

A1 Birtley to Coal House

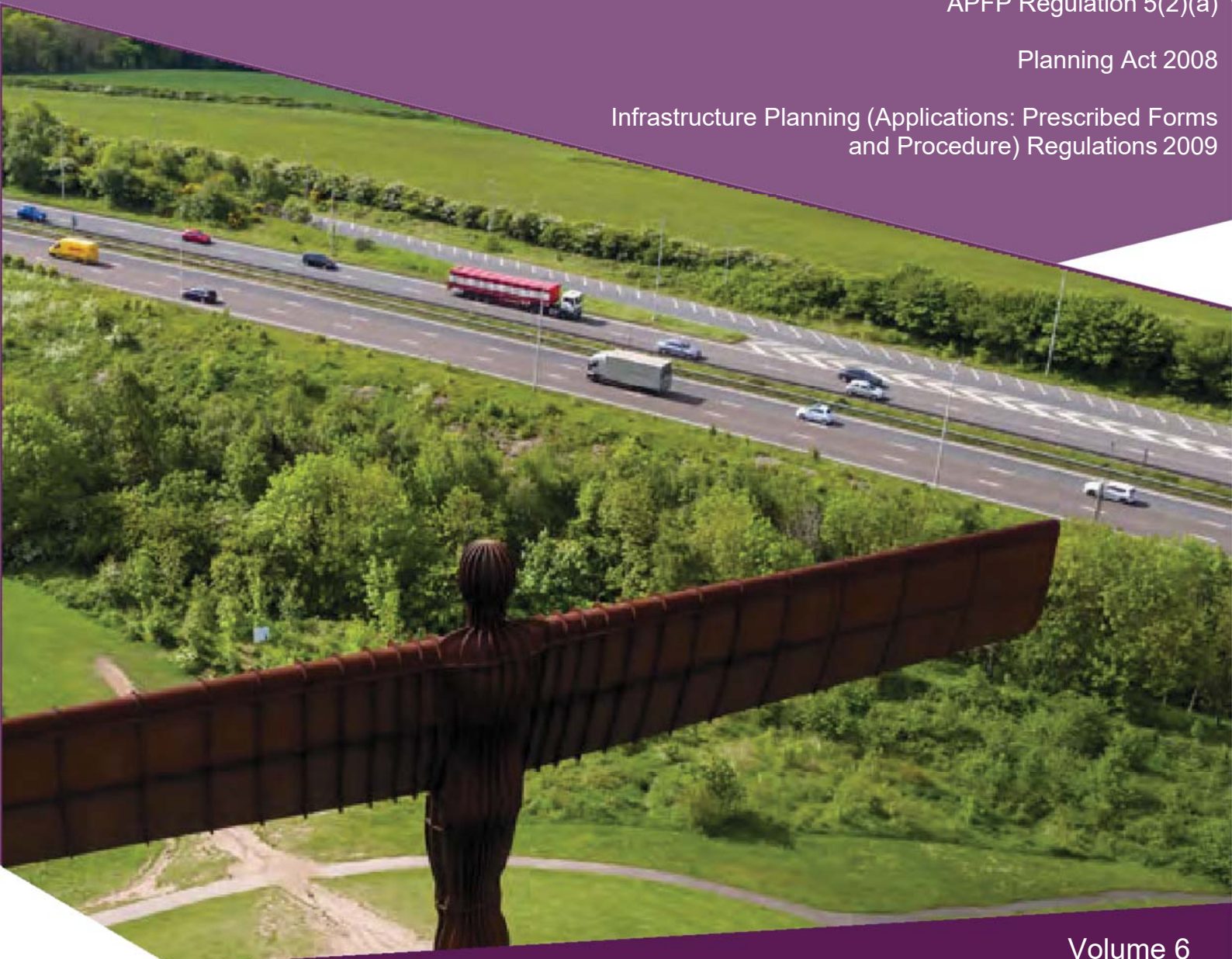
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6.3 Environmental Statement – Appendix 6.3 Bowes Railway Retaining Wall Survey Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedures) Regulations 2009**

**A1 Birtley to Coal House
Development Consent Order 20[xx]**

**Environmental Statement -
Appendix**

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University of
Salford
MANCHESTER

Historic Building Investigation

Bowes Railway
Retaining Wall,
Birtley,
Tyne and Wear

Client:
WSP UK Ltd

Technical Report:
Chris Wild

Report No:
SA/2018/46



Site Location: The site is located at the northern end of the Long Bank underpass on the north side of the A1 near Birtley, Tyne and Wear

NGR: Centred at NGR 427190 557335

Internal Ref: SA/2018/46

Prepared for: WSP UK Ltd

Document Title: Bowes Railway Retaining Wall, Birtley, Tyne and Wear

Document Type: Historic Building Investigation and Walk-Over Survey Report

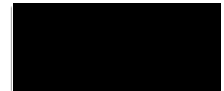
Version: Version 1.1

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Date: August 2018

Signed:

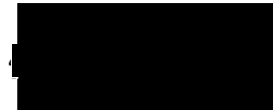


Approved By: Ian Miller

Position: Assistant Director

Date: August 2018

Signed:



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Summary

Highways England has proposed to carry out a scheme of improvements to the A1 between Birtley and Coal House, near Washington in Tyne and Wear. One element of the proposed scheme necessitates the widening of a bridge known as the Long Bank Underpass near Birtley (centred on NGR 427190 557335), which presently carries the A1 over the course of the Bowes Railway, a Scheduled Monument (No 1003723).

