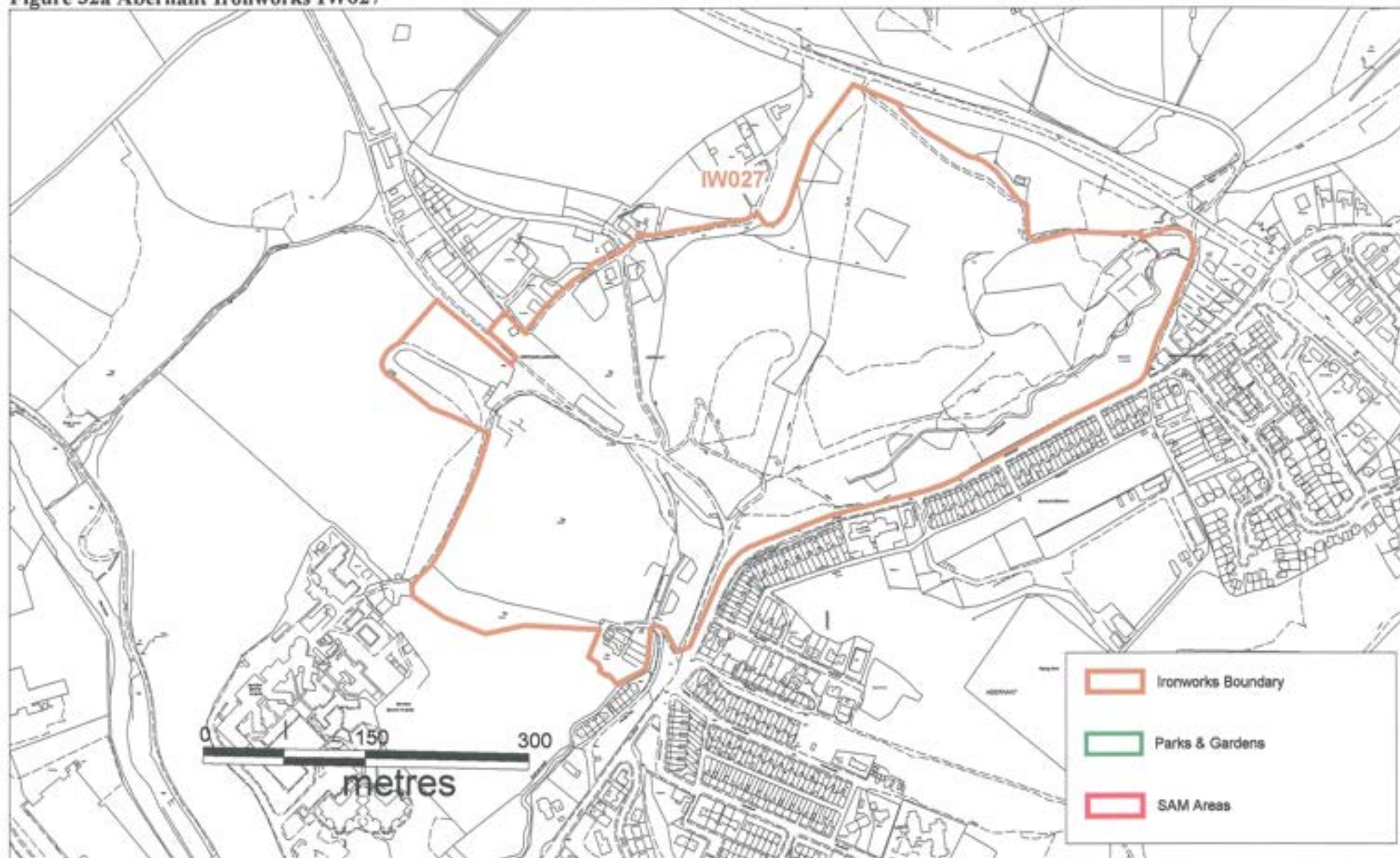
The area has been extensively reclaimed, though some possibility of buried remains relating to the furnaces may survive; further evaluation would be needed to confirm this. Some building footings and platforms, relating to structures of unknown purpose were noted along the southern edge of the area during the field visit.

Plate 016 Abernant Ironworks IW027



Plate 016: View towards Furnace area at Abernant Ironworks (PRN: 01264m), view to northeast.

Figure 32a Abernant Ironworks IW027

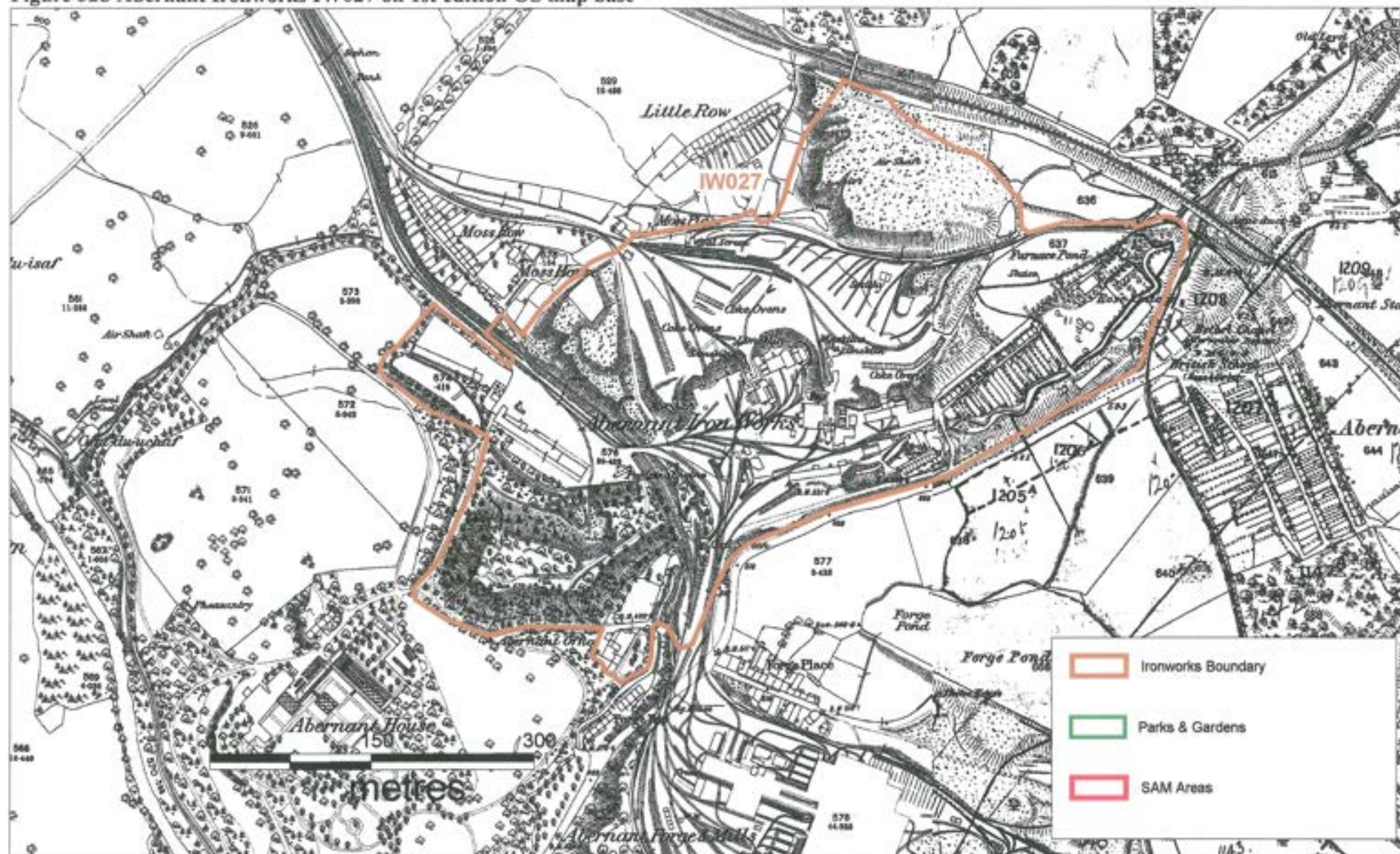


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Figure 32b Abernant Ironworks IW027 on 1st edition OS map base



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IW Number 028 Aberaman Ironworks SO 01509 00300

General Description

The Aberaman Ironworks comprised a short-lived mid 19th century ironworks dating from 1845, when three furnaces were constructed, a fourth being added by 1867. While being of interest for its association with entrepreneurial ironmaster Crawshay Bailey of Nantyglo and Beaufort Ironworks, was otherwise unexceptional. In fact greater importance was attached to the mineral ground, exploited by the Aberaman Colliery (NPRN 80,548). The 1st edition OS 1:2500 map depicts the furnace bank at SO 01511 00287. Other features identified on the 1st edition OS map included limekilns at SO 01514 00258 and SO 01547 00431, the internal tramroad network with the Tre-aman siding and the Black Band Pit (SO 01499 00146).

The Aberaman Colliery site, indicated on the 1st edition OS as being centred on a shaft at SO 01597 0380 is enlarged by the end of the 19th century to encompass the entire area of the former ironworks site (2nd edition OS 1:2500). The furnaces appear to have been cleared by this date, the only structure surviving is a limekiln at SO 01514 00258; later removed by the survey of the 3rd edition, following remodeling of the colliery site.

The site is currently devoid of any above ground remains, having been cleared and reclaimed (to a poor standard) during the 1970s. The survival/condition of buried remains is unknown, but it is considered unlikely that significant remains survive in a buried state due to the site's history of remodeling and later continued use for colliery purposes.

Historical Background

The Aberaman Ironworks developed after the rich mineral estate of Aberaman in the Cynon Valley was purchased in 1837 by Crawshay Bailey. Bailey. In 1845 he constructed three furnaces on the property. A 44in. x 9ft. beam blowing engine with a massive 122in. blowing cylinder was purchased from the Neath Abbey Iron Company to provide the blast.

Although the furnaces were out of blast in 1854 they were continually at work from 1855 until 1866. There was an attempted sale of the works in 1862 for £250,000 and another in 1864 when a £100,000 deposit was paid and the Aberaman Iron Company floated. The affairs of the Aberaman Iron Company were, however, eventually wound up by the Court of Chancery in 1867 and the ironworks taken over by the Powell Duffryn Steam Coal Company. At that time the works comprised four furnaces, seventeen puddling furnaces, a small forge and a mill. Although there were reports in 1868 of the alteration of the buildings into a tinworks and reports in 1872 of repairs to the works, it would appear that the works remained abandoned. It would seem that the Aberaman Ironworks was acquired for its valuable mineral ground which continued to be exploited while the works remained unoccupied (Ince 1993, pp 40-41)).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

