



STATEMENT OF SIGNIFICANCE FOR THE BRUSSELTON INCLINE AND ACCOMMODATION BRIDGE

**For Blackett Ord
Conservation**

November 2015



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Summary

The accommodation bridge,¹ incline and access road at Brusselton, 1.5km west of Shildon in County Durham are owned by Durham County Council and the Asset Management team are currently in the process of assigning formal responsibility for the accommodation bridge to the Bridges Section. However, the structures need to be brought into a good state of repair before responsibility is passed on. This Statement of Significance is designed to help inform that process of repair and concentrates on the surviving bridge/accommodation arch, the remains of the former road bridge, a short length of incline and a potential future parking area. Other related heritage assets are mentioned where relevant.

The railway incline and bridge form part of the former Stockton and Darlington Railway (NGR 21150 25598). A public right of way crosses the site following the former railway line. The Brusselton Conservation Area encompasses the bridge and incline and extends to the former engine house and cottages to the east. The accommodation bridge and incline are designated scheduled monuments and the accommodation bridge is also a grade II listed building. Originally there was a second bridge crossing Brusselton Lane, which carried the railway line, however, this has now been removed, although some archaeological evidence remains.

A group of volunteers, the Brusselton Incline Group, principally formed by engineering professionals in 2013, has been established locally with an aspiration to repair the bridge and carry out works to improve the incline and surrounding area. In 2014, the group tidied up the incline and exposed the historic stone sleepers on a bed of new ash ballast. The group have also expressed the desire to install formal car parking adjacent to the incline, install low fencing around the eastern edge of the incline to prevent informal car parking in this area, install a replica chaldron wagon and interpretation panels to the eastern side of the incline and replace existing barriers on the incline either side of Brusselton Lane.

The status of the incline as a listed building and scheduled monument means that it is nationally important. Its early date means that the structures as a whole are part of the internationally important pioneering phase of railway development.

There are nineteen designated assets in England² that are related to inclines which is a relatively low number and includes assets associated with inclines such as bridges, canals and railways. This suggests that Brusselton, and by implication Etherley, are relatively rare designated assets, however it is also clear that inclines are not adequately recorded on the National Heritage List and so many other inclines may well be designated. Their association with the Stockton & Darlington Railway adds to their national importance.

Brusselton is strongly associated with the evolution of the incline plane and the use of stationary engines adequate for the job of pulling large numbers of heavy wagons over much longer areas than had previously been used in mining operations. Because of the challenging terrain, they were the focus of technological achievements resulting from an arduous process of trial and error that concentrated on the locomotive power and the

¹ A bridge connecting two areas of land which were under common ownership but separated when the railway was built.

² <http://historicengland.org.uk/listing> [accessed 10.11.15]

stability of the wagons. They consequently made a major contribution to the knowledge of how to construct an efficient railway system that would be adopted across the world. The combination of several different railway structures at Brusselton covering the first dynamic twenty years of rail travel adds to that importance.

However the current extent of the scheduled monument does not reflect the importance of the incline. It stops considerably short of the visible incline and does not include the reservoir that fed the engines or the track east of Brusselton, or the Milk Bridge. Indeed the reservoir and Milk Bridge, despite being nationally important, are not even recorded on the Historic Environment Record (HER). The scheduling should therefore be revisited and the data added to the HER. The Conservation Area covers a larger area than this report, but does not have the benefit of a conservation area appraisal. This should be rectified so that the significance of the conservation area is better understood and can be protected where the scheduling and listing does not offer any protection.

The incline is also of historic interest because it is supported by a wealth of archives, some of which (in London) have only been skimmed for this report. In addition to the archives in the Public Records Office, The Durham County Records Office, the Ken Hoole Collection and the National Railway Museum, there are historic photographs from the late 19th century which capture its decline and disuse, various newspaper articles and private archives. Brusselton is also strongly associated with George and Robert Stephenson, Timothy and Jane Hackworth and other named enginemen and incline staff. Hackworth was an engineman at Brusselton; first moving to a newly built house with his wife Jane in 1825. He improved the engine design by George Stephenson and was responsible for the new engine house being built (HACK 1/1/4). The lessons that Stephenson and Hackworth learned here helped them to persuade the Liverpool and Manchester Railway, with some difficulty, to adopt the moveable locomotion engine, rather than be strangled by the ropes of a stationary engine.³

The railway heritage is under threat despite the forthcoming 200th anniversary of the opening of the S&DR line. Celebrations to commemorate this event in 1875, 1925 and 1975 do not seem to have been enough to protect the line from ill-informed damage, development and vandalism. The structures at Brusselton are therefore increasingly important as much for their rarity as the information they contain about a technological achievement that changed the face of the world.

The former road bridge, demolished despite a public outcry, exists largely as an archaeological site and therefore its special interest is archaeological rather than architectural. Given that photographs do exist of the bridge, combined with its measurements, we do know what form the bridge took however the poor condition of the adjacent retaining walls suggests that these may need to be consolidated. Further, the concrete render over the west scar where the bridge met the embankment may be damaging to any stonework beneath the surface and adjacent to it. There may therefore be a case to remove the concrete render and expose the scarring from the bridge while work is carried out to the retaining walls. This should be recorded archaeologically. The fact that the bridge was struck by large vehicles on more than one occasion and road widening was being discussed from at least 1928, suggests that rebuilding the bridge is not feasible at its original

³ NRM HACK 1/1/122

size. If it cannot be rebuilt to match the scale of the former bridge, it is questionable whether any future replacement bridge would need to reflect the design of the original at all. There are no heritage constraints why a new bridge could not be built here to accommodate users of a future rail trail, although some archaeological recording might be required depending on the design.

Additional research could try to determine why this bridge was of a more crude design than the adjacent accommodation arch and why distinctly different cuts of stone were used on the east side than the west.

The adjacent accommodation arch is however largely intact and as such is it an exceptionally rare survival on an early railway line and so its national, possibly international importance is assured. However, the bridge requires repair as a matter of urgency because of the persistent and damaging vandalism. Cement appears to have been used in repairs dating to the 1960s and may need removing, although in most places, it does not yet seem to be damaging the stonework. The vandalised wing walls appear to be fixed with a lime mix and so they have not yet been through a process of repair. The Brusselton Incline Group has been donated stone which has been inspected and approved for use by the conservation officer from Durham County Council and the inspector from Historic England.⁴

Specifications for the construction of the railway cuttings and embankments suggest that contractors were asked to put ballast on the surface and so it would be appropriate to resurface the bridge in ballast. The specifications did not state what the ballast should be made of, but quarry waste from Brusselton quarry or waste from coal mines seems most likely and some limited disturbance in 2014 uncovered layers of limestone and coal ash near the cottages. The sleepers that have been used as steps could remain as steps, or be extracted, replaced and the sleepers restored to the bridge deck. However if vandalism continues to be a problem, they may be better left where they are. If the cycle of vandalism is not to be repeated, consideration needs to be given to avoiding future harm. This is difficult because apart from West Thickly Farm (currently up for sale), there are no houses which overlook the site. If the bridge forms part of a well used national trail, then it may be better protected because it will be in the public eye more often. Alerting the local police to the site and its legal status and encouraging night time drive bys may also help to protect the site. A briefing note for the local police on the legal status of the S&DR generally may be of benefit, but will regularly need to be updated to allow for staff changes in the local police force.

The public footpath is broken by Brusselton Lane and safety fencing is located at the end of the incline to prevent walkers falling on to the road below. The fencing with the footpath stile adjacent to the bridge may also require repair or replacement. When considering new fencing, choices should be influenced by materials which cause the least visual intrusion, so that the eye can still be drawn along the line without interruption. Materials such as wire for the horizontal elements and wooden posts or black estate posts for the verticals might be a combination of practicality, visual unobtrusiveness and robustness.

There are currently in the region of 306 stone sleepers exposed⁵ on the site and it is clear that they continue under the tarmac at Brusselton Cottages. The sleepers east of the

⁴ Trevor Horner, Brusselton Incline Group pers comm.

⁵ Northern Echo 22.11.2014

cottages are not in their original positions and some are upside down; they may have been placed here in 1975 as part of the railway celebrations. Some thought also needs to be given to how the stone sleepers can be protected from theft. Applying fixings or setting them into a lime mixture may be damaging and would require lifting, resetting and be potentially expensive and ineffective. There is no easy answer, but as the importance of the S&DR railway increases in public knowledge, the monetary value of the sleepers will only increase. If future work is proposed to the decking of the bridge, some clearing of the surface should be carried out archaeologically in advance of the works and this should also attempt to assess whether sleepers are in situ or have been relaid and to explore whether they were originally fixed to the ground or set on top of it without fixing.

The railway embankment is in good condition, but the retaining walls require consolidation where the earlier 1992 works did not extend to. It is relatively robust and should be able to withstand use by walkers, but intensive use by cyclists could cause damage through rutting. The presence of stone sleepers on the surface may also make it a less than ideal surface for cycling or mobility scooter use and so any future recreational use may not be fully accessible.

The extent of the scheduling of the embankment does not reflect the national importance of the site and needs to be extended towards Brusselton village and as far as, and including, the Milk Bridge.

The cutting of the embankment east of Brusselton Cottage may be a result of 1975 landscaping and not be in a true position. As the sleepers are also in the wrong position, an archaeologically supervised machine excavated trench across the cutting could establish its original profile and provide an opportunity to correct it and reset the sleepers. It could also establish the location of the platform and ascertain if there is anything to conserve and expose.

There are a number of smaller heritage assets on the site and while the Brusselton Incline Group are well aware of them, future contractors and DCC officers may not be. These should be clearly shown on site plans and if necessary, fenced off during works in order to protect them. The parish boundary stone is vulnerable because it disappears under vegetation but is located on the south bank of the east side of the railway embankment where works to the site of the road bridge, or to the adjacent drain could cause damage. If it needs to be moved for any future works, the boundary stone should be removed archaeologically so that its fixing can be recorded and then returned to its current original position on the parish boundary.

Another small feature is an in situ milestone on the embankment; it is extremely unusual for milestones to survive along the route and so it should be protected. The work to clear the line of vegetation has restored the historic association between the milestone and the incline, but this level of vegetation control needs to be maintained. A second milestone is located in a garden wall at the Engine House. Future owners of the house will need to be made aware of the significance of this milestone and it should be specifically mentioned in both the listed building description and in any future conservation area appraisal. The wider area has a number of stone walls which incorporate the remains of sleepers. Some protection should be extended towards them in order to manage future works in a way that

ensures that the sleeper stones continue to make a contribution towards the area's character.

An area has been identified as a possible future car parking site by the Brusselton Incline Group which could be used by future visitors to the site without causing disruption to local residents. There is no evidence that this area is of any special interest in relation to the railway heritage or any other aspect of the historic environment. The proposed parking area is beyond the retaining wall and it will not impact on S&DR land. There is an area of possible archaeological interest to the north where the road bends in a distinctive manner. There must be a reason why it does this, but it is no longer apparent. Generally, a site for informal parking should be selected which will not place large numbers of parked cars in a position likely to detract from distant views towards the incline.

Acknowledgements

A number of railway experts have contributed generously to this report. Trevor Horner and Michael O'Neill of the Brusselton Incline Group have shared their expertise, photographs and papers. Trevor Horner has also arranged permission to reproduce photographs from the Armstrong Railway Photographic Trust and so I am also grateful to Richard Barber, their Secretary for granting consent.

Jane Hackworth Young of the Friends of the National Railway Museum has also sourced papers, loaned her private collection of books and shared photographs including John Proud's albums from the 1970s. In that respect I am also grateful to Win Proud for being so generous in making the photographs accessible.

There is a wealth of information on the S&DR much of it conflicting and sometimes unsourced; there are also significant gaps. If there are mistakes in this report arising, they are all mine and not those of the people who helped.

The drive to conserve and celebrate the remains associated with the Stockton & Darlington Railway is being met with huge public support and this is also reflected in the support given to the project by the National Railway Museum; I am grateful to Dawn Whitehead of the Search Engine at the NRM in York and Sarah Goldsborough of the Head of Steam Museum in Darlington both of whom have helped uncover material and have waived any charges for reproduction.

Report author

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Appendix 1 Definitions of significance

Brusselton Incline Statement of Significance

Introduction

The accommodation bridge,⁶ incline and access road at Brusselton, near Shildon in County Durham are owned by Durham County Council and the Asset Management team are currently in the process of assigning formal responsibility for the accommodation bridge to the Bridges Section of Durham County Council. However, the structures need to be brought into a good state of repair before responsibility is passed on. This Statement of Significance is designed to help inform that process of repair and concentrates on the surviving bridge/accommodation arch, the remains of the former road bridge, a short length of incline and a potential future parking area. However it also looks at a wider area including the associated engine house and the railway line dating to 1825 in order to better understand the significance of the remains and their national context.