The replacement of the Long Bank Underpass will necessitate the removal of a 17m-long section of a mid-19th-century masonry retaining wall associated with the Scheduled Monument, and will also remove any associated above-ground structures that may be hidden by vegetation along the railway cutting. Following consultation with Historic England, it was recommended that the section of the retaining wall that is to be demolished needed to be subject to an archaeological survey, commensurate with a Level 3 historic building investigation, together with a walk-over and photographic survey of a 40m section of retaining wall north of the underpass on both sides of the cutting. In accordance with the advice provided by Historic England, WSP UK Ltd, acting on behalf of Highways England, commissioned Salford Archaeology to undertake the required building investigation and walk-over survey. This was carried out in July 2018.

The area of retaining wall that will be removed by the proposed road-widening scheme comprises a low wall that has been repointed in parts, and is decaying in others. Whilst the incline itself formed part of a heritage asset of nationally importance, reflected in its Scheduled Monument designation, the retaining wall itself is a poor example of a common feature of the period, with stone retaining walls being used almost ubiquitously within domestic and industrial settings within the north of England; the retaining wall does not embody any features that are indicative of railway-related architecture.

A detailed measured survey of the above-ground elements of the retaining wall has been compiled, and a descriptive and photographic record has also been undertaken, commensurate with an Historic England Level 3-type survey. The foundations of the wall, however, were not visible at the time of the survey, and thus the full height of the wall could not be established. No associated features were identified during the survey.

The detailed record is an appropriate means of offsetting the harm of development on the above-ground elements of the retaining wall, which do not merit any further archaeological investigation in advance of demolition, although any below-ground elements could be added to the existing record, should these be exposed during the proposed works. In addition, given the significance of the incline, and of the Bowes Railway, the proposed road-widening scheme offers a valuable opportunity to enhance the heritage asset in this location. This could be achieved, for instance, by installing a permanent information panel to celebrate and explain the heritage interest in the Bowes Railway, and also signpost visitors to the Bowes Railway Museum.

1. Introduction

1.1 Circumstances of Project

Highways England has proposed to carry out a scheme of improvements to the A1 between Birtley and Coal House, near Washington in Tyne and Wear. The improvement scheme aims to increase capacity along this section of the A1, which will be widened to provide a three-lane carriageway; additional lanes will be provided between junctions to help manage traffic joining and leaving the A1. It is proposed that modifications will be made to the existing structures at junction 65 (Birtley), junction 66 (Eighton Lodge), and junction 67 (Coal House) to accommodate the additional lanes. In order to deliver the scheme, a bridge at junction 65 that presently carries the A1 over the course of the Bowes Railway, a Scheduled Monument (No 1003723), will need to be widened. This will require the replacement of Long Bank Underpass with an elongated structure of similar design. Construction of the replacement underpass will necessitate the removal of a section of masonry retaining wall associated with the Scheduled Monument, and will disturb any associated above-ground structures that may be hidden by vegetation along the railway cutting.

Following consultation with Historic England, it was recommended that a programme of archaeological investigation will be required in advance of any construction work. The investigation was intended to enable an appropriate strategy to be formulated that will offset any harm to the Scheduled Monument, and comprised a walk-over survey along the 17m-long section of the Bowes Railway that is susceptible to impact by the works for the road improvement scheme, coupled with the production of scaled drawings and a photographic record of the retaining wall. In addition, a photographic record of a 40m section of retaining wall north of the underpass on both sides of the cutting was to be compiled to establish whether a dilapidated section of wall can be repaired as part of an enhancement mitigation strategy.

In accordance with the advice provided by Historic England, WSP UK Ltd, acting on behalf of Highways England, commissioned Salford Archaeology to undertake the required building investigation and walk-over survey.

1.2 Aims and Objectives

The principal aim of the project was to provide a detailed drawn, photographic and textual record, as appropriate, of the section of the masonry retaining wall associated with the Scheduled Monument that is proposed for demolition as part of the proposed road improvement works. It was anticipated that the results obtained from the investigation would enable a decision to be reached as to whether any further archaeological investigation is merited in advance of development.

The principal objectives of the archaeological investigation, as stated in the Written Scheme of Investigation produced by Salford Archaeology prior to the commencement of the fieldwork, were:

- to undertake a walk-over survey of the section of retaining wall that is to be demolished to identify, map and produce a photographic record of any features / structures associated with the railway;
- to produce a scaled measured survey drawing that shows the elevation and plan of the section of retaining wall proposed for demolition;
- to produce a photographic record of a 40m section of retaining wall north of the underpass on both sides of the cutting to establish whether a dilapidated section of wall can be repaired as part of an enhancement mitigation strategy;
- to provide sufficient information to enable an informed decision to be made about the need for any additional archaeological mitigation.

The project also aimed to inform relevant research themes stated in the current North East Regional Research Framework, including:

- *Research Theme PM2*: ‘The North-East was a world leader in the development of early railways. This needs to be recognised in on-going research. Three avenues have been defined. First, investigation should focus on the earliest wagon-ways and pre-locomotive hauled lines, as well as activity at the terminals of early railways, specifically the development of coal staithes. Second, existing landscape features along the course of known early wagon-ways require survey, including railway formations, track-beds and gradients’ (Petts with Gerrard 2006, 180).
- *Strategic*: ‘There is a requirement for the survey of the surviving wagon-way and pre-1850 locomotive-hauled railway infrastructure. Where necessary, appropriate protection should be put in place’ (*op cit*, 184).

1.3 The Setting

The study area is located at the northern end of the Long Bank underpass on the north side of the A1 near Birtley, Tyne and Wear (centred on NGR 427190 557335). The A1 forms the dominant landscape feature in the immediate locale, with urban settlement to the south and agricultural fields to the north (Plate 1).



Plate 1: Recent aerial view across the A1 at Birtley, showing the study area

2. Methodology

2.1 *Walk-Over Survey*

The initial element of the fieldwork comprised a walk-over survey along the 17 metres section of the Bowes Railway on the north side of the Long Bank Underpass that is likely to be impacted by the new underpass structure. The walk-over survey was intended to identify, map and produce a photographic record of any features / structures associated with the historic railway that may not have been recorded previously.

