

Former Air Products Site, Llangollen Road, Acrefair, Wrexham.

A Desk Based Archaeological
Assessment and Walkover Survey



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Former Air Products Site, Llangollen Road, Acrefair, Wrexham: A Desk Based Archaeological Assessment and Walkover Survey

Non Technical Summary.

An archaeological desk-based assessment and walkover survey was carried out on the former Air Products site to the south of the A539 in the village of Acrefair, which is within Wrexham County Borough in NE Wales. The walkover was done on May 14th. Weather was overcast but fairly bright.

The site was closed for industrial use in the early 21st century, having been the site of a factory producing industrial gases for the Air Products Company, and was then allocated as a potential mixed use or housing development site by the Local Planning Authority due to its location in Acrefair.

The site is shown on early Ordnance Survey maps as part of the site of the New British Iron Works and was occupied by buildings serviced by rail or tram tracks which linked the iron works to mines owned by the company and to the main railway network. A bank of blast furnaces survives at the southern edge of the site, built against a steep bank which is part of the site but outside the area proposed for housing development.

The area under consideration was mainly used as the car park for the Air Products works with the demolished remains of a former office on the southwestern part and is the eastern part of the Air Products site. The remainder of the site is part of a separate development proposal by another developer.

The site inspection showed that the eastern end of the site is below a substantial revetment wall and was probably partly terraced into the slope of the land. Excavations for drainage test pits did not reveal any remains and the area in front of the furnaces on the southern side was cleared of vegetation and tarmac to reveal a clean clay surface.

The site is considered, from the map evidence to have high potential for holding some structural evidence of the iron works. This is countered by the evidence from engineer's test pits that suggests there is a relatively shallow layer of deposits, most likely relating to site demolition and clearance and the creation of a level surface for the car park over a clay subsoil. The step down to the site from the level of the furnace arches of the southern block of furnaces may also be the result of levelling work on the site which would have removed any evidence for a casting bed in front of the furnaces extending into the area of the proposed housing. This all suggests the archaeological potential of the site is much lower.

Ironworks are a reasonable well documented type of site and the proposed shallow foundation design for the houses to be constructed on the site, along with importing clean fill to raise the surface to aid site drainage, will minimise impacts on any truncated fragments of the structures on the site. It is considered that a requirement for further archaeological investigations on the site would be disproportionate to the significance of any fragmentary remnants of the works.

The structures of the furnaces on the southern edge of the site however need to be assessed by an appropriately qualified structural engineer with experience of historical industrial structures and a repair schedule and conservation plan for longer term management should be drawn up, which should include an archaeological record and may require further work specific to the engineer's recommendations for conservation and repair works.

Author

This Assessment Report was prepared by Peter McCrone of McCrone Archaeology, Consultancy and Contracting Services. The author is a Member of the Chartered Institute for Archaeology (MCIfA) and holds, amongst other qualifications, a B.Sc. (Hons) degree in Archaeology and a Postgraduate Diploma in Buildings and Heritage Conservation. The author has many years of experience of the historic environment of Britain including experience of “hot metal” industrial sites of Wales.

Acknowledgements

Thanks go to Doug Bailey of Turnpike Consulting Ltd. for commissioning the report on behalf of Gower Homes Ltd. and for enabling access to the site, discussing the details of the proposed development and providing site documentation and photos of engineers’ test pits. Mr Gary Duckers at the Historic Environment Record (HER) at the Clwyd-Powys Archaeological Trust supplied the HER information for the site and surrounding area.

Site Location

The Ordnance Survey National Grid Reference for the approximate centre of the site is SJ 28163 43180.

Figure 1 Location in UK (contains OS data © crown copyright, 2021. Source OS Opendata).