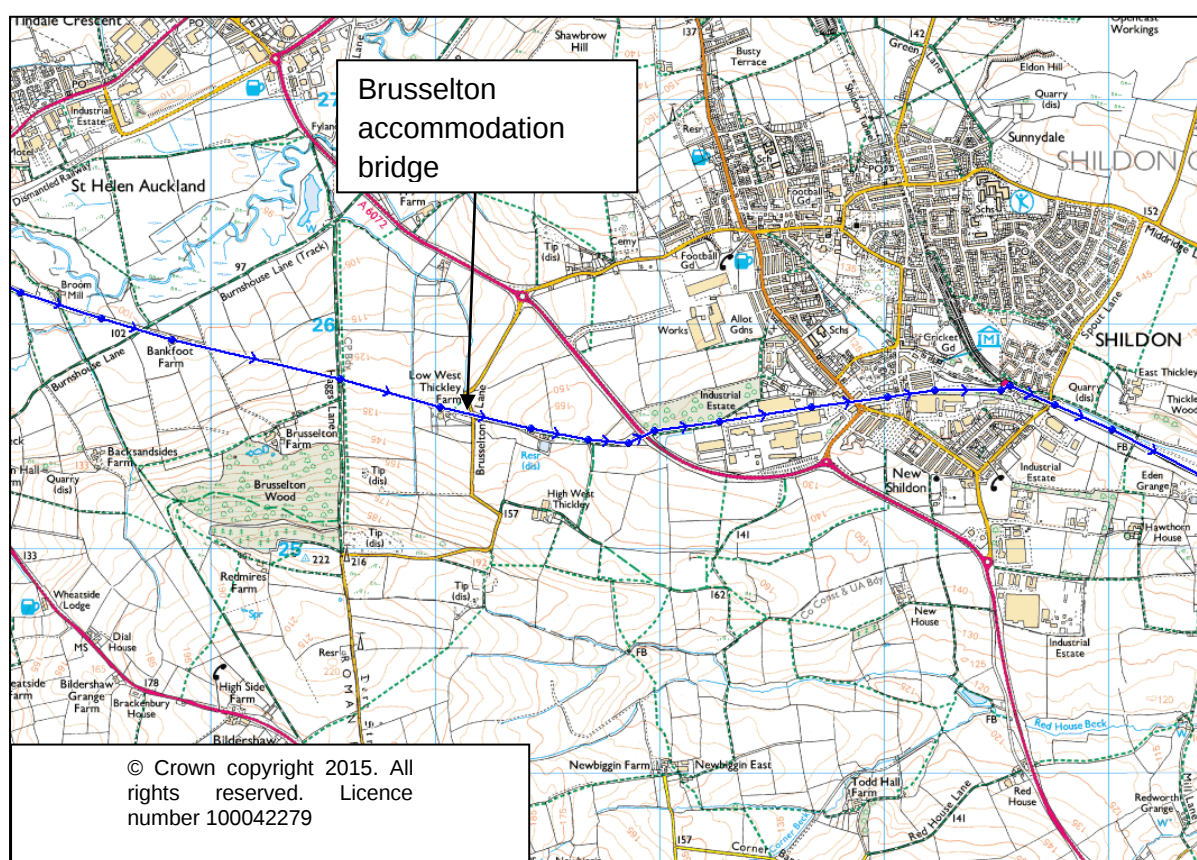


Figure 1. Location plan of the Brusselton accommodation bridge. The blue line marks the route of the 1825 S&DR which includes the Brusselton Incline

The railway incline and bridge are situated approximately 1.5km to the west of Shildon and form part of the former Stockton and Darlington Railway (NGR 21150 25598). A public right of way crosses the site following the former railway line. The Brusselton Conservation Area encompasses the bridge and incline and extends to the former engine house and cottages to the east. The accommodation bridge and incline are designated scheduled monuments

⁶ A bridge connecting two areas of land which were under common ownership but separated when the railway was built.

and so the remains of the road bridge including that part of the road it once crossed are also included in the scheduling. The accommodation bridge is also a grade II listed building. There is a vehicular access from Brusselton Lane running parallel to the railway line which serves the former engine houses, now in residential use, and cottages. Informal parking occurs in the area surrounding the incline by people using the public right of way.

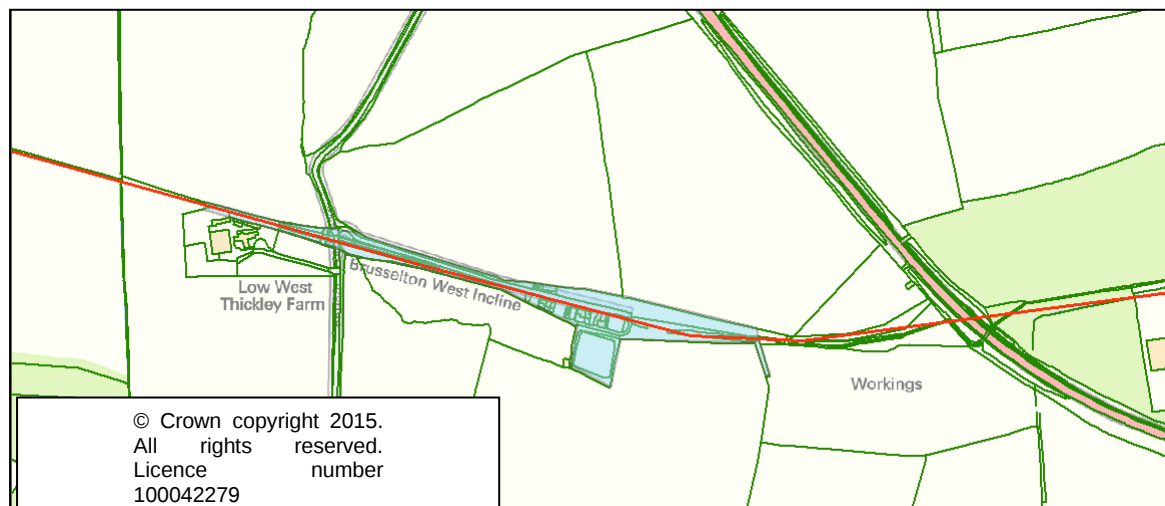


Figure 2. The extent of Brusselton Conservation Area (in blue)

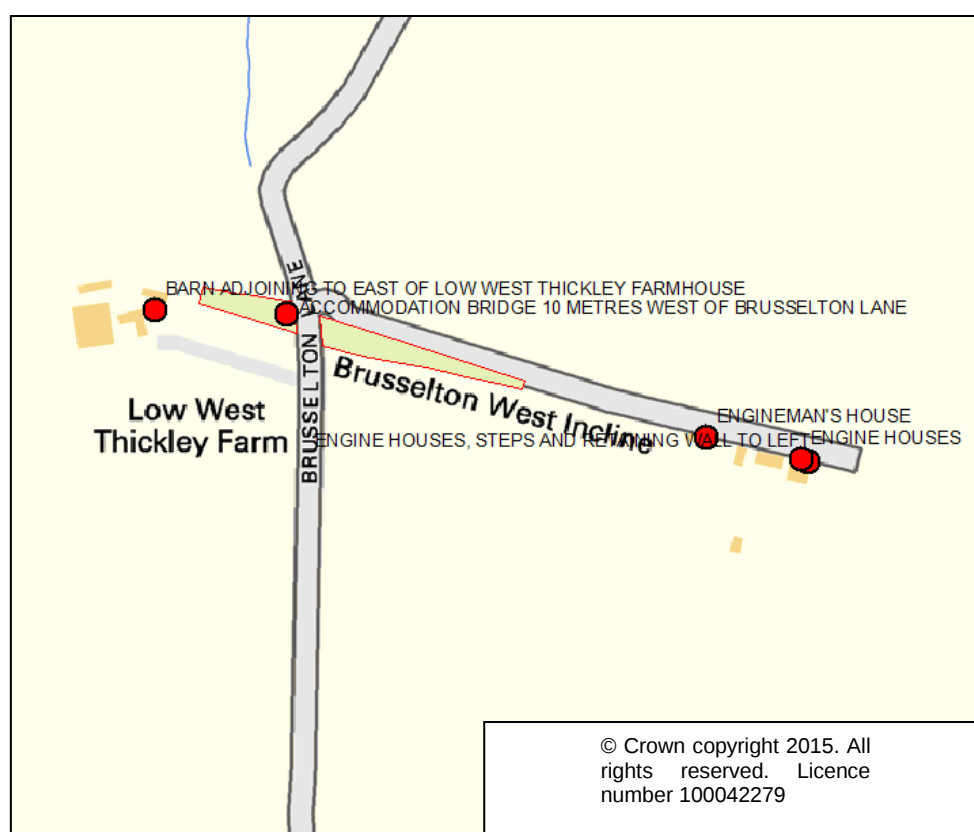


Figure 3. The extent of the scheduled area at Brusselton (in green) and the location of the listed buildings

A group of volunteers, the Brusselton Incline Group, principally formed by engineering professionals in 2013, has been established locally with an aspiration to repair the bridge and carry out works to improve the incline and surrounding area. In 2014, the group cleared

the line of vegetation and exposed the historic stone sleepers on a bed of new ash ballast. The group have also expressed the desire to install car parking adjacent to the incline and low fencing around the eastern edge of the incline to prevent informal car parking in this area, install a replica chaldron wagon and interpretation panels to the eastern side of the incline and replace existing barriers on the incline either side of Brusselton Lane. These works would require Scheduled Monument Consent which takes precedence over the listed building designation.

If repair works to the bridge are not forthcoming in the near future there is some concern that its condition will deteriorate further, resulting in harm to the significance of this important heritage asset or potentially its complete loss. The current condition of the parapets also suggests that access to the arch is now dangerous. It is important that repair works are carried out as soon as possible, in line with the national Heritage at Risk agenda.

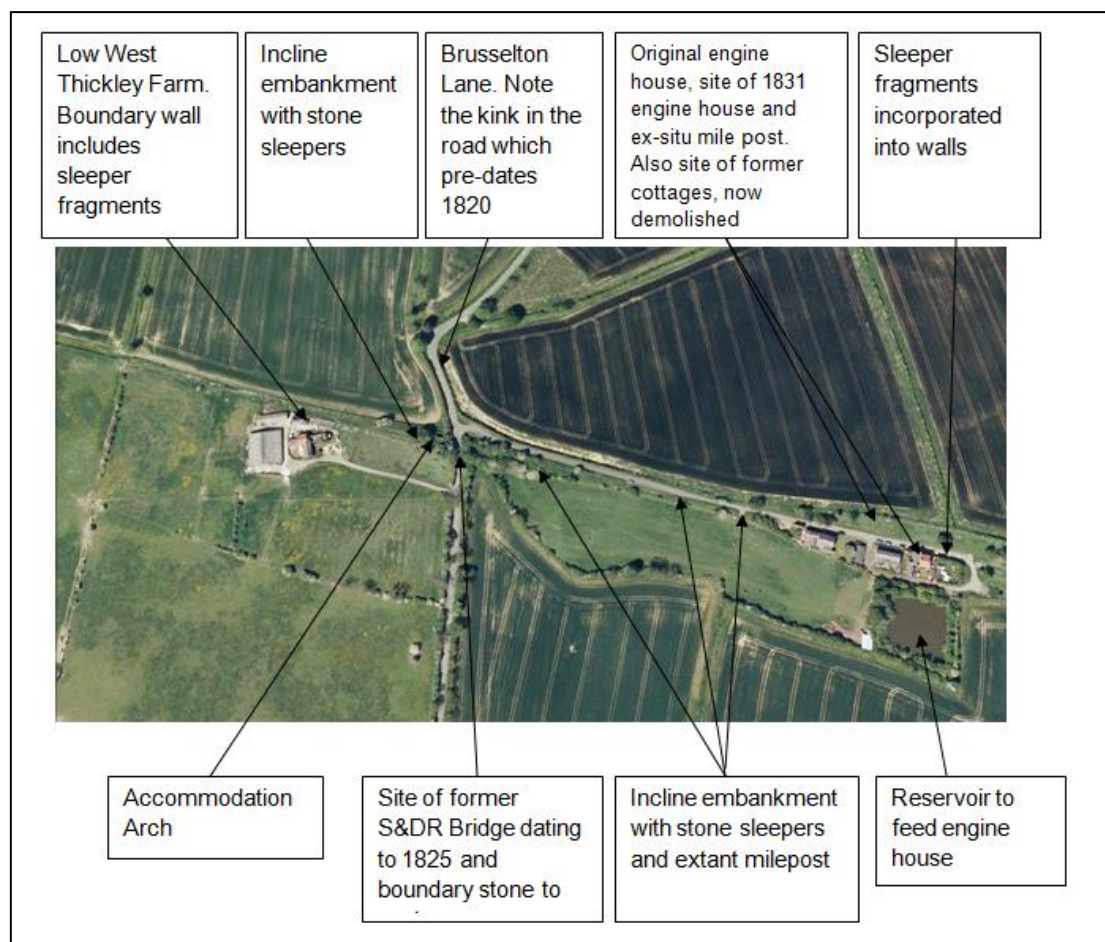


Plate 1. Aerial photograph (Google Earth) 2009 of the Brusselton Incline from Low West Thickley Farm to the engine house and reservoir showing features referred to in the text

Historic background

When twelve wagons of coal left Phoenix Pit at Witton Park Colliery at seven in the morning on the 27th September 1825 to be hauled by horse and engine along the much awaited Stockton & Darlington Railway line, the thousands of people who attended to watch the show, knew that this was the start of something special. Horses drew the twelve wagons each carrying two tons of coal to Etherley where a combination of stationary engine and self acting plane negotiated the Etherley ridge. At St. Helen's Auckland another wagon was added carrying bags of flour and horses then drew all thirteen wagons to the foot of Brusselton West Bank. Crowds gathered to watch the sixty horse power stationary engine haul the wagons up the incline and a few excited observers may have hitched a lift.⁷ At the Brusselton Engine House itself (the 'permanent steam engine' according to publicity material of the time, see figure 1), the railway proprietors gathered at 8 o'clock in order to 'examine their extensive inclined planes'.⁸ More spectators clung on to the wagons as they rolled down the hill and headed towards Locomotion No.1 with her new coat of paint, her engines fired to build up a head of steam ready to haul twenty one new wagons including the long passenger coach named Experiment. They were designed to carry 300 passengers that day, but somewhere between 450 to 600 travelled.⁹ The first overcrowded rail journey in the world set off at 9am and so the day that would change the world, was well underway.