2.2 *Measured Survey*

The second element of the fieldwork comprised the production of measured survey drawings that captured the elevation and plan of the section of retaining wall proposed for demolition. The methodology employed was commensurate with an Historic England Level 3-type survey, and comprised a systematic account of the retaining wall's origins, development and use. The record includes all drawn and photographic records that may be required to illustrate the wall's appearance and structure, as per Historic England guidance (Historic England 2016, 26). The baseline survey data was captured in the field using a laser scanner.

2.3 *Photographic Record*

A comprehensive inspection and photographic record has been compiled of a 40m section of retaining wall north of the underpass on both sides of the cutting. This was intended to provide adequate data to inform a decision as to whether a dilapidated section of wall can be repaired as part of an enhancement mitigation strategy.

The photographic record utilised a high-resolution digital camera. All frames, excluding general contextual views, incorporated a graduated metric scale, and a plan showing the view point directions has been produced.

3. *Historical Background*

3.1 *Contextual Background to the Bowes Railway*

The Bowes Railway was intended as a colliery railway built to transport coal mainly from pits in north-west Durham to the River Tyne at Jarrow. The railway was first proposed by a group of local coal-owning families to connect their new Springwell colliery and the older Mount Moor colliery with their Jarrow staiths. An 11.5 mile railway was proposed by John Buddle originally, which included six rope-worked inclines. However, the project was passed to the Pontop & Jarrow Company and George Stephenson was commissioned to design the railway from Mount Moor Pit to Jarrow via Springwell, using three incline planes and a locomotive-worked section.

The earliest section opened on 17th January 1826, making it one of the world's first modern railways. Initially, it employed inclines and horses until the new steam locomotives were delivered in April 1826. The railway was extended to Kibblesworth in 1842 (including the present study area), Marley Hill in 1853, and reached its full extent of 15 miles by reaching Dipton in 1855. The six-mile middle section of the line continued to utilise six inclines (two gravity worked and four powered) with very steep gradients, with locomotives working sections at either end of the railway.

At its peak, the Bowes Railway handled over 1 million tons of coal per year, and remained virtually intact until 1968. Between 1968 and 1974, most of the line was closed until only the last 3.5 miles between Monkton and Jarrow staithes were operated by the National Coal Board. However, the original 1826 section between the Black Fell bank head and Springwell Bank Head was acquired for preservation in 1976 by Tyne and Wear County Council. This comprises Blackham's Hill West and East inclines, which are operated by a stationary haulage engine. It is the only working preserved standard gauge rope-hauled railway in the world. In 1977, the Railway's Engineering and Wagon Shops at Springwell were added to the scheme, providing the facilities needed for maintenance.

