

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

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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.

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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

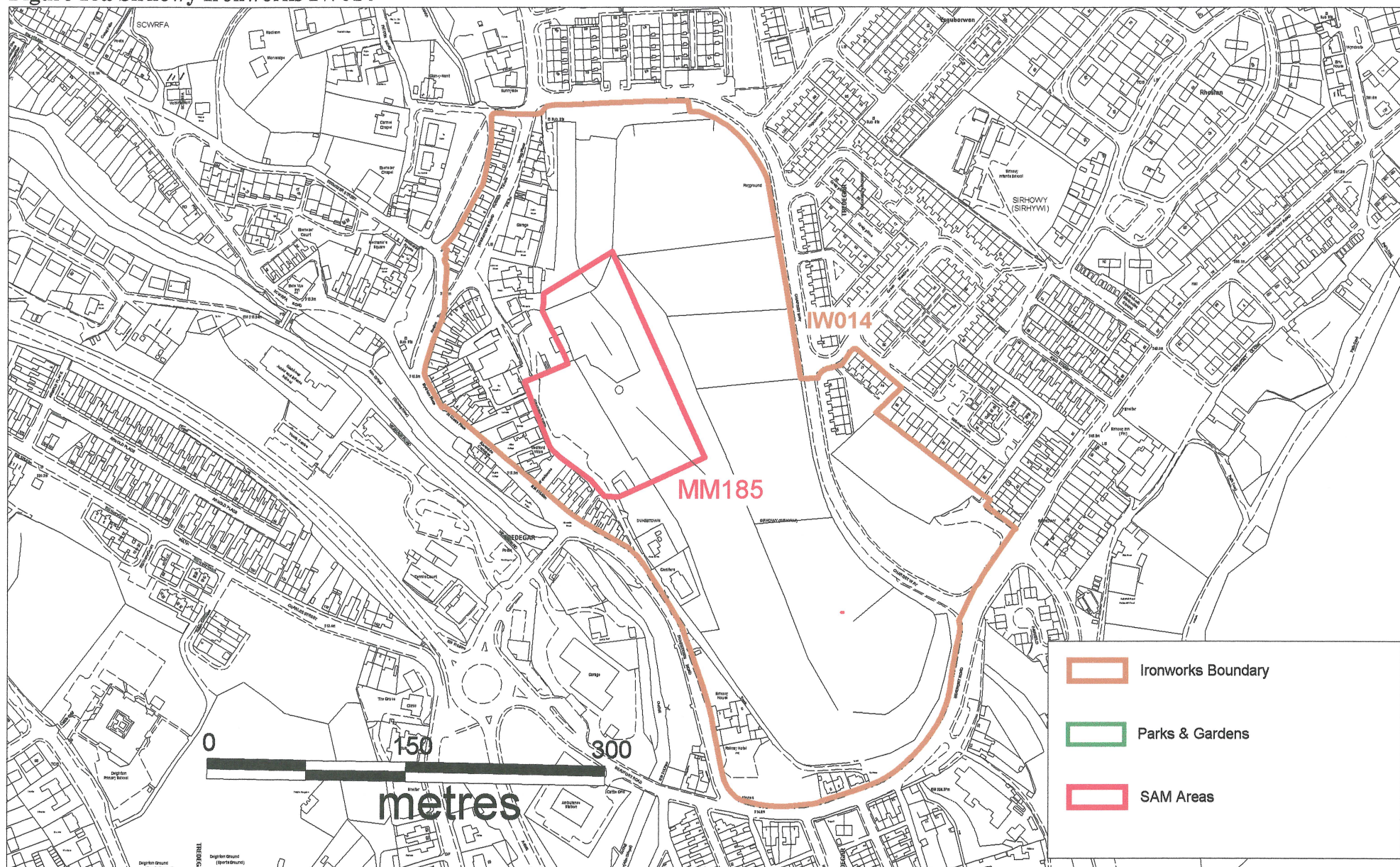
No threats have been identified from the UDP, however future pressure from housing development on the northeastern part of the site should be resisted.