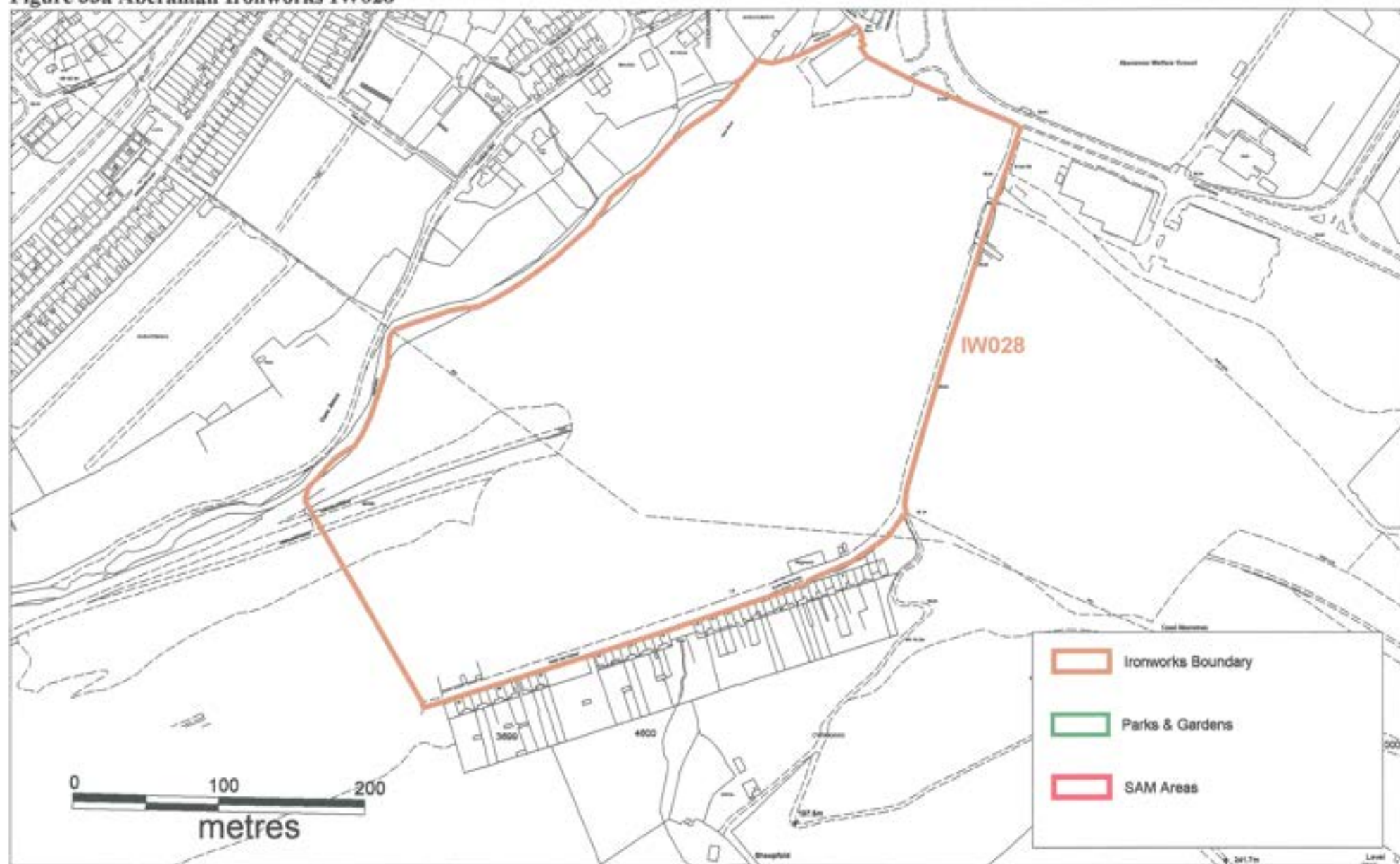
Threats to the area as identified from the UDP are in the form of further land reclamation. The area appears already to have undergone some reclamation following clearance during the 1970s. No features currently survive above ground on the site.

Plate 017 Aberaman Ironworks IW028



Plate 017: View across site of former coke yard, the furnaces would have stood to the right (treed area) view to southwest.

Figure 33a Aberaman Ironworks IW028



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IW Number 029 Ystalyfera Ironworks (01207w) SN 76450 08300

General Description

The Ystalyfera Ironworks (NPRN: 34,126; PRN: 01207w), typical of a type fuelled by locally available anthracite coal, which diversified into the area of tinplate production, is a mid-19th century ironworks of some historical significance. During the 1840s and 1850s the Tinplate works with between 12 and 16 mills was considered to be the largest in the world and the works' bank of 11 blast-furnaces was second only to that at Dowlais. After the reduced number of furnaces were taken out of blast in 1885, the tinplate works continued production until 1946, when the buildings were finally demolished. Unfortunately much of the site was subsequently cleared and redeveloped and now little remains to indicate the importance and scale of the original works.

Cartographic evidence shows continuing alteration to the ironworks site between the first, second and third editions: many of the ironworks features depicted on the first edition 1: 2500 OS map (see below), had been cleared by the survey of the third edition. The area has today almost been entirely cleared of above ground remains; aerial photographs indicate much of the site was redeveloped by the late 1960s, after which single-storey factory units were constructed on the site. The massive stone wall of the charging bank survives west of the recent development and fragmentary remains of furnace sites also appear to survive: a blast furnace platform (PRN: 01207w) surviving adjacent to the canal at SN 764 084 noted in 1981 was noted during the field visit. Buried remains associated with the other furnace sites within the northern half of the site and within the narrow strip of land adjacent to the canal, might also survive. Thick vegetation was found to obscure much of this area during the field visit, however, and the exact condition of these features was not established. Much of the ironworks area was reclaimed from the river valley of the Tawe by the construction of impressive slag banks; these remain *in situ*.

The first edition 1: 25000 OS map depicts various features including the single anthracite furnace (PRN: 01207w) of 1838 at SN 764 084, a further possible furnace site to the south at SO 76369 08297, and the extensive bank of furnaces, constructed during the 1840s and 50s at SN 76491 08413. Also depicted are three kilns adjacent to the main furnace bank at SN 76463 08408, two offices (SN 76495 08352 and SN 76570 08314), the extensive tinplate works (SN 76410 08196) in addition to an internal works railway/tramroad and an associated brickworks with adjacent shaft and old pit at the northeast end of the site (SN 76701 08638). The brickworks site is now a leisure facility of tennis courts and playgrounds.

Historical Background

The Ystalyfera Ironworks dates from 1838 when a single anthracite fired furnace was built by Benjamin Treacher and Evan James of Swansea. In the following year the works was sold to Brancker & Co., which consisted of Sir Thomas Brancker, JJ Hogan of Liverpool and Edward Budd of Swansea. The change of ownership seems to have led to additional investment at Ystalyfera, for a second furnace was under construction in 1839. It is probable that a 24in. Neath Abbey blowing engine was purchased at that time. Furnaces were periodically added to the works and in 1845 a 52½in. beam blowing engine was purchased from the Neath Abbey Iron Company.

Later by 1846, when under the ownership of James Palmer Budd the works was enlarged to contain six blast furnaces and diversified with the addition of a tinplate works. Expansion of the

Southeast Wales Industrial Ironworks Landscapes

site to twelve mills twelve years later, the tinplate works claimed to be the largest in the world. Budd also experimented with new iron producing techniques during the period, perfecting the use of waste gases generated in the furnaces to heat the air blast from the blowing engines. In 1848 improvements were made to the furnaces and production of each furnace at Ystalyfera increased to between 50 to 60 tons of iron each week: the six furnaces were linked by arches upon which five hot blast stoves were constructed.

Expansion of the works continued with Ystalyfera possessing ten furnaces during the 1850s although in 1854 only seven were in blast. During the 1860s the Ystalyfera Ironworks was able to keep six furnaces in production and in 1872 the concern boasted forty-two puddling furnaces and sixteen mills. The presence of puddling furnaces obviously indicates the use of bituminous coals at the works.

There was a gradual decline in the fortunes of the Ystalyfera Iron Company from the mid 1870s with only four furnaces in blast in 1877 and the men only working two weeks out of three. Following the retirement of Budd in 1880 and withdrawal of financial support in 1883, the Ystalyfera Ironworks closed in 1885. A 16 mill tinplate works continued in production until after World War II, the buildings being demolished in 1946 (Hughes and Reynolds 1988, p 17; Ince 1993, pp 162-163).

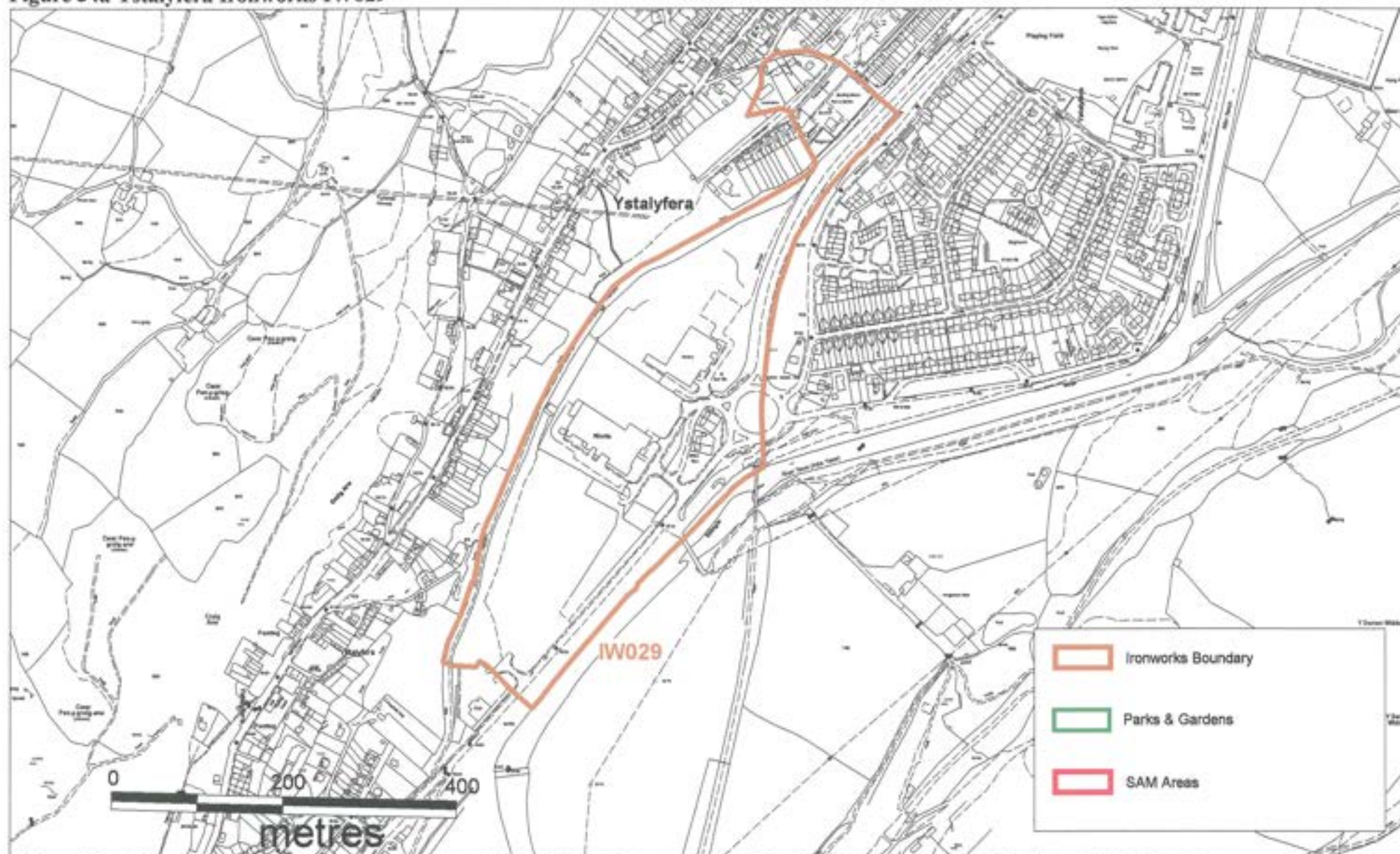
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

No threats were identified from the UDP; the site has been partly reclaimed and redeveloped for light industrial use, though some original features do survive in the wooded slope along the area's western boundary. The area already re-developed for light industrial use is potentially at risk from future housing development; any such development should be covered by the planning process.