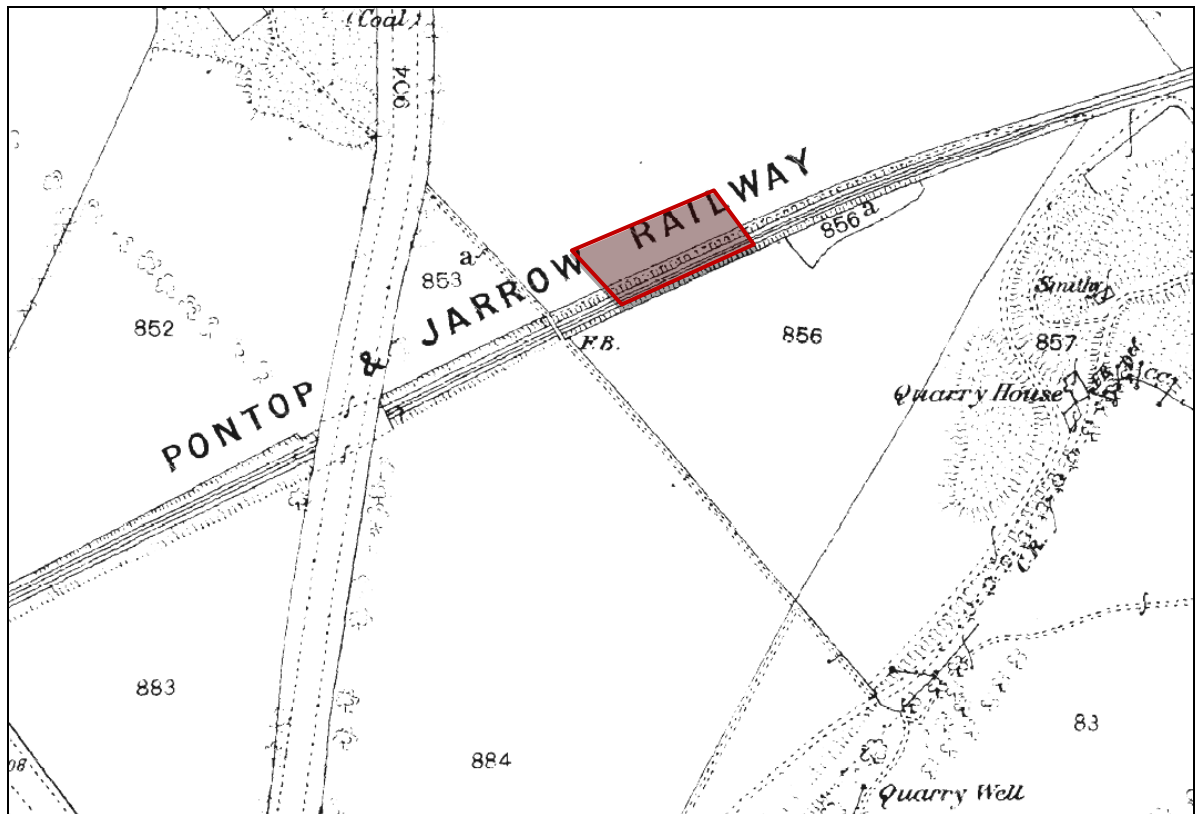


Plate 2: Extract from the Ordnance Survey map of 1859, showing the study area

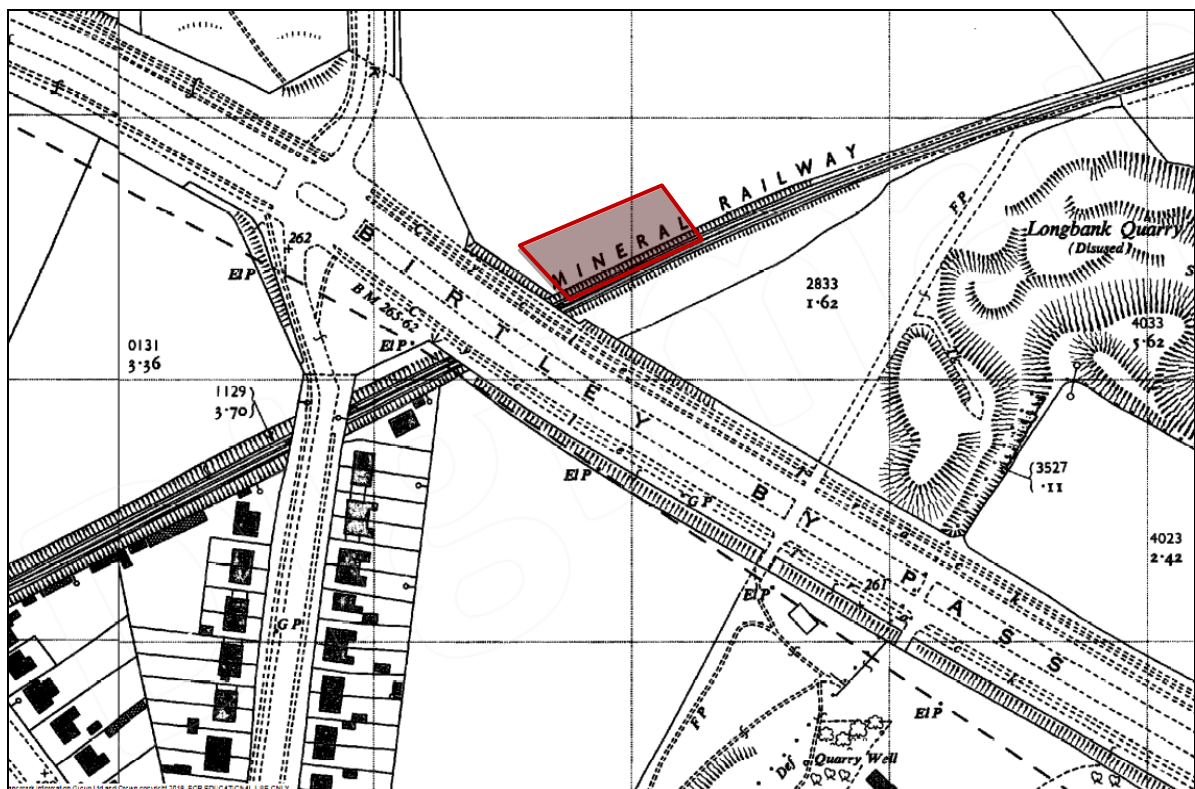


Plate 3: Extract from the Ordnance Survey map of 1960, showing the study area

4. Results of the Survey

4.1 Introduction

A programme of historic building investigation and walk-over survey was carried out as an initial assessment of the surviving elements of the northern retaining wall of the Bowes Railway incline at Birtley, Tyne and Wear. This section of retaining wall lies immediately to the east of where the course of the railway is crossed by the A1. The retaining wall is considered to be a designated heritage asset as it forms part of the Bowes Railway, which is afforded statutory protection as Scheduled Monument (No 1003723), reflecting its national, if not international, importance.

The site comprised an approximately 40m length of the northern retaining wall of an incline on the Bowes Railway (Figs 1 and 2). It typically survived to a height of only 0.65m above ground level, which forms a grass verge to a gravel cycle path/bridleway that replaced the original railway track at an unknown comparative level (Plates 4 and 5). An area of approximately 17m length had been cleared of vegetation overgrowth, denoting the area of the retaining wall that would be impacted by the proposed widening of the A1, and to enable the recording, which was undertaken to Historic England Level 3 standard. This involved the production of a plan, where the top of the wall was visible beneath the overlying material on the bank, and elevation of the area of the retaining wall that would be affected by a proposed widening of the A1 (Figs 2 - 4), accompanied by a photographic and descriptive record of the form, phasing, and condition of the structure.



Plate 4: General view of the northern retaining wall, looking north-east



Plate 5: General view of the cleared element of the northern retaining wall, looking north-west

4.2 Retaining Wall of the Bowes Railway Incline

The wall was of three courses of roughly squared sandstone rubble, laid in roughly horizontal courses (Plate 6), rather than at the angle of the 5% (1 in 20) incline, as recorded during the survey. The wall was capped with triangular coping stones, many of which were earth-fast within the retained bank to the north (Plates 6 and 7). The majority of these coping stones comprised a right-angled profile, with the vertical edge set against the earth bank, measuring 12" (0.30m) in height, and also along its base (Plate 7), with each stone being between 6" and 8" (0.15-0.18m) wide.

Two misplaced copings, lying within rubble at the western end of the extant wall, were of equilateral profile, with an 18" (0.46m) depth, and having a small hole in each face for a dowel to attach the adjacent stone (Plate 7), possibly suggesting that the wall was free-standing and wider in this position. Elsewhere it appears to have comprised loose random rubble behind the facing stones (Plate 8), which had been re-pointed in places with a cementitious mortar (Plate 9), although the original construction was probably drystone. Within the area of walling to be retained, a large section of the wall face had been repointed in struck cement mortar (Plate 10), and whilst this probably prevented initial rapid deterioration, it may cause longer term damage.