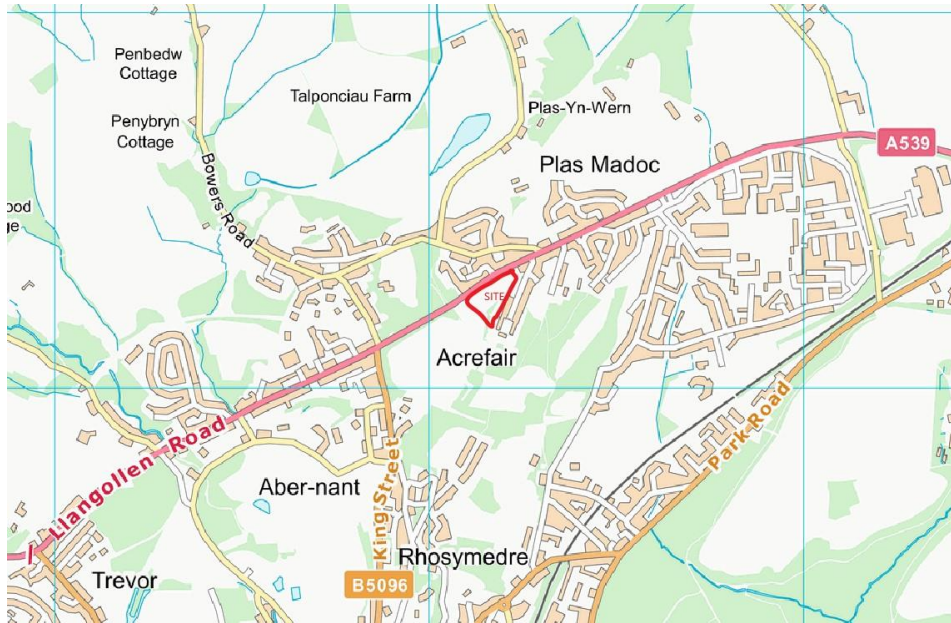
The site comprises c. 1.15 ha lying on the southern side of the Llangollen Road (the A 539) in Acrefair, which is c. 11 km SW of the town of Wrexham (Wrecsam) and 15 km north of the town of Oswestry (Figures 2 and 3).

Figure 2 Regional Location (contains OS data © crown copyright, 2021. Source OS Opendata).



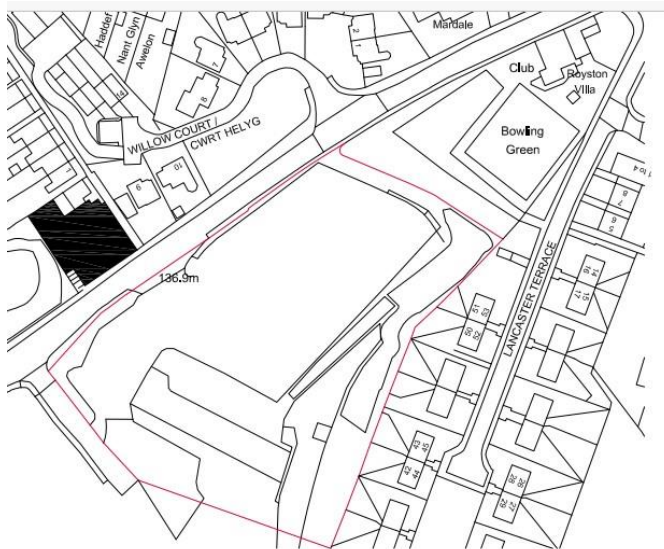
The former Air Products site is in two parts, north and south of the Llangollen Road and totalling 11.38 ha. This report covers the part to be developed by Gower Homes Ltd site which is the eastern section of the southern part of the site (Figures 3 and 4).

Figure 3 Local Map (contains OS data © crown copyright, 2021. Source OS Opendata).



The site is an irregular quadrilateral with the longer axis running NE – SW. For the purposes of this report the NE end will be referred to as the eastern end, the SE side as the southern, the SW end as the western and the NW as the northern (Figure 4).

Figure 4 Gower Developments site map.



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Parry Davies Architects.		Chartered Architects.		
PRODUCT TITLE	LAND AT ACREFAIR	DATE	SCALE	DRAWN
		JUNE 2016	1:1250@A4	RSG
DRAWING TITLE	LOCATION PLAN	DRAWING NO.		REV
		20.6072/L1		
Studio 55:20, North Wales Business Park Abergele LL22 8LJ		Tel: 01745 585517 E-mail: PDPArchitects@aol.com		

Site description

The site appears generally level, although it falls slightly from E – W. The eastern end has a revetment wall supporting a raised platform beyond the development site. This supports a bowling green to the east and c 5 metres higher than site level (Figures 5 and 6).