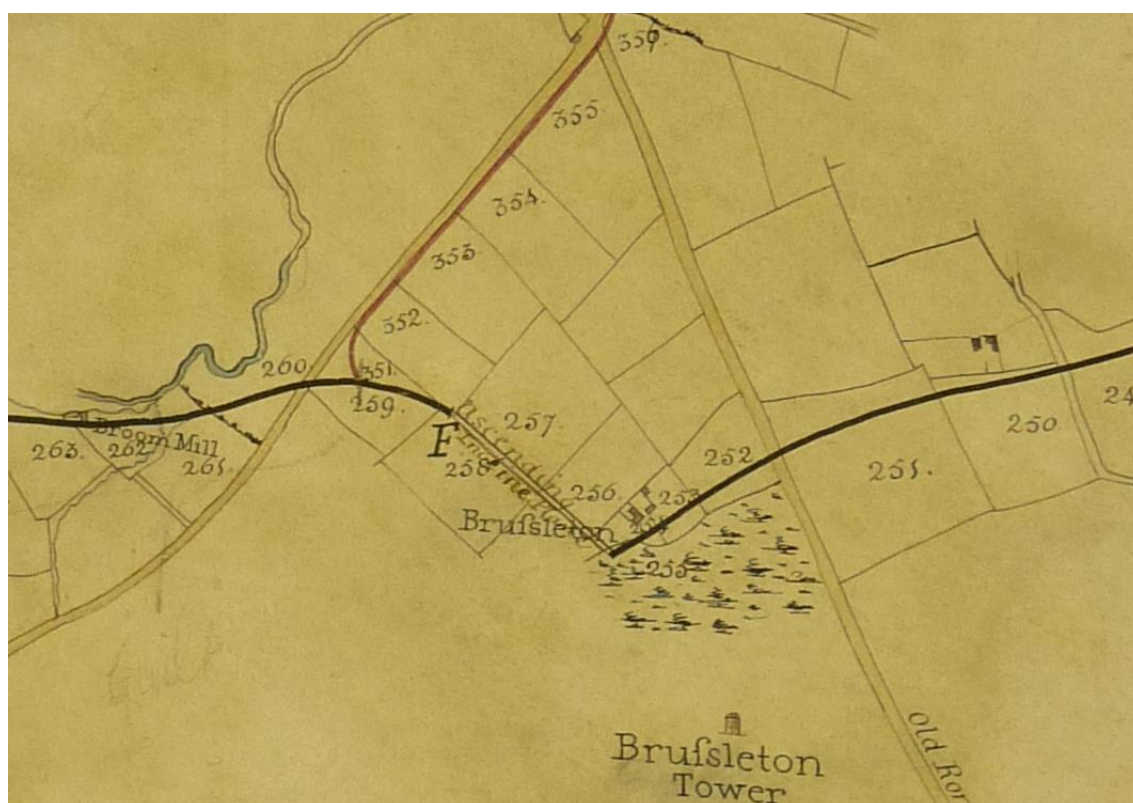


Figure 4. Overton's plan of 1820 showing the ascending incline further west near Brusselton Farm and then crossing the Roman Road Dere Street (now Haggs Lane) towards Low West Thicklely Farm. Stephenson was to alter this arrangement and place the incline further east as he believed that Overton's incline was too steep and would lead to accidents

⁷ Slack and O'Neill 2015, 19

⁸ Taken from the publicity notice issued at the time (fig 1)

⁹ Ibid, 19 and Jeans 1974, 70

THE
STOCKTON & DARLINGTON
RAILWAY COMPANY

Whereby give Notice,

THAT the FORMAL OPENING of their RAILWAY will take place on the 27th instant, as announced in the public Papers.—The Proprietors will assemble at the Permanent Steam Engine, situated below BRUSSELTON TOWER, about nine Miles West of DARLINGTON, at 8 o'clock, and, after examining their extensive inclined Planes there, will start from the Foot of the BRUSSELTON descending Plane, at 9 o'clock, in the following Order:—*

1. THE COMPANY'S LOCOMOTIVE ENGINE.
2. The ENGINE'S TENDER, with Water and Coals.
3. SIX WAGGONS, laden with Coals, Merchandize, &c.
4. The COMMITTEE, and other PROPRIETORS, in the COACH belonging to the COMPANY.
5. SIX WAGGONS, with Seats reserved for STRANGERS.
6. FOURTEEN WAGGONS, for the Conveyance of Workmen and others.

At 9 o'clock The WHOLE of the above to proceed to STOCKTON.

7. SIX WAGGONS, laden with Coals, to leave the Procession at the DARLINGTON BRANCH.
8. SIX WAGGONS, drawn by Horses, for Workmen and others.
9. Ditto Ditto.
10. Ditto Ditto.
11. Ditto Ditto.

The COMPANY'S WORKMEN to leave the Procession at DARLINGTON, and DINE at that Place at ONE o'clock; excepting those to whom Tickets are specially given for YARM, and for whom Conveyances will be provided, on their Arrival at STOCKTON.

TICKETS will be given to the Workmen who are to dine at DARLINGTON, specifying the Houses of Entertainment.

The PROPRIETORS, and such of the NOBILITY and GENTRY as may honour them with their Company, will DINE precisely at THREE o'clock, at the TOWN-HALL, STOCKTON.—Such of the Party as may incline to return to DARLINGTON that Evening, will find Conveyances in waiting for their Accommodation, to start from the COMPANY'S WHARF there precisely at SEVEN o'clock.

The COMPANY take this Opportunity of enjoining on all their WORK-PEOPLE that Attention to *Sobriety* and *Decorum* which they have hitherto had the Pleasure of observing.

The COMMITTEE give this PUBLIC NOTICE, that all Persons who shall ride upon, or by the sides of, the RAILWAY, on Horseback, will incur the Penalties imposed by the Acts of Parliament passed relative to this RAILWAY.

* Any Individuals desirous of seeing the Train of Waggons descending the inclined Plane from EYBERRY, and in Progress to BRUSSELTON, may have an Opportunity of so doing, by being on the RAILWAY at ST. HELEN'S AUCKLAND not later than Half-past Seven o'clock.

RAILWAY-OFFICE, *Sept. 19th, 1825.*

ATEINSON'S Office, High-Road, Darlington.

Figure 5. A poster promoting the formal opening of the railway on the 27th September 1825 referring to the Brusselton Incline.

The route of the S&DR line had been set out by the S&DR engineer, George Overton in 1818 which finally obtained assent from Parliament in 1821; earlier attempts being defeated because of disputes over rights of way and the death of King George III. This first section of the S&DR line was hilly with two ridges running across the landscape and would present major engineering challenges. Overton chose a route requiring a steep incline which Stephenson thought would be dangerous. He therefore made the ascending plane three times longer to create a more gentle climb. He also placed the line a little to the north at the top of the summit in order to have a greater descent from the engine which instead of requiring horses to return the empty wagons, could be hauled back by the engine.¹⁰ Stephenson also sought to use locomotives on the line and suggested stationary locomotives at Etherley and Brusselton which would pull the wagons up the inclines and control their descent.

Inclines had been negotiated innumerable times in the past, but what made this section of the S&DR unique at the time was the fact that the scale of the distance to be negotiated was four miles from Witton Park to Shildon. Overton chose to take the route from Broom Mill Farm to Low West Thickley Farm where it would cut almost at a right angle towards Brusselton, crossing the Roman Road Dere Street, now known as Haggs Lane. Stephenson's solution was to use two engines; one at Etherley and one at Brusselton and he chose an alternative route for the Brusselton Incline avoiding Overton's sharp deviations

with a more gradual ascent in a straight line from Broom Mill Farm and passing immediately north of Low West Thickley Farm where it would cross Brusselton Lane and head towards the engine house at the top of the incline.

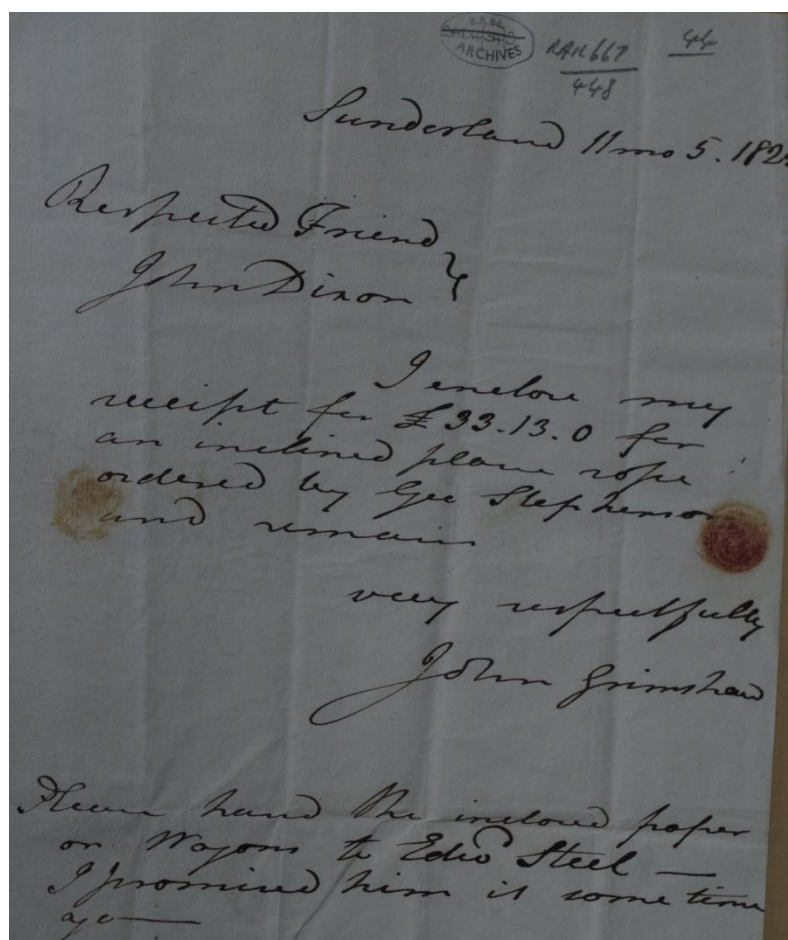


Plate 2. Receipt from John Grimshaw to John Dixon for incline plane rope ordered by George Stephenson (PRO RAIL 667/448)

Horses pulled the wagons from the foot of the Etherley incline to the foot of the Brusselton Incline. While Etherley was designed to have an engine haul the wagons up and a self acting incline to help them descend, Brusselton used a steam powered stationary engine to

control both the incline and the decline, each with a gradient of 1 in 33 ½.

¹⁰ Stephenson's justification to the S&DR Committee proposing an alternative route PRO RAIL 667/166

Statement of Significance for the Brusselton Accommodation Arch and related features

The engines were ordered from Stephenson's son's newly created company, Robert Stephenson & Co in November 1823 – its first big order. It was Robert Stephenson, a mere lad at 22 years of age, who designed and oversaw the works at Brusselton, while the newly appointed Resident Engineer, Timothy Hackworth spent many hours and probably some blood, sweat and tears ensuring that everything at the incline worked well in time for the opening day on the 27th September 1825.