Plate 6: Detail of retaining wall construction



Plate 7: Detail of the two types of coping stones



Plate 8: Exposed rubble wall core



Plate 9: Section of wall that had been partially pointed with cement mortar



Plate 10: Struck cement pointing within section of wall to be retained



Plate 11: Wall continuation beyond area effected by proposed road scheme, looking north-west

Vegetation was cleared from the face of the wall for a length of *c* 17m, where it will be compromised by the proposed works associated with the widening of the A1 road. However, the retaining wall continued for approximately 22m to the east, reducing in height above ground level up the incline (Plate 11). Despite being partly obscured by vegetation, it appeared to have a defined eastern terminus stone (Plate 12), beyond which the northern side of the cutting was formed by a shallow earth bank. No others features, fixtures or fittings associated with the railway were identified during the walk-over survey.



Plate 12: Apparent eastern terminus of retaining wall



Plate 13: Southern earth embankment of incline, looking south-west

The southern bank appears to have been remodelled during the creation of the cycle path/bridleway. However, it probably retains element of the approximately 2.5m high earth bank (Plate 13). No features relating to the operation of the incline survive within the remodelled trackway within the incline.

5. Discussion

5.1 *The Bowes Railway Incline*

The Bowes Railway represented an early application of locomotive power as an effective means of transport. As with almost all of the early nineteenth-century railways, it was built to transport coal, in this instance from the North Durham coalfields to the major industrial port at Jarrow, on the River Tyne. Although originally proposed by several coal-mining families, the final design was undertaken by the most-celebrated pioneer of the early railway infrastructure, George Stephenson. His design, modifying the original route of John Buddle, included several incline planes within the 11½ mile (18.5km) line. Such features were typical of the earliest railways, allowing them to scale gradients steeper than could be climbed by the steam engines available at that time. Indeed, many inclines were steeper than the capabilities of even the final generation of colliery locomotives, with the six-mile middle section of the line continuing to utilise six inclines (two gravity-worked and four powered) with very steep gradients, until the closure of the railway in the early 1970s.

The first section of the railway opened in January 1826, although horses were used until the locomotives were delivered in April of the same year. This was only a year after the completion of the Stockton and Darlington Line, also built to take coal from the Durham coalfields, but from the southern area to the port of Stockton-upon-Tees. By this date, George Stephenson was also working on the design of the route for the ambitious Liverpool and Manchester Railway, which finally came to fruition in September 1830. However, Stephenson had built his first locomotive in 1814, and his first railway track at Hetton Colliery, County Durham, in 1819.

The incline at Birtley, however, was not opened until 1842, by which time railways were becoming a common feature across the country. The line remained open as a coal line, handling over 1 million tons per annum at its peak, finally closing following the reduction in colliery production in the early 1970s.

The incline was remodelled immediately to the west of the study area whilst the railway was still in operation in the late 1930s, with the construction of the Birtley Bypass, opened immediately prior to World War II, and representing one of the earliest elements of the creation of the A1 trunk road through County Durham (Chartered Institution of Highways and Transport (CIHT) 2012a). The road was again remodelled in the early 1970s, becoming the only three-lane section of motorway north of the M1 (CIHT 2012b). It is unclear how much of the retaining wall of the incline was removed by these alterations, although a small stub of what appears to be original stone walling survives at the base of the corrugated concrete walling.

6. Conclusion

6.1 Conclusion

The area of walling that will be affected by the proposed widening of the A1 comprises only a low wall that has been repointed in parts, and is decaying in others. It dates to 1842, based on documentary evidence, and comprises what was originally probably a dry-stone wall of standard construction. Other than modern repointing, no evidence for any phasing in the development of the retaining wall was noted during the survey, suggesting that it was erected as a single phase of construction.

In broad terms, the retaining wall survives in reasonably good condition, particularly those sections either side of that part of the wall that will be demolished as part of the highway improvement works, although there is some scope for consolidation, which may include replacement of the unsympathetic struck cement pointing that does not complement the historic character of the wall.

Whilst the incline itself formed part of a nationally-significant railway line, hence its Scheduled Monument designation, the retaining wall itself is a poor example of a very common feature of the period, with stone retaining walls being used almost ubiquitously within domestic and industrial settings within the north of England. There is nothing in the appearance or fabric of the wall that can differentiate the structure from other dry-stone walls of the period.

A detailed measured survey of the above-ground elements of the retaining wall has been compiled (Figs 2 and 3), and a descriptive and photographic record has also been undertaken, commensurate with an Historic England Level 3-type survey. The resultant record is considered an appropriate means of offsetting the harm of development on the above-ground remains of the heritage asset, and it is not considered that any further archaeological investigation in advance of demolition is merited. However, the foundations of the wall were not visible at the time of the survey, and these could be added to the archaeological record, should they be disturbed by the implementation of the proposed construction works. Similarly, it is unknown whether any physical evidence for the Bowes Railway survives beneath the modern cycle track.

Given the significance of the incline, and of the Bowes Railway, it may be appropriate to install an information panel on the cycle path to highlight the heritage interest in the Birtley incline, and possibly the Birtley Bypass, and also increase awareness of the Bowes Railway Museum, which retains a working section of one of the original inclines from the 1826 section of the line.

6. Archive

6.1 Archive

The results of the archaeological investigation form the basis of a full archive that has been prepared to professional standards, in accordance with current Historic England guidelines, the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990), and current CIfA standards and guidance for the creation, compilation, transportation and deposition of archaeological archive. The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the CIfA in that organisation's code of conduct.