Figure 34a Ystalyfera Ironworks IW029

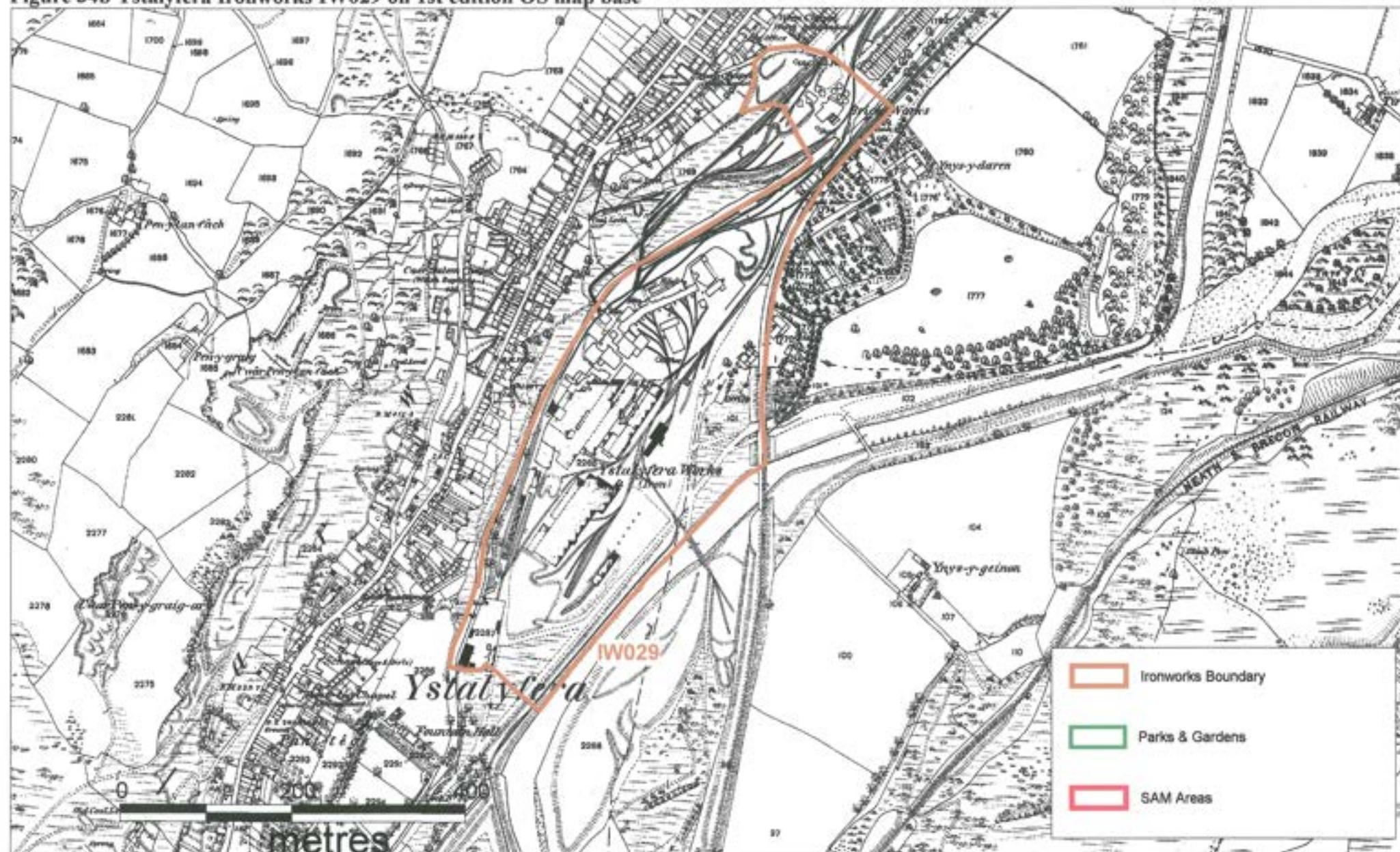


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Figure 34b Ystalyfera Ironworks IW029 on 1st edition OS map base



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IW Number 030 Ynyscedwyn SO 0690 0320

General Description

The Ynyscedwyn Ironworks (NPRN 34,037) was a nationally important ironworks of 18th century foundation, converted to coke fuel by the 1820s. In fact, the Ynyscedwyn Ironworks was the only ironworks site in South Wales to have used charcoal, bituminous coals and anthracite as fuels in iron production and was instrumental in developing technology which allowed the economic use of anthracite coal as a fuel in iron production ultimately leading to the emergence of a major iron-smelting industry not only in south-west Wales but also in the United States of America.

Illustrated in the early 1820s (National Library of Wales), the ironworks had two large blast-furnaces (one of 18th century date), steam blast-powered blast engine-house, charging bank and the small cupola furnace, used 1837 during the successful experimental use of anthracite fuel (Hughes 1990). Unfortunately the furnace remains were completely cleared in 1978, and the site partly redeveloped during the 1980s for the Ystradgynlais Community Hospital. The surviving remains include a brick-built arcaded mill/engine house structure with adjacent brick-built chimneystack (SN 78362 09209), located to the north of the former furnace bank. Nothing of interest now remains above ground in the area of the furnace bank, itself and it is considered that little is likely to survive on the site in a buried state.

During the mid-19th century the concern was extensively revamped and a completely new 'model' works (SN 7831 0912) was partially built in 1866-72. This remodeled plant never equaled the success of its predecessor and was finally closed in 1878. The first edition 1:2500 OS map depicts features associated with the remodeled plant, but also indicates that earlier features may have been incorporated in the later remodeling, possibly the two earlier furnaces (SN 78311 09121). Features extant at the survey of the first edition OS map include a Waterwheel (SN 78245 09308), Smithy (SN 78400 09198), Calcining Kilns (SN 78314 09445), Boilers (SN 78319 09208) and the works shop (SN 78243 09131).

The second edition OS shows further additions to the site relating to the Tinsplate Works (SN 78306 09212) added in 1889, following the closure of the ironworks itself. The Tinsplate Works stood in the vicinity of the current ambulance station.

Historical Background

The Ynyscedwyn Ironworks in the Swansea Valley was instrumental in solving the problems associated with using anthracite for producing iron. The Ynyscedwyn works possesses a long history and it is the only South Wales ironworks' site to have produced iron using charcoal, bituminous coals and anthracite as fuels. A charcoal fired furnace was in blast at Ynyscedwyn during the eighteenth century when for part of the time it was a component in the iron making empire of the Crowley family. During the 1770s and 1780s the furnace was in the hands of various people, including Thomas Price, John Miers and David Tanner, and Richard Parsons. The furnace continued to be charcoal fired and during 1796 produced 800 tons of iron. However, the date of changeover to coke firing is not documented and so the 1796 figure could possibly represent the output of coke iron. The furnace at Ynyscedwyn was still in blast during 1805 but the Parsons' family was forced to close the works in 1817. The ironworks remained unoccupied until the early 1820s when George Crane of Bromsgrove purchased it. Certainly by this time it was coke fired. In 1823 the single furnace at Ynyscedwyn produced 1,498 tons of iron with a

Southeast Wales Industrial Ironworks Landscapes

second furnace being built in 1830. Crane and his works' manager, David Thomas, set about experimenting with the use of local anthracite as a fuel in the furnace. The results of these experiments were the successful production of iron using anthracite with a hot blast and the granting of a patent in 1836. Crane seems to have continued using a proportion of bituminous coals in his furnaces and this may explain the longevity of the enterprise when compared with the many unsuccessful anthracite ironworks in South Wales. A third furnace had been constructed by 1839 and in 1844 the blast was being provided by a 45in. x 8ft. beam blowing engine with a 90in. blowing cylinder. Two further beam blowing engines were constructed at the works with 60in. x 6ft. blowing cylinders supplied by Harvey & Co. of Hayle, Cornwall. By the death of Crane in 1846 the site has seven furnaces.

During the early 1850s the Ynyscedwyn Iron Company owned the works. In 1856 the number of furnaces on the site were reduced from seven to six although by 1862 only a single furnace was in blast. A complete closure of the works took place in August 1863 but conditions in the iron trade improved, which led to a reopening in the early part of 1864. During 1866 the furnaces at Ynyscedwyn were largely demolished and a new charging bank was constructed to feed to newly constructed circular metal clad furnaces; both of these were out of blast by 1869. A new company under T. Challender Hinde, who started iron production in 1870, then purchased the Ynyscedwyn ironworks. The new company, the Ynyscedwyn Iron, Steel and Coal Company, put the two furnaces back into blast and plans were drawn up to build a steel department at the works. In 1872 a forge or mill was started, however in November 1876 the venture was wound up with the buildings of the steel department unfinished. Machinery at the works was sold off in February 1878 with the site being abandoned until 1889 when a tinplate works was built on the property (Hughes and Reynolds 1988, pp 17-18; Ince 1993, pp 161-162).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st, 2nd and 3rd editions 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

There are no threats to the area identified from the UDP; the area was extensively cleared of remains in 1978, and redeveloped during the 1980s. The Ystradgynlais Community Hospital now stands on the site of the furnaces. The surviving standing remains on the site, ie the mill/engine house with chimney (NPRN 34,037), have been recently conserved as Heritage Features.

Plate 018 Ynyscedwyn Ironworks IW030



Plate 018: Remains of the mill/engine house (NPRN 34,037) at Ynyscedwyn, view to southeast.

Figure 35a Ynyscedwyn Ironworks IW030

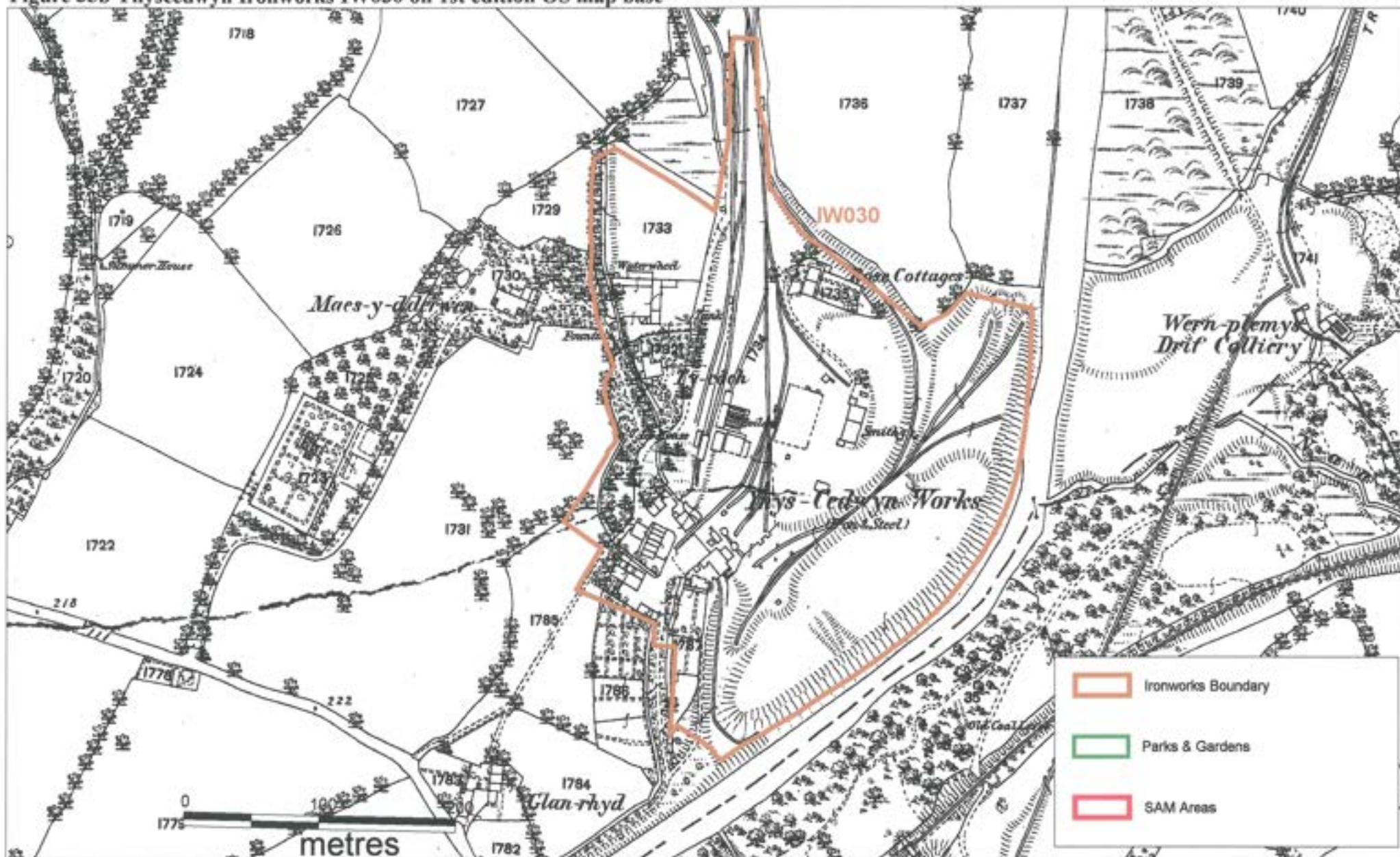


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Figure 35b Ynyscedwyn Ironworks IW030 on 1st edition OS map base