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

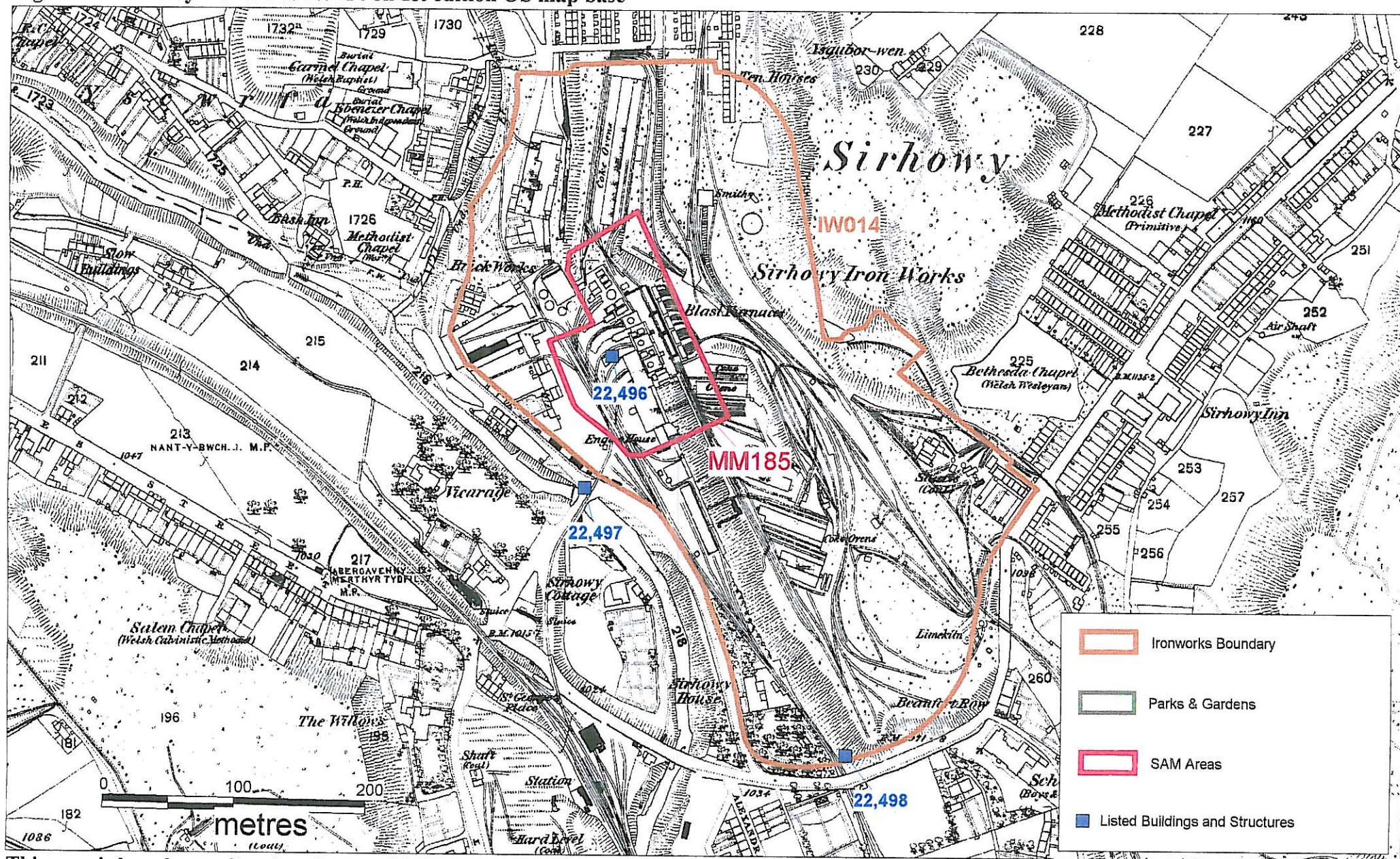


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Figure 18b Sirhowy Ironworks IW014 on 1st edition OS map base



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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

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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