The building of the engine house at Brusselton was put out to tender on the 1st May 1824 and included the construction of Etherley Engine House and was advertised in the local press by Robert Stephenson & Co referring prospective masons and joiners to contact Thomas Storey at Saint Helen's Auckland where they could view the plans.¹¹

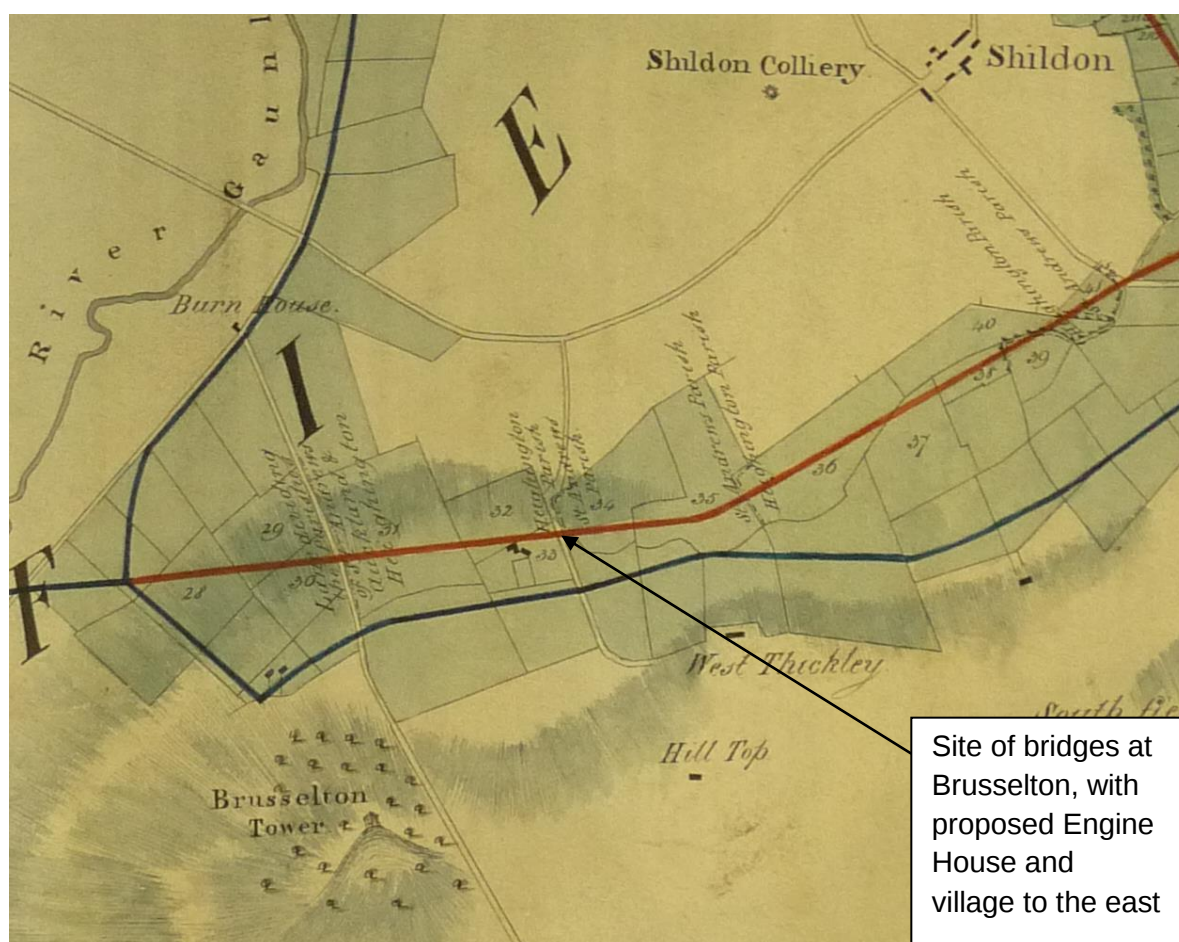


Figure 6. Stephenson's amended plan dated 1822 retained the incline but moved it so that it crossed north of Low West Thickley Farm following a more gentle incline from Broom Mill (Stephenson's amendments in red)

The engine at Brusselton was to be two 30 horsepower two cylinder low pressure engines costing £3,482-15s. The company were also commissioned to provide winding gear which spun the rope around drums sitting above the line within a stone built shelter and boilers measuring 8 feet in diameter and 20ft long.¹² It was a simple hemp rope 1850 yards long that hauled the engines up the incline at a steady 8mph and a shorter 825 yard length that lowered the wagons to New Shildon, both supplied by John Grimshaw of Bishop Wearmouth

¹¹ Durham County Advertiser 8.5.1824

¹² Slack and O'Neill 2015, 16

in 1822 at cost of £33.13.0 and ordered by George Stephenson.¹³ Another sub contractor Rowland Webster won the contract to rope the inclined planes at a rate of a farthing per ton of coals, with a minimum tonnage guaranteed.¹⁴



Plate 3. Brusselton Engine House, now demolished (photo courtesy of the Ken Hoole Collection, undated, but possibly c.1880). The large empty building of 1831 held the winding gear which consisted of large drums which sat above the line, powered by Hackworth's steam engine adjacent. This was a replacement of the first Engine House which still survives partially on site today

The engine, boilers and winding gear were to be a source of trouble and constantly needed repair. Hackworth carried out major modifications in 1826 and he replaced the engine in 1831 with a more powerful 80 horse power one. Due to its large size, the new engine house and chimney had to be placed on the north side of the track and the drum house spanned the track linking the new engine house and the original one. It is this later arrangement that can be seen in surviving historic photos (see plate 3). The new arrangement was a great success and increased the speed and capacity of the incline.

The running of the incline after the excitement of the 27th September fell to William Mowtrej who was paid as a sub contractor 1 1/4d to draw the loaded wagons and haul the empty ones and to maintain them. He was also responsible for paying his assistant's wages, the fireman's wages and to source supplies. The Company reverted to a waged structure of 22 s a week and 18 s for the assistant, presumably because it cost less, but then reverted to subcontract terms at a reduced tonnage rate. By 1838 when the area was surveyed to produce the tithe map, the garden at the engine house cottages was occupied by Thomas Lamb, but still owned by the S&DR. The use of the line was contracted out to private users and at the foot of the incline James Garthwaite drew and coupled wagons and collected tickets.

¹³ PRO RAIL 667/448

¹⁴ Ibid 25



Plate 4. A similar view in 2015 without the winding house and chimney which were demolished at the end of the 19th century (Slack and O'Neill 2015, 70), but still with the other 1825 buildings in the picture intact, but extended. The building at right angles to the road is the first engine house.

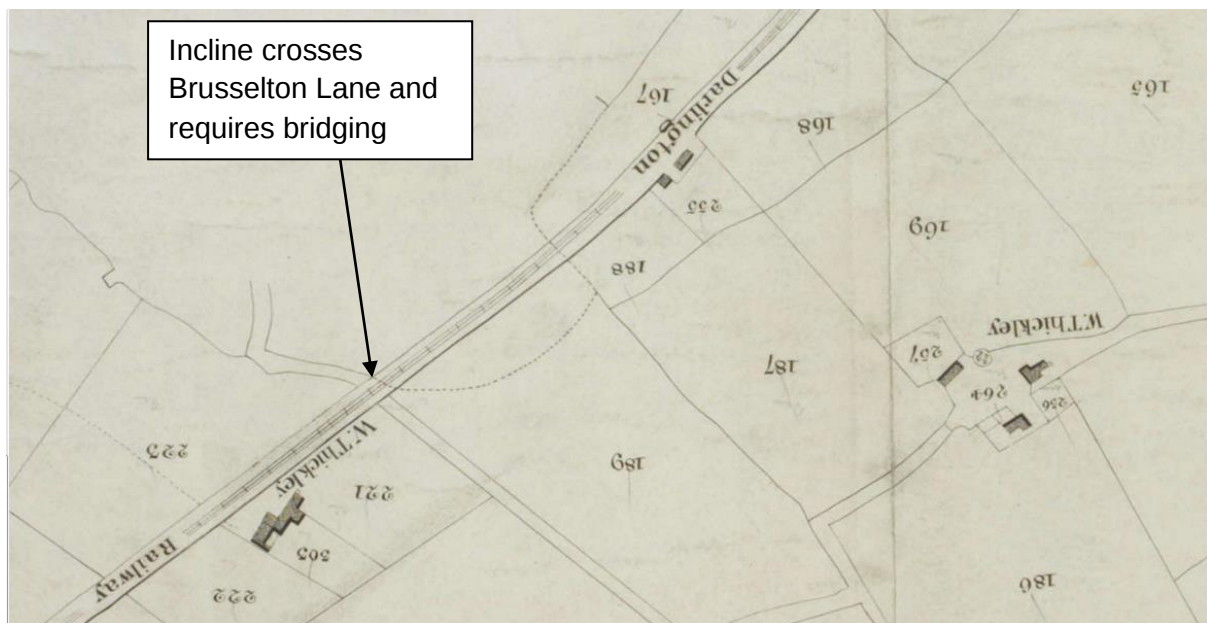


Figure 7. The tithe map of 1839 shows the incline from Low West Thickley Farm up to the cottages at Brusselton. It is clear that the railway had to cross the Roman road (Brusselton Lane) but there is no evidence of any need for an Accommodation Arch to the west, suggesting that the surviving Accommodation Arch is a later addition. Field 255 behind the cottages on the incline was occupied by Thomas Lamb and owned by the S&DR. Field 168 was fittingly named as Engine Field. Apart from the line itself and the cottages, most surrounding land was owned by Sir George Musgrave

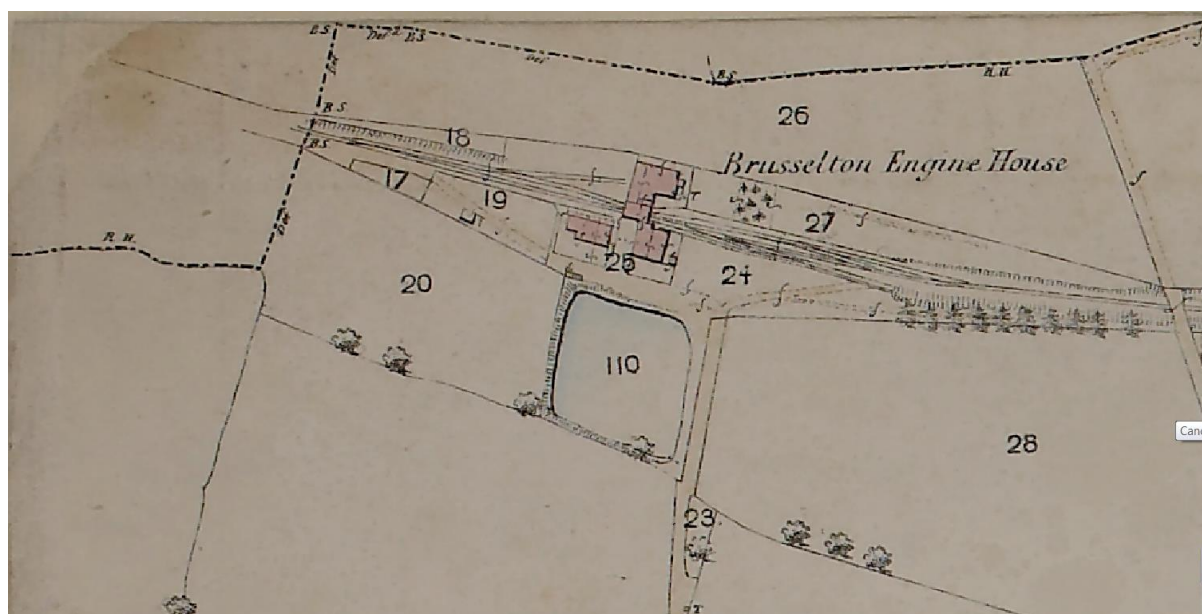


Figure 8. The Brusselton Engine house as depicted on the 1st ed OS map of 1856 (DT 42.15 A) with the 1831 engine house with chimney and winding gear over the line; the cottages for workers and families and the reservoir to feed the steam engine.

The engineman at the top of Brusselton Incline had to be told when wagons a mile-and-a-half away were ready to be pulled up. A tall pole was erected at the bottom with a disc on top of it. When the disc was spinning, it meant the wagons were ready. To see the disc, the engineman had a telescope permanently fixed near his chair. However, when visibility was poor the disc couldn't be seen, so long wires attached to bells or rappers were installed. This is said to be the first recorded example of a railway signal system anywhere in the world,¹⁵ but requires further research to confirm.

The smooth running of the whole railway line was very dependent on the inclines. If the export of coal was held up at the docks (only two staithes were provided by 1826 in Stockton and this caused delays in loading), trains would back up as there were initially very few sidings where fully loaded wagons could await processing. When backlogs did happen, the inclines often had to work through the night so that coal could continue to be transported from the collieries around West Auckland (Slack and O'Neill 2015, 26-7).