IW Number 031 Onllwyn Ironworks SN 84020 10360

General Description

The Onllwyn Ironworks (NPRN: 80,156) was a short-lived and generally unsuccessful venture of mid-19th century date using anthracite as a fuel. Unfortunately no features of note associated with the Onllwyn Ironworks are considered to survive within the core area; aerial photographs indicate that the western two thirds of the site, including the furnaces, and the adjacent industrial housing had been removed by open cast operations by the late 1970s, with the eastern part buried beneath an associated tip and by 1985 the entire area had been reclaimed and 'landscaped'.

By the 1860s, when the Onllwyn Ironworks was at its greatest extent the site comprised a Smithy (SN 84074 10404), an Ironworks' Shop And Post Office (SN 84159 10364), in addition to two furnaces at SN 84020 10360 and associated calcining kilns (SN 83839 10333). Also extant by this date were two parallel rows of industrial workers' housing, Front Row and Back Row with a school at its west end, situated at SN 83775 10102, and the Onllwyn Pit (SN 83781 10203); these features were located just to the west and beyond the area adopted for the present study.

The site is shown disused and abandoned on the first edition OS 1:2500 map with the only features relating to the ironworks depicted being the dual limekilns (calcining kilns NPRN: 80,156) located at SN 8406 1027 south of the former blast furnaces, an incline leading to the furnaces from various workings to the south, including Coal Level 4 (NPRN 80,157), the ironworks shop (then a post office), and the adjacent Old Coal Drift (equates to PRN 80,161; NGR: SN 8418 1037).

The RCAHMW have identified two further features within the ironworks' area: the Khartoum Tip, BFT, (NPRN: 80,144; NGR: SN 8400 1035) and Coal Level 2 (NPRN: 80,154; NGR: SN 8384 1021) both associated with the Onllwyn Colliery Complex. None of these features now survives.

Historical Background

The Onllwyn Ironworks was constructed in the Dulais Valley in the early 1840s, and initially its two furnaces used locally available anthracite coal as fuel. The ironworks is known to have been in production in 1844 when the Neath Abbey Ironworks repaired a 21 1/2in. engine at the site. Neath Abbey also supplied a 24in. high-pressure engine to the Onllwyn Ironworks in 1846. In 1854 there was one furnace in blast with the works having been recently purchased by W. Llewellyn & Son who had interests in coal mining and tinplate works in the Neath Valley.

By 1859, when the works was taken over by William Parsons, one furnace remained in blast. The process of producing iron using anthracite coal proved unsuccessful and the furnaces were modified to burn bituminous coal from 1861. During the period 1862-64 two furnaces were in blast and in 1864 the works was taken over by the Onllwyn Iron and Coal Company. The two furnaces remained in blast until the financial collapse of the company in 1866. Though a new company was formed under the same name, the furnaces remained out of blast and the works finally ceased to operate (Ince 1993, p 94).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

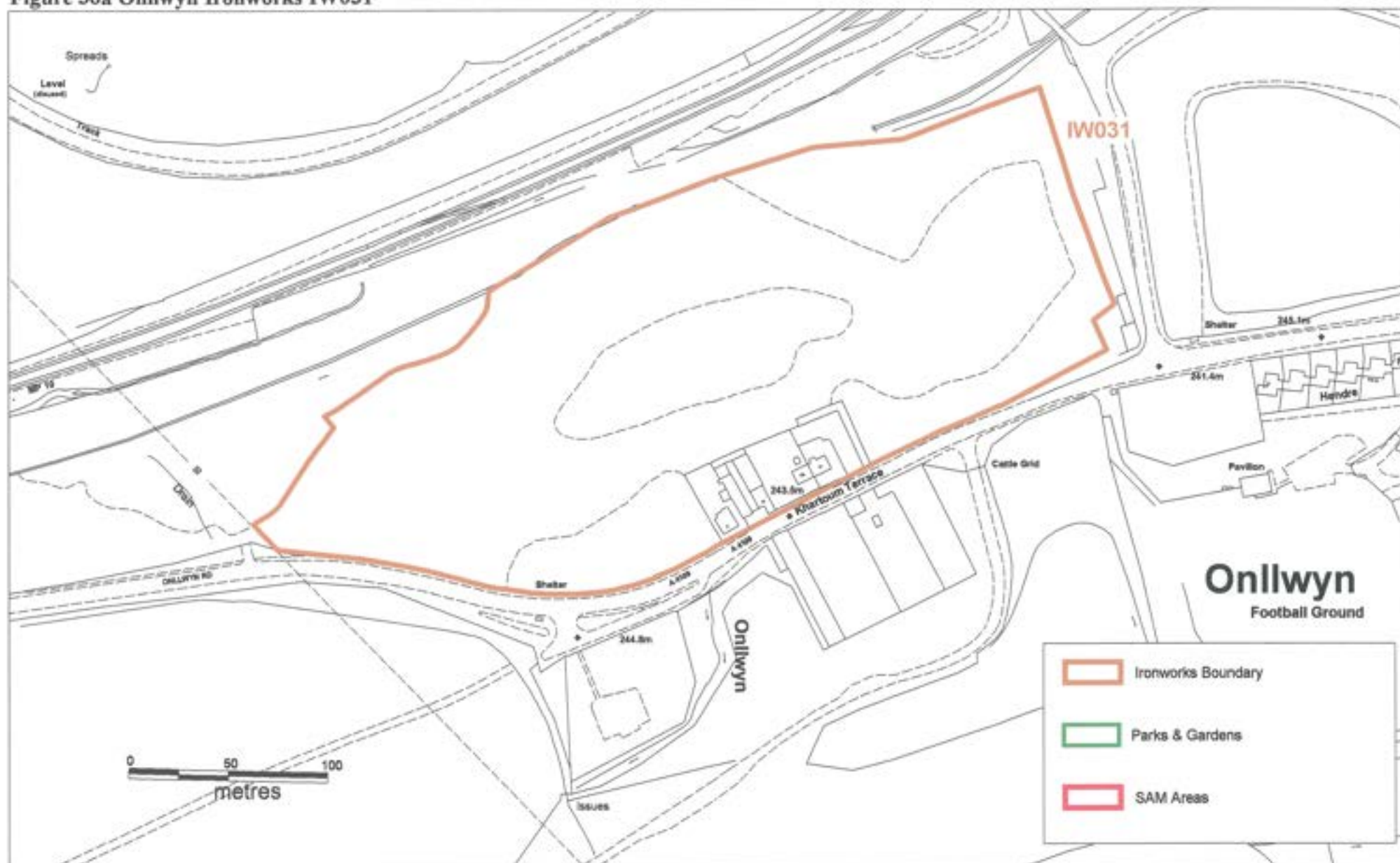
There are no known threats identified from the UDP. The area has been the subject of opencast operations with the result that nothing now survives of the ironworks site.

Plate 019 Onllwyn Ironworks IW031



Plate 019: The now opencasted and reclaimed landscape of the Onllwyn Ironworks, looking towards the site of the former furnaces, view to south.

Figure 36a Onllwyn Ironworks IW031

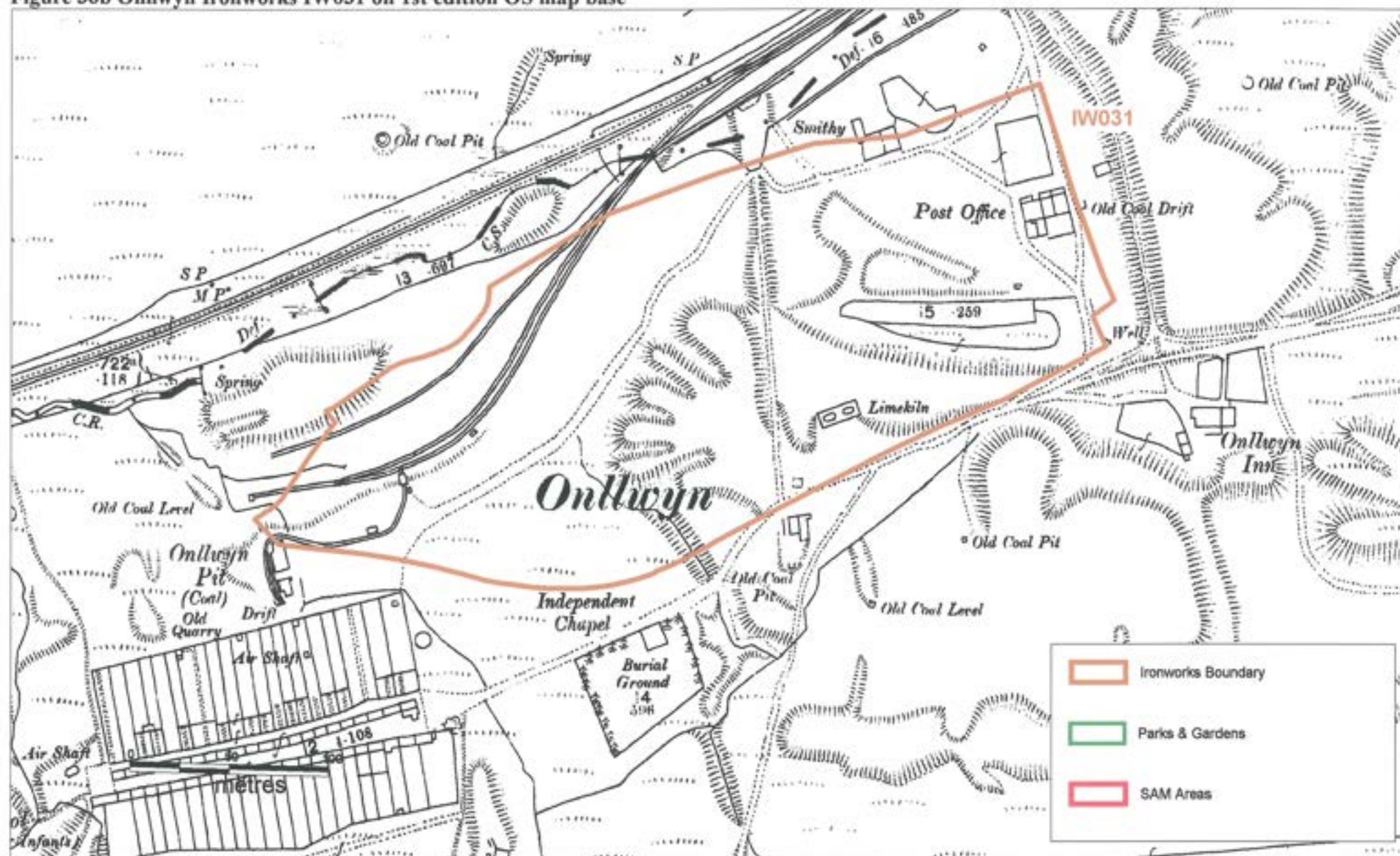


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Figure 36b Onllwyn Ironworks IW031 on 1st edition OS map base



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IW Number 032 Banwen Ironworks (01566w; SAM Gm420) SN 8680 1045

General Description

The Banwen Ironworks (NPRN: 34,071; PRN 01566w; SAM Gm420) is a very significant example of the ironworks being the most complete example of an ironworks to survive on the anthracite coalfield. Founded in the 1838, the works was short-lived and generally unsuccessful; as a result the works at Banwen remained small-scale and representative of relatively rare single-phase development. The furnaces at the site, now scheduled (SAM Gm420) were probably built to exploit local anthracite as fuel following the successful experiments of George Crane at nearby Ynyscedwyn in the 1830s. The site is of considerable interest because of the relatively high level of preservation of standing and buried remains. The RCAHMW have undertaken considerable recording work at the site, including the excavation of the weighbridge, which revealed the intact mechanism *in situ*.