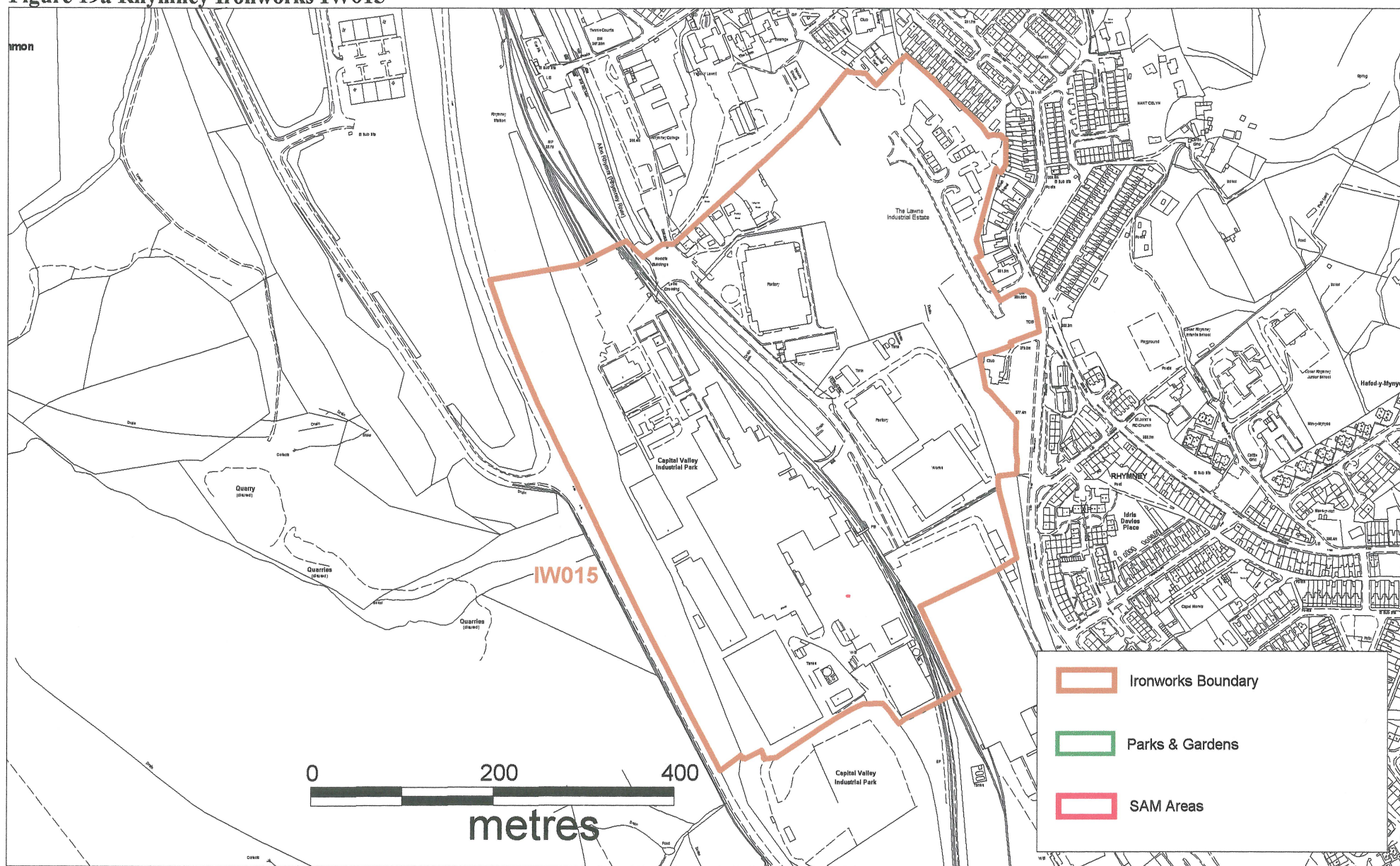
Plate 010: The scheduled Furnace site (SAM Gm403) at Rhymney Old Furnace (IW015a) view to northeast.

