



STATEMENT OF HERITAGE SIGNIFICANCE

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LOW MILL FURNACE, Silkstone, South Yorkshire

INTRODUCTION

SCOPE

This document presents a statement of heritage significance for Low Mill Furnace (hereafter, 'the site'; **Figure 1**), National Grid Reference: SE 29646 06787. The document has been prepared to inform the application for the demolition of an existing barn and the construction of a new two-storey dwelling. The conversion of the adjacent Low Mill Furnace to holiday accommodation is covered by a separate, forthcoming application.

The assessment has been informed through a site visit and consultation of sources of information listed in the bibliography. It has been undertaken in accordance with guidance published by Historic England and the Chartered Institute for Archaeologists, as set out in the Supporting Material section.

DESIGNATION

Low Mill Furnace is designated a Scheduled Monument (NHLE: 1004793) (**Figure 1**), under the Ancient Monuments and Archaeological Areas Act of 1979, as a site of national archaeological importance.

Note: at the time of initial research it was not possible to consult all original sources in the production of this assessment due to restrictions on public access to archives and libraries during the COVID-19 pandemic. Subsequently additional sources that were identified, but which were not available to consult, have been reviewed. No additional information of relevance was identified.

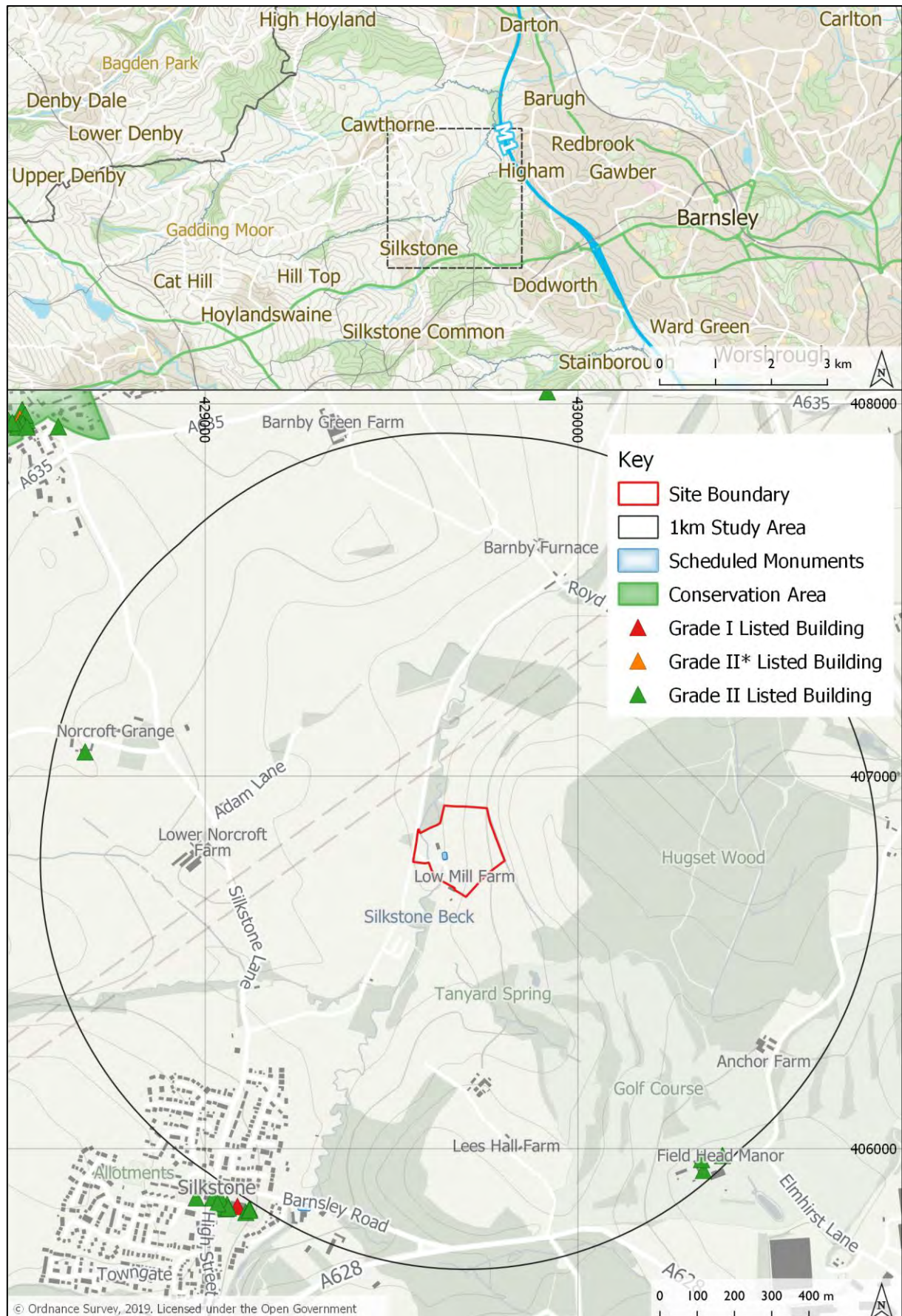


Figure 1: Site location plan showing heritage designations

SITE SUMMARY

ARRANGEMENT

The site (**Figure 2**) is located approximately 850m north of the village of Silkstone, bounded to the west by the Silkstone Waggonway, a recreational and Industrial History Trail. East of the site is Hugset Wood.

Located within the site is Low Mill Farm, a former pigsty, the semi-ruinous Low Mill Furnace Scheduled Monument, and a large modern barn. A sinuous series of fishponds lie north of the furnace and west of the barn. The Silkstone Beck passes through the western side of the site.

The land within the site is predominantly pasture except for gardens adjacent to Low Mill Farm.

The site straddles the parishes of Cawthorne and Dodworth and has on occasion been historically referred to as within Silkstone Parish.

TOPOGRAPHY & GEOLOGY

The topography of the site climbs from c.77m above Ordnance Datum (AOD) at Silkstone Beck to 102m AOD at the eastern boundary.

The geology at the site comprises sandstone of the Parkgate Rock and Mudstone, Siltstone and Sandstone of the Pennine Lower Coal Measures Formation (BGS, 2020). Coal mining has historically occurred in the vicinity of the site with former workings recorded east, west, and north of the site.

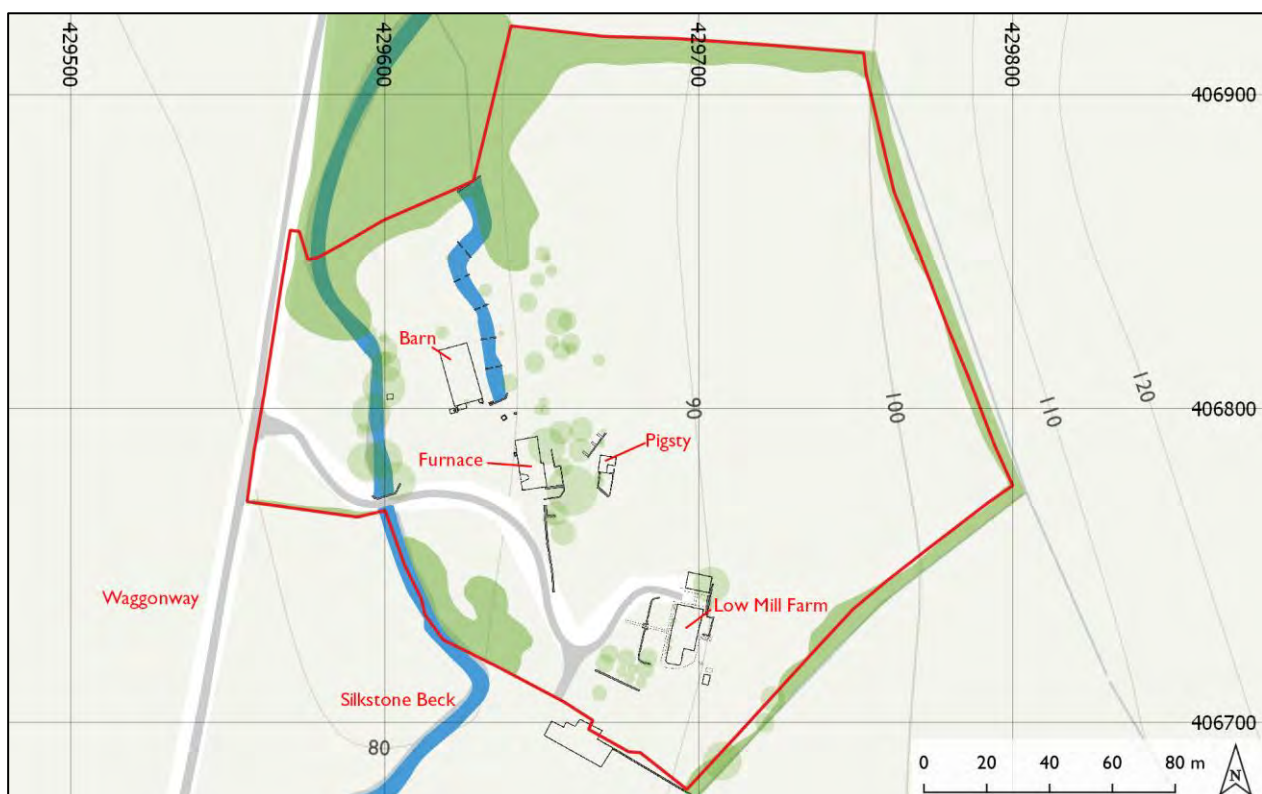


Figure 2: Site layout

HISTORICAL BACKGROUND

BACKGROUND

The site lies in a region which saw extensive industrial development during the early post-medieval period, c. 17th Century, with the resources for ironmaking all present in the surrounding area. Ironstone lies locally in seams running roughly north from Silkstone to Cawthorne, extensive coal seams, large woods for charcoal, and numerous tributaries of the Deame for waterpower.