The scheduled area contains the well-preserved remains of two substantially intact blast furnaces with their associated massive masonry charging platform, the engine house and the site of the chimney (originally square in plan). The two furnaces are constructed of roughly coursed large grey stone and archways on all four sides with pecked detailing to the quoins. These are now ruinous on the north; their upper portions collapsed so that loose rubble is visible in the arches. The lime-mortar pointing remains in a poor state and is in urgent need of consolidation.

The engine house, of a reddish (?iron)stone, is relatively well preserved with upper stories with window openings. The interior of the structure is obscured by fallen masonry and vegetation obscures much of the detail. Standing masonry appears to be severely threatened by unchecked tree growth. Both the furnaces and the charging platform are in need of conservation and consolidation to ensure their long-term survival; this is now appears to be a matter of some urgency.

Beyond the limits of the scheduled area are the former weighbridge (also known as the stable) at SN 86733 10342, now a roofless ruin (roof structure partly collapsed) and former smithy and carpenter's shop (SN 86660 10390), now a barn (re-roofed), the farmhouse of Ton Pyrddin itself and the ruins and foundations of Tai-garreg, a row of workers' cottages (SN 86738 10182). Beyond the area to the south connected to the furnaces were a series of linear iron-ore quarries (SN 86742 10018). By the survey of the 1st edition OS 1:2500 the site is disused.

Historical Background

The Banwen Ironworks was founded in the early 1840s by a London joint stock company, but had a disappointing commercial career, with minimal production. The Banwen Iron Company was wound up in 1849 and an unsuccessful attempt was made to sell the concern through the Chancery Court the following year. It was stated that the two furnaces could produce 90 tons of iron per week.

A James Henty purchased the works following a four-year interval; however iron production remained almost non-existent and the Ironworks was again offered for sale in 1854. At this date the furnaces were described as being blown by a 19 1/2in. x 5ft. 6in. high-pressure beam blowing engine with a 60in. blowing cylinder. The works remained unoccupied until 1861 when taken

over by Llewellyn & Son who put both furnaces into blast. However, iron production ceased in the following year and the furnaces remained out of blast until Banwen disappeared from the Mineral Statistics in 1871. (Hughes and Reynolds 1988, p 19; Ince 1993, p 94)

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on a plan given in Hughes 1990 and on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

No threats to the area have been identified from the UDP, however the standing remains of the site, in particular the furnaces and the engine house are subject to continued dereliction and damage from invasive vegetation.

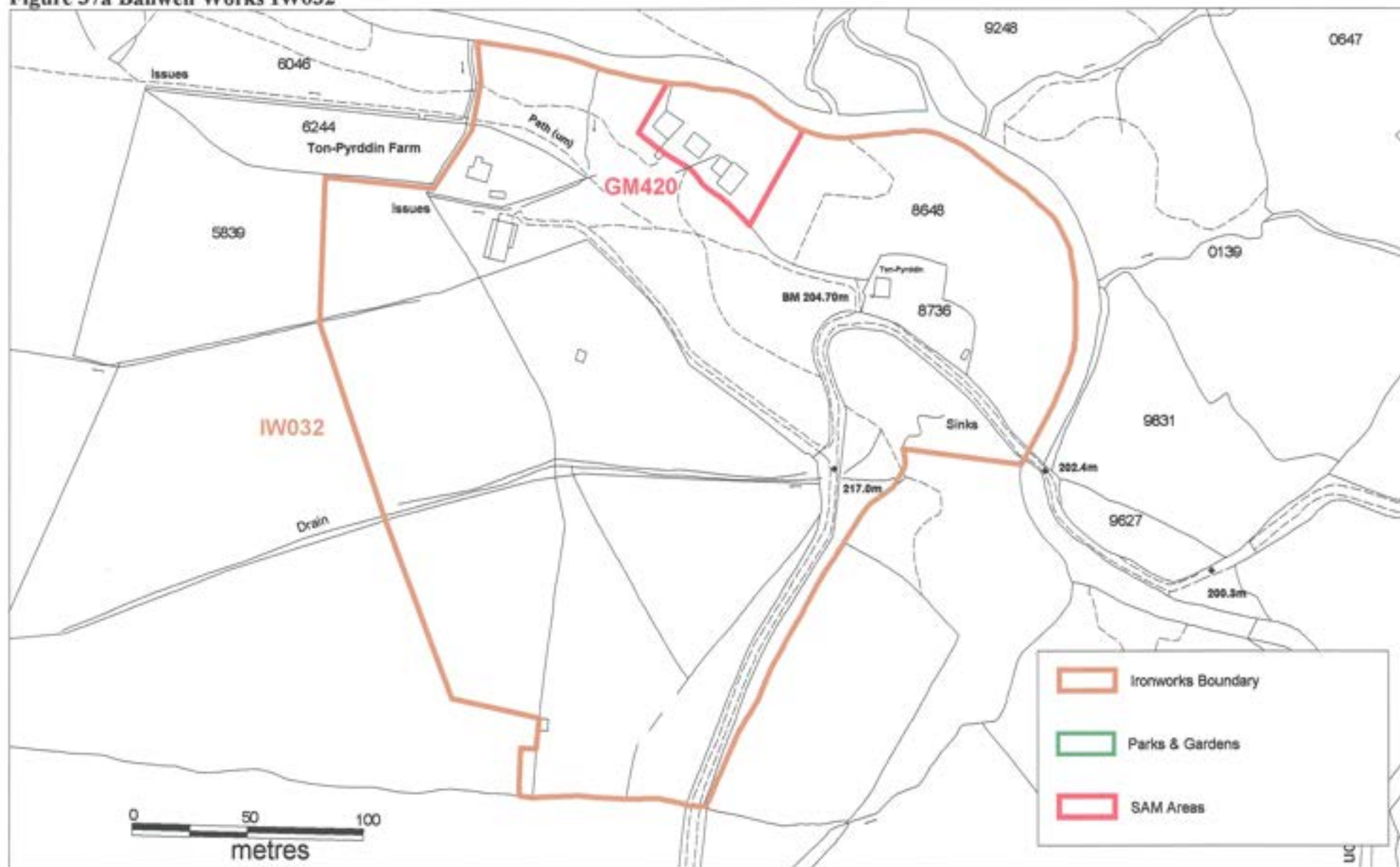
The field visits allowed a further examination of the condition of the standing remains; the engine house was found to be in a dangerous state of dereliction, threatened by tree growth, mortar deterioration and masonry collapse. The other features in the group are similarly threatened. The site in general is in urgent need of conservation and consolidation work. If this is not undertaken in the near future the completeness and value of the site may be severely compromised.

Plate 020 Banwen Ironworks IW032



Plate 020: Remains of the Weighbridge House, Banwen Ironworks, view to northwest.

Figure 37a Banwen Works IW032

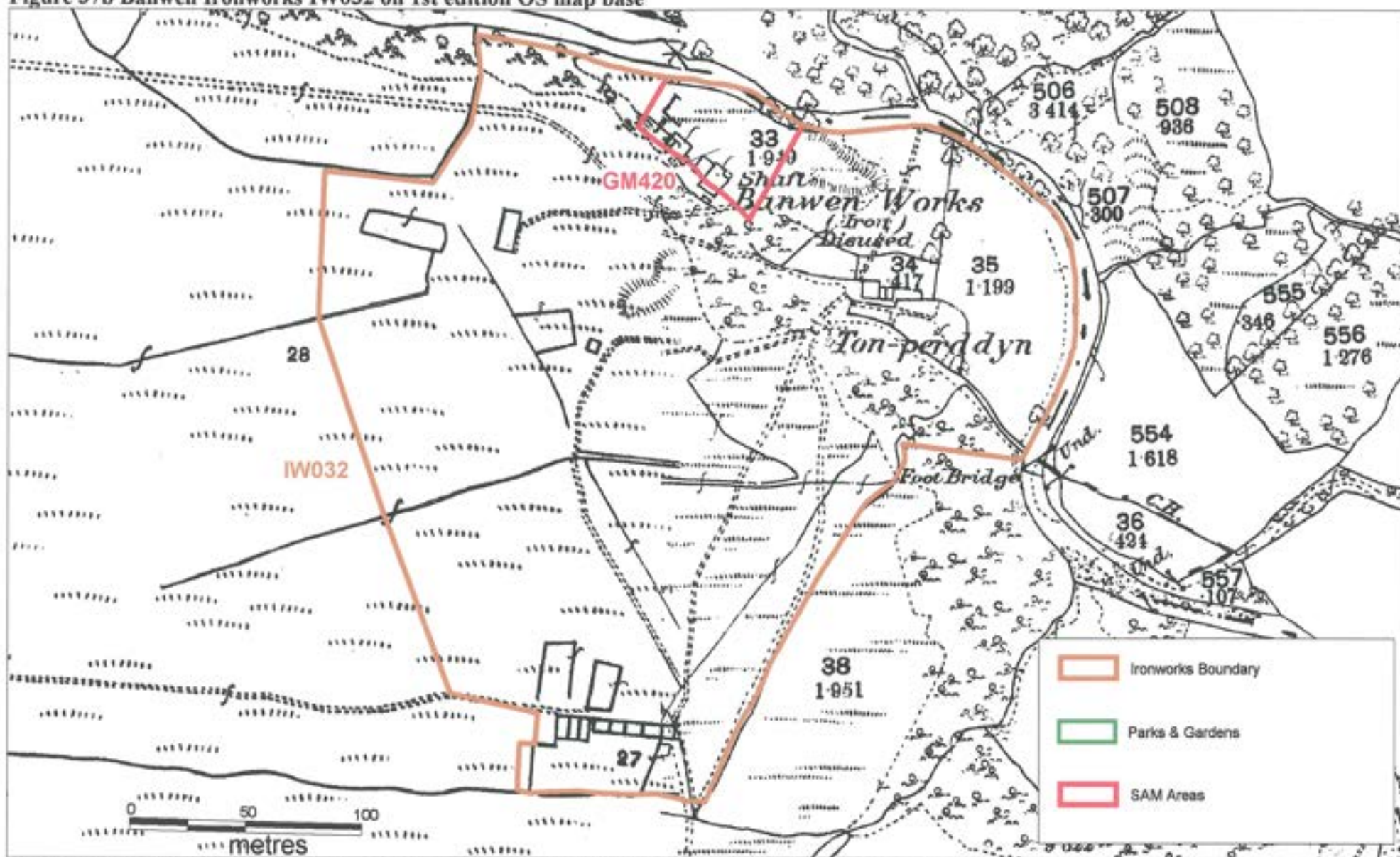


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Figure 37b Banwen Ironworks IW032 on 1st edition OS map base



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IW Number 033 Melincwrt Ironworks (01086w; SAM Gm416) SN 825 018

General Description

The Melincwrt Ironworks (NPRN: 34,100; 34,099; PRN: 01086w; SAM: Gm416) is a nationally important ironworks of early 18th century with good survival of both standing structures and buried remains; these remains appear to extend north beyond the area currently protected through legislation (ie beyond the SAM area). The identified features of the Melincwrt Ironworks, which operated between 1708 and 1808, include the considerable and impressive remains of furnace and foundry/finery buildings associated with the Melin Court Furnace. The charcoal furnace of 1708 appears to have been converted to coke during the 1790s. A plan of 1793 details the layout of the site, which at the time was laid out on three levels and included in addition to the main furnace and small air furnace, a waterwheel for working the bellows, storehouses, calcining kilns, a counting house, a smith's shop and dwelling house and an associated watercourses system, including reservoirs and underground leats. Power for the blast was provided by a single waterwheel: the original wheel was small and of undershot type, this was replaced by a larger overshot model served by a launder. Contemporary prints by Wood and Horner depict the launder, which conveyed water to the waterwheel and detail changes to the water resource disposition at the site, which might be indicative of conversion to coke as a fuel.