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



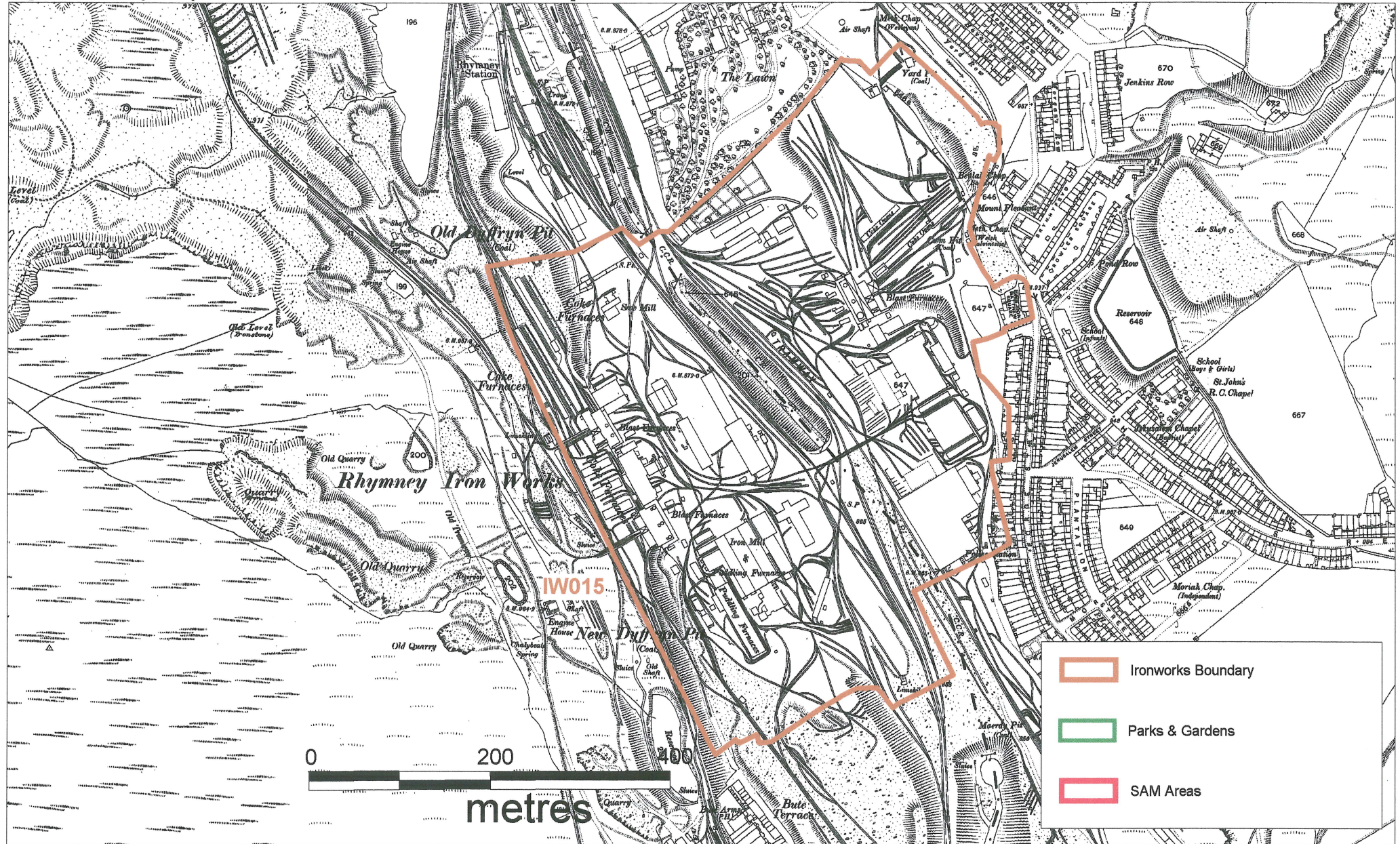
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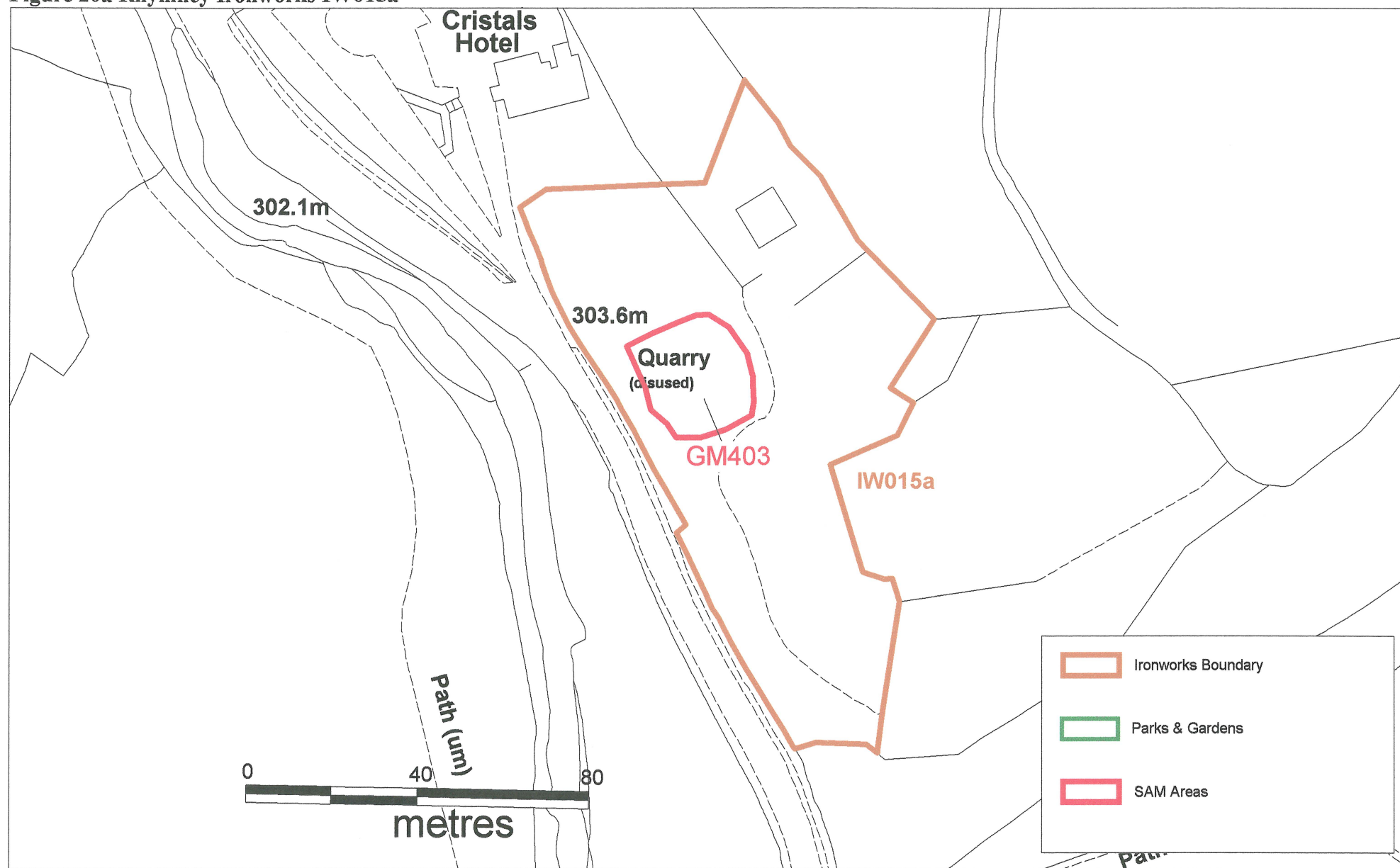
Figure 19b Rhymney Ironworks IW015 on 1st edition OS map base