The braking system on the early wagons required considerable modification. The brakes could only be applied from inside the vehicle, but if the rope on the incline snapped unmanned wagons would fly off smashing into anything that stood in their way. Young lads were employed to stand by the side of the incline ready to jump aboard a runaway train and apply the brake. Near the foot of the bank, the last braking device consisted of men with huge blocks of wood and tree trunks which they threw into the path of the rolling wagons to deliberately derail them.¹⁶ In 1832, a wagon carrying Joseph and Henry Pease, Timothy Hackworth and William Kitching (of Kitching's ironworks on North Road, Darlington) was descending down Brusselton incline when the rope snapped. All jumped to safety except Kitching who was a rather large man and he attempted to apply the brake. A gang of youths led by John Summerson jumped aboard and managed to slow the wagon down to 8mph by the time it reached the bottom of the incline. Mr Kitching was badly shaken and Summerson

¹⁵ Northern Echo 22.11.2014 but unsourced

¹⁶ Northern Echo 22.11.2014 but unsourced

was given a shilling for his efforts.¹⁷ Timothy Hackworth subsequently invented a system (called the cow) whereby if the rope snapped and the wagon lost control, it would be thrown off the tracks, thus limiting any subsequent damage – this may have been small comfort to Mr Kitching.¹⁸ The ongoing issues with breaking, stretching and twisting ropes was to convince Hackworth and Stephenson that the way forward would be mobile locomotives and they took an important role in convincing the Liverpool and Manchester Railway line to adopt mobile locomotives rather than be ‘strangled’ with the ropes of the stationary engine.¹⁹



Plate 5. Brusselton Incline east of the Milk Bridge (and so east of Brusselton village and the Accommodation Bridge) with the village and Milk Bridge in the distance. This shows the Brusselton line electrified when it was used as a repair line between the Milk Bridge and Shildon. Photo: from the Ken Hoole Collection at Head of Steam – Darlington Railway Museum

Brusselton Incline ceased operations in 1856 when the Tunnel Branch was constructed to meet the growing traffic flows, although formal closure was not announced until 13th October 1858 (Slack and O'Neill 2015, 33). In 1859 the engine was sold by private contract (Darlington & Stockton Times 23.7.1859), but the incline was maintained as a contingency route until the 1880s in case the Shildon Tunnel was blocked (Slack and O'Neill 2015, 33). The line east of Brusselton and west of Shildon was used as part of a wagon repair line with an engine shed to house wagons awaiting repair. This section of line consequently remained in use sufficiently to be electrified between the Milk Bridge and the Masons Arms in Shildon, probably around 1914. Although the line was reduced to a repair siding, steam engines

¹⁷ Slack and O'Neill 2015, 27

¹⁸ Northern Echo 22.11.2014, but unsourced

¹⁹ NRM HACK 1/1/122

could still be seen on occasion as far west at Brusselton village in the early 1950s, possibly to load coal to local residents, or simply to assist with shunting wagons around.²⁰

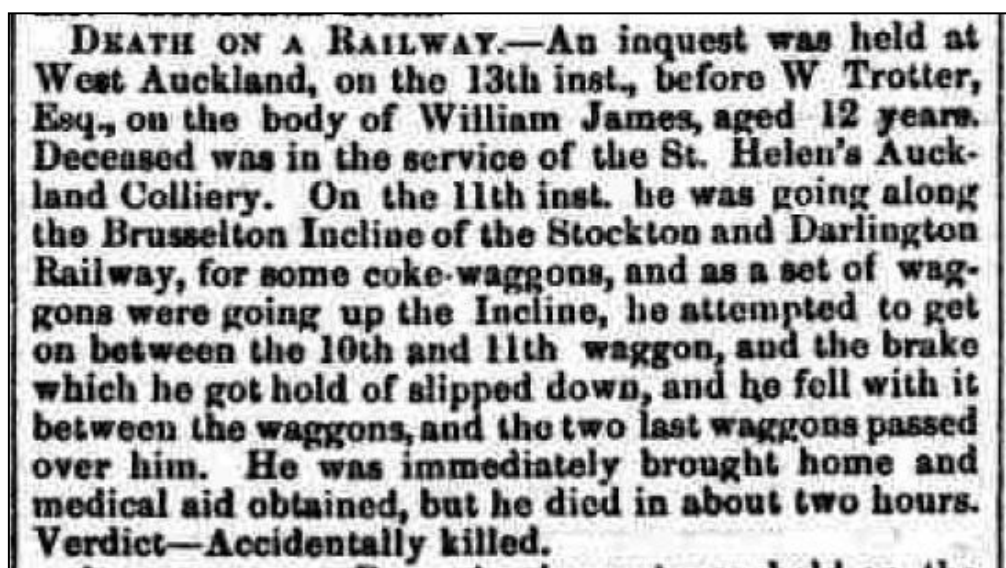


Figure 9. Extract from the Durham County Advertiser 20 October 1854

Brusselton Incline Today

After nearly two hundred years, only part of the Brusselton Incline survives, but the level of survival is much better than almost any other stretch of the 26 mile line. The 1831 engine house and winding gear were demolished in the late 19th century but the original 1825 cottages including the original engine house survive (although many other houses were constructed later and these too are now mostly demolished). On the incline itself, the embankment survives from Low West Thickley Farm to the engine house and beyond and recent work by the Brusselton Incline Group has exposed the stone sleepers and set ash ballast on the surface. The bridge that carried the railway line over Brusselton Lane, was demolished sometime between 1957 and 1962 apparently for road widening. An accommodation arch survives, but is badly damaged. Architectural fragments, mostly sleepers have been incorporated into adjacent walls.



Plate 6. Left: the reservoir that was constructed to feed the engine house. This currently has no legal protection. Right: the engine house

²⁰ Trevor Horner, Brusselton Incline Group pers comm.

The significance of the Brusselton Incline and associated structural elements

The Brusselton Incline includes a number of related features which are all associated with the pioneering phase of the railways and are therefore considered to be internationally and nationally important (English Heritage 2011, 3, 7). This more detailed statement of significance fleshes out this special interest. The nature of the significance is divided into archaeological, architectural, historic and artistic interest as outlined in national planning policy. The level of significance is divided into considerable, some, limited, unknown or none. Definitions of these terms are given in appendix 1.

The incline is made up of a number of associated features within the study area as follows:

The Road Bridge, remains of.

The commissioning of bridges by the S&DR Company was carried out separately from the commissioning of the cuttings and embankments. Specifications were produced, but at the time of writing have not been located, however the tenders were issued for the construction of the embankment, battery and ballast dated to September 1822 and presumably the bridges were commissioned at a similar date or earlier.²¹ The 1821 Act of Parliament set out some requirements for road bridges including the need for a 'good and sufficient Fence to be made on each Side of every Bridge, which Fence shall not be less than Four Feet above the Surface of such Bridge'. This is clearly referring to parapets. It also required any 'Ascent to every such Bridge for the Purpose of such Road shall not be more than One Foot in Thirteen..'.²¹

The road bridge was skewed to accommodate the angle of the road. This can be seen on the 25 inch OS maps and historic photographs (see figs 10 and 13 and plate 8). It was clearly part of the original design with the railway being shown as passing over it from the 1823 proposals maps by George Stephenson.

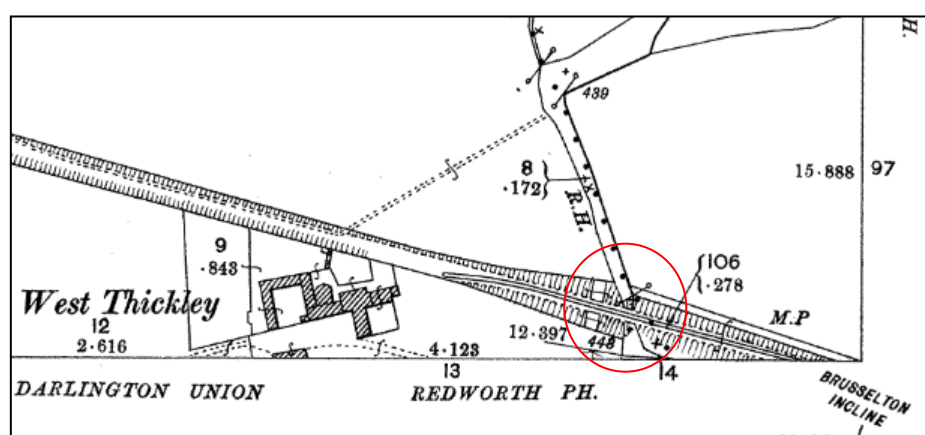


Figure 10. The 2nd ed OS map dating to the 1890s shows the skewed angle of the road bridge through the embankment of the incline. The cutting through of the accommodation arch can also be seen immediately west but this was cut straight through with no need to respect earlier routes

²¹ PRO RAIL 667/893



Plate 7. An undated photo showing both the road bridge (right) and the accommodation bridge (left) intact. The surviving Accommodation Bridge appears to be a grander structure with a capped parapet, while the 1825 road bridge is a simple structure with few architectural pretensions (Photo: J.W Armstrong/ Armstrong Railway Photographic Trust)



Plate 8. The bridge built to take the S&DR line over Brusselton Lane; the pile of stones suggest that damage or demolition has already occurred to the road bridge which was demolished in the early 1960s to allow for road widening. (photo courtesy of Jane Hackworth Young)



Plate 9. A similar view in 2015. The only evidence of the road bridge is a strip of concrete render on the retaining wall to the left (west)



Plate 10. The decking of the road bridge with the accommodation bridge beyond. Both have metal plaques on them numbering them. (Photo undated but possibly 1925, courtesy of Trevor Horner)

Historic photos show a relatively simple bridge parapet, although the skewing of the arch was more complex. The parapet was topped with rounded coping stones with more prominent copes at the ends. Dressed stone retaining walls held back the earth embankment of the incline on both sides of the road. These were terminated with triangular cope stones which match the accommodation arch adjacent. The retaining walls on the east and west sides was different. The east retaining wall stones were better dressed and were made of larger ashlar blocks than the west side. It is not clear why this was the case. Later plans first produced in 1925²² by the NER measured the height of the arch from the road as 15 feet high with a span of 11 feet 2 inches at road level but a gap of 11 ft 4 inches between the parapets. The same plans were annotated in November 1946 with a note 'said to be the first railway stone arch over a public highway.'

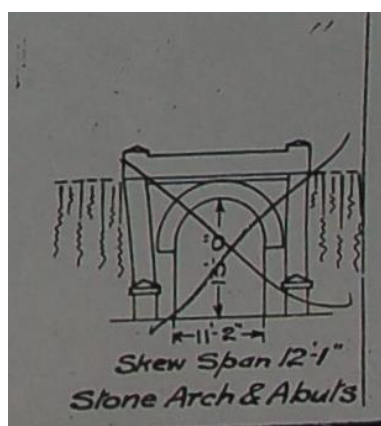


Figure 11. An extract from the Track Mileage plans of the Brusselton Branch used by the NER.²³ The plans date to 1925, but were annotated in 1946 suggesting they were used over several decades. The bridge has been scored out suggesting that this was to show that the bridge had been demolished – presumably therefore the scoring out was added in the late 1950s or early 1960s.

The size of the road bridge was potentially causing problems to road traffic in the 20th century. On the 21st December 1928, the LNER wrote to the Darlington Rural District Council to say that they were considering the disposal of their land at the Old Brusselton Incline. While they had conducted some preliminary discussions, they had decided to give the council the opportunity of acquiring any of the land 'in connection with any road or any other scheme which they may have in mind.' The surveyors at the LNER helpfully pointed out that there were 'bridge questions at Hags Lane (further west) and the high road immediately East of Low West Thickley Farm, and it may be that your Council would care to consider, among other things, questions of improvement at these two points'. The council declined to enter into negotiations for the land in a prompt reply on Christmas Eve and stated that 'Undoubtedly there is room for road improvement at the Bridge over the Highway immediately to the east of Low West Thickley Farm but the Surveyor points out that any improvement here would be carried out on the east side of the present road and bridge, and if and when this improvement is contemplated it will doubtless be necessary to approach your Company in the matter.'²⁴

The road widening was not carried out but in the 1950s the bridge, or rather its east retaining wall, was hit by a lorry and damaged. This may have instigated action by the council who proposed demolishing the bridge and widening the road. There was a public outcry and articles printed in the press, but the demolition went ahead in 1954.²⁵ Photos of the demolition show that the arch had been painted to draw attention to the low height of the bridge.

²² NRM NER Civ Eng DS/14E Box 231

²³ *ibid*

²⁴ DRO R/Da 202

²⁵ This is based on recollections by local residents but as yet the newspaper articles have not been located.

On site today, there is no evidence at all of the bridge on the east side of the road suggesting that, as the surveyor had pointed out in 1928, the widening took place here. However the ashlar blocks appear to have been reused to make a new retaining wall to hold back the earth bank of the cut back incline. On the west side of the road however, there is a concreted over scar where the bridge was located and it is still clear that the stonework on this side was different. The retaining walls on either side of this are now in poor condition with clear signs of bulging, suggesting that there is a risk of the retaining wall failing, leading to a tumble of construction materials on to the highway.

The significance of the road bridge

Whether the author of the annotated note on the NER Track Mileage plans was correct or not that this was the first railway stone arch over a public highway, it is perhaps simply a record of what has been lost. The loss of the bridge means that its special interest is **limited** to the **archaeological** evidence presumably hidden behind the concrete render. It is not clear how significant this evidence is likely to be. It may show the join between the bridge and the embankment, or it will more likely create a section through the embankment which will provide information on the method of construction.



Plate 11. An undated photo of the demolition of the road bridge underway. The exposed structure of the embankment can be seen and it appears to consist of terracing of stone filled with rubble and earth. (Photo: J.W Armstrong/ Armstrong Railway Photographic Trust)



Plate 12. The only visible remains of the road bridge is concrete render over the join where the bridge abutted the embankment on the west side of the road.

Moving forward.....

Given that photographs do exist of the bridge, combined with its measurements, there is already an archaeological record of sorts. However the poor condition of the adjacent retaining walls suggests that these may need to be consolidated. Further, the concrete render may be damaging to any stonework beneath the surface and adjacent to it. There may therefore be a case to remove the concrete render and expose the scarring from the bridge while work is carried out to the retaining walls. This should be recorded archaeologically. The fact that the bridge was struck by a lorry and that the issue of road widening was being discussed from at least 1928, suggests that rebuilding the bridge is not feasible at its original size and if it cannot be rebuilt to match the existing, it is questionable whether any future replacement bridge would need to reflect the design of the original at all. There are no heritage constraints why a new bridge could not be built here to accommodate users of a future rail trail, although some archaeological recording might be required depending on the design.