The site, located on a precipitous site above Melin Court Brook, appears to have been abandoned after closure in 1808; the site is now characterised largely by mature deciduous native woodland.

Historical Background

The site formed the subject of intensive study by Harry Green and Dr Martin Cahn, during the 1980s. A full account of the findings of this work can be seen in Green 1980, of which the main points can be summarised as follows:

A plan of 1793 indicates that the site initially comprised a charcoal fuelled ironworks, fed by one main leat approaching from the southeast. The 1793 site was laid out on three levels to allow heavy materials to be easily transported downhill. At the highest level the ore nodules were calcined and roughly broken up in preparation for the main smelter. Here the ore was mixed with charcoal and any necessary fluxing agent, and was smelted in a furnace with a forced draught produced with the aid of a waterwheel, which at this date seems to have been of undershot design and powered by water from the main leat. De-carburised through re-melting took place in a smaller furnace (the 'air' furnace) on the lowest level. The product of this furnace could be cast into pig iron. The lack of additional waterwheels in 1793 indicates that the works possessed neither forge nor foundry and that the pig iron was processed elsewhere (probably at Aberdulais).

Between 1793 and 1799, a number of alterations had apparently been made, which might relate to the conversion from charcoal to coke fuel: the main furnace had been reduced in size, consistent with the use of coke, while the 'air' furnace had been enlarged. Reference to Aberdulais confirms the latter; Clutterbuck mentions that refined iron from Melin Court was there mixed with charcoal iron, which 'charcoal being scarce, they procure...from Lancashire and Carmarthenshire'.

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By this date the main waterwheel had been enlarged and converted to overshot design, and the existence of a third, 'refining' furnace was noted; implying that the works now had a foundry. There is, however, a specific reference to the absence of a forge; Aberdulais appears to have continued to undertake this work.

Conversion to coke fuel is also reflected in alterations to the water supply arrangements; a new leat was constructed to provide a head of water for the main wheel, while the water from the original main leat was diverted to power a wheel at the upper level, presumably that providing the draught for the finery furnace. There also seems to have been a wheel constructed to provide draught for the 'air' furnace, although it is not clear which leat was the source of this water.

Between 1799 and the closure of the works in 1808 further attempts appear to have been made to increase output. The reason for the final closure of the works in 1808 is not clear, although the most likely reason is the superior efficiency of steam over waterpower in providing the blast for the furnaces (Burnham 1985; Hughes and Reynolds 1988, p 18; Green 1980).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area shown on an estate plan of 1793 and on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

No threats to the area have been identified from the UDP. The area has been protected from development through legislation (ie the site is now a Scheduled Ancient Monument), however the site visit identified dereliction as being a significant and active threat to the remains in the area.

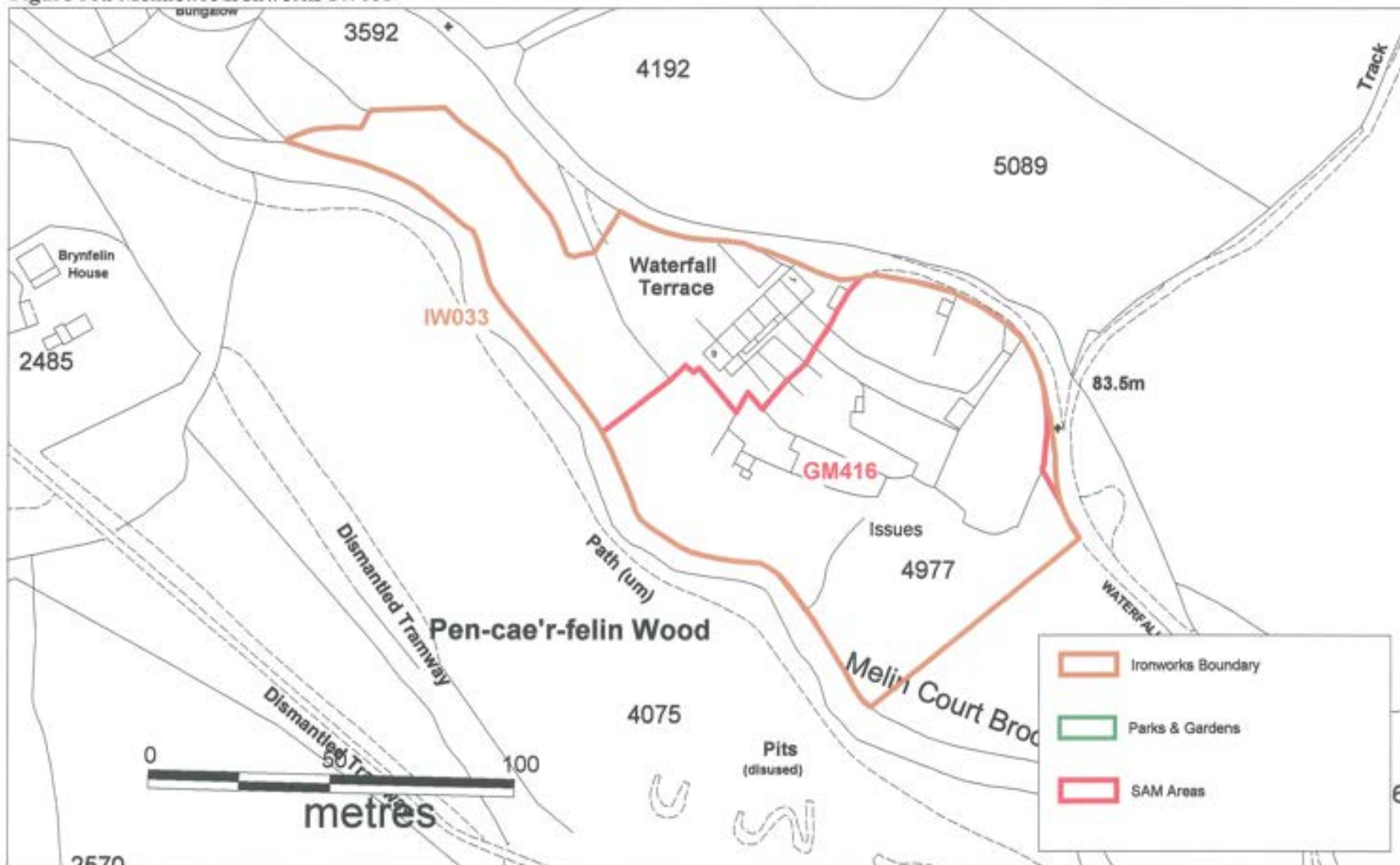
The surviving visible remains noted during the field visit remain much as surveyed by Dr Martin Cahn in 1980. The standing remains are currently in an overgrown and generally poor state.

Plate 021 Melincwrt Ironworks IW033



Plate 021: Standing remains Melincwrt Ironworks (SAM Gm416), illustrating overgrown nature of the site, view to north.

Figure 38a Melincwrt Ironworks IW033

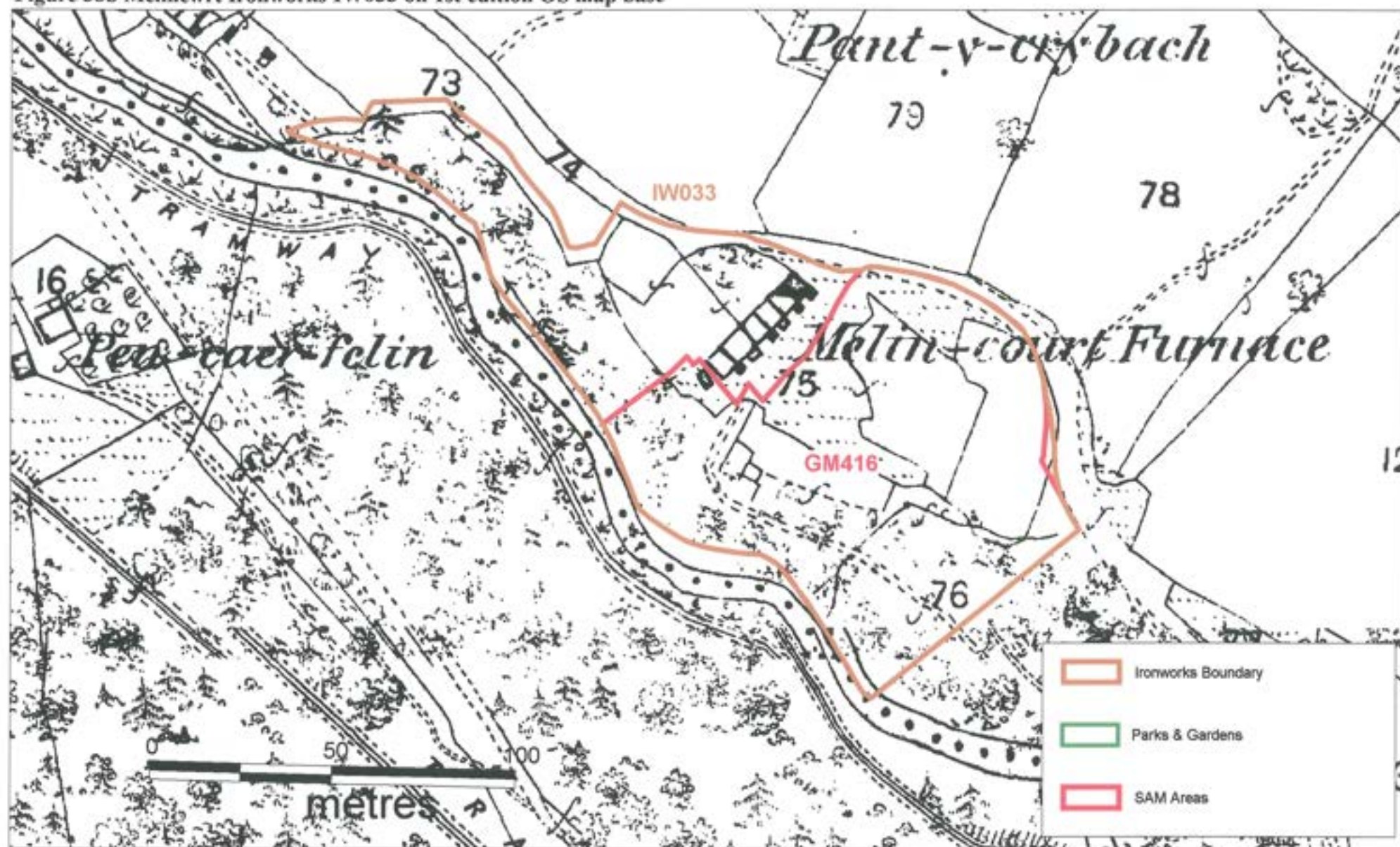


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Figure 38b Melincwrt Ironworks IW033 on 1st edition OS map base



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IW Number 034 Venallt Ironworks (01124w; SAM: Gm423) SN 864 050

General Description

The Venallt Ironworks, located at Cwmgwrach, (NPRN: 34,120; PRN 01124w; SAM: Gm423) was one of several anthracite ironworks founded in the Neath Valley using the hot-blast process then recently introduced at Ynyscedwyn. Venallt was in operation between 1839-42, and out of use by 1854. The site, despite later-use as a patent fuel works, which lead to the demolition of some features, nonetheless retains important and impressive remains and extensive works buildings; the core ironworks area contains an engine house, charging platform, hearth and twin tuyere nozzles. The engine house is particularly fine, surviving to roof height, and retaining the base of its chimneystack and a block of slag with two tuyeres on the site of the furnace. The adjoining Venallt Farmhouse was originally the company shop and offices, and may also have housed the ironworks manager.