The local ironstone whilst not of the highest quality was sufficient for the purposes of the nail making and wiredrawing trades that subsequently developed in the area (Hey 1979, 119). The local coal produced from the Silkstone seam was prized for its low ash and high heat (Hey, 2015). The impact on the landscape from the extraction of coal is clear in Huglet woods to the east of the site where detailed topographical survey has revealed hundreds of bell pits (**Figure 3**).

Charcoal fired blast furnaces are first documented in South Yorkshire around 1585. At Silkstone a lease dated 1607 recorded “one pair of smithies, iron mills or iron forges commonly known as Silkstone Smithies” and in 1656 the Spencers of Cannon Hall are recorded as having built a new furnace, replacing the bloomery furnace at Barnby which had been in existence since at least 1635 (Hey 1979, 118, Rastrick & Allen 1939, 170). Evidence for the Barnby furnace can be seen in the landscape today as a small area of woodland to the north of Low Mill farm which was once the holding pond for the furnace (BMBC Silkstone Walks). Further afield, the furnace at Rockley was built by Copley in 1652 replacing an

earlier bloom hearth, string hearth and reheating hearth (Hey 1979, 118).

Key to the ironworking industry of the area were the Spencer family of Cannon Hall. Records held in 1938 at the Bradford City Museums recorded that they were connected to at least 10 furnaces, 18 forges and 5 slitting mills as well as controlling ironstone mines and coal leases in the region (Rastrick & Allen 1939, 168).



Figure 3: Hill-shaded LIDAR data showing the site and donut shaped bell-pits in Huglet wood
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The Silkstone Waggonway

The Barnsley Canal was opened in the 1790s as a means of carrying coal to the Aire and Calder Navigation at Wakefield, although the stretch from Barnsley to Barnby Basin was not opened until 1802 (Hey, 2015).

In 1808 the canal company received parliamentary approval for the construction of a horse drawn waggon way from Silkstone Cross to Barnby Basin to provide access to market for the many day holes' and drift mines in the area; opening the following year (Hey, 2015).

In 1847 the canal company offered to sell the waggonway to the Manchester, Sheffield and Lincolnshire Railway, although the purchase never took place. In 1864 ownership of the waggonway transferred to the Aire and Calder Navigation Company, although trade was already in decline and by August 1872 it was reported all the rails had been pulled up and sold (Goodchild, 1994).

The Corn Mill

A corn mill is documented within the vicinity of Low Mill from at least the 18th Century. It is first labelled on Jeffrey's map dated 1767-1770 where a waterwheel is shown within the vicinity of Low Mill Furnace (Figure 4). The mill appears again on Fairbank's map of the intended Dearne and Dove Canal of 1793, showing two ponds to its south. A further survey of Cawthorne dated to 1806 records the land around Low Mill belonging to the W.S. Stanhope and occupied by Mary Moxon (Umpleby 2000, 113).



Figure 4: 1767-70 Thomas Jeffrey's map showing a waterwheel within the site (© Sheffield Archives)

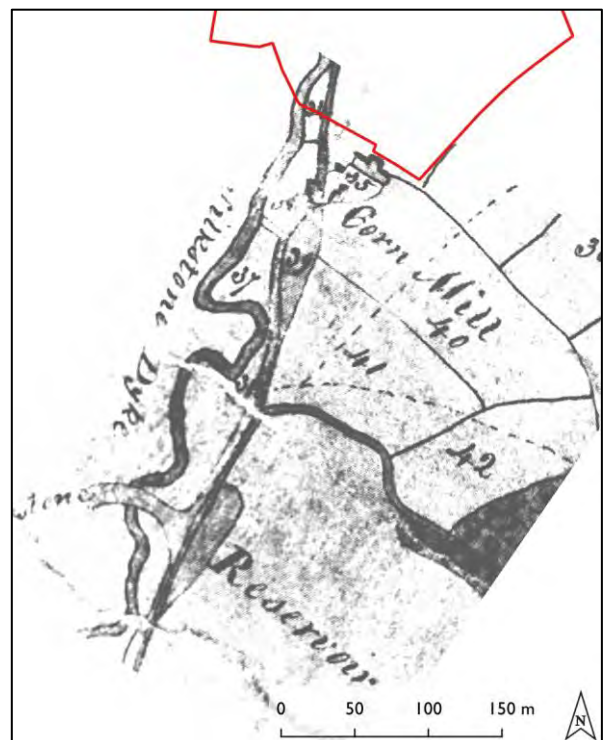


Figure 5: 1846 Dodworth parish tithe map (possibly based on a survey from c. 1806)
(Reproduced from Umpleby, 2000).

The Dodworth parish tithe map dated 1846 (**Figure 5**) depicts a bypass water system drawing from the Silkstone Beck with a reservoir adjacent to Fall Head Lane and a dam just south of Low Mill from which a tail goit leads north to re-join the beck which followed a more easterly path than at present, through the centre of the site.

Structures are shown at the northern end of the dam, presumably the corn mill, with a rectangular range to the north-east. Whilst the 1846 map does not show the furnace, this could be because it is a copy of an earlier survey of 1806 (Umpleby, 2000: 113).

By the production of the 1850 Ordnance Survey (OS) map (**Figure 6**), the reservoir and dam are still shown but the buildings at the head of the dam and the respective goits are not shown. Whilst this would suggest the mill had been demolished by this period, William Kidd was still listed as a miller at Low Mill in 1852 (White's 1852 Gazetteer and General Directory of Sheffield), and Thomas Sissons as a miller and farmer at Low Mill in 1899 (Lincolnshire Chronicle 14 July 1899).

THE ORIGIN AND OPERATION OF THE FURNACE

There is limited documentary evidence for the furnace, although various reports have tried to piece together its history (Baker, 1943; Crossley, 1995; Umpleby, 2000; and ArchHeritage, 2012).

The earliest date attributed to the furnace was by Ronald Frank Tylecote (formerly of Dept. of Metallurgy at Kings College Newcastle) who suggested it probably started work about 1650 (pastscape.org). The furnace at Low Mill has also been attributed an 18th Century date through comparative work undertaken in the publication of

archaeological excavations at Rockley Furnace (Crossley, 1990). These dates have yet to be substantiate through documentary evidence.

An article in the Journal of Industrial Archaeology (1964) states the furnace may have first worked in 1761.

Low Mill is not listed in the 1788 or 1796 surveys of furnaces nor in the lists of those that had closed from 1750-1788 (Meade 1882). Absence from these lists does not provide evidence of absence, however, as furnaces were not always reported by owners to avoid excise duty (Umpleby, 2000: 115). Cartographic evidence for this period is limited to Jeffry's map (**Figure 4**) which shows Silkstone Beck as passing close to the site of the furnace and depicts a waterwheel at the site. The later 1846 Dodworth tithe map, possibly based on a survey of 1806 (*ibid.*), does not show the furnace with the line of the beck passing through its current site (**Figure 5**).

It has been previously suggested that the furnace may have fallen out of use in the latter half of the 18th Century before being brought back into blast (i.e. back into operation) between 1799 and 1817, at which time it was converted to use coke (Bayliss 1995, 20 & ArchHeritage 2012, 74-5).

Of note when considering the age of the furnace is that legal proceedings brought during a dispute over the furnace in 1839 stated it had been erected by James Bland who was involved with the site from 1819 (see below); whilst a (c.1855) tithe rate book recorded the adjacent plot as an unoccupied 'House and Garden by New Furnace' owned by John Spencer Stanhope (Umpleby, 2000: 116; our emphasis).

In July 1817 Major Wilson is recorded to have taken up a lease on a furnace, together with a colliery (possibly Pall Mall see Umpleby, 2000), for a rent of £187.10. That same month James Cockshutt of Thurgoland, a renowned local ironmaster, made an agreement with Major Wilson to manufacture charcoal smelted pig iron at the furnace (Umpleby, 2000: 115; ArcHeritage 2012, 75 and Morley, 2002).

An earlier rental of 1811 between the Wilsons and the Spencer Stanhopes referring to 'Furnace Farm' has been suggested elsewhere (ArcHeritage, 2012) to refer to Low Mill, however this to have most likely been 'Furnace House' where the Wilsons lived at Barnby (1822 Baines' Directory; Bishop Transcripts: & Tiplady Pratt, 1882: 62).