Figure 5 Revetment Wall at E end of site, Llangollen Rd to left.



Figure 6 View of eastern end of site from Llangollen Road, showing step created by revetment wall. Former Air Products site on right of step in wall heights.



There is a steep slope along the southern edge of the site, rising from site level towards the south although the area proposed for constructing houses ends at the base of this slope. Built into this slope are a set of blast furnaces (Figure 7). At the top of the slope, beyond the site, adjoining the site, is a residential road named Maes Derwydd or Lancaster Terrace (Lancaster Terrace appears to have originally been a row of houses off the Llangollen Road to the northeast of the site, the two names seem to be used interchangeably by some map sources).

Figure 7 The steep bank on the southern edge of site, the furnaces are just left of centre.



On the west side the levelled area extends for approximately 200 metres, ending in a steep slope down to a road. This area is in separate ownership and is subject to a separate and unrelated planning application (Figure 8).

Figure 8 Western part of Air Products site.



The northern edge of the site is bounded by the A539 Llangollen Road which falls c 3 metres from E – W as it passes the site (Figure 9).

Figure 9 North side of site from Llangollen Road, site entrance towards top of picture . Entrance on right is to adjoining development area.



The site was last used as the car parking area, with some buildings sited at the southwestern part, for the Air Products works which had most of its buildings to the west to the west. The site is currently a level area with stretches of tarmac surface, areas of brick rubble from the demolition of an office building of the of the former works and developing scrub woodland (Figure 10).

Figure 10 Former car park area from north.



Planning Background

The role of the planning authorities in terms of responsibilities to the historic environment are set out in legislation at national and local level.

Welsh Government Planning Policy Wales, Edition 11, Section 6, Distinctive and Natural Places, (Welsh Government 2021) sets out the importance of the historic environment as part of Distinctive and Natural Places and the policies of the government towards the historic environment. Sections relevant to this site are quoted:

Para 6.1.2 The historic environment is made up of individual historic features which are collectively known as historic assets. Examples of what can constitute an historic asset include:

- Listed buildings;
- Conservation areas;
- Historic assets of special local interest;
- Historic parks and gardens;
- Townscapes;
- Historic Landscapes;
- World Heritage Sites; and
- Archaeological remains (including scheduled monuments).

6.1.7 It is important that the planning system looks to protect, conserve and enhance the significance of historic assets. This will include consideration of the setting of an historic asset which might extend beyond its curtilage. Any change that impacts on an historic asset or its setting should be managed in a sensitive and sustainable way. 6.1.8 It is the responsibility of all those with an interest in the planning system, including planning authorities, applicants, developers and communities, to appropriately care for the historic environment in their area. The protection, conservation and enhancement of historic assets is most effective when it is considered at the earliest stage of plan preparation or when designing proposals new proposals. 6.1.9 Any decisions made through the planning system must fully consider the impact on the historic environment¹⁰² and on the significance and heritage values of individual historic assets and their contribution to the character of place

Preserve and enhance the historic environment

Protect archaeological remains which are a finite and non-renewable resource

Ensure that the character of historic buildings is safeguarded

Ensure that conservation areas are protected or enhance

6.1.8 It is the responsibility of all those with an interest in the planning system, including planning authorities, applicants, developers and communities, to appropriately care for the historic environment in their area. The protection, conservation and enhancement of historic assets is most effective when it is considered at the earliest stage of plan preparation or when designing proposals new proposals.

6.1.9 Any decisions made through the planning system must fully consider the impact on the historic environment and on the significance and heritage values of individual historic assets and their contribution to the character of place

Archaeological Remains

6.1.23 The planning system recognises the need to conserve archaeological remains. The conservation of archaeological remains and their settings is a material consideration in determining planning applications, whether those remains are a scheduled monument or not

6.1.25 In cases involving less significant archaeological remains, planning authorities will need to weigh the relative importance of the archaeological remains and their settings against other factors, including the need for the proposed development.