Very little remains of the site's two furnaces, with only evidence of the buried foundations surviving: Venallt Furnace I (PRN: 04298w; SN8642804965) and Venallt Furnace II (PRN: 04299w; SN8642104962). The near intact remains of the engine house or Venallt Blowing Engine House (PRN 04295w; SN8644404986) comprise a large unroofed stone and cement structure, 10m x 15m by 15m high, an entrance to the S with metal steps, the structure has 8 arched openings 3m high and 1.5m wide run along the top half of the structure. Associated with the engine house is the base of a damaged stack (PRN: 04301w; SN8646204987) visible as a square stone and cement structure measuring 5m x 5m and 8m high, of circular internal construction with 4 archways, 1.5m high. Nearby lies the near intact remains of a chimney platform (PRN: 04296w; SN8645804970), surviving as a large stone and cement structure 20m x 20m by 10m high, built into the hillside. Fencing has been erected on top of the structure for safety. The remains of the cast house (PRN: 04297w; SN8642704979) are fragmentary and comprise a single wall, 8m in length, constructed of cement stone facing N-S. The two main arched doorways have been bricked up.

Also included is the site of an enclosure (PRN: 04300w) noted on the 1st and 2nd edition OS maps at SN8642504941.

The remains at Venallt are considered to be of national significance due to their good state of preservation with good survival of both standing structures and buried remains currently protected through legislation (SAM Gm423); the site is relatively well presented and interpreted having been comprehensively restored by the West Glamorgan County Council in 1981. Interpretation panels were erected, since replaced by a single panel by Forest Enterprise (2000). The scheduled area was extended in 2003 to include major visible features, including the charging bank, retained by a substantial stonewall and a short section of Protheroe's Tramroad, which served the works. Other features included within the scheduled area at the time were a stone-revetted watercourse, and waste tips.

Historical Background

Arthur & Company constructed the Venallt Ironworks in 1839 with two purpose-built anthracite fuelled furnaces. It is known that by 1846 Venallt was in the ownership of Jevons and Wood. In 1849, when the works was offered for sale, the ironworks consisted of 3,000 acres of mineral property, two blast furnaces, hot blast stoves, casting houses, a foundry, a finery and a blowing engine house built for a pair of engines but containing a single 50 h.p. high pressure beam

blowing engine.

During the 1850s the Aberdare Iron Company owned the Venallt Ironworks but little production of iron seems to have taken place. In 1860 the site was in the hands of N.V.E. Vaughan concentrated on exploiting the associated rich mineral grounds of the property, allowing the works themselves to stand idle. During 1869-70, the Neath Abbey Iron Company was in possession of the works; Ince informs us that this was probably solely for the dismantling of the machinery. The coal and iron ore reserves were further exploited from 1871 by W. Gregory, no further mention is made of the ironworks, itself (Hughes and Reynolds 1988, 18-19; Ince 1993, pp 93-94).

Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st and 2nd edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

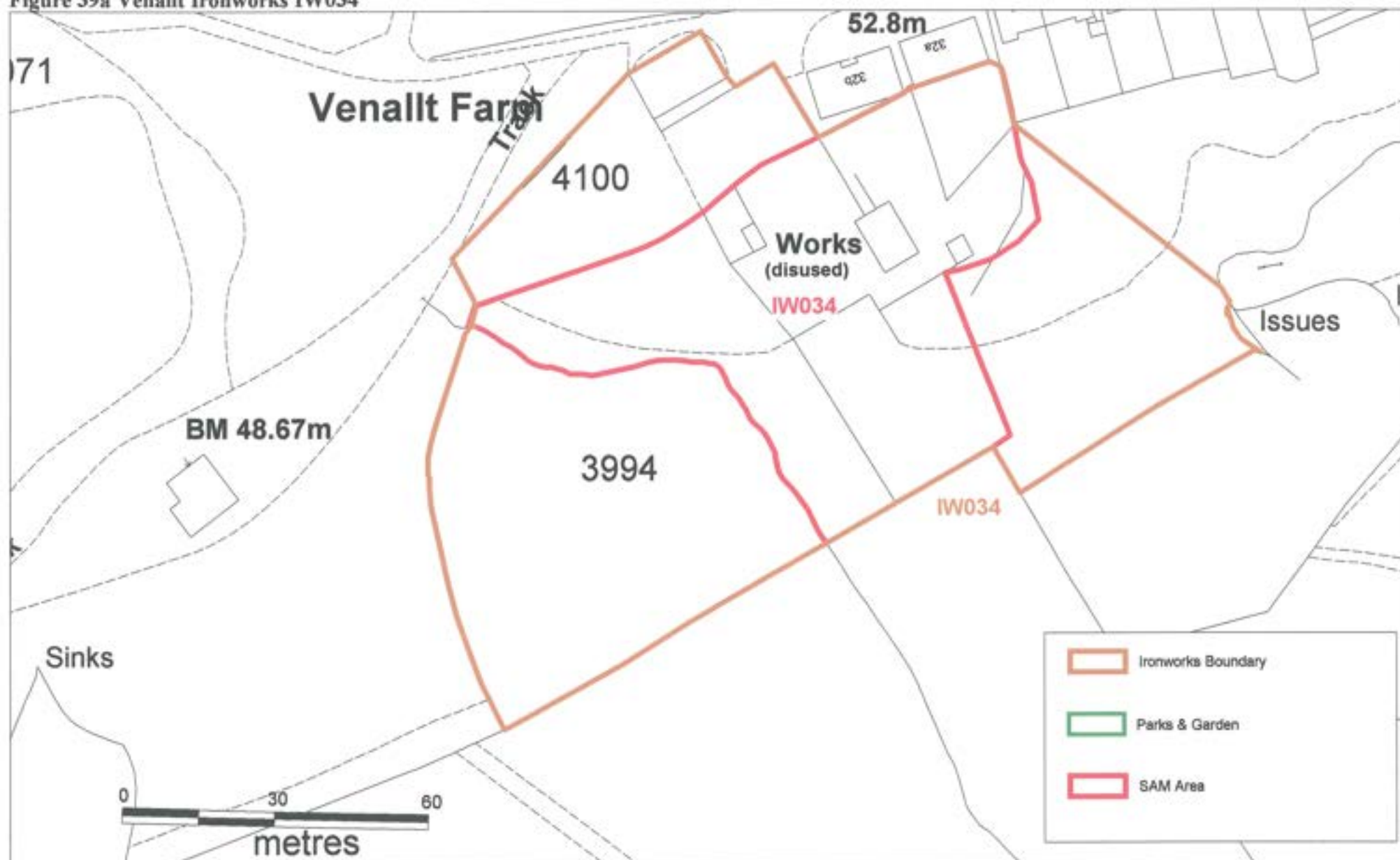
There are no identified threats to the area from the UDP. Though generally in good to fair condition since restoration in the 1980s, the condition of the site has varied; erosion to access paths and vegetation growth, for example on the charging platform, has been noted in the last decade. The visit to the site confirms the general condition of visible above ground remains is generally excellent; some recent tree growth on the masonry structures, was noted however, this requires remedial attention to prevent further deterioration. Continued monitoring of the site's condition, currently in the ownership of the Forestry Commission, is recommended.

Plate 022 Venallt Ironworks IW034



Plate 022: Remains of the Engine House (PRN 04295w), Venallt Ironworks (SAM Gm423), view to northeast.

Figure 39a Venallt Ironworks IW034

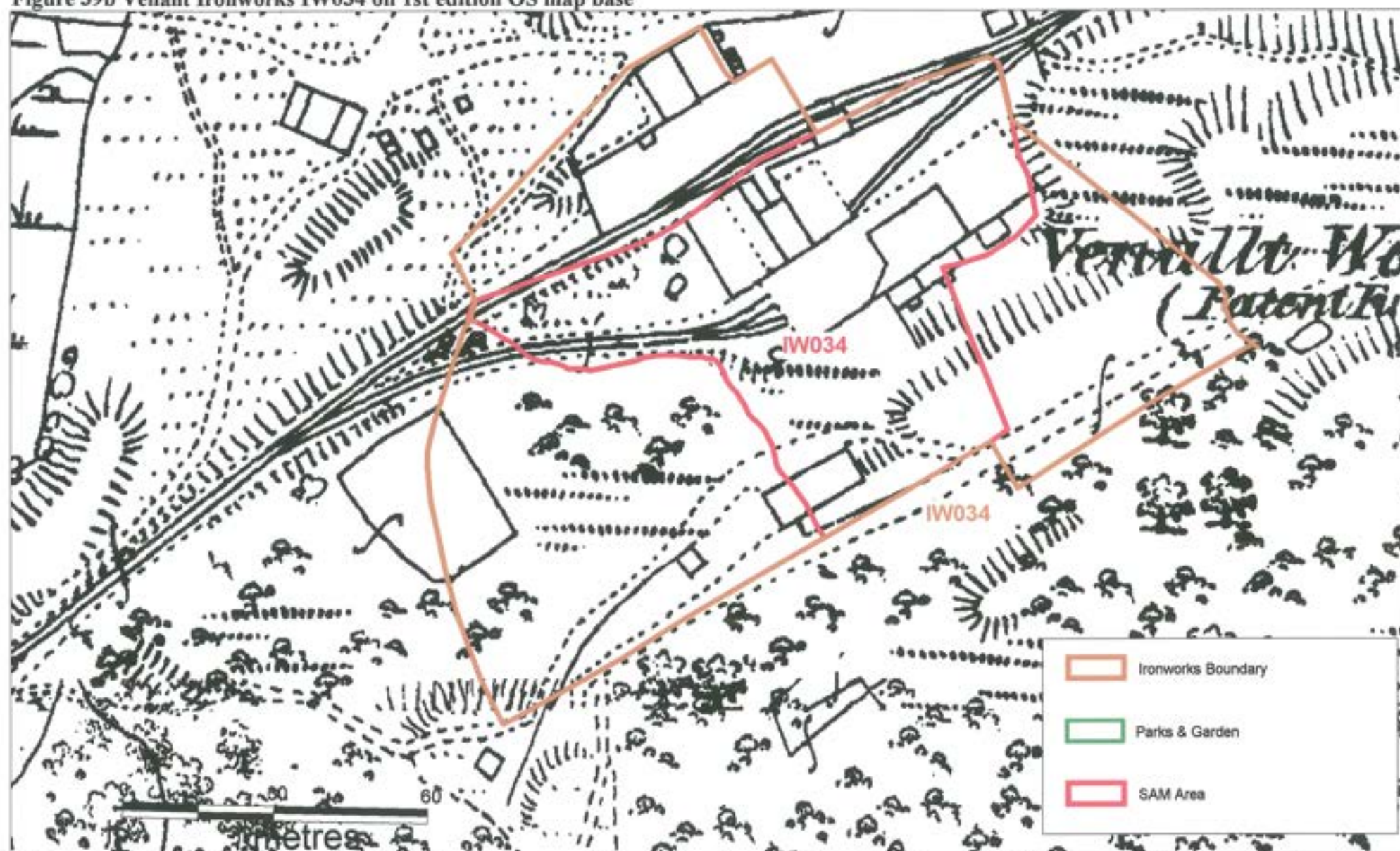


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Figure 39b Venallt Ironworks IW034 on 1st edition OS map base



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IW Number 035 Abernant Ironworks SN 88160 0632

General Description

The Abernant Ironworks, located at Glyn-neath, is one of several anthracite ironworks founded in the Neath Valley by the Neath Abbey Iron Company during the mid-19th century and like most was in production for a relatively short period. The works, dating from 1845, was located at the northern terminus of the Neath Canal (NPRN: 34,465; SN 8823 0635). The Abernant Ironworks area is currently thought to be of low archaeological value: unfortunately the site was partly levelled before the mid-1970s, the remainder being reclaimed during the following decade and subsequently removed by the construction of the A465(T). The construction of the A465(T) has destroyed the northern half of the site, which comprised the main core of the ironworks and included the site of the former furnaces and calcining kilns, engine house the chimney, smithy and limekilns. In addition it removed the bridge terminus of the Neath Canal and the wharf area associated with the ironworks. Now only the southern part of the site bordering the River Neath survives, though in an altered and reclaimed state; this area contained the site of the former associated Brickworks. It is currently unknown whether any buried remains relating to this site survive.