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Figure 20a Rhymney Ironworks IW015a

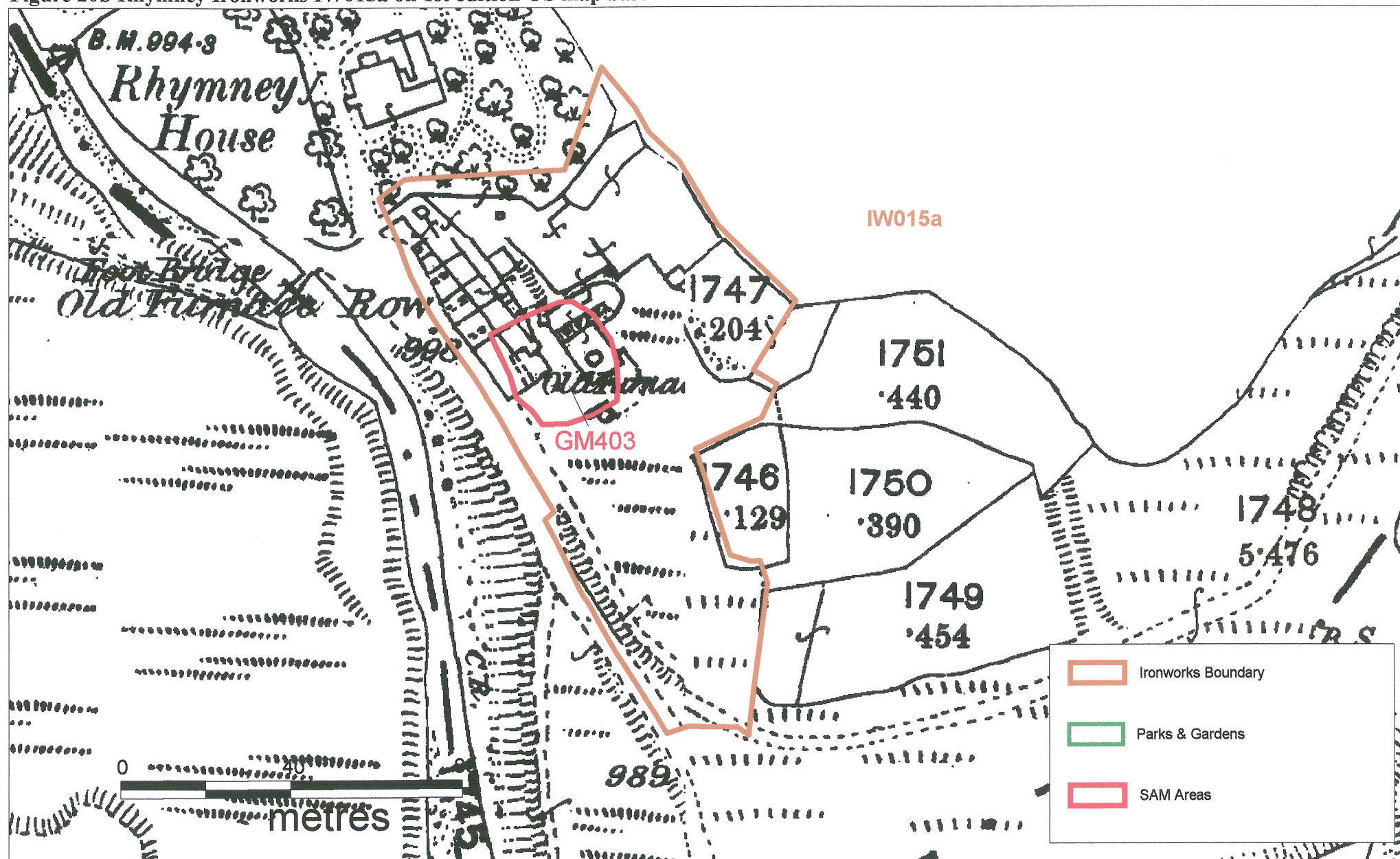


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Figure 20b Rhymney Ironworks IW015a on 1st edition OS map base



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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 led 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).