The project archive is entirely in digital format. It would thus be appropriate to deposit a copy of the archive generated from the archaeological investigation with the Archaeological Data Service (ADS), through ADS-Easy. In addition, copies of the report will be forwarded to the Tyne and Wear Historic Environment Record, and to the Inspector of Ancient Monuments (North East) for Historic England. A copy of the report will also be forwarded to the Bowes Museum.

Sources

Maps

Ordnance Survey 25": 1 mile map of 1859

Ordnance Survey 1:2500 map of 1960

Secondary Sources

Chartered Institution of Highways and Transport, 2012a *Motorway and Trunk Road Development in the North East*. www.ciht.org.uk/download.cfm/docid/02F7FEE5-1802-4986-A1341038B5F36729

Chartered Institution of Highways and Transport, 2012b *The A1 Trunk Road* www.ciht.org.uk/download.cfm/docid/the_a1_trunk_road.pdf

Petts, D. with Gerrard, C. 2006 *Shared Visions: The North-East Regional Research Framework for the Historic Environment*, Durham County Council

Acknowledgements

Salford Archaeology would like to thank Elizabeth Murray of WSP UK Ltd for commissioning and facilitating the archaeological survey on behalf of Highways England, and Lee McFarlane, Inspector of Ancient Monuments (North East) for Historic England, for her advice.

The historic building investigation was undertaken by Chris Wild, and the illustrations were produced by Richard Ker. The report was edited by Ian Miller, who was also responsible for project management.

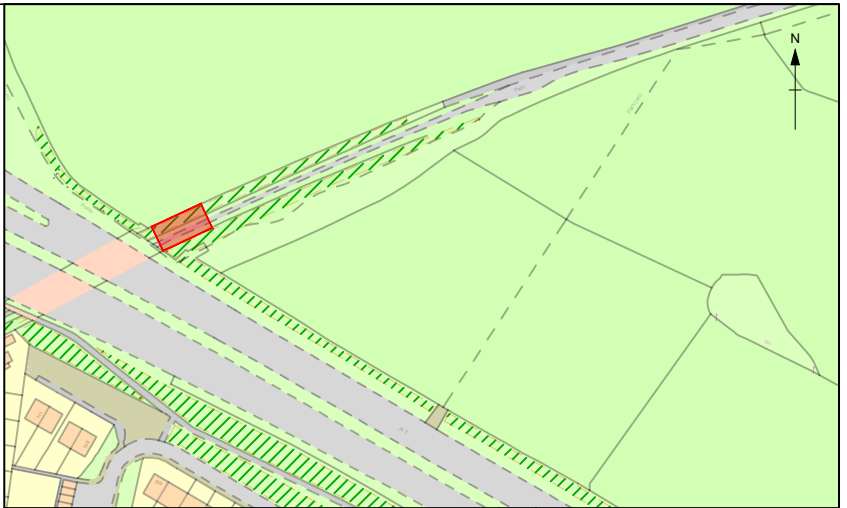
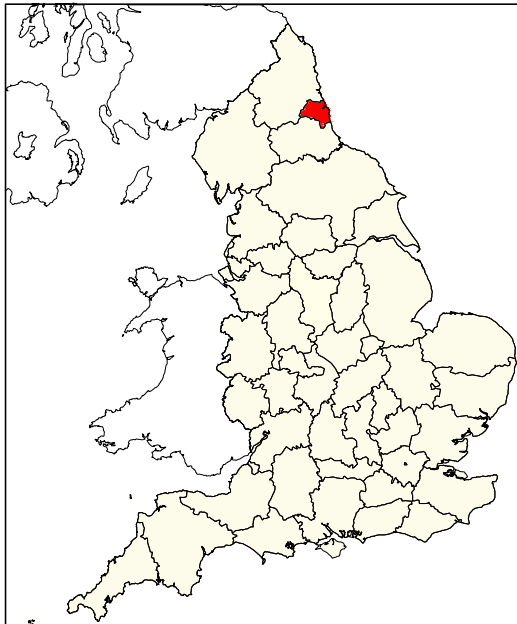
Appendix 1: Illustrations

Figure 1: Site location

Figure 2: South-east-facing elevation of the retaining wall

Figure 3: Rectified photographs of the south-east-facing elevation of the retaining wall

