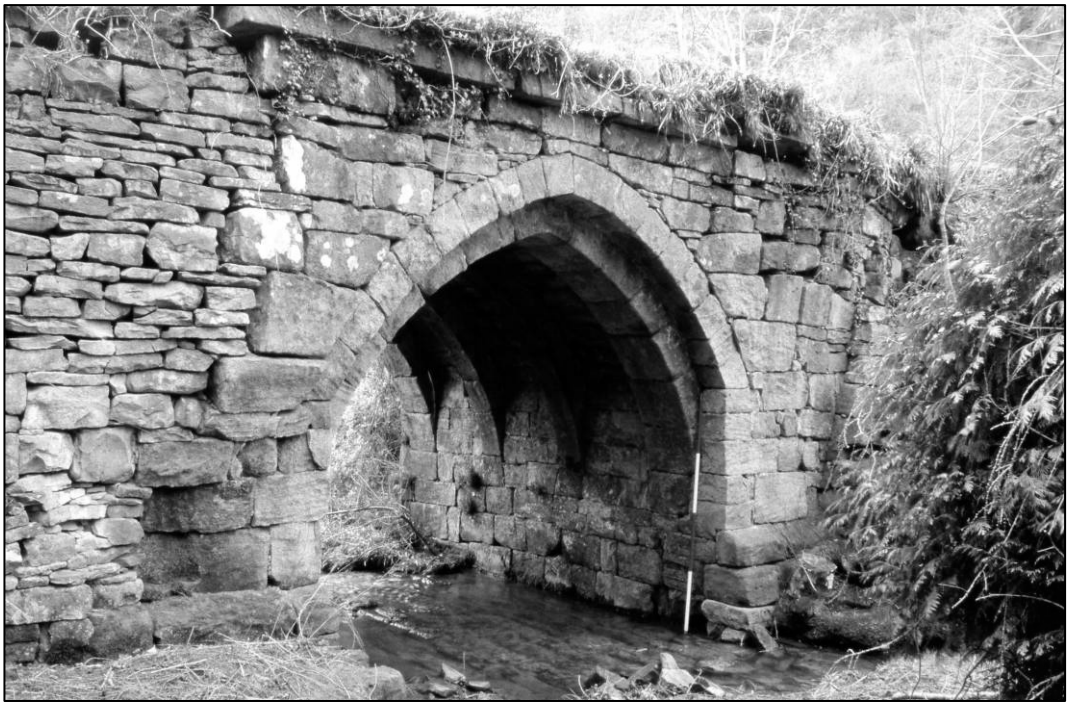
# BUTTERTON BRIDGE