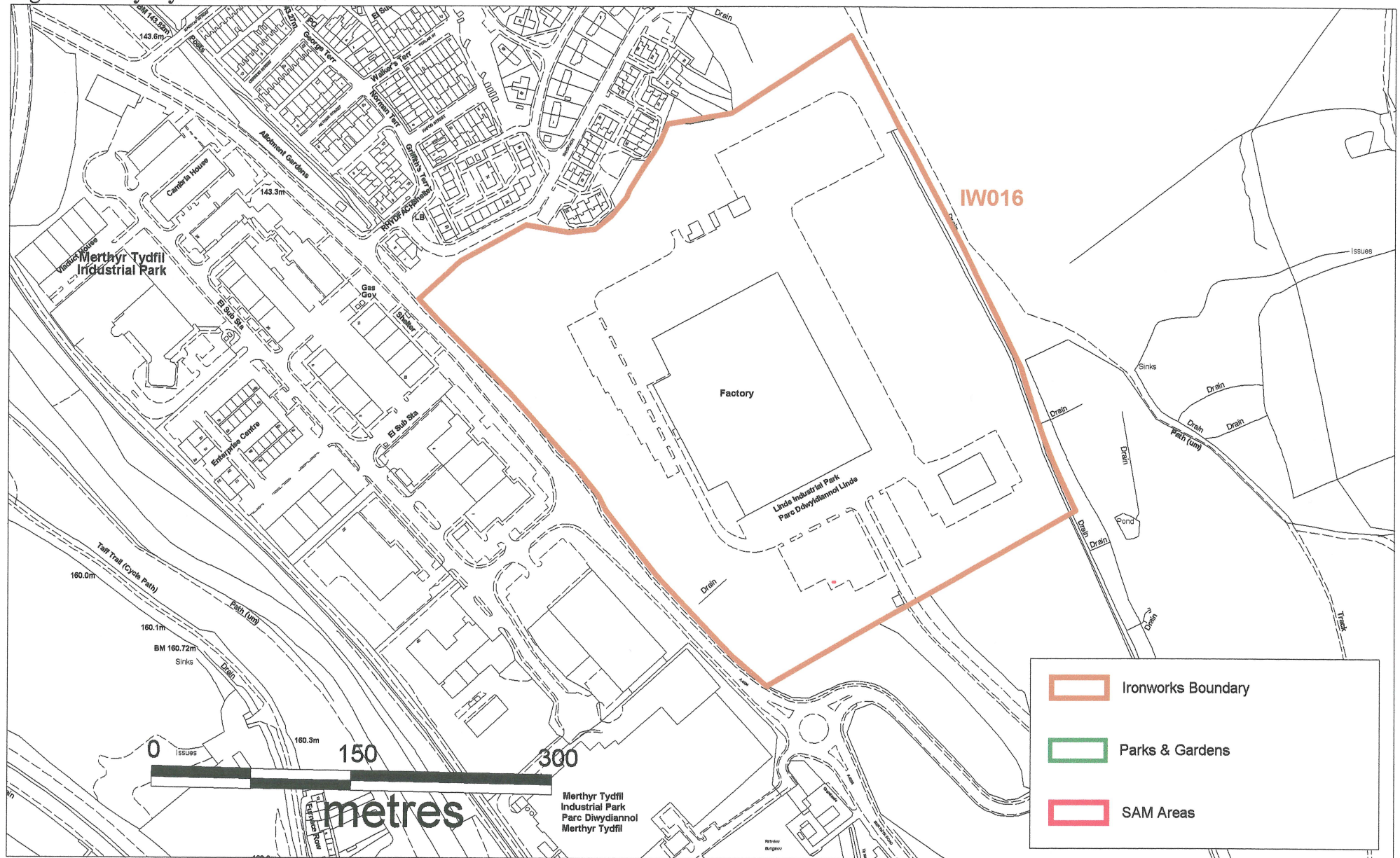
Ironworks Boundary

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



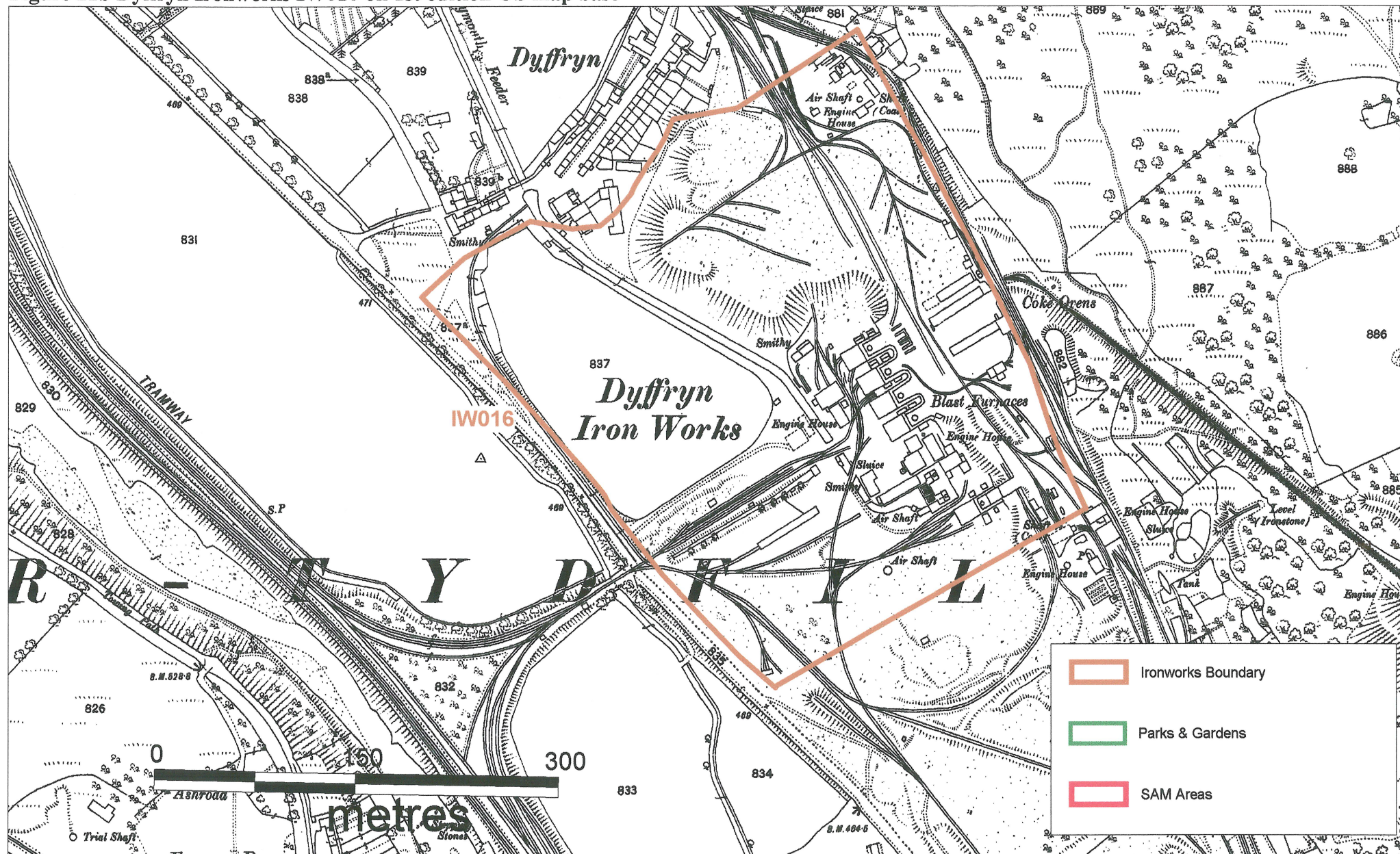
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Figure 21b Dyffryn Ironworks IW016 on 1st edition OS map base



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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).