After Cockshutt's death in 1819 James Bland, his executor, continued the company with Edward Cockshutt. at which time Silkstone Low Mill Blast Furnace was recorded to be part of the estate (Morley, 2002). Further evidence from this period includes documented rents due for payments for the use of the Silkstone Waggonway in 1820 (ArcHeritage, 2012: 75); an agreement for purchase of land at £250 per acres for ironstone in Silkstone in 1822 (Umpleby, 2000: 115); and record of the sale a load of cinders to the Barnsley Canal Navigation in 1822 (*ibid.*). In addition to the transportation of pig iron and cinders from the furnace to Barnby Basin, the company are also likely to have used the waggonway to bring in the ironstone, coke, cortwood and flux that were used to charge the furnace (ArcHeritage, 2012: 75).

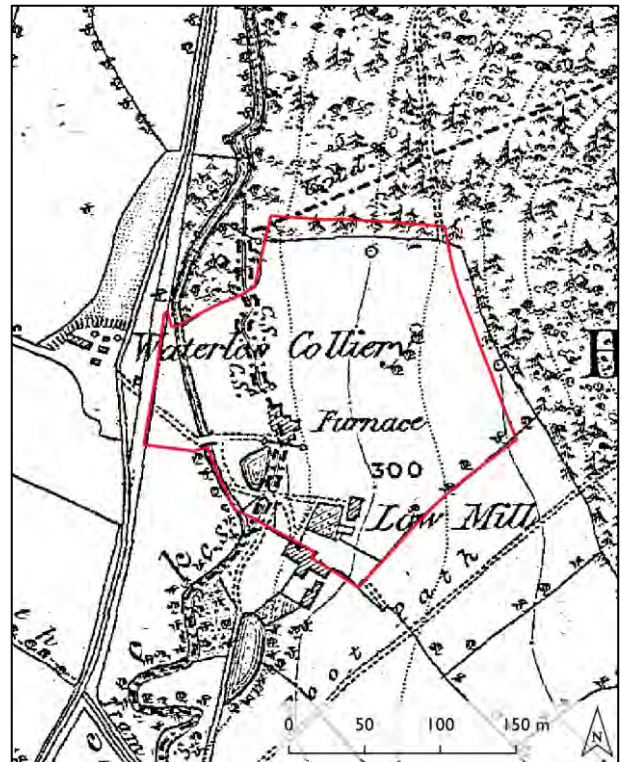


Figure 6: 1850 Ordnance Survey 1:10560 map

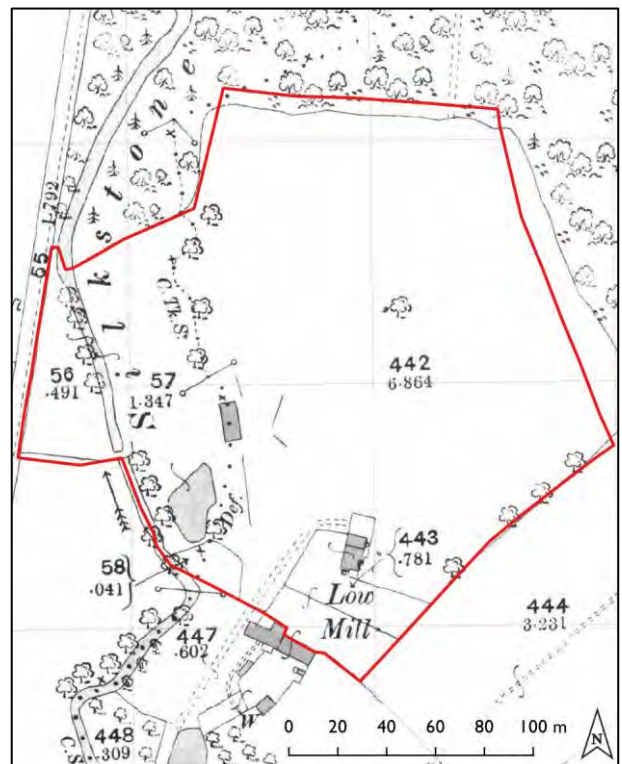


Figure 7: 1893 Ordnance Survey 1:2500 map

Thomas and Daniel Wilson paid further rentals from July 1823-25 for 'Fall Head, cottages and a furnace' still with the rental of £118.10s, correlating to the figure cited in 1817 (Umpleby, 2000: 115). Conversely, the furnace was not recorded in the national lists of blast furnaces for 1823 or 1825 suggesting that it was little used, perhaps providing auxiliary capacity to the Wilson's other site at Barnby.

In 1825 James Bland agreed to sell the lease on Low Mill Furnace for 1000/- to Messrs Graham and Hartopp of Milton Iron works. The Grahams spent some time disputing the sale, arguing they believed Hartopp, the iron works manager, to have entered the agreement of taking the lease with Bland alone (Annon, 1836: 212), although acknowledging that 'works at Silkstone were carried on for the benefit of the firm' (Morning Post, 3/12/1835: 4). Evidence referred to included correspondence from 1825 to 1829 (when the Graham and Hartopp partnership was dissolved on the retirement of Hartopp) that made several references to the Silkstone furnace including stock and expenses relating to it (Morning Post 9/11/1835, 3). The furnace was cited as being owned by John Spencer and a note in the legal proceedings suggested it had been 'erected by Bland' (1836, 212). The case was dismissed the judge ruling that the Grahams had sanctioned the purchase.

After Bland requested payment in 1827 the Grahams appeared to have stopped operating the site, which is corroborated by the archaeological evidence that suggests it was not converted to utilise the hot blasting technique introduced into England in 1828 (ArchHeritage, 2012: 76).

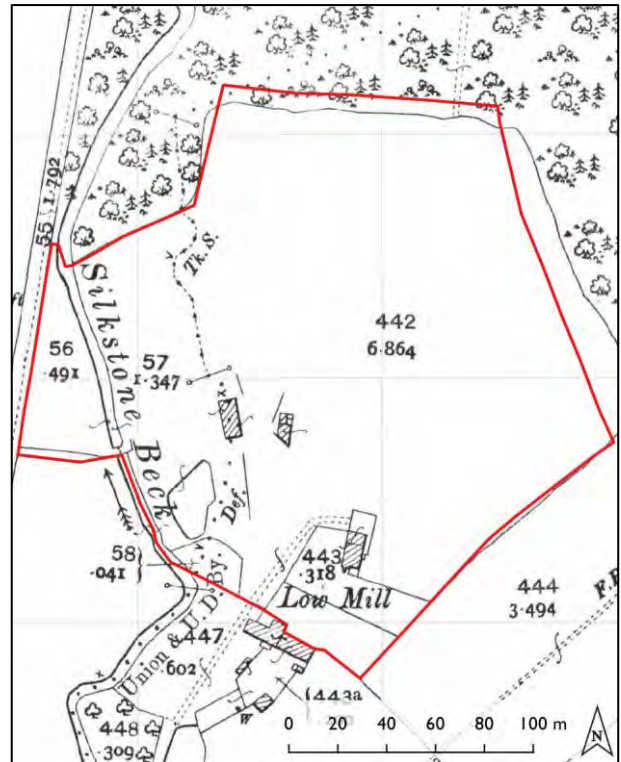


Figure 8: 1906 Ordnance Survey 1:2500 map

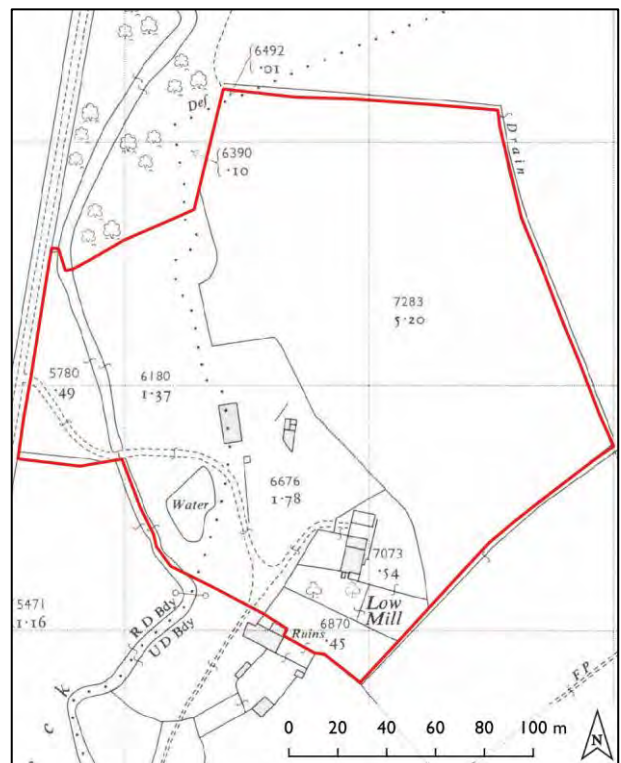


Figure 9: 1959 Ordnance Survey 1:2500 map

CONVERSION TO A FARM

The poll books for 1841 show George Hinchcliffe at Low Mill, Dodworth (listed as voting under Silkstone). He was noted as being an occupier paying a rent of at least £50 per annum (p47). Hinchcliffe was described in the 1851 census as being a smith and farmer and in 1861 census as being a farmer of 85 acres, employing three men both at addresses at Fall Head. In 1824, an advert for the sale of wood, taken from Fall Head recorded George Hinchcliffe of Bamby Furnace as the woodman (Leeds Intelligencer 19 February 1824, 2), illustrating a continued connection between the two furnaces.