The first edition 1:2500 OS map identifies a number of features at the Abernant Iron And Brick Works including the following: the furnaces and kilns at SN 88127 06320; lime kilns at SN 88158 06315; a smithy at SN 88145 06317; and an engine house with associated chimney at SN 88093 06304. North of the furnaces was the ironwork's wharf on the Neath Canal (SN 88155 06350) with its crane. The southern part of the area included a brick works with five brick kilns (SN 88172 06287), while the work's cinder tip, now reclaimed, bordered the River Neath at the south eastern edge of the ironworks area (SN 88254 06312).

By the survey of the second edition OS the site was divided between the Carbon Works and the enlarged site of the Abernant Brick and Cement Works, now with eight circular kilns; by the publication of the third edition, the former had been removed and the latter is shown disused and partly dismantled.

Historical Background

The Abernant Ironworks was a subsidiary works of the Neath Abbey Iron Company (under the Fox-Price partnership). It was the second works to have been constructed by the company and had a fairly short life compared with the Neath Abbey Ironworks, itself.

The Abernant ironworks, built in 1845, was situated on the boundary between bituminous and anthracite coal deposits, was purpose-built to use anthracite fuel in its blast furnaces. It initially comprised two furnaces and refineries. According to Ince the two furnaces at Abernant were blown by a 40in. x 8ft. Neath Abbey beam blowing engine (60 h.p.), while the refineries received their blast from a 12in. table engine. The third and final furnace was added in 1851.

During the period 1856-57 all three furnaces were in blast but by the following year iron production had ceased. The period 1859-61 saw only one furnace in blast and it would seem that the works, like most anthracite ironworks, was a commercial failure. In 1862 the Abernant Ironworks was put up for sale. At this date the Abernant property consisted of 127 acres of mineral ground, three blast furnaces capable of making 250 tons of iron per week, a cupola, two refineries, hot blast stoves, calcining kilns, workshops, cast houses and twenty one cottages.

Southeast Wales Industrial Ironworks Landscapes

Unsold, the works was eventually dismantled c. 1868 (Ince 1993, p 93).

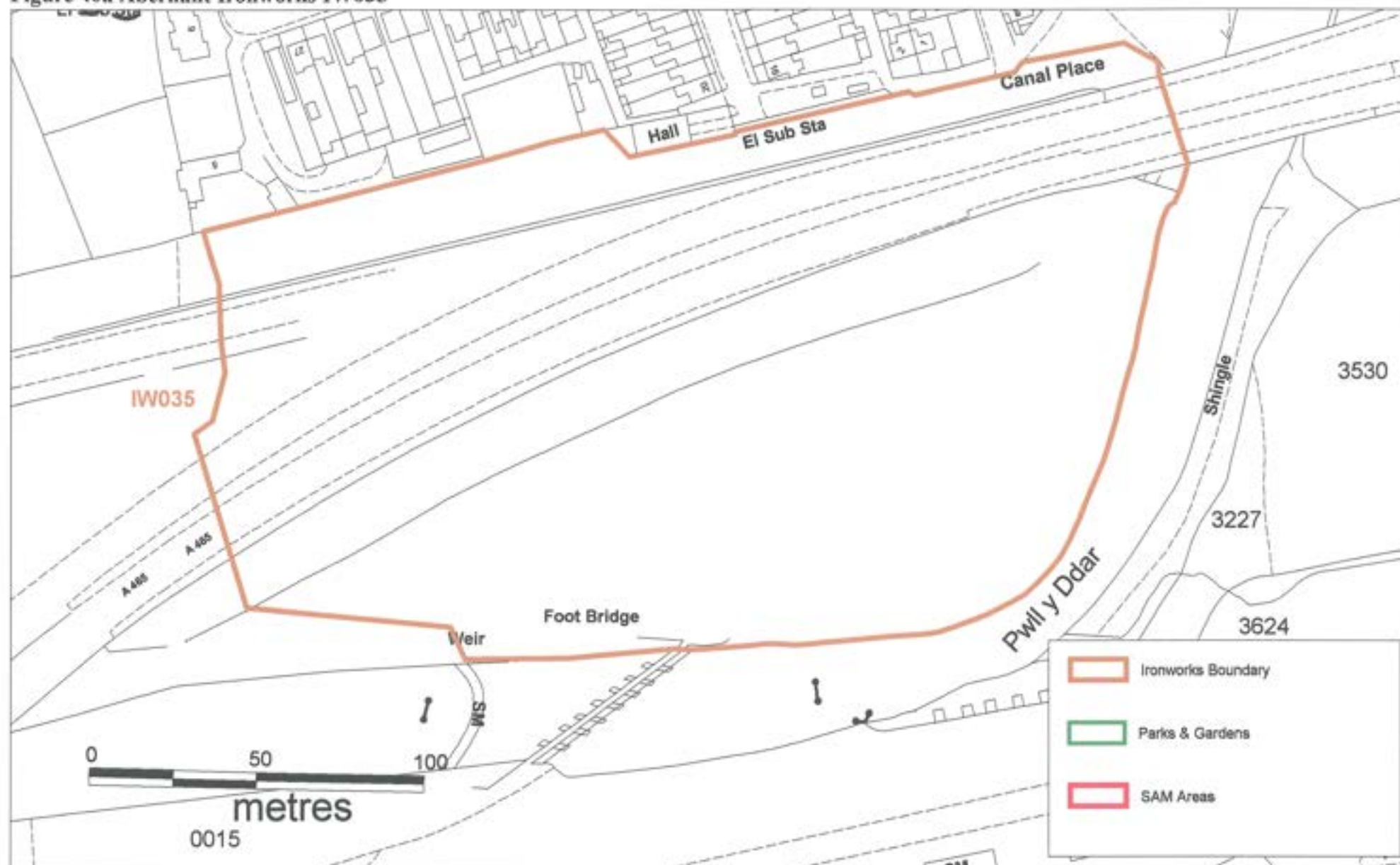
Ironworks Boundary

The ironworks boundary, as defined for the purpose of this report, is essentially based on the core area of activity shown on the 1st edition 1:2500 OS map, though tied into current boundaries as depicted on landline mapping data.

Identified Threats

There are no identified threats to the area as identified from the UDP. The area has been extensively altered in the latter part of the 20th century and little of significance is thought likely to survive.

Figure 40a Abernant Ironworks IW035

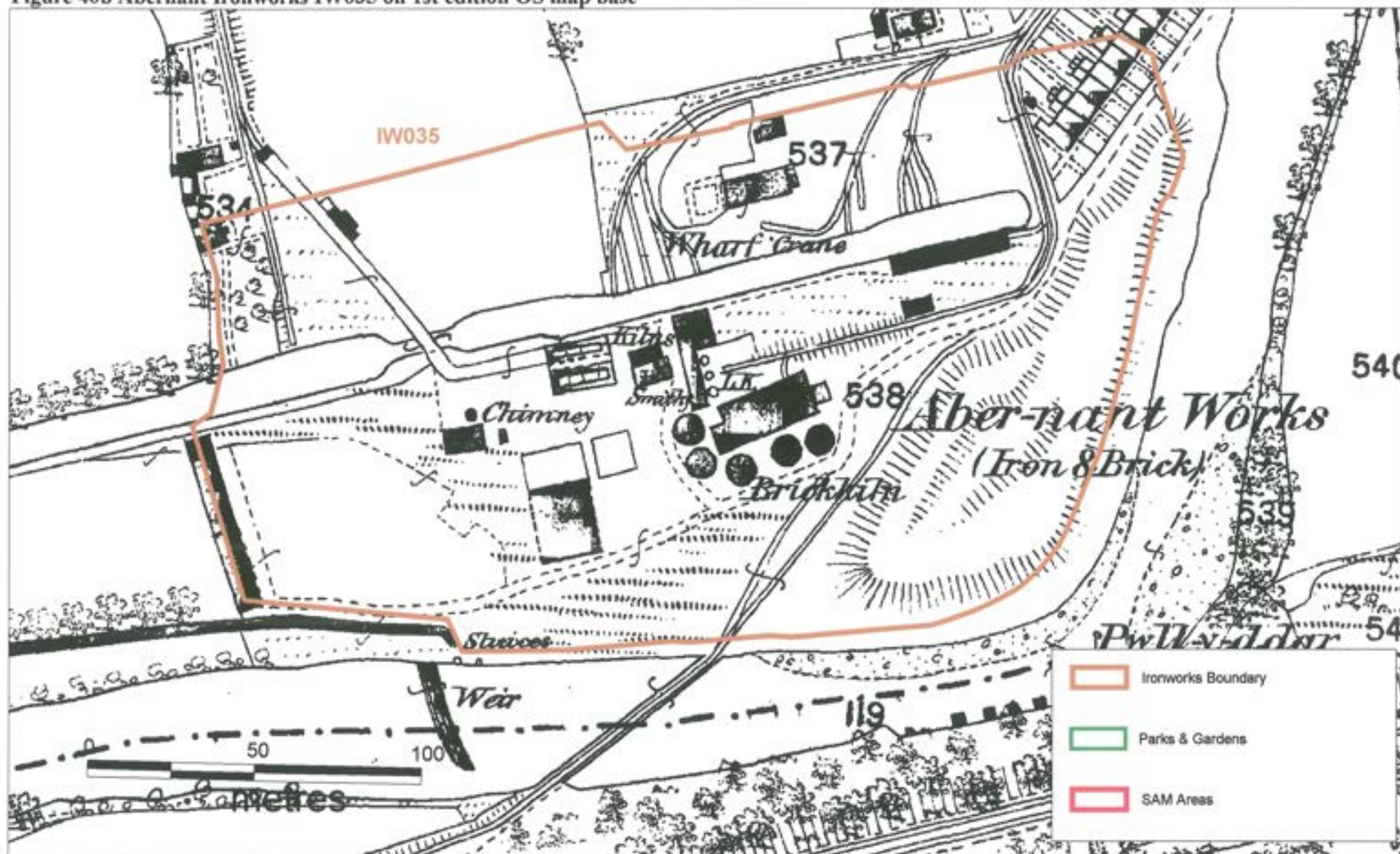


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Figure 40b Abernant Ironworks IW035 on 1st edition OS map base



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