Additional research could identify the original specification for the bridge which has not been located. It could also try to determine why this bridge was of a more crude design than the adjacent accommodation arch and why distinctly different cuts of stone were used on the east side than the west.



Plate 13. The retaining walls are bulging and will require consolidation. This may also be an opportunity to remove the cement render on the scarring of the original bridge.

The Accommodation Arch

This bridge is listed grade II (112206) and is also a scheduled monument which takes precedence in terms of designation (DU 108) and is therefore considered to be nationally important. It is a single span, round arched bridge topped by a plain stone parapet with stone coping and square stone piers. The design is more elegant and richly executed than the road arch and the reason for this is not clear. Such bridges were not part of the original design of the line. The 1821 Act of Parliament (para XII) made provision to purchase any small areas of land left stranded by the construction of the line, but did not make provision for bridges to reunite divorced sections of land in the same ownership. The general committee presented shareholders with a report on the 9th September 1825 stating that unforeseen expenditure had been incurred building the railway line because of the necessity of purchasing land, paying for damages to tenants, 'exceeding by £18,000 the estimate made as to the value of the land, together with the great expense of erecting occupation bridges, which your committee did not anticipate....'²⁶ There was therefore no standardised design for these bridges at the outset and instead they appear to have been tailor made to suit the individual needs of the landowner and occupier of the time. The land belonged to Sir Phillip Musgrave and it is possible that he insisted on a more ornate bridge, although he did not live locally

²⁶ Jeans 1974, 63

and the adjacent farm was rented out to John Parker (based on the plans produced by Stephenson for the Act of Parliament). Either side are sloping wing walls with stone copings, which terminate in small square piers. To the west, later stone steps, some made of stone sleepers, carry a footpath over the incline and the bridge. According to the listing description it is an original S&DR 1825 structure and 'is one of very few of the original bridges on this, the first ever railway line, to survive unaltered'. As it provides access under the railway to link fields on the farm, it appears to have been designed as an accommodation arch rather than an occupation arch.²⁷ The field pattern had to be altered once the railway line was built as it left a small triangle of land on the north side. Consequently this triangle of land was amalgamated with the adjacent field to create one larger one to the north and a reduced one to the south.

The date of its commission has not been confirmed yet, nor has the specification been located, but the embankment for the railway line was commissioned in September 1822 and one might expect the bridges to be constructed first so that the embankment could be set against it. The tender to build the engine house at Brusselton was advertised on the 8th May 1824²⁸ and the houses at Brusselton were nearly finished by July 1825.²⁹ The bridge probably pre-dates the construction of the line therefore could date to between 1820 -1824.

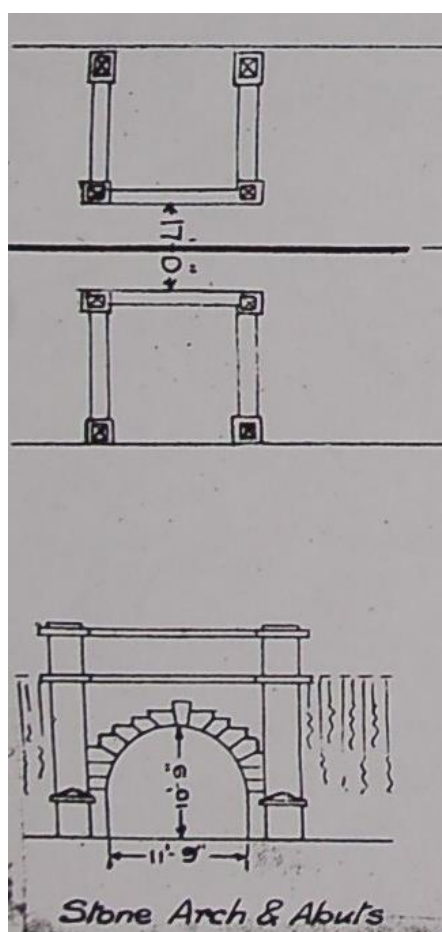


Figure 12. NER track plan sketches dating to 1925 of the elevation of the accommodation arch and a plan showing distance between parapets at 17 feet. (NRM NER Civ Eng DS/14E Box 231). Compare to pl 14.

A specification for the bridge set out that it should be 'as wide and as high to take a fully loaded cart of hay' (S&DR 150 R&P Committee 1975). Later plans first produced in 1925³⁰ by the NER measured the distance between the parapets to be 17 feet; this is significantly wider than the adjacent road bridge (11 feet 4) and it is not clear why. The height necessary to accommodate the fully laden wagon appeared to be 11 feet 9 wide and 10 feet 9 high (see plate 15).

²⁷ Although the NER refer to it as an Occupation Arch in 1925, thus confirming general confusion regarding their respective definitions (NRM NER Civ Eng DS/14E Box 231)

²⁸ Durham County Advertiser 8.5.1824

²⁹ Letter from Timothy Hackworth to his wife Jane dated July 1825 saying the Storey suggested they take one of the newly finished houses at Brusselton until the works and new house at New Shildon are built.

³⁰ NRM NER Civ Eng DS/14E Box 231



Plate 14. The scheduled accommodation bridge 10m west of Brusselton Lane in 2015

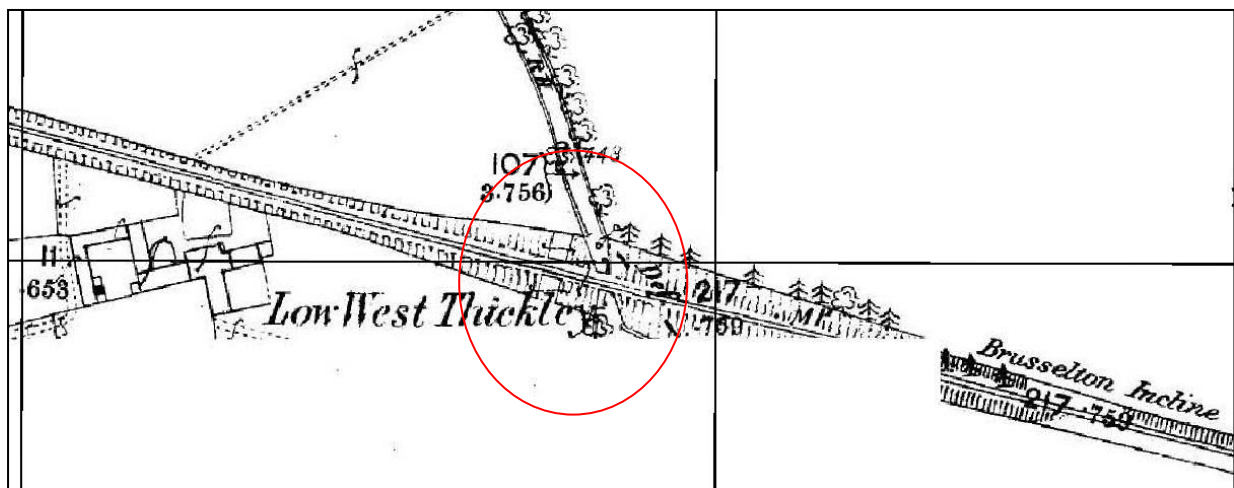


Figure 13. 1st ed 25 inch OS map dating to the 1850s-60s shows both the Accommodation Bridge and the road bridge both under the incline. (Extracts from the map are missing)

An account of the accommodation arch in 1966 by Vera Chapman (2005, 72) referred to it as being recently repaired after vandalism, but when visited in 1974 by John and Win Proud, it was described as being in fine condition. This suggests that the process of vandalism and repair may go back several generations.



Plate 15. Photo taken from the south looking north of the Accommodation Arch in 1974 at which time, it was described as being in fine condition (John Proud albums).



Plate 16. The same view in 2015

The bridge parapets today are in poor condition and the decking may also be damaged on the surface. The south parapet has been pushed in an attempt to topple it over and stone sleepers are sliding down off the decking north and southwards. The decking surface is eroding and exposing masonry at the bottom of the parapets that ought to be buried

(although photographs from the 1970s suggests that this has been the case for at least forty years and so may be quite stable). The wing walls are in particularly poor condition on the north side where the coping has been prised off. This has exposed lime pointing suggesting that it is original, or at least 19th century, as cement has not been used. However there is evidence of some cementitious pointing elsewhere on the structure, presumably the 1960s repairs.

The significance of the accommodation arch

This is one of a relatively few structures still intact from the S&DR railway of 1825 and so is **nationally important**. Indeed it is the best surviving accommodation bridge on the line – the others having been demolished, altered or have had their decking or arches removed. It belongs to the pioneering phase of railway design (English Heritage 2011, 3) and for railway structures from this phase, most that pre-date 1840 will often be of **international significance** as being among the earliest railway structures in the world, and even partial survivals need to be assessed carefully for listing (ibid, 7). Unlike many other aspects of the early railway heritage, the bridge at Brusselton did not go through a process of alteration and adaptation because as a building type it was suitable for its purpose from the outset, having evolved from earlier bridges, aqueducts and viaducts. As the line fell into disuse and it was not required to accommodate larger vehicles (such as road bridges were) or larger farm machinery, it has avoided the loss of its arch. It is of the **considerable significance architecturally, archaeologically and historically** and this applies to the whole structure. Its association with the railway embankment, the stone sleepers and the rest of the buildings in Brusselton only serve to enhance this significance.

Based on historic photographs and the account of Vera Chapman (2005, 72), it is likely that there has been at least one earlier phase of repair works to the bridge, but this does not diminish its significance. It is extremely vulnerable in its current condition and the position of the stone sleepers on its surface is also precarious and they are at risk of being stolen.

Moving forward.....

The bridge requires repair as a matter of urgency. Based on a site visit, it is almost certain that the 1966 repairs were with cement, but the repairs did not extend across the entire bridge; the wing walls appear to be fixed with a lime mix. However some of the cement beneath the arch does not appear to be resulting in any erosion and so could be left. It is likely that local stone from Brusselton quarry was used to build the bridge and so similar sources will need to be found for any missing stonework. The Brusselton Incline Group have been donated stone from two different sources; one from a bridge at Stillington and one from a bridge at Bishop Auckland. The stone has been inspected and approved for use by the conservation officer from Durham County Council and the inspector from Historic England.³¹

³¹ Trevor Horner, Brusselton Incline Group pers comm.



Plate 17. The decking of the accommodation arch with the road bridge decking beyond. Stone sleepers scatter the surfaces of both structures and the view of the bridge structure below the parapet shows loose stonework needing resetting and pointing. This may have been carried out in 1966, based on Vera Chapman's account (2005, 72). The photograph is undated but the parapet appears to have been removed from the road bridge. The decking stonework appears to be loose and that is still the case today. (Photo: J.W Armstrong/ Armstrong Railway Photographic Trust: 0392-3B)



Plate 18. Photo of the Accommodation Arch possibly in the 1960s showing sleepers ex situ (DRO D/Ph 234/378-9. Not to be reproduced without permission from the DRO)

Specifications for the construction of the railway cuttings and embankments suggest that contractors were asked to put ballast on the surface and so it would be appropriate to resurface the bridge in ballast. The specifications did not state what the ballast should be made of, but quarry waste from Brusselton quarry or waste from coal mines seems most likely. Some limited exposure of the embankment surface near the cottages during recent clearance work uncovered stratigraphic layers of coal waste and limestone.³² This requires further research.

The sleepers that have been used as steps could remain as steps, or be extracted, replaced and the sleepers restored to the bridge deck. However if vandalism continues to be a problem, they may be better left where they are. If the cycle of vandalism is not to be repeated, consideration needs to be given to avoiding future harm. This is difficult because apart from West Thickly Farm (currently up for sale), there are no houses which overlook the site. If the bridge forms part of a well used national trail, then it may be better protected because it will be in the public eye more often. Alerting the local police to the site and its legal status and encouraging night time drive bys may also help to protect the site. A briefing note for the local police on the legal status of the S&DR generally may be of benefit.

The public footpath is broken by Brusselton Lane and safety fencing is located at the end of the incline to prevent walkers falling on to the road below. The fencing with the style adjacent to the bridge may also require repair or replacement. When considering new fencing, choices should be influenced by materials which cause the least visual intrusion, so that the eye can still be drawn along the line without interruption. Materials such as wire for the horizontal elements and wooden posts or black estate posts for the verticals might be a combination of practicality, visual unobtrusiveness and robustness.



Plate 19. Left: The damaged retaining walls show that they were made of dressed stone with a rubble core and that lime mortar was used. Right: The south parapet has been partially dismantled and the west end pushed over ready to topple. The foundations of the parapets and the stone decking are also exposed.

³² Trevor Horner, Brusselton Incline Group pers comm



Plate 20. Part of the parapet has been dislodged and toppled while the coping stones from one of the retaining walls have been removed.



Plate 21. Left: Sleepers have been reused to form the steps from the bridge to the road. Right: Sleepers have been dislodged and are being pushed to the edge. These were originally designed to be as large as 'one man' could carry and so are vulnerable to theft.