In 1870 reference is made in the Barnsley Chronicle to a day-pit at Low Mill, Cawthorne. Identified as the property of Mr Stanhope the report noted that work had been suspended 'a few months ago' and that Messrs Taylor, Ellis and Wood were inspecting the pit to see if it could be worked again when an explosion occurred seriously injuring them all (23 July 1870, 8).

The 1893 OS map (**Figure 7**) shows the site after the furnace had likely ceased to operate, the buildings much as they had appeared on earlier edition of 1850 with the exception of additions to the rear of the furnace that had presumably been removed. The goits are also no longer shown, presumably infilled, although the dam evidently survived. Walls are shown on a north-south alignment to the north and south of the furnace, with two additional walls shown on a funnel like arrangement to the east of the furnace, the latter of which had been incorporated into the pigsty building (larger than the present building) that appears on the 1906 OS map (**Figure 8**)

Both these maps suggest access to the farmhouse at this time ran north from Low Mill Cottage, the present link to Silkstone Waggonway appearing on the 1959 OS

(**Figure 9**). This edition also shows the addition of a garage to the north of the farmhouse and the formation of a boundary dividing the north-eastern part of the site. Parts of Low Mill Cottage to the south are marked as ruins.

In March 1957 Mr C.H. Hinchcliffe advertised the sale of his farm stock, recording he was retiring from farming on account of ill health (South Yorkshire Times and Mexborough and Swinton Times, 16/03/1957: 4).

In July 1979 Low Mill Farm was put up for auction. The OS map produced that year (**Figure 10**) shows the old dam had been infilled, and an open sided shed built in its vicinity. Whilst few changes are shown on subsequent OS maps of the 20th Century (**Figures 11-12**) alterations were made to the farmhouse during this period.

A rear extension was made c.1980, with a photo taken that year showing works commencing to the roof over the western bay of the building. This photo also shows the rear of the building abutted by a long offshot, which historic satellite imagery shows had been replaced by 2003 with a double gabled two storey extension. Between 1993 and 2002 the earlier open-sided shed on the site of the old dam was pulled down and a new four-bay steel shed built to the north of the furnace for fish rearing, including the re-excavation of the old goit and insertion of concrete weirs to create fishponds.

The property was put up for sale again in 2013 when it was bought by the current owners who extended the house with an additional bay to the south.



Figure 10: 1979 Ordnance Survey 1:2500 map
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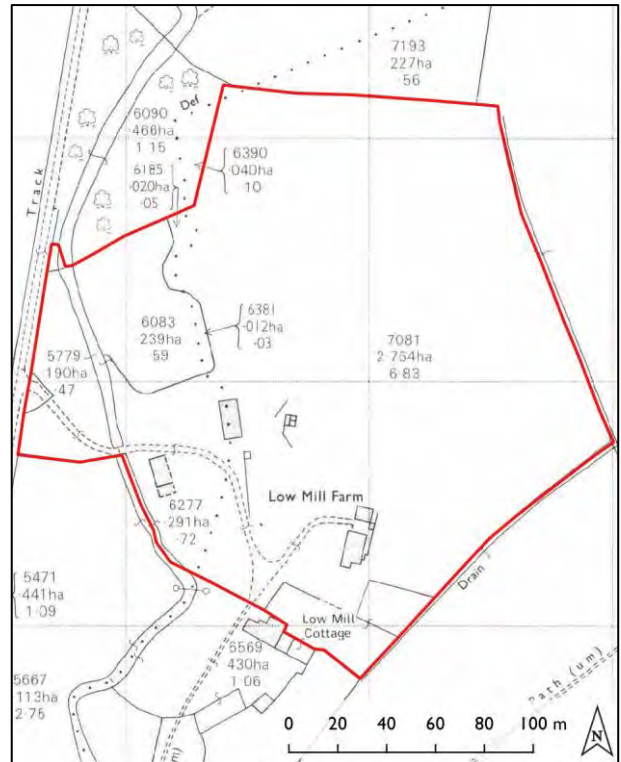


Figure 11: 1983 Ordnance Survey 1:2500 map
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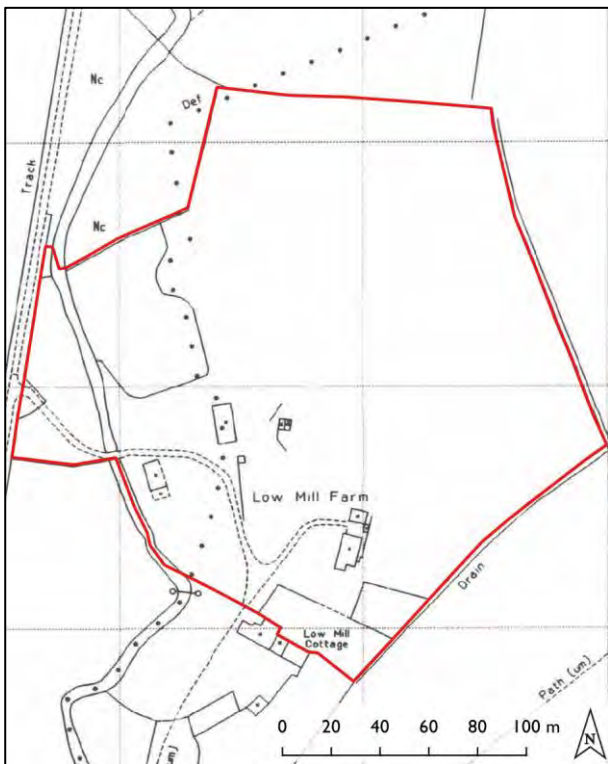


Figure 12: 1993 Ordnance Survey 1:2500 map
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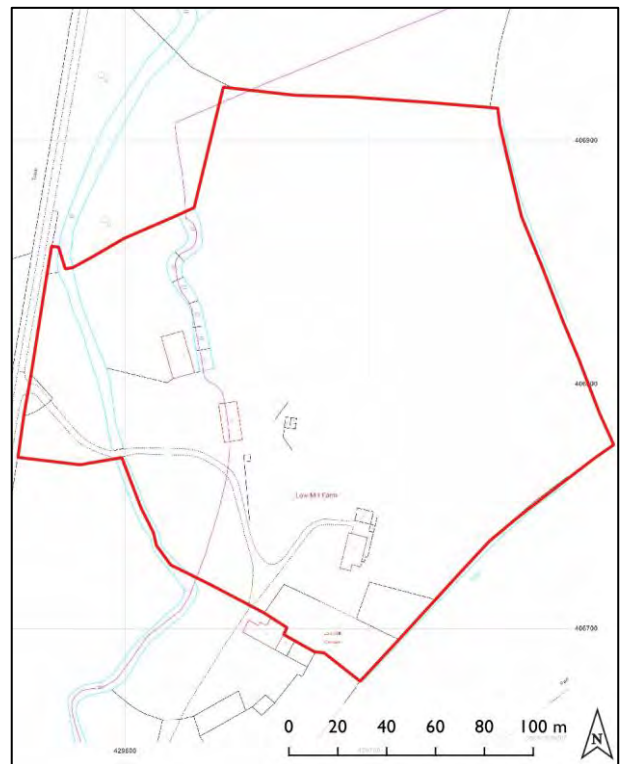


Figure 13: 2003 Ordnance Survey 1:2500 map
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Figure 14: Undated (post-1900) photo of Low Mill Furnace, looking north (© Cawthorne Victoria Jubilee Museum)



Figure 15: Undated (post-1900) photo of Low Mill Furnace, looking east (© Cawthorne Victoria Jubilee Museum)

SITE APPRAISAL

GAZETTEER

Features of architectural, archaeological, or historical interest (i.e. Heritage Assets) identified within the site are summarised in the gazetteer below and their location is shown on **Figure 16**. The Heritage Assets are cross referenced in the subsequent sub-sections containing detailed descriptions of landscape features and buildings with numbers prefixed with HA.

A number of features located outside of the site boundary (**HA5-7 & HA10**) have been included as they are considered to have been intrinsically related to the historical operation of the site.

Heritage Asset	Description	Picture
<i>Buildings</i>		
1: FURNACE <i>Type: Blast Furnace</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429648 406776</i>	Single storey stone built ruined blast furnace and adjoining former casting shop, now disused cowhouse. Described in more detail in following sections. Building shown on 1850 OS map	
2: FARMHOUSE <i>Type: Farmhouse</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429697 406727</i>	Two storey stone built former farmhouse, now residential dwelling. Originally two bays with rear lean-to and extended to the north in the 1980s and to the south in 2013. Building shown on 1850 OS map	
3: PIGSTY & DOVECOT <i>Type: Blast Furnace</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429671 406779</i>	Two storey brick-built structure with pitched stone slate roof. Contains two pigsties at ground floor, with adjoining enclosed yards, and dovecot above with gable end doors and flight holes. Ruined structure to south incorporating remains of earlier retaining wall (HA13). Building shown on 1906 OS map.	