6.1.26 Where archaeological remains are known to exist or there is a potential for them to survive, an application should be accompanied by sufficient information, through desk-based assessment and/or field evaluation, to allow a full understanding of the impact of the proposal on the significance of the remains. The needs of archaeology and development may be reconciled, and potential conflict very much reduced, through early discussion and assessment.

Welsh Government Technical advice note 24 states:

Heritage Impact Assessment

1.15 Heritage impact assessment is a structured process that enables the significance of a designated asset to be taken into account when considering proposals for change.¹² Heritage impact assessments should be proportionate both to the significance of the historic asset and to the degree of change proposed, and should include sufficient information to enable both the significance of the asset and the impact of change to be understood. The results of the heritage impact assessment should be summarised in a heritage impact statement which must form part of any listed building consent, conservation area consent and, when requested, scheduled monument consent applications.

4.7 Where archaeological remains are known to exist, or considered likely to exist, and a study has not already been undertaken by the applicant, the local planning authority should ask an applicant to undertake a desk-based archaeological assessment and, where appropriate, an archaeological evaluation. These should be done by a qualified and competent expert to the appropriate standard.⁵⁶ The reports of these investigations will form part of the planning application. Applicants should show they have modified their development proposals to minimise any negative impact on the identified archaeological remains, and how they intend to mitigate any remaining negative impacts

The Wrexham Local Development Plan includes Policy SP 16 (Historic and Cultural Environment).

The policy is supported by several explanatory paragraphs including the following:

5.106 Not all archaeological remains meriting preservation will necessarily be scheduled and the vast majority of archaeological sites will not be afforded any statutory protection. The Historic Environment Record (HER, compiled and maintained by Clwyd Powys Archaeological Trust) contains records of known archaeological sites and should be consulted when preparing proposals within archaeological sensitive areas such as Holt, Overton, Maelor, region, Llay and Brymbo to identify any potential assets that could be affected. Where

development would directly affect non-designated archaeological remains it will be important to undertake archaeological investigation to determine the nature, extent and significance of the remains. This process will help determine whether in-situ preservation and a programme of excavation and recording will be needed. The desirability of preserving archaeological remains and its setting is a material consideration in determining planning applications.

Following the closure of the former Air Products factory on the site, Wrexham County Borough Council produced a supplementary Development Brief for the site; *Planning Brief – January 2012, Air Products, Llangollen Road, Acrefair, Wrexham*.

This sets out the context for development, the site being in two parts (north and south of the A539) indicates that it is allocated for mixed use development in the emerging Wrexham Local Development and sets out background and advice for developers. This includes:

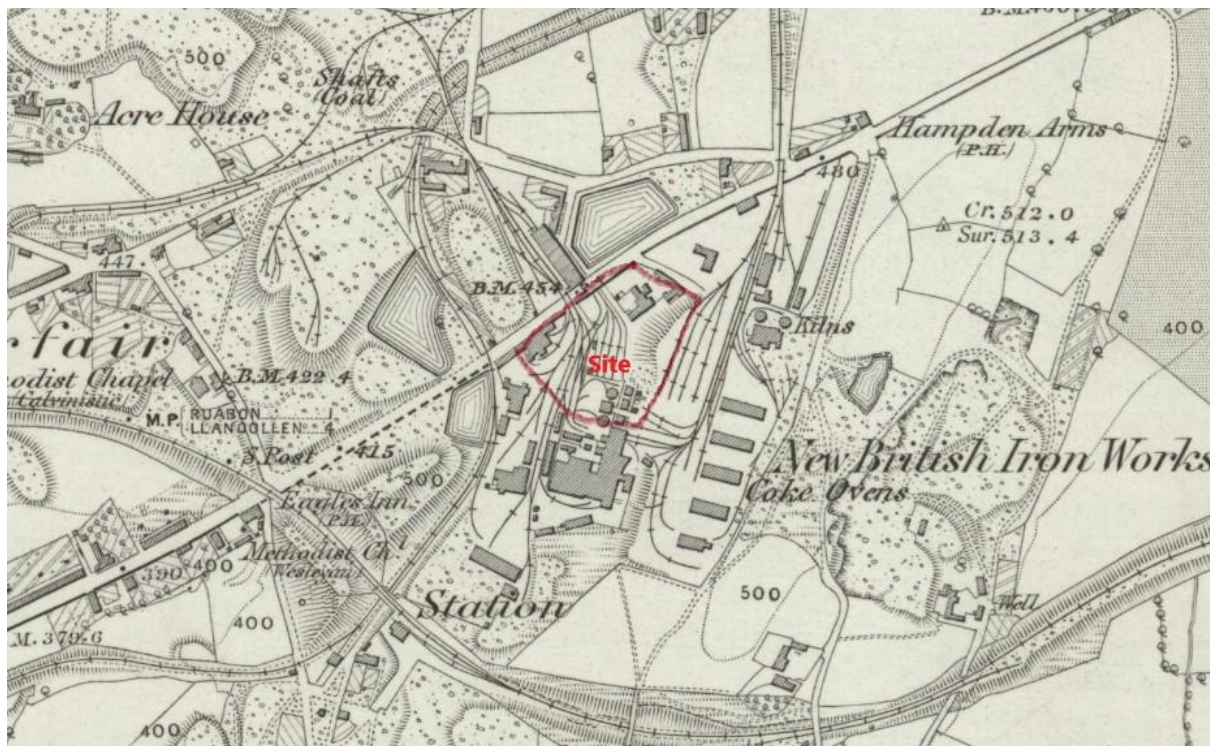
5.5 Archaeology: It is expected that the above ground archaeological feature, the former kiln to be used within the proposals as part of the site's layout. An archaeological audit is required to inform the design of the sites.

Historical background.

The Regional Historic Environment Record indicates that this was part of the former British Iron Works site and has entries on and around the site for elements of the works. These are all short entries and those on the development site are for the buildings of the New British Iron Works

The Ordnance Survey 1st edition 1:10560 maps of the area, surveyed in 1872-3, published 1879 (Sheet Denbighshire XXV) show the area of the site, and the area extending considerably farther to the south and east, occupied by the site of the New British Iron Works with a complex of buildings serviced by single track railways or dram roads (Figure 10).

Figure 10 1st edition OS 1:10560 surveyed 1872-73 (Courtesy National Library of Scotland).



Online research indicates the British Iron Company was founded in 1824 to smelt and manufacture iron and to mine ironstone and coal. It was re-formed as The New British Iron Company in 1843, following disputes between various directors and shareholders, and finally went into voluntary liquidation in 1892.

The Acrefair site was the company's principal site in north Wales, generally known as the Ruabon works. An ironworks had been established earlier but the owner became bankrupt and the works were bought by the British Iron Company in 1825. There were three furnaces, forges, and mills. The works finally closed in 1887. The company also had collieries in the area, including Acrefair, Plas Benion and Wynnstay which were connected by railways to the ironworks.

In 1849 the New British Iron Works at Acrefair is recorded as having three blast furnaces making 300 tons of iron weekly with forges and mills capable of converting that quantity into malleable iron (Lewis, 1849) (cast iron from the blast furnaces was very brittle so was "puddled" in reverberatory furnaces to convert it to a form that could be wrought)..

In 1883 the works had two cold blast furnaces (Griffiths, 1883).