The sleepers

The use of sandstone blocks was initially limited to the section of line between Witton Park and Darlington; transporting the stone further afield was not considered economical,

although that would change once the railway was established.³³ The sleepers were quarried locally and in the case of those at Brusselton, they were sourced from a newly opened quarry at Brusselton. A temporary incline plane was established at the quarry to facilitate delivery (Rolt 2012). An advert in the Durham County Advertiser dated 25th February 1826 advertised the lease of the quarry as worked by the S&DR and producing 'every description of stones suitable for building purposes'. It was promoted as being close to the S&DR which offered cheap transit to Stockton and also passed through an area poor in building stone and thus a ready market was assured. Presumably the Company had less need for the quarry once the railway structures had been built.



Plate 22. Left: Some sleepers on the incline show markings caused by the rails. Centre: The earliest two hole sleeper. Right: the second phase four hole sleeper to provide greater stability

Each sandstone block weighed about 75lbs which was considered the optimum weight for handling by one man, but weighty enough to be robust. In fact, most sleepers are far heavier than can be lifted by one person in the 21st century! The rails were attached to the blocks by iron brackets (chairs), double nailed to the blocks. Boys at Brusselton Quarry were paid 8d a day for drilling two holes in 24 blocks.³⁴ However from the 1830s these blocks were replaced by heavier ones and the chairs were attached with four nails. This was to try to reduce the wobble and bending of the rails when in use. The sleepers on top of the bridge have been excavated and relaid and so may not be in their exact original positions (S&DR 150 R&P Committee 1975); indeed a photo possibly from the 1960s shows sleepers having tumbled down from the arch (see plate 19). Six sleepers are now in the National Railway Museum in York which were excavated from the Brusselton Incline during open cast works. One still has an iron chair attached.³⁵ These may have been from further down the line towards Broom Mill Farm where the open casting appears to have removed all traces of the Incline, but Hall (1961, 226) reported that the NCB excavated a trench across the incline between the stone bridges and the houses in 1956 and exposed a rail and jointing chair. Neither were typical of the S&DR types and would not fit the stone sleepers still visible on the line. The remains of wooden inserts were visible in the bolt holes. Two other chairs were also identified and these were of the typical type that would fit the stone sleepers. This suggests that beneath the surface, there may be three types of sleeper fixture providing a much more extensive chronology of the evolving railway.

³³ Two hole sleepers have now been found at Goosepool towards the east end of the line suggesting that stone replaced wood in some instances.

³⁴ Northern Echo 22.11.2014

³⁵ 1958-77/1-6 (no.5 has the iron chair attached)

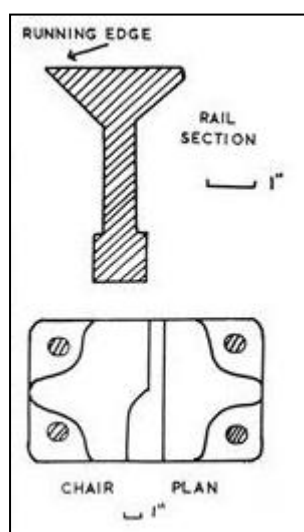


Figure 14. Plan of the chair and section of the rail uncovered on the incline in 1956 (Hall 1961, 226)

The significance of the sleepers

Stone sleepers have generally not survived well in situ beyond the Etherley and Brusselton inclines and so are nationally very rare. As a fixing type it was replaced and now there is only one two nail block visible at Brusselton on the incline, the rest are four nail, but this therefore still provides an example of the evolution of the early sleeper type still *in situ*. Further, a number of sleeper blocks, particularly on the restored section of embankment, also show wear caused by the rails and this adds to their **considerable historic interest**. The embankment and sleeper stones together also reflect the gauge of the railway that was first chosen by George Stephenson which was 4 feet 8 ½ inches (1,435 mm) and which was subsequently adopted as the standard gauge for railways, not only in Britain, but throughout the world. They therefore represent a major technological achievement that contributes towards their **considerable historic interest**. As with the other structures at Brusselton, they belong to the pioneering phase of railway heritage and so are considered to be **internationally and nationally important**.

Moving forward....

There are currently in the region of 306 stone sleepers exposed³⁶ and it is clear that they continue under the tarmac at Brusselton Cottages. The sleepers east of the cottages are not in their original positions and some are upside down; they may have been placed here in 1975 as part of the railway celebrations. Some thought also needs to be given to how the stone sleepers can be protected from theft. Applying fixings or setting them into a lime mixture may be damaging and would require lifting, resetting and be potentially expensive and ineffective. There is no easy answer, but as the importance of the S&DR railway increases in public knowledge, the monetary value of the sleepers will only increase. If future work is proposed to the decking of the bridge, some clearing of the surface should be carried out archaeologically in advance of the works and this should also attempt to assess whether sleepers are *in situ* or have been relaid and to explore whether they were originally fixed to the ground or set on top of it without fixing.

Boundary stone (NGR NZ 21178 25580)

Members of the Brusselton Incline group found a stone on the back of the south wing wall on the east side of the Accommodation Bridge. It is a square shape in plan with a domed top. The letter S is incised on one face and the letter R on the opposite side. The other two opposing faces are blank.

³⁶ Northern Echo 22.11.2014



Plate 23. Boundary stone from the Accommodation Bridge

The letter is similar in execution to the S&DR mile posts, but it appears to be marking the parish boundary which ran along the road. The 'R' probably relates to Redworth parish and the 'S' to Shildon parish.

Significance of the boundary stone

The position of the stone in the embankment suggests that it was set here by the railway company to mark the parish boundaries and may be a replacement for an earlier stone or is an earlier stone reset into the embankment. It is therefore very rare and should be considered to be part of the scheduled monument. It is an important aspect of its significance that it is located on the parish boundary with the letters in the correct positions to mark the sides of Redworth and Shildon parishes. It is therefore of **considerable historic interest**.

Moving forward...

Care will need to be taken to avoid harming the stone during any future works. There is a drain located next to the site of the stone and this will need regular cleaning out to maintain its function of draining the adjacent field. If the stone needs to be moved for any future works, it should be removed archaeologically so that its fixing can be recorded and then returned to its original position on the parish boundary. Vegetation needs to be controlled around the stone to prevent it becoming hidden which will make it vulnerable to accidental damage.

The Incline Embankment

Works to create the embankments and cuttings for parts of the line were costed by contractors in response to adverts to tender in September 1822.³⁷ However as the Brusselton stretch was part of Stephenson's revised route, work here may have been commissioned only after the Act of Parliament was approved in 1824. Works were certainly taking place in 1824 at Brusselton, because the tragic death of Thomas Lamb, aged 37 was reported in the Durham County Advertiser on the 21st February 1824. His death had been caused by earth and stones falling while he was working in a cutting near Brusselton and he left behind a wife and small family. The fact that it was a cutting means it was not at the site of the bridges but either further east or west, but was probably part of the same contract.

³⁷ PRO RAIL 667/893

Three sets of specifications survive in the PRO issued in 1822 and these may give some insight into the construction of the embankment at Brusselton which took place later. The North Lot was called Brusselton, but appears to have covered Witton southwards; the Middle Lot included Etherley and the ponds and Lot 10 included up to Cottage Row in Stockton on the quayside. The 1822 specifications for the works required contractors to build the embankments (or batteries as they were called) and cuttings and to include ballast. They were also to provide all materials. However structures such as bridges would be commissioned separately and the S&DR Company would themselves provide and fit stone sleepers, chairs, rails and ballast waggons. The specification for the North Lot stated that the battery was to be fourteen feet broad at the top (Brusselton is generally wider than this) and the sides to be an angle of 51 ½ degrees. The produce or waste from the cuttings was to be transported to places where batteries or embankments were required and the material used there. The works would be inspected every second Monday by the Company Engineer or his assistants.³⁸ Further information can be gleaned from historic photographs. Plate 10 shows the road bridge in the process of demolition. The exposed structure of the embankment can be seen and it appears to consist of terracing of stone filled with rubble and earth. The recent (2014) clearance of the incline revealed stratified layers on the surface of the embankment of fired coal and ash ballast over crushed limestone.³⁹

The boundary of the S&DR line was defined using (possibly 6,000) quicksets from Stockton to Darlington⁴⁰ and stone walls from Darlington to Witton. Receipts in the Public Records Office include payment for 'arch stones' possibly coping stones or dressed stonework for bridge or conduit arches, 'loads of wallers', and flag stones.⁴¹ The Act of Parliament specified that the line would not deviate more than 100 yards from the route shown in the plans (1823, para IV) and never into lands or grounds of persons not included in the accompanying Book of Reference. The earlier 1821 Act also specified that the breadth of the line would be no more than 15 yards except for passing places or for raising embankments, constructing cuttings or erecting warehouses, cranes or weighbeams. In such places, and where deliveries and loads were processed, the maximum width was to be 60 yards with no requirement for additional approvals from the landowner (1821 Act para IX).

The retaining walls to the embankment appear to be on the original location, although those on the north side of the incline leading towards the hamlet of Brusselton were conserved in 1992 by Sedgefield District Council with assistance from English Heritage. This is still in good condition (nearest the road to Brusselton) but the south side of the embankment has a retaining field wall which is in poor condition and no longer stock proof. Similarly the retaining walls nearest Low West Thickley Farm are also in poor condition and appear to have been rebuilt in the past using stone sleepers. There are different distinctive finishes to the coping along the retaining wall suggesting different phases of repair and alteration.

Photographs in the Ken Hoole collection⁴² show that until the 1960s the line also had a metal post with a cast iron metal diamond shaped top with ½ marked on it. This is a standard British Rail Eastern Region milepost marking a fraction of a mile. Whole miles were marked

³⁸ PRO RAIL 667/276

³⁹ Trevor Horner, Brusselton Incline Group pers comm

⁴⁰ PRO RAIL 667/448 quote dated 18.10. 1822

⁴¹ PRO RAIL 667/448

⁴² KH 914

with a square head.⁴³ The miles in this case were counted from the junction at Shildon. This was located half way up the incline between the stone milepost and the cottages. It is no longer on site. An iron rail was found towards the top of the incline near the cottages by the Brusselton Incline Group, but was interpreted as a reused rail positioned vertically.⁴⁴

Personal recollection also suggests that a platform existed east of Brusselton Cottages on the south side of the line.⁴⁵ There were also apparently localised excavations here which uncovered evidence of the platform and sidings.⁴⁶

The significance of the embankment.

As with the rest of the S&DR structures at Brusselton, the embankment belongs to the pioneering phase of the railway and so is **nationally and internationally important**. The embankment is further enhanced by its association with stone sleeper blocks, a milepost, and the accommodation bridge. The embankment survives well and is intact in this area and so the whole embankment at Brusselton is of **considerable historic interest**.

Moving forward....

The embankment is in good condition, but the retaining walls require consolidation where the earlier 1992 works did not extend to. It is relatively robust and should be able to withstand use by walkers, but intensive use by cyclists could cause damage through rutting. The presence of stone sleepers on the surface may also make it a less than ideal surface for cycling. As it was originally intended to use horses between the sleepers, it would seem ironic to exclude them from the embankment, but any such use would require considerable maintenance to top up the ballast and repair erosion. The current approaches are not suitable for horse traffic in any case.

The extent of the scheduling of the embankment does not reflect the national importance of the site and needs to be extended towards Brusselton village and as far as, and including, the Milk Bridge.

The cutting of the embankment east of Brusselton Cottage may be a result of 1975 landscaping and not be in a true position. As the sleepers are also in the wrong position, an archaeologically supervised machine excavated trench could establish the original profile of the cutting and provide an opportunity to correct it and reset the sleepers. It could also establish the location of the platform and sidings and ascertain if there is anything to conserve and expose.

S&DR milestone (NGR 421211 525585)

This is located on the north side of the incline upwards from the gap for Brusselton Lane. It is shown on the OS 1st and 2nd ed 25 inch maps as a milestone. The face is badly eroded, but presumably once had the miles from Stockton engraved on it (20 ¾?). It is located exactly three miles from Phoenix Row as the start of the line. It sits within the scheduled area and so is legally protected.

⁴³ Trevor Horner pers comm

⁴⁴ Trevor Horner pers comm

⁴⁵ Trevor Horner pers comm

⁴⁶ Slack and O'Neill 2015, 73 but unsourced



Plate 24. Photo dating to 1973 of the milestone with Win Proud. (Photo John Proud)



Plate 25. The milestone in 2015. Recent clearance works on the incline have restored its relationship with the stone sleepers

Significance of the Milestone

The survival of the milestone *in-situ* is extremely rare; further its association with the incline and sleepers and the remains of the Engine House mean that it is of **considerable historic interest**. As it appears to be *in situ*, it may be of **some archaeological interest** as any excavation around its base would reveal information on how such stones were fixed.

Moving forward....

It is extremely unusual for milestones to survive along the route and so it should be protected. The work to clear the line of vegetation has restored the historic association between the milestone and the incline, but this level of vegetation control needs to be maintained. The stone is potentially vulnerable to theft, although a substantial part of it should be buried below ground. If the grass is cut on the incline it may be vulnerable to

damage from trimmers and if stock escape on to the line (they do) it could be used as a rubbing post. It should be added to the County Historic Environment Record.