Heritage Asset	Description	Picture
<i>Landscape Features</i>		
4: DAM <i>Type: Blast Furnace</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429628 406751</i>	Site of former dam serving the water wheel at Low Mill furnace. Now infilled, but partially legible as shallow depression. Shown on 1850 OS map.	
5: SITE OF CORN MILL <i>Type: Corn Mill</i> <i>Date: Mid 18th Century</i> <i>NGR: 429634 406665</i>	Site of Low Mill corn mill, now in private gardens belonging to Low Mill Cottage. Shown on 1767 Jeffry's map of Yorkshire and absent from 1850 OS map.	
6: SITE OF WATER SYSTEM <i>Type: Water supply and drainage</i> <i>Date: Mid 18th Century</i> <i>NGR: 429460 406311 to 429639 406731</i>	Site of water system associated with Low Mill corn mill, and potentially Low Mill furnace, comprising a southern reservoir and northern dam with connecting goits. All elements in private land and not surveyed. Shown on 1846 Dodsworth Parish tithe map. The southern reservoir and northern dam were still present on the 1906 OS map.	
7: SITE OF WEIR <i>Type: Water supply and drainage</i> <i>Date: Mid 18th Century</i> <i>NGR: 429460 406311</i>	Site of weir on Silkstone Beck. No physical remains are evident within the bed of the beck, but there are elements of sandstone drystone walling along the edge of the beck that may comprise former wing walls. The depth of the stream in comparison to surrounding land indicates any channels taking water from it must have been in a deep cutting or culverted. Shown on 1893 OS map.	
8: WHEEL PIT <i>Type: Water power site</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429654 406775</i>	Former wheel pit to the east of Low Mill furnace. Constructed from stone and measuring 5.2m long, 1.7m wide and 2m deep. North-east wall reinforced in concrete. No remains of wheel or mountings survive, nor where scars from the wheel evident on the sides of the pit. Arched stone lined entrance to culverted tail goit evident in north- corner. Head goit/pentrough not observed. Vegetation and soil choking the pit may obscure further evidence. Association with Furnace shown on 1850 OS map.	
9: TAIL GOIT <i>Type: Water supply and drainage</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429637 406801 to 429625 406870</i>	Sinuous stream, representing former tail goit and before that an earlier alignment of Silkstone Beck. Cleared out in early 21st Century and concrete weirs installed to create fishponds. No historic structures observed. Shown on 1850 OS map.	

Heritage Asset	Description	Picture
I0: SITE OF TAIL GOIT <i>Type: Water supply and drainage</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429625 406870 to 429622 406934</i>	Dried and silted up channel of former tail goit and before that the line of Silkstone Beck. No historic structures observed. Shown on 1850 OS map.	
I1: RETAINING WALL <i>Type: Retaining wall</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429651 406770 to 429654 406741</i>	Sandstone built retaining wall bordering the track from the Silkstone Waggonway to Low Mill Farmhouse and Cottage. Potentially also served as access route to charging bank to east of furnace. Possibly shown on 1850 OS map.	
I2: RETAINING WALL <i>Type: Retaining wall</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429670 406791 to 429665 406784</i>	Sandstone built retaining wall with three substantial buttresses to north-west face. Shown on 1893 OS map.	
I3: RETAINING WALL <i>Type: Retaining wall</i> <i>Date: Late 18th to Early 19th Century</i> <i>NGR: 429668 406774 to 429671 406771</i>	Sandstone built retaining wall incorporated into ruined structure associated with the adjacent pigsty/dovecot. Shown on 1893 OS map.	
I4: BRIDGE <i>Type: Bridge</i> <i>Date: Early 19th Century</i> <i>NGR: 429601 406769</i>	Stone built segmental arched bridge with flat gravelled deck, low parapet walls with flat coping and curved wing walls. Shown on 1850 OS map.	

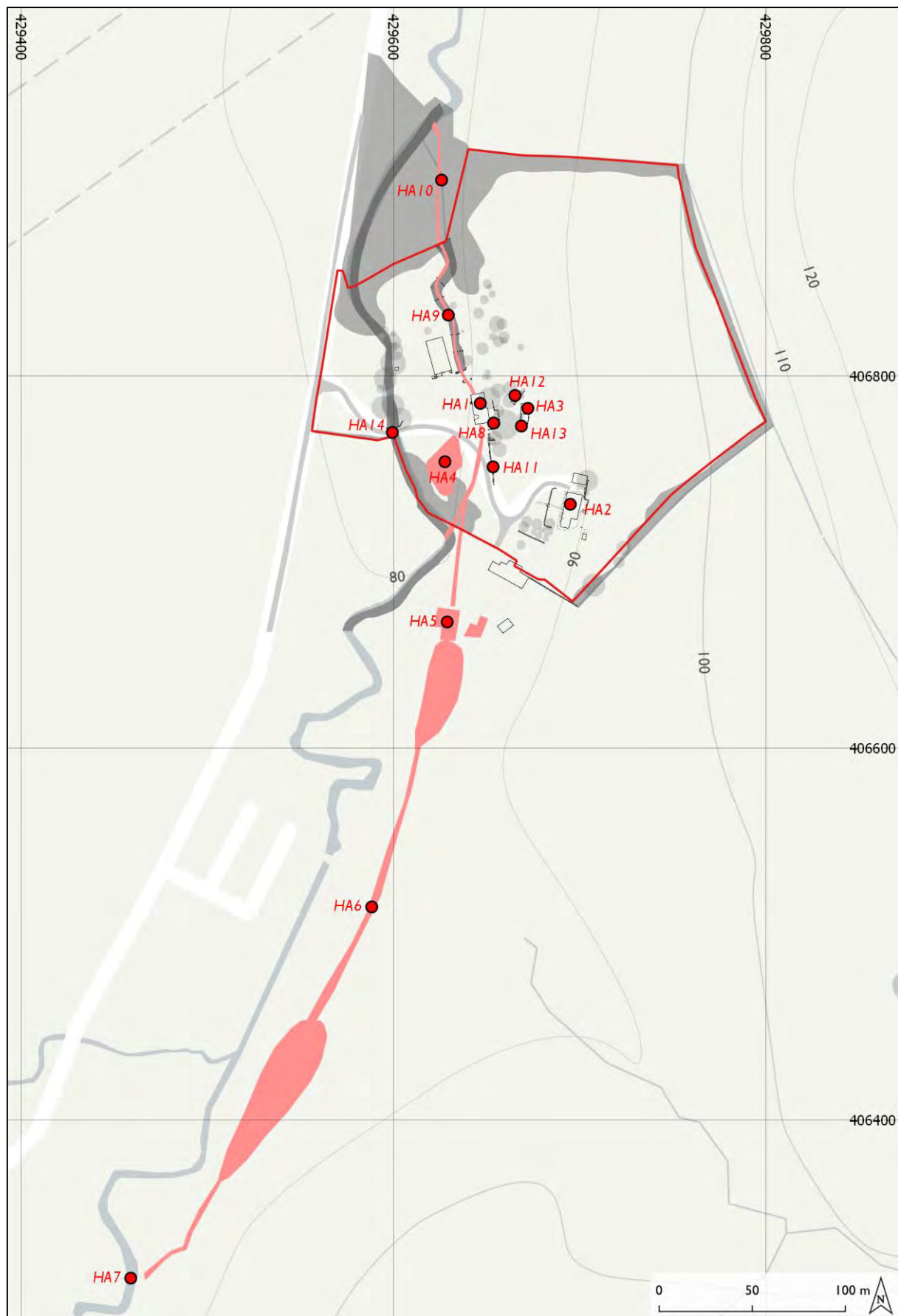


Figure 16: Identified Heritage Assets

LANDSCAPE APPRAISAL

Water Management System

It is believed Low Mill Furnace possessed water-powered bellows to generate the 'blast', or forced draft of air, that drove the heat of the furnace to the temperature required to reduce iron ore to molten iron ore.

Analysis of historic maps indicate that Low Mill Furnace was formed on an earlier line of the Silkstone Beck with a new channel cut to divert the beck to the west sometime in the late 18th to early 19th Century.

The 1850 OS map indicates the old line of the river remained open at that time, with a dam (HA 4) shown to the south-west of the furnace. This dam has now gone but is visible as a slight depression. An undated photograph (Figure 14) shows the dam with the furnace beyond, in which a potential sluice structure is visible.