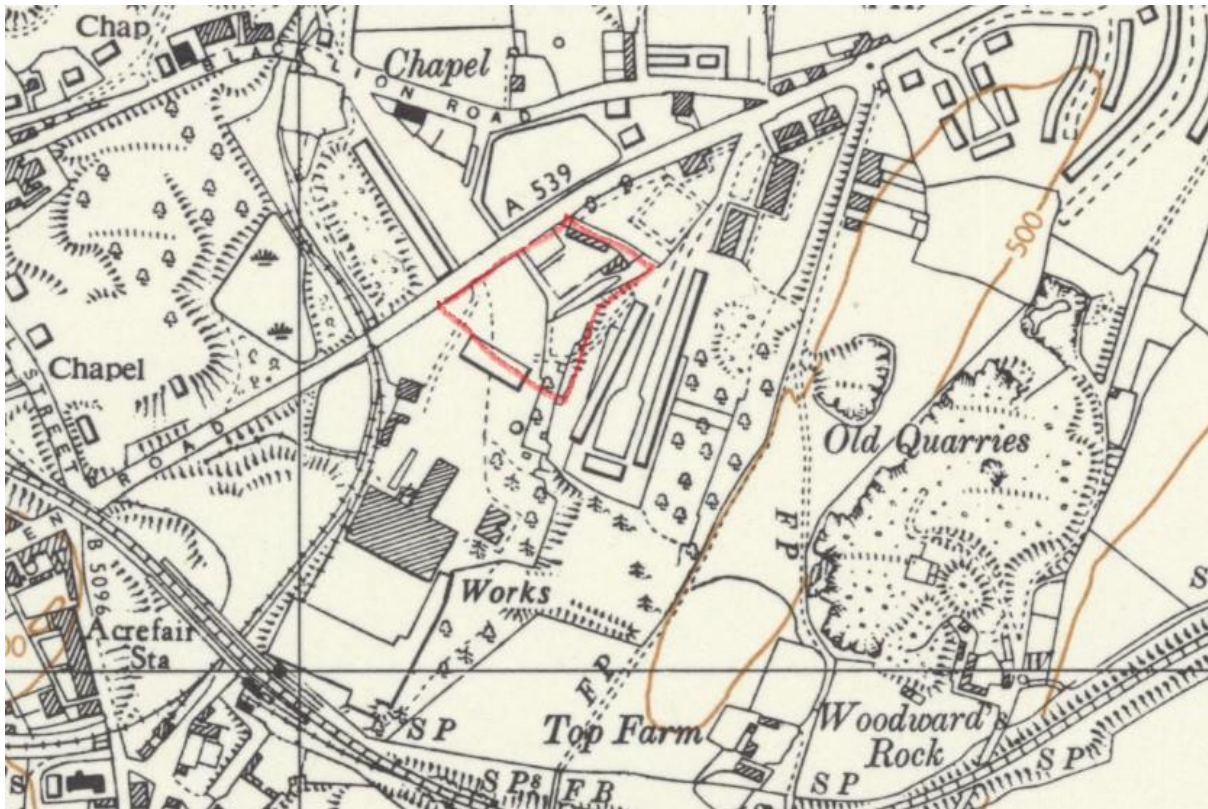
In the 20th Century the site was owned by the Butterley Co. Ltd. An engineering firm with interests in other areas such as brickmaking and mining (Figure 11).

Figure 11 Revised OS 1:10560 surveyed 1898 (Courtesy National Library of Scotland)



On 15 August 1957 Air Products, a US based company, signed a joint venture agreement with the Butterley Company and so Air Products (Great Britain) Limited came into existence with offices in London and a manufacturing site in Acrefair, North Wales (Figure 12).

Figure 12 Air Products site in 1963 A series 1:10.000 Published 1963 (Courtesy National Library of Scotland).



Air Products produced a range of gases for industrial use and developed the site as their production plant, most of the buildings being on the western part of the level site, outside of this development although the demolished remains of some lie in the southwestern part of this development's area (Figure 13).

Figure 13 View E over site from SW with demolition rubble in foreground



The Air Products site closed in the early 21st century and the buildings were demolished, leaving the site as it appears today. The site was sold for housing development shortly after closure and its assessment as a suitable site for “brownfield” development by the Local Planning Authority which led to the production of the planning brief.

Archaeological potential

The site has existing structures in the shape of the bank of kilns or furnaces on its southern side. Historic mapping shows the site covered with a complex of buildings and structures relating to the iron works during the 19th century. By 1912 the site was occupied. The site was cleared prior to the construction of the Air Products works. This removed all structures above ground level (except for the furnaces on the south side) and the revetment walls around parts of the site boundaries) and it is likely that features such as rail and tram lines were taken up and scrapped along with any other machinery that formed part of the works.