Milestone (NGR 421487 525515) and reused sleepers in garden walls

A milestone has been rebuilt into a garden wall near Brusselton Engine House. It is incised on one side with the letter S over the number 20 ½ and presumably marked the point 20 ½ miles from Stockton. Its current location is 20 ½ miles from Stockton and so has not travelled far from its original position. There are also a number of stone sleepers incorporated into the stone walls east of the cottages which may also include demolition material from the 1831 engine house and possibly North Row Cottages. The sleepers have been split through the middle so that the pin holes can be seen in section.



Plate 26. Left: milestone built into a garden wall. Right: sleepers have been split and reused in the garden walls

Significance of the milestone & reused sleepers

The original location of the milestone is not clear but the survival of such markers is rare on the S&DR line and so it should be protected. The reuse of the sleeper stones in the garden walls and the visible nature of the milestone all make a distinctive railway heritage contribution to the conservation area and are of **some historic and architectural interest**.

Moving forward...

The milestone is associated with Engine House which is listed. It is however well away from the proposed bridge repair works and will not be affected. It should be referred to in any listing revisions and both the milestone and the reused sleepers in the walls should be mentioned in any future conservation area appraisal in order to ensure that they continue to make a positive contribution to the area.

Possible car parking area

An area north of the incline and east of Brusselton Lane has been identified as a possible future car parking site which could be used by people wishing to visit the incline. There is no evidence that this area was ever used by the railway company and there is no evidence for subsequent use either. As the incline is an embankment at this stage, there is unlikely to be movement between the line and the surrounding lower land. The proposed parking area is beyond the retaining wall and it will not impact on S&DR land. There is an area of possible archaeological interest to the north where the road bends in a distinctive manner. There must be a reason why it does this, but it is no longer apparent. Any ground disturbance here might indicate what the road was seeking to avoid.

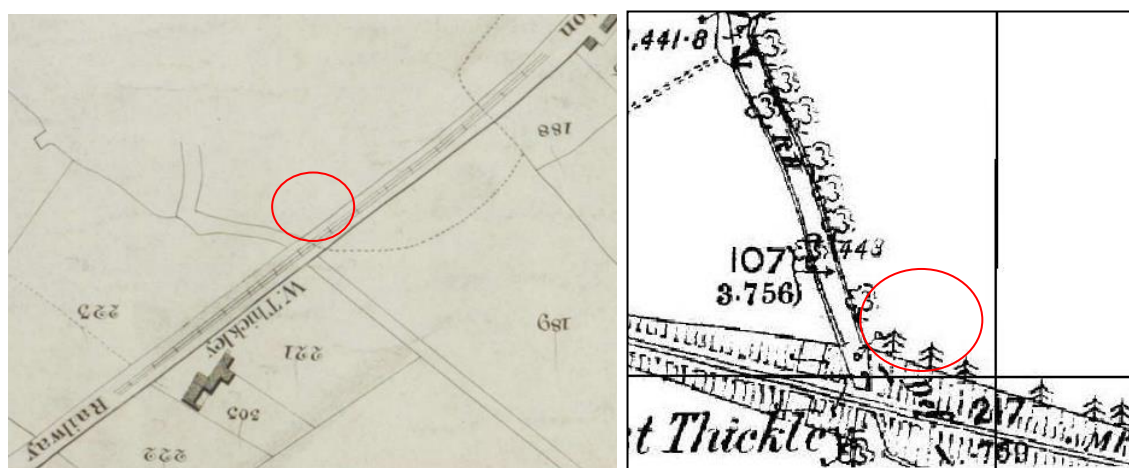


Figure 15. The 1838 tithe map and the 1st ed OS map shows no features at the site of the possible car park.

Conclusion

The status of the incline as a listed building and scheduled monument means that it is nationally important. Its early date means that the structures as a whole are part of the internationally important pioneering phase of railway development.

There are nineteen designated assets in England⁴⁷ that are related to inclines which is a relatively low number and includes assets associated with inclines such as bridges, canals and railways. This suggests that Brusselton, and by implication Etherley, are relatively rare designated assets. Their association with the Stockton & Darlington Railway adds to their national importance.

Brusselton is strongly associated with the evolution of the incline plane and the use of stationary engines adequate for the job of pulling large numbers of heavy wagons over much longer areas than had previously been used in mining operations. Because of the challenging terrain, they were the focus of technological achievements resulting from an arduous process of trial and error that concentrated on the locomotive power and the stability of the wagons. They consequently made a major contribution to the knowledge of how to construct an efficient railway system that would be adopted across the world. The combination of several different railway structures at Brusselton covering the first dynamic twenty years of rail travel adds to that importance.

⁴⁷ <http://historicengland.org.uk/listing> [accessed 10.11.15)

However the current extent of the scheduled monument does not reflect the importance of the incline. It stops considerably short of the visible incline and does not include the reservoir that fed the engines or the trackbed east of Brusselton, or the Milk Bridge. Indeed the reservoir and Milk Bridge, despite being nationally important, are not even recorded on the Historic Environment Record (HER). The scheduling should therefore be revisited and the data added to the HER. The Conservation Area covers a larger area than this report, but does not have the benefit of a conservation area appraisal. This should be rectified so that the significance of the conservation area is better understood and can be protected where the scheduling and listing does not offer any protection.

The incline is also of historic interest because it is supported by a wealth of archives, some of which (in London) have only been skimmed for this report. In addition to the archives in the Public Records Office, The Durham County Records Office, the Ken Hoole Collection and the National Railway Museum, there are historic photographs from the late 19th century in private ownership which capture its decline and disuse, various newspaper articles and private archives. Brusselton is also strongly associated with George and Robert Stephenson, Timothy and Jane Hackworth and other named enginemen and incline staff. Hackworth was an engineman at Brusselton; first moving to a newly built house with his wife Jane in 1825. He improved the engine design by George Stephenson and was responsible for the new engine house being built (HACK 1/1/4). The lessons that Stephenson and Hackworth learned here helped them to persuade the Liverpool and Manchester Railway, with some difficulty, to adopt the moveable locomotion engine, rather than be strangled by the ropes of a stationary engine.⁴⁸

The railway heritage is under threat despite the forthcoming 200th anniversary of the opening of the S&DR line. Celebrations to commemorate this event in 1875, 1925 and 1975 do not seem to have been enough to protect the line from ill informed damage, development and vandalism. The structures at Brusselton are therefore increasingly important as much for their rarity as the information they contain about a technological achievement that changed the face of the world.

The former road bridge, demolished despite a public outcry, exists largely as an archaeological site and therefore its special interest is archaeological rather than architectural. Given that photographs do exist of the bridge, combined with its measurements, we do know what form the bridge took however the poor condition of the adjacent retaining walls suggests that these may need to be consolidated. Further, the concrete render over the west scar where the bridge met the embankment may be damaging to any stonework beneath the surface and adjacent to it. There may therefore be a case to remove the concrete render and expose the scarring from the bridge while work is carried out to the retaining walls. This should be recorded archaeologically. The fact that the bridge was struck by large vehicles on more than one occasion and road widening was being discussed from at least 1928, suggests that rebuilding the bridge is not feasible at its original size. If it cannot be rebuilt to match the scale of the former bridge, it is questionable whether any future replacement bridge would need to reflect the design of the original at all. There are no heritage constraints why a new bridge could not be built here to accommodate users of a future rail trail, although some archaeological recording might be required depending on the design.

⁴⁸ NRM HACK 1/1/122

Additional research could try to determine why this bridge was of a more crude design than the adjacent accommodation arch and why distinctly different cuts of stone were used on the east side than the west.

The adjacent accommodation arch is however largely intact and as such is it an exceptionally rare survival on an early railway line and so its national, possibly international importance is assured. However, the bridge requires repair as a matter of urgency because of the persistent and damaging vandalism. Cement appears to have been used in repairs dating to the 1960s and may need removing, although in most places, it does not yet seem to be damaging the stonework. The vandalised wing walls appear to be fixed with a lime mix and so they have not yet been through a process of repair. The Brusselton Incline Group has been donated stone which has been inspected and approved for use by the conservation officer from Durham County Council and the inspector from Historic England.⁴⁹

Specifications for the construction of the railway cuttings and embankments suggest that contractors were asked to put ballast on the surface and so it would be appropriate to resurface the bridge in ballast. The specifications did not state what the ballast should be made of, but quarry waste from Brusselton quarry or waste from coal mines seems most likely and some limited disturbance in 2014 uncovered layers of limestone and coal ash near the cottages. The sleepers that have been used as steps could remain as steps, or be extracted, replaced and the sleepers restored to the bridge deck. However if vandalism continues to be a problem, they may be better left where they are. If the cycle of vandalism is not to be repeated, consideration needs to be given to avoiding future harm. Alerting the local police to the site and its legal status and encouraging night time drive bys may also help to protect the site. A briefing note for the local police on the legal status of the S&DR generally may be of benefit, but will regularly need to be updated to allow for staff changes in the local police force.

The public footpath is broken by Brusselton Lane and safety fencing is located at the end of the incline to prevent walkers falling on to the road below. The fencing with the footpath stile adjacent to the bridge may also require repair or replacement. When considering new fencing, choices should be influenced by materials which cause the least visual intrusion, so that the eye can still be drawn along the line without interruption. Materials such as wire for the horizontal elements and wooden posts or black estate rail posts for the verticals might be a combination of practicality, visual unobtrusiveness and robustness.

There are currently in the region of 306 stone sleepers exposed⁵⁰ on the site and it is clear that they continue under the tarmac at Brusselton Cottages. The sleepers east of the cottages are not in their original positions and some are upside down; they may have been placed here in 1975 as part of the railway celebrations. If future work is proposed to the decking of the bridge, some clearing of the surface should be carried out archaeologically in advance of the works and this should also attempt to assess whether sleepers are *in situ* or have been relaid and to explore whether they were originally fixed to the ground or set on top of it without fixing.

⁴⁹ Trevor Horner, Brusselton Incline Group pers comm.

⁵⁰ Northern Echo 22.11.2014

The railway embankment is in good condition, but the retaining walls require consolidation where the earlier 1992 works did not extend to. It is relatively robust and should be able to withstand use by walkers.

The cutting of the embankment east of Brusselton Cottage may be a result of 1975 landscaping and not be in a true position. As the sleepers are also in the wrong position, an archaeologically supervised machine excavated trench across the cutting could establish its original profile and provide an opportunity to correct it and reset the sleepers. It could also establish the location of the platform and ascertain if there is anything to conserve and expose.

There are a number of smaller heritage assets on the site and while the Brusselton Incline Group are well aware of them, future contractors and DCC officers may not be. These should be clearly shown on site plans and if necessary, fenced off during works in order to protect them. The parish boundary stone is vulnerable because it disappears under vegetation but is located on the south bank of the east side of the railway embankment where works to the site of the road bridge, or to the adjacent drain could cause damage. If it needs to be moved for any future works, the boundary stone should be removed archaeologically so that its fixing can be recorded and then returned to its current original position on the parish boundary.

Another small feature is an *in situ* milestone on the embankment; it is extremely unusual for milestones to survive along the route and so it should be protected. The work to clear the line of vegetation has restored the historic association between the milestone and the incline, but this level of vegetation control needs to be maintained. A second milestone is located in a garden wall at the Engine House. Future owners of the house will need to be made aware of the significance of this milestone and it should be specifically mentioned in both the listed building description and in any future conservation area appraisal. The wider area has a number of stone walls which incorporate the remains of sleepers. Some protection should be extended towards them in order to manage future works in a way that ensures that the sleeper stones continue to make a contribution towards the area's character.

An area has been identified as a possible future car parking site by the Brusselton Incline Group which could be used by future visitors to the site without causing disruption to local residents. There is no evidence that this area is of any special interest in relation to the railway heritage or any other aspect of the historic environment.

Bibliography

English Heritage 2011 *Designation Listed Selection Guide. Transport.*

Chapman, V 2005 *Around Shildon*

Hall, R 1961 'Brusselton Incline' in *Railway World* July 1961

Jeans, J. S 1974 *History of the Stockton and Darlington Railway*

Rolt, L T C 2012 *George & Robert Stephenson: The Railway Revolution*

Slack, G and O'Neill, M 2015 *The First Five Miles*

S&D.150 Research and Preservation Sub-Committee 1975 *Rail Trail* (leaflet)

Appendix 1

This assessment of significance includes an assessment of the nature, extent and level of significance of the heritage asset and how this helps to understand its significance. The nature of the heritage assets is divided into archaeological, architectural, artistic or historic interest (PPS 5, annex 2).

Within this report the following terms are used to define the level of significance and are designed to aid informed conservation and the need to balance heritage significance with the wider public benefit of the proposal which is the spirit of PPS5:

Considerable: aspects of the site considered as seminal to the archaeological, architectural, artistic or historic significance of the site, the alteration or development of which would destroy or significantly compromise the integrity of the site.

Some: aspects that help to define the archaeological, architectural, artistic or historic significance of the site, without which the character and understanding of place would be diminished but not destroyed.

Limited: aspects which may contribute to, or complement, the archaeological, architectural, artistic or historic significance of the site but are not intrinsic to it or may only have a minor connection to it, and the removal or alteration of which may have a degree of impact on the understanding and interpretation of the place.

Unknown: aspects where the significance is not clearly understood possibly because it is masked or obscured and where further research may be required to clarify its significance.

None: aspects which may make a negative contribution or a neutral contribution where its loss would make no difference to our understanding and interpretation of the place.