Analysis of ground levels suggest that the furnace might not have utilised water drawn immediately from the beck to its south of the dam, the base of which lies in a cutting at approximately 77.7m above Ordnance Datum (AOD; based on LIDAR data) as the water would have to have proceeded uphill, or at best on an almost level course, to the wheel pit. Instead, the system may have taken water from the former Low Mill corn mill (HA5), which would have been operational when the furnace was built, and the dams of which remained on the 1906 OS map. This water system (HA6) no longer survives but can be traced from earlier maps to have drawn water from Silkstone Beck some 500m to the south of the furnace close to a point where a weir is shown on

the 1893 OS map. Inspection of the site of the weir today indicates the weir has been removed, although stone-built walls along the east bank may represent the remains of associated structures (HA 7).

Water from the dam proceeded by culvert to a wheel pit (HA 8) situated to the east of the furnace. The pit, measuring 5.2m long by 1.7m wide and 2m deep, is stone lined and lies perpendicular to the furnace and partially lapping around its south-east corner. The wheel pit was choked with woody vegetation when inspected and inaccessible for survey. A stone arched culvert for the tail goit was observed to the north-east corner of the pit, but the entrance was not visible amongst the vegetation.

From the wheel, the goit was culverted for approximately 30m then opening into a sinuous channel on the earlier line of Silkstone Beck. The first c.73m section of this has been reprofiled and divided into fishponds with concrete weirs (HA 9). Beyond this the silted channel remains clearly visible as it passes through woodland for c.55m to the point where it previously re-joined Silkstone Beck (HA 10). No remains of sluices or other structures were identified at the time of the site visit.

Charging Bank

The furnace backs onto a steeply sloped 8m high bank that lies along the eastern edge of the earlier line of Silkstone Brook and falls towards the north and south. The southern tail of the bank is abutted by a sandstone retaining wall (HA 11) where it has been cut back to accommodate the lane to Low Mill Farmhouse and the top of the bank.

On the top of the bank behind the furnace lie two sandstone-built walls aligned diagonally to the slope

and forming an approximate funnel in plan. The northern wall (**HA 12**) has added buttresses to its south whilst the southern wall (**HA 13**) has been incorporated into a wall surrounding part of an early 20th Century brick-built combined pig sty and dovecot (**HA 3**). These earlier walls have been interpreted as enclosing a former working platform where ore was roasted and then combined with coke with a small mound of roasting debris and coal previously noted to the north end of the terrace (Historic England field observation, 18th March 2008).

From the bank a bridge structure would have crossed to the furnace chimney for delivery of the coke/charcoal, iron ore and lime. No remains of this bridge are visible.

Waggonway

It is believed that a waggonway was laid from the Silkstone Waggonway to the furnace by Cockshutt

and Co. Although no maps survive showing the rails, tracks marked on the 1855 OS map have been interpreted as marking their former alignment (ArchHeritage, 2012: 75). The depicted tracks lead from the original track bed of the Silkstone Waggonway (later diverted to Waterloo Colliery when it opened c. 1839-1842) across Silkstone Beck and straight across to the furnace. A circuit is also shown around the furnace dam which may have provided a siding for marshalling waggons. Interestingly no tracks are shown to the top of the bank behind the furnace which would have been of use for hauling materials for charging the furnace.

Nothing now remains of the waggonway except for a bridge across the Silkstone Brook (**HA 14**). The bridge is built from dressed sandstone and has a round arch and flat top with coped stone parapet and curving wing walls.

FURNACE BUILDING APPRAISAL

The Furnace

The furnace (**Figure 17**) is square in plan, measuring approximately 7.6m (or 25'), with an outer face of dressed stone with horizontal tooling, and inner stone rubble core surrounding the furnace lining. This stone structure steps slightly as it rises. A substantial amount of the dressed stone has been removed, exposing large areas of the core.

Facing north-west into the casting house, the 'work arch' (**Figure 18**) comprises the tallest of the arches with a three-pointed brick arch, four courses thick, and dressed stone cheeks and keystone. The extra height of this arch was to allow more space for iron workers. The inner face of the work arch retains an iron lintel beneath which the original fore-hearth has been removed and blocked with stone and a cast-iron stove added.

Facing towards the north-east is the first 'tuyere arch' (**Figure 19**) which similarly possessed a brick arch and dressed stone cheeks and keystone although here the arch is rounded. This arch faces a level platform beside the wheel pit. The tuyere arch would have most likely accommodated a pair of bellows (onto which metal nozzels, or tuyere, projected into the furnace) operated by a cam shaft driven by the waterwheel. It is postulated that these bellows may have been replaced with cylindrical piston driven blowers (Crossley, 1990: 166) although no evidence for the machine or their linkages remain.

The second tuyere arch (**Figure 20**) which faces towards the south-west is evidently an insertion, comprising brick cheeks and arch of a single brick thickness, with the masonry around it lacking the

dressed edge evident on the other arches. The inner face of the opening is brick built, with a horizontal iron support, and central rounded aperture. No remains of blast machinery are visible.

Internally the furnace has a heavily vitrified heath (**Figures 21-23**), now filled with sand, which appears to taper inwards to join with a cylindrical brick shaft that decreases in radius as it rises. The inner shaft partially emerges from the furnace where the outer stone structure has fallen away. Inset into the structure are three arched openings.

The Casting Shop

The casting shop is a rectangular single storey stone built from coursed dressed sandstone with horizontal tooling of similar design to that of the furnace. The building abuts the furnace, partially lapping onto it where it tapers inwards as it rises.

The building has a stone slate roof laid in diminishing courses with clay ridge tiles supported on three substantial trusses of five vertical posts, the central three being bolted to the tie beam, with raking struts and tenoned and pegged purlins (**Figure 27**). The southern most truss lies against the side of the furnace.

The south-west elevation (**Figure 24**) possesses a large arched opening with finely dressed voussoirs and an internally opening plank and batten door with bead and quirk planks, plain iron strap hinges and wrought iron latch with rhombus shaped back plates. External pintles suggest that an earlier externally opening door may have been present. This archway



Figure 17: South elevation of furnace (1m scale)



Figure 19: East tuyere arch (1m scale)



Figure 18: North work arch in adjoining building



Figure 20: Secondary west tuyere arch



Figure 22: Interior of furnace, looking south-west



Figure 21: View of tuyere hole, north arch



Figure 23: Interior of rear blocking to work arch

is mirrored in the north-east elevation (**Figure 26**), although here it has been blocked in a hard-red machine pressed brick with inset 6-paned timber framed window. North of both archways are rectangular windows with timber frames incorporating projecting timber sills, two lower fixed panes and upper vents. Both windows have horizontal metal rails across their lower part, presumably to prevent damage from animals leaning against the building.

Within the north elevation (**Figure 25**) is a ground floor doorway, positioned west of centre, with outward opening plan and batten stable door, spear headed iron strap hinges and plain latches. Above it, positioned centrally in the gable, is an inserted taking-in door with outward opening stable door with fixed timber frame and iron hinges.

Internally the building has been divided into a southern haymow with cowstalls to the north with loft over. The walls are limewashed squared rubble laid largely to courses.

The haymow (**Figure 28**) has a stone flagged floor, with clay quarry tiles extending into the work-arch of the furnace. A block and chain hangs from the purlins above the entrance in the south-west elevation. To the east is an inserted timber staircase providing access to the loft.

The cowstalls (**Figure 29-30**) are divided from the haymow by a low brick-built wall with integral stone chutes with timber railing above serving as a hay rack. The western end of this structure has been cut through to form a passage between the two parts of the building. To the north of the dividing wall are three stalls with timber framed partitions with vertical

timber plank and timber hitching rails (one has been replaced with a steel bar). A further stall is in the north-east corner of the room with salt-glaze trough and timber hay rack. The floor within the cow stalls is largely of brick laid on edge, with stone kerbs to raised platforms beneath the stalls, stone flags inside of the entrance in the north-west elevation and stone lined drainage channels. A further raised platform in the north-west corner illustrates the position of a further, now removed, stall. The loft (**Figure 32**) is supported on a transverse beam above the hay racks with two longitudinal beams supported midway on two inserted timber posts. The eastern beam has taper burn marks on it (**Figure 31**), widely associated with ritual practices associated with folk superstition. Between the beams are joists with wide timber floorboards covered over with plywood sheets. The floor is slightly uneven, suggesting some degree of settlement has occurred.



Figure 24: South-west elevation of Casting Shop



Figure 25: North-west elevation of Casting Shop



Figure 26: North-east elevation of Casting Shop



Figure 31: Detail of taper burn marks on loft joist



Figure 28: Blocked arched door in east of haymow



Figure 27: Detail of truss



Figure 30: Detail of south-east cowstall (1m scale)



Figure 29: View of the cowstalls (1m scale)



Figure 32: View of the loft (1m scale)

STATEMENT OF SIGNIFICANCE

SUMMARY OF AGE AND PHASING

The age of Low Mill Furnace has yet to be definitively established. Whilst previous studies have attributed dates ranging from as early as 1650, the generally accepted date of construction is the mid-18th Century. Cartographic sources suggest the route of Silkstone Beck was only diverted from running through the site of the furnace in the early 19th Century, a date compatible with the documented reference to the furnace having been built by James Bland who stepped in to manage Cockshutt & Co after James Cockshutt died in 1819. The structure itself appears late 18th to early 19th Century in character which seems to support this later date. The age of the furnace requires further research to unpick, and it may only be possible to accurately establish the history of the site through archaeological investigation.