There is a high probability that the area in front of the furnaces at the southern side held features relating to the production of iron, most likely a casting bed, a structure holding sand for the creation of channels and ingot moulds for tapping the furnaces and creating “pigs” of iron, ingots of c.1 cwt (56kg). It is also possible that after the invention of the Bessemer process for converting cast iron to steel the molten metal was run off into a ladle car and transferred to a converter without the intermediate pig iron stage.

The potential is therefore for the lower parts of any structures that existed on the site, such as the foundation walls of buildings, pits below machinery for catching waste and to enable machines to be fastened to massive stone structures using long “holding down” bolts and the ballast from rail lines and former roads through the site. There may also be bases for boilers for providing steam power for parts of the site.

Test pits for engineering tests revealed the site had a subsoil of yellow clay overlain by deposits of demolition rubble and industrial waste (Figures 14 and 15)

Figure 14 Engineer’s test pit with demolition debris and yellow clay subsoil. (photo D. Bailey).



The last use of the site as a car park and offices would have required the levelling of the surface and construction of foundations. It is unknown if levelling was by adding material to the site or scraping and grading rubble from the former works.

Figure 15 Engineer's test pit showing layers of material levelling up site in sections (Photo D. Bailey).



The area in front of the furnaces and within the housing site boundary was roughly cleaned off using an excavator to remove vegetation and soil build up allowing an examination of the surface below.

This revealed a surface of demolition debris and surviving kerbstones from the car park (Figures 16 and 17). It should also be noted that the developer's surveys indicate a height difference of c.3.5 metres between the level of the former car park and the base of the furnaces in the bank to the south (Bailey, pers.com.).