Figure 4: Photo location plan

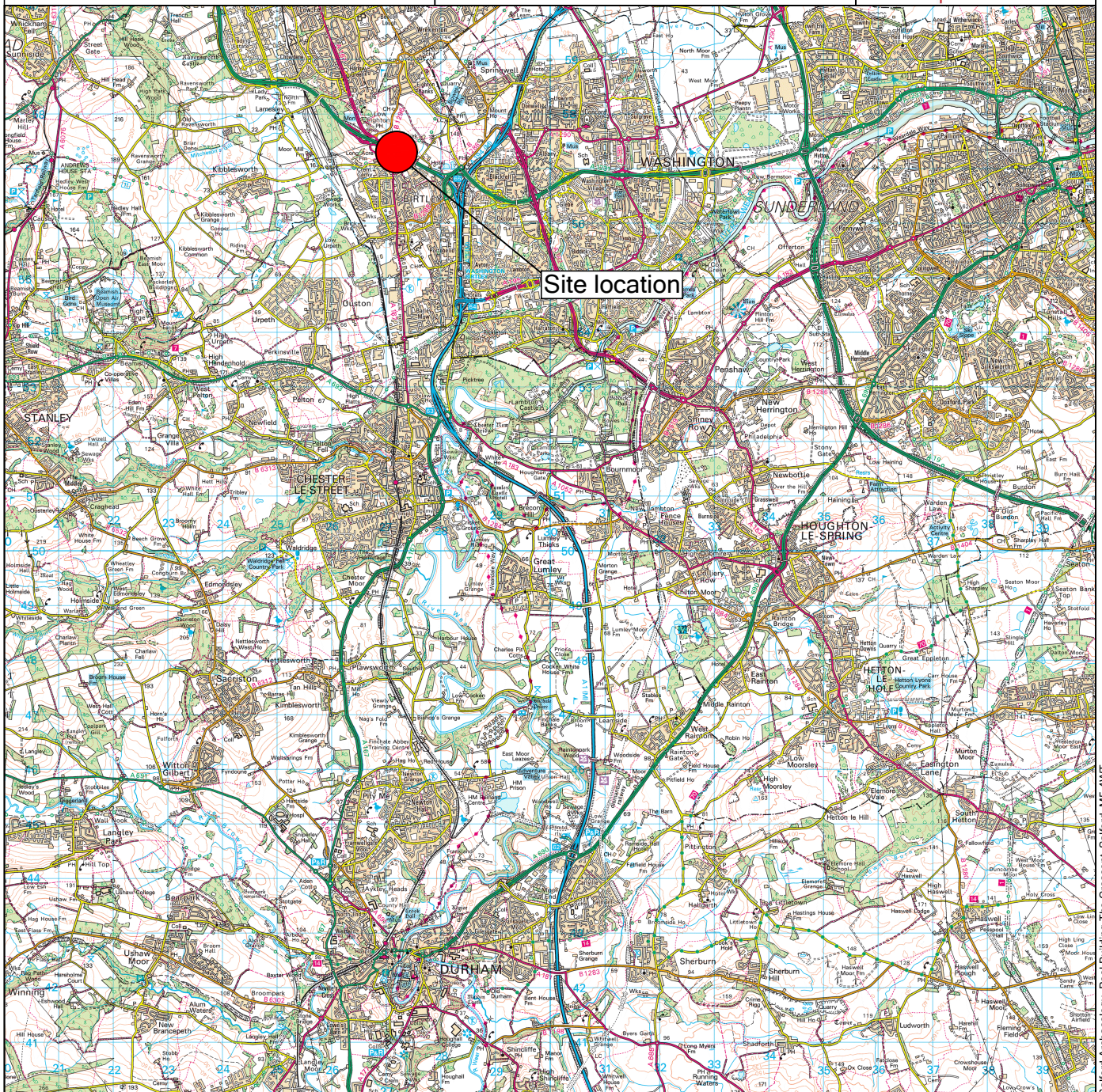


Bowes Railway Retaining Wall, Birtley, Tyne and Wear

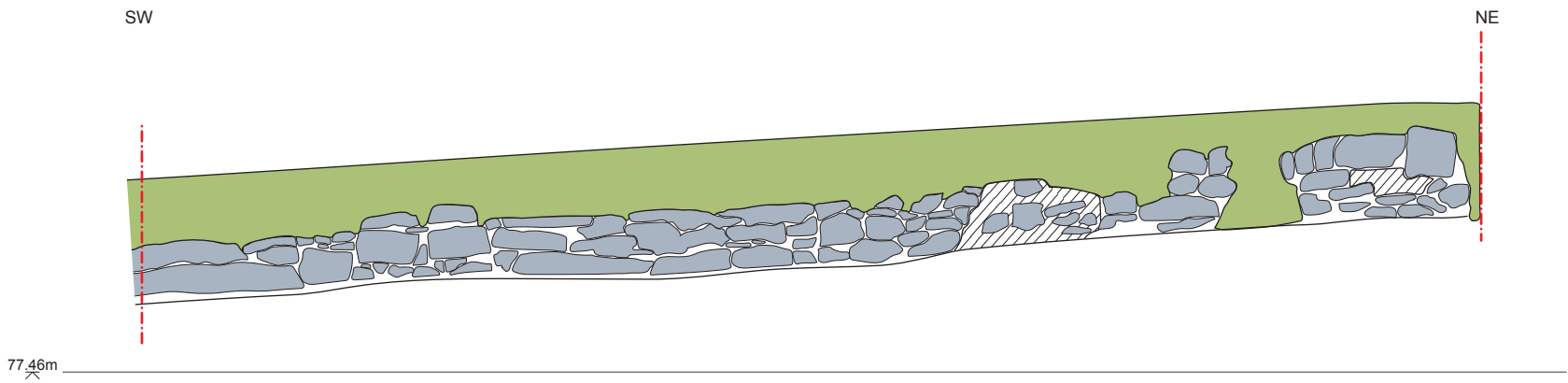
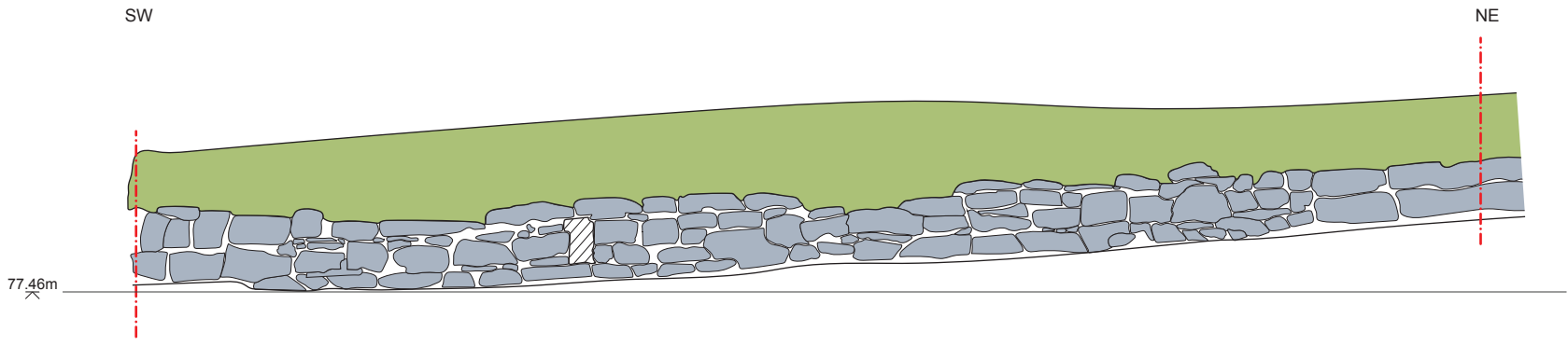
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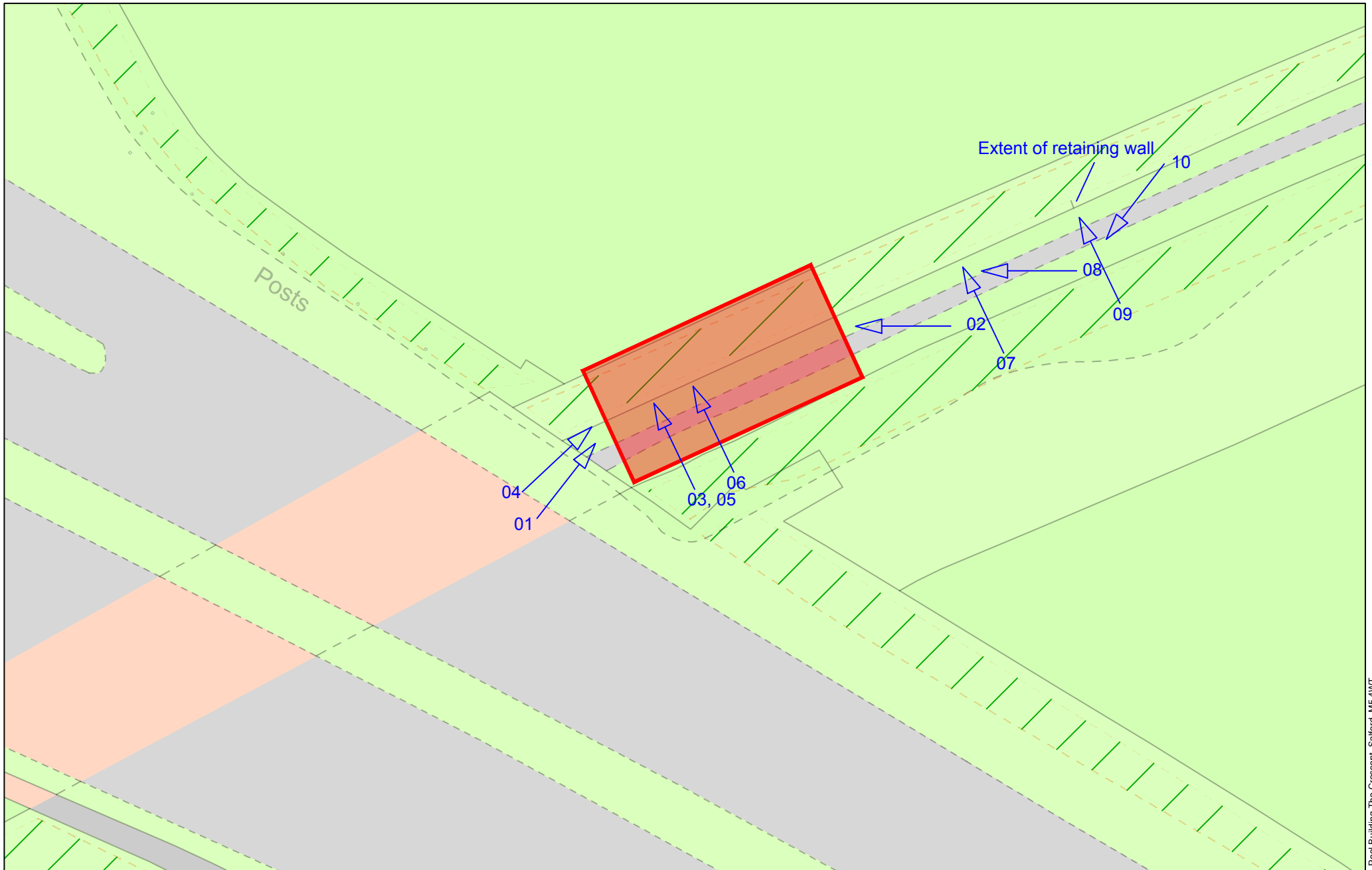
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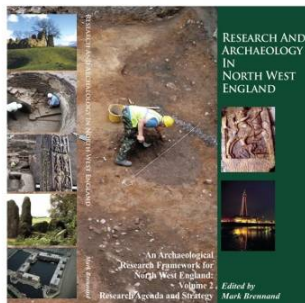
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CONSULTANCY



DESK BASED ASSESMENTS



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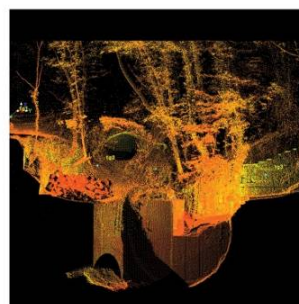
EXCAVATION



BUILDING SURVEY



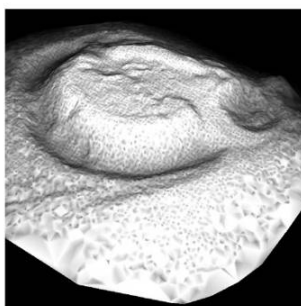
3D LASER SCANNING



COMMUNITY INVOLVEMENT



LANDSCAPE SURVEYS



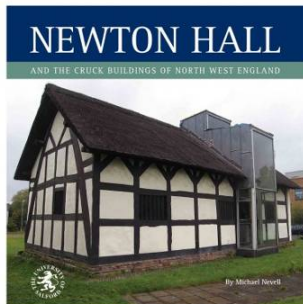
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