The absence of the furnace from official records in the latter 19th Century has been interpreted as the site having fallen out of use, later being brought back into blast between 1799 and 1817. This is believed to have coincided with the conversion of the furnace from charcoal to coke based on evidence for the addition of a second tuyere arch that would have enabled the extra blast required by the new fuel (Crossley, 1990: 166).

The lease on the site was sold by James Bland to Messrs Graham and Hartopp of Milton Iron works in 1825 who worked the site until 1828. The site had been converted to a farm by 1841, with the casting shop turned to a cowhouse.

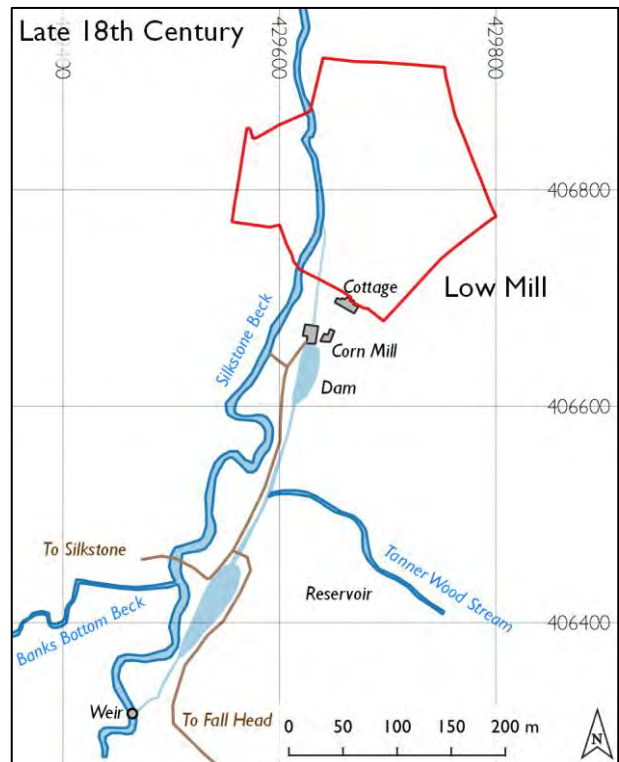


Figure 33: Low Mill by the late 18th Century based on cartographic sources

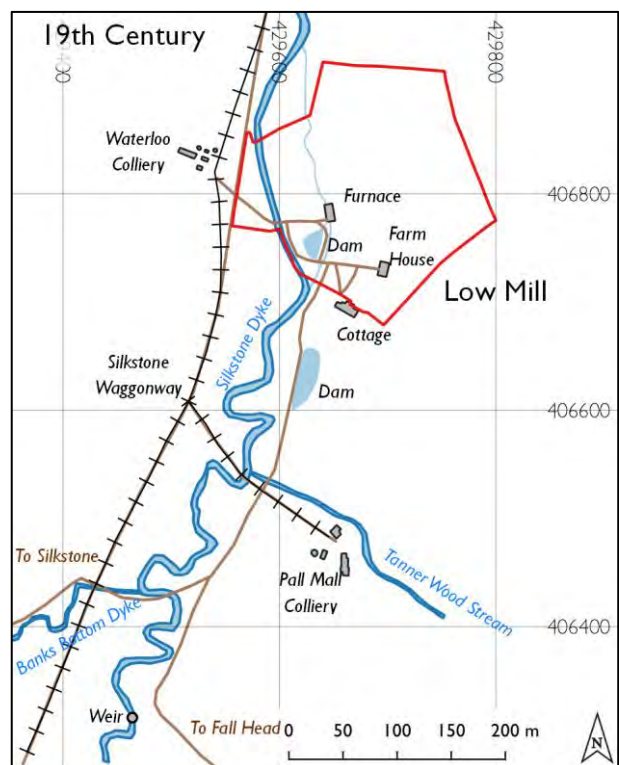


Figure 34: Low Mill by the mid 19th Century based on cartographic sources

STATEMENT OF SIGNIFICANCE

Low Mill Furnace represents an example of a probable late 18th Century blast furnace for converting iron ore into pig-iron, thus placing it within a period of rapid expansion of iron production in England. This technology was first brought to England in 1496, with the earliest known examples in the South Yorkshire, located at Kimberworth and Wadsley, built by 1583 (Bailey, 1995). A further furnace nearby at Rockley, was built between 1698 and 1704 (*ibid.*). The furnace, whilst not especially early or innovative, is representative of the evolution of the technology, and possesses special interest regarding the evidence for its adaption from charcoal to coke and the unusual survival of its associated casting shop.

The furnace shares several significant associations with historical industrial figures, including the Spencer Stanhopes, the regionally influential industrialists of Cannon Hall who appear to have owned the site and may have been responsible for its promotion; and James Cockshutt, a renowned ironmaster who operated Wortley Iron Works.

The surviving furnace has lost a large portion of its stack and much of its external stone structure, the work arch has been altered to install a stove removing evidence of how it was tapped, and all associated blast machinery, waggonways and its charging ramp have been removed. Despite these losses, the building is visually distinctive as a furnace, with evidence for phases of change, preserves its inner hearth and furnace lining and has a high potential to retain buried remains relating to its lost features that would be of archaeological interest.

The conversion of the site to agricultural use is possibly responsible for the preservation of the casting shop, a rare survival, which despite conversion to a barn is likely to preserve buried remains relating to industrial activities including pig-beds, casting pits industrial residues and lifting apparatus that would also be of archaeological interest.

The extant stalls and fittings are likely to be of 1830s date and their good survival is unusual, having avoided the typical improvements in concrete that occurred on account of milk and dairy hygiene regulations brought in the 1920s-50s. The conversion of the casting house is of illustrative historical interest in relation to the development of the site, whilst the age and character of the surviving 19th Century fittings are of historical technological and archaeological interest, complementing the significance of the site.

Setting

Low Mill Furnace is situated in an essentially agricultural setting, although one which preserves a sense of its industrial past including the proximity of the former Silkstone Waggonway, now heritage trail, beside which are areas of ash mounds; and extensive remains of mining in Hugset Woods. These features make an important positive contribution to the setting, and significance, of Low Mill Furnace.

The loss of practical agricultural activities at Low Mill Farmhouse and Low Mill Cottage has also introduced a residential character to the area, although this is low key and does not detract from the significance of the furnace.

The modern steel frame and blockwork barn to the west of the furnace is sufficiently distant that its scale and mass do not impact the prominence of the

furnace, however its unsympathetic design and materials detract from the aesthetic of the site.

Summary of Significance

The site is of **national heritage significance**, reflected in its designation as a Scheduled Monument, deriving from the following key heritage interests:

- * a high level of archaeological interest in respect to the potential for buried remains to survive relating to the development and operation of the site.
- * a moderate level of architectural and artistic interest in respect to the traditional industrial vernacular of the surviving buildings, and its later fixtures and fittings surviving from the conversion of the buildings to a barn.
- * a high level of historical technological interest in respect to the surviving fabric of the furnace, the casting shop, the wheel pit and structures around its charging bank.
- * a moderate level of associative historical interest in relation to the site's association with important historical industrialists, the Spencer Stanhopes and James Cockshutt.

Principal Contributions to Significance

Elements that make a high positive contribution to the significance of the site comprise:

- Fabric relating to earliest phase of the furnace, casting shop and associated infrastructure (**HA1, 8, 11-13**).

- Buried remains associated with the development and operation of the site, including:
 - internal areas within the furnace and casting shop.
 - the land to the east of the furnace.
 - the land at the head of the charging ramp.
 - the presumed route of the original waggonway west from the casting shop.
 - the tail goit including presumed route of culverted section from wheel pit (**HA9-10**).
 - the former dam and presumed route of the former head goit. (**HA4**).
- Low Mill Farmhouse (**HA2**) & bridge (**HA14**)
- The relationship of the site with Silkstone Waggonway and associated archaeological industrial sites including Low Mill Corn Mill, Barnaby Furnace, Waterloo Colliery and Pall Mall Colliery.

Elements that make a low positive contribution to the significance of the site comprise:

- Fabric, fixtures, and fittings relating to the conversion of the casting shop to a barn, including:
 - Doors and windows.
 - Brick infill to north-east arched doorway.
 - Cow stalls and loft.
 - Floor surfaces.
- The former pigsty/dovecot (**HA3**).

Elements that make a negative contribution to the significance of the site comprise:

- The character of the modern barn to the north-west of the furnace and west of tail goit
- The concrete fish weirs in the tail goit (**HA9**).

HERITAGE IMPACT ASSESSMENT

PROPOSED DEVELOPMENT

Potential Effects Arising from the Proposal

1. **Groundworks** – groundworks associated with the demolition of the existing building and the construction of foundations and services for the proposed building.
2. **Works Affecting Position, Scale and Mass** – repositioning and increase of development within the site, affecting views and experience.
3. **Works affecting appearance** – Change in the appearance of development at the site in relation to architectural design, and materials.

ARCHAEOLOGICAL REMAINS

Groundworks - The proposal will result in groundworks deriving from the demolition of the existing modern barn, and as a result of excavations for new footings, services, and surfaces will have the potential to impact buried archaeological remains. Overall the site is anticipated to encompass a high potential for post-medieval remains of regional significance and low potential for remains pre-dating that period which could be of up to regional significance.

Specifically the proposed development site is considered to have lower archaeological potential. This is primarily as a result of previous impacts which will have occurred as a result of construction of the existing modern barn and the re-profiling of the former beck and tail goit (**HA 9**) and its division into

fishponds using concrete weirs. To limit the impact upon potential below ground archaeological remains the development has been matched to the footprint of the existing modern barn. This minimises the opportunity for disturbance of any potential below ground archaeological remains.

The proposed development site will be accessed via the existing farm track which will be extended northwards to meet the property. It has been proposed that service trenches will follow the line of the new access track to minimise the need for additional groundworks.

SETTING OF LOW MILL FURNACE

The setting of Low Mill Furnace is considered to make a positive contribution to the heritage significance of the scheduled monument, through its contribution of historic and archaeological interest. This historic and archaeological interest is formed by the numerous elements indicative of the post-medieval industrial character and operation of the site, such as the wagonway and goit system.

The modern steel frame and blockwork barn which forms the proposed development site in its current form is considered sufficiently distant that its scale and mass do not impact the prominence of the furnace, however its unsympathetic design is considered to detract from the aesthetic of the site.

The dwelling will be constructed in vertical boarded, unfinished timber with a standing seam zinc, mid-grey roof. The materials and form proposed have been selected to reflect the site's current agricultural setting. This will ensure that the essentially agricultural setting, although one which preserves a sense of its industrial past, is maintained. The choice of materials

has also been selected to ensure that the final building blends more easily into its surrounding, this will reduce the perceived mass and scale of the building.

The higher quality of materials and design is considered to improve those aspects of the proposed development site which currently detract from the aesthetic of the furnace's setting.

In addition to the new dwelling and access path a new domestic curtilage is proposed, comprising a garden, terrace, parking and new planting.

A number of trees will be planted which will restrict, although not entirely screen visibility between the new dwelling and Low Mill Furnace. This is considered to enhance the setting of Low Mill Furnace by softening the presence of modern development to the north, restricting visibility of the building's associated domestic curtilage, whilst maintaining some visual link between the furnace and the associated features and land to the north.

DISCUSSION

CONCLUSION

Low Mill Furnace represents a nationally important example of a late 18th Century blast furnace dating to a period of rapid expansion and innovation in the English iron-making industry. The structure of the furnace has been truncated but preserves important aspects such as its inner hearth and access arches, the latter of which exhibit evidence of technological improvement.

Other aspects of the working site also survive in structures associated with its charging bank, retaining walls and waterpower system whilst much more has the potential to survive below ground level.

Fabric, fixtures and fittings relating to the buildings later change to a barn are of lesser importance but are of some interest in their own right positively contribute to the historical and archaeological interest of the site.

It is considered that the groundworks have the potential to impact upon below ground archaeological remains likely to be post-medieval in date, relating to the agricultural or industrial uses of the site. This potential is considered low in the case of groundworks proposed for the excavation of foundations for the new building, given previous impacts arising from the construction of the modern agricultural shed and its later conversion for use in the rearing of fish. The building has been matched to the footprint of the existing modern barn to minimise the opportunity for disturbance of any potential below ground archaeological remains whilst avoiding any further impacts to the heavily modified tail goit.

The removal of the modern barn to the north-west of the furnace is seen as an enhancement of the setting of the furnace, as a result of the reduction of the perceived mass and scale of the proposed development. The use of natural materials will also soften the building's appearance whilst maintaining the principally agricultural feel of the site.

Screening offered by the new planting scheme is considered to soften the addition of any new domestic curtilage whilst maintaining visibility and connectivity between the key heritage asset features of the site.

Overall it is considered that the proposals will result in a minor change to the setting of Low Mill Furnace, however this is considered to have a neutral impact upon the feature's heritage significance which primarily resides in its historic fabric, fixtures and fittings as well as its association with numerous heritage assets in the surrounding area.

AUTHOR

James Thomson BA MA PGDip (Conserv.) MCIfA

Revised by Jennifer Oliver BA MA MCIfA

Research by Victoria Beauchamp PhD

Edited by Oliver Jessop BA MA MCIfA

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ASSESSMENT METHODOLOGY

ASSESSMENT OF SIGNIFICANCE

The significance of heritage assets is their value to this and future generations because of the archaeological, architectural, artistic or historic interest embodied in their physical presence and way in which they are experienced (MHCLG, 2019), defined as (MHCLG, 2018):

- **Archaeological interest:** There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.
- **Architectural and Artistic interest:** These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skill, like sculpture.
- **Historic interest:** An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

The assessment of heritage interest is undertaken in consultation with the guidance set out in the supporting materials section including Historic England's staged approaches to assessing significance

and the contribution made by setting (2015b & 2019).

By understanding the heritage interest of an asset or place, it is possible to derive an assessment of overall significance through reference to published guidance:

Heritage Significance		
International	Heritage assets of outstanding universal value which fulfil the criteria for inclusion on the UNESCO World Heritage List (section II.D of UNESCO, 2019).	1
High National	Heritage assets of exceptional interest, and of particular or national importance that fulfil the criteria for listing at a high grade (i.e. as a Scheduled Monument, or Grade I or II* Listed Building / Registered Park and Garden) (DCMS 2013 & 2018 & Historic England selection criteria.	2
National	Heritage assets of special interest that fulfil the criteria for listing (i.e. as a Conservation Area, Grade II Listed Building / Registered Park and Garden, Registered Battlefield or Protected Wreck Site) (DCMS, 2018) & Historic England selection criteria.	3
Regional	Heritage assets of moderate interest that fulfil the criteria for local listing as set out by local authority guidance or Historic England's advice note on Local Listing (2016b). Broadly defined, such assets possess architectural or historical interest that notably contributes to local distinctiveness or possesses archaeological interest that greatly contributes towards the objectives of a regional research agenda.	4
Local (Negligible)	Heritage asset of limited interest that fails to fulfil the criteria for local listing or only slightly contribute to the objectives of a regional research agenda, typically due to poor preservation, survival or restricted contextual associations.	5

CONTRIBUTION TO SIGNIFICANCE

Elements of a heritage asset, including elements of their setting, may not contribute equally to its significance, reflecting the varying degree of heritage interest embodied in its fabric, where there is capacity for an asset to support change without loss of significance, and where there are opportunities for significance to be enhanced. This is expressed in line with the following scale:

Contribution to Significance		
High	Element is fundamental to the key heritage interest/s that define the significance of the asset.	H
Medium	Element makes an important contribution to the significance of the asset, either as embodying a secondary aspect of the asset's heritage interest or comprising an aspect of the asset's key heritage interest that has been affected by moderate (under 50%) loss such that its contribution to significance is reduced.	M
Low	Element makes a slight contribution to the significance of the asset, either in complementing an aspect of the asset's heritage interest or comprising an aspect of the asset's key heritage interest that has been affected by substantial (over 50%) such that its contribution to significance is greatly reduced.	L
Neutral	Element does not contribute to the significance of the asset.	N
Negative	Element represents an unsympathetic change which detracts from the significance of the asset.	Neg
Uncertain	Sensitivity uncertain: more information required.	?

ASSESSMENT OF EFFECT

An assessment of the effect of the proposed works considers the contribution made by the affected element to the significance of a heritage assets, and the nature of any effect (both negative and positive) to that contribution. The scale of effect adopted is set out in the following table:

Effect of Proposal		
Very Positive	Proposals will greatly reveal or enhance the contribution the effected element makes to the significance of the heritage asset, and/or substantially contribute towards the conservation of the asset.	++
Positive	Proposals will better reveal or enhance the contribution the effected element makes to the significance of the heritage asset and/or contribute towards the conservation the asset.	+
Neutral	Proposals will preserve the contribution the effected element makes to the significance of the heritage asset.	o
Negative	Proposals will result in the partial loss of the positive contribution the effected element makes to the significance of the heritage asset and/or will have a detrimental effect on the conservation of the asset.	-
Very Negative	Proposals will result in the total loss of the positive contribution the effected element makes to the significance of the heritage asset and/or will have a significant detrimental effect on the conservation of the asset.	--
Uncertain	Effect uncertain: more information required.	?

SUPPORTING MATERIAL

CONSULTED SOURCES:

- Archives held by the owner
- Sheffield City Archives

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1818 Teesdale Map of Yorkshire (John Goodchild Collection - Wakefield)

1828 Greenwood Map of Yorkshire (John Goodchild Collection - Wakefield)

1829 W. Bingley plan of Silkstone township (SpSt Map 103 possibly Barnsley Archives)

1839 Map of the manor of Cawthorne by John Walker (SA SpSt Add Maps: 1/124R) ref in ArchHeritage

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