Figure 16 Area below furnaces

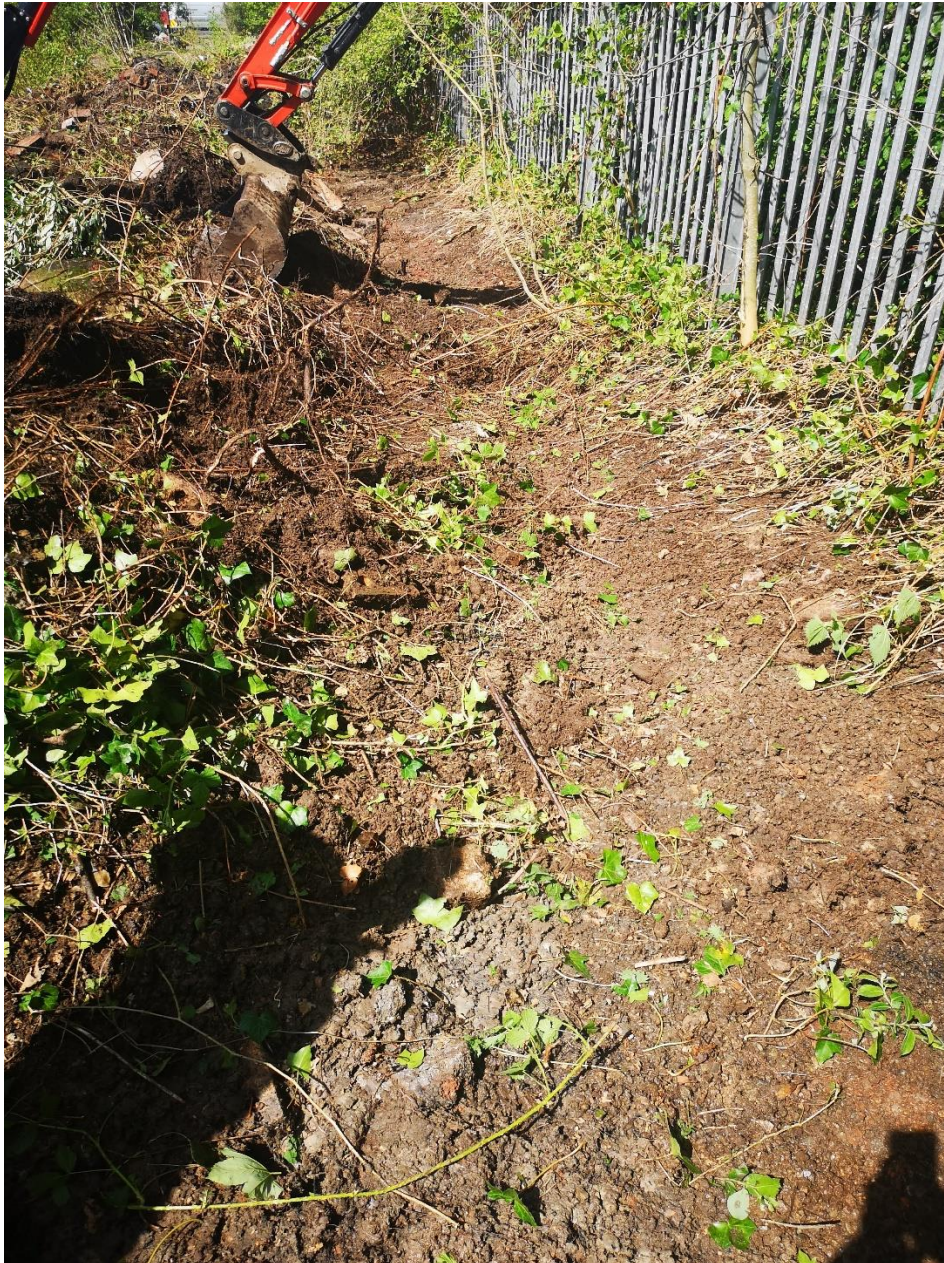


Figure 17 Area below furnaces with demolition debris and length of kerb from car parking area.



The area at the western end of the southern site, the subject of a separate application by a different developer, appears from historic maps to have been mostly used as a tip, probably for furnace waste and other industrial debris as the sides of the embankment beside the Llangollen Road had low revetment walls of large slag lumps and there are cobble and gravel sized pieces on the surface of the site. This material may have been graded and levelled to form the level platform to the west of this development site and possibly graded over the development site itself. The tarmac is likely to have been laid over a base of crushed stone or perhaps on top of levelled furnace waste.

On the southern edge of the site the bank of furnaces is of high significance as well preserved, although vulnerable, structures relating to the operations of the iron works and form a group with the remains of the banks of coke ovens to the south of Lancaster Terrace (beyond the southern site boundary). The kilns were constructed in at least two phases, the western block first. The furnaces were encased in masonry with arched access to the furnace arches at the front and a slight batter to the walls of the stone encasing the furnace shafts. The two phases can be identified by a straight joint between the different blocks of work and the eastern furnace structure overlies the batter of the western block. It is proposed that the structures be consolidated and conserved to aid their long-term survival as a monument to the industries that shaped the area (Figures 18 and 19).

Figure 18 Phase 2 furnace. Phase 1 on right, joint behind tree to right of furnace arch.



Figure 19 Furnace showing visible structural defects.



Conclusion

The site is considered to have high potential for holding some structural evidence of the iron works although clearance of the iron works infrastructure and machinery will have reduced this potential.

Any such remains however are likely to be of moderate to low significance because of site clearance and remodelling by grading and levelling of the site area for later development. Engineers test pits suggest the site is covered by a thin layer of demolition material and industrial debris over a yellow clay base.

The area in front of the furnaces seems to have been levelled down to create the platform for Air Products buildings, with a difference in levels of over 3 metres between the base of the furnace arches and the surface of the development site, which will have removed any traces of the casting floor for pig iron other than in the area immediately in front of the furnaces and beyond the area which will have houses built.

Shallow foundation design, which are proposed, will mitigate the potential impacts of housing development on the site. Further mitigation of the impacts of development will be provided by the proposal to raise the surface of the site by between 600 and 1000 mm using clean fill material, both to mask any risk of contact with contamination from the site's industrial past and to provide suitable falls for the drainage required by the proposed development which will fall from the south towards the Llangollen Road to meet mains services there (Bailey pers.com.).

The block of furnaces needs to be assessed by an appropriately qualified structural engineer with experience of historical industrial structures and a repair schedule and conservation plan for longer term management should be drawn up. This should include an archaeological record of the structures and, if advised, a programme of archaeological works during conservation work.

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