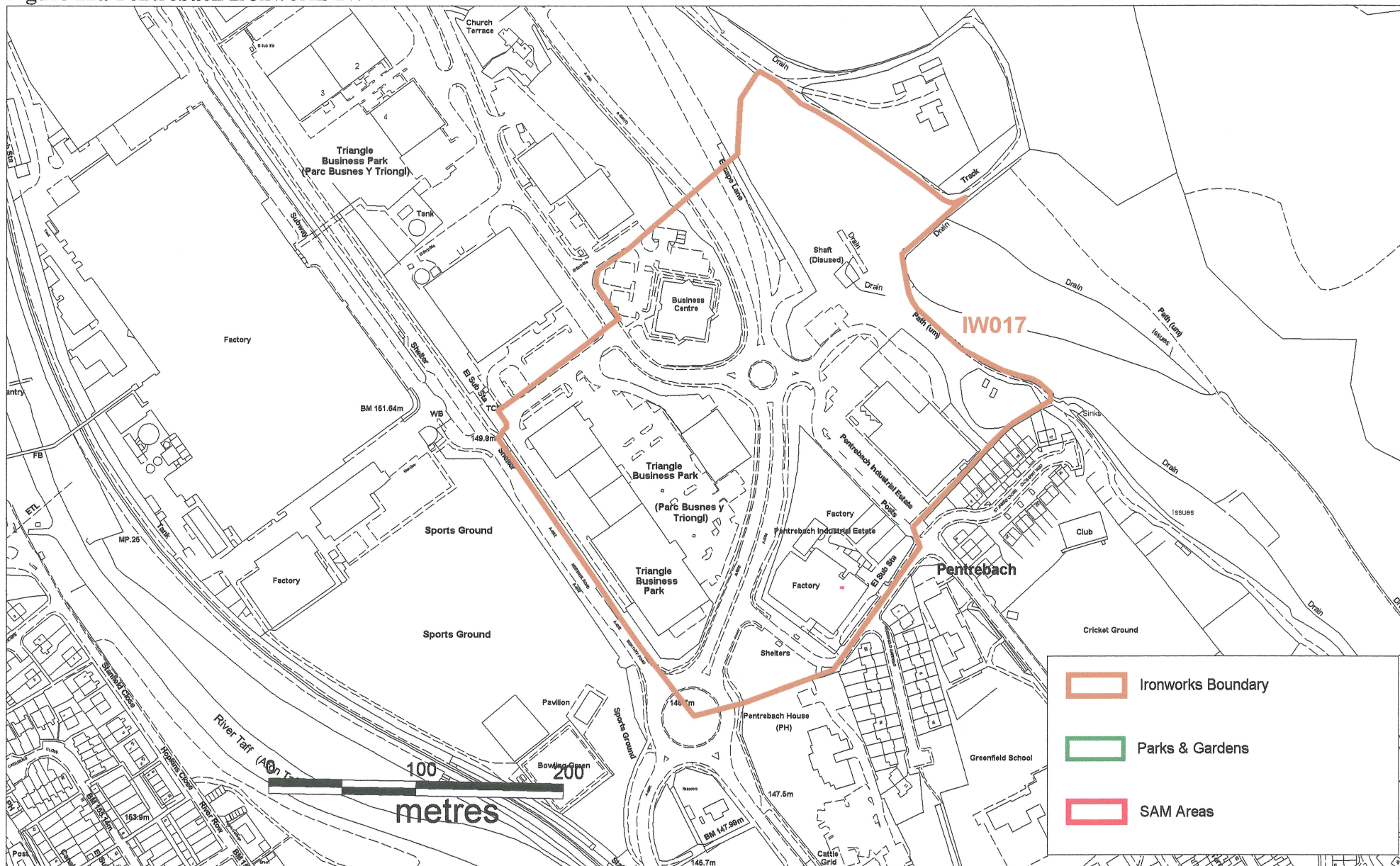
Ironworks Boundary

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).

Figure 22a Pentrebach Ironworks IW017



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This is a detailed historical map of the Pentre-bach Ironworks area in Wales. The map shows the layout of the ironworks, including the main buildings, a large reservoir, and surrounding residential areas. Key features include:

- Ironworks Boundary:** A large area in the center of the map is outlined in orange, labeled "IWO17".
- Parks & Gardens:** Several areas are outlined in green, including "Upper Pentre-bach" and "Lower Pentre-bach".
- SAM Areas:** Two small areas are outlined in red, labeled "SAM Areas".
- Buildings and Structures:** Numerous buildings are labeled, including "Pentre-bach School (Endowed)", "Wern-las House", "Pentre-bach House", "Wern-las Pit (Coal)", "Engine Houses", "Air Shafts", "Reservoir", "Sluice", "F.B.", "Level Coat", "Saw Mill", "Lodge", "Winches Row", "Old Coal & Engine House", "Aber-cunaw Bridge", and "Aber-cunaw House".
- Transportation:** A railway line runs through the area, and a canal is visible on the left side.
- Scale and Orientation:** A scale bar at the bottom indicates distances in metres (0, 100, 200). The map is oriented with North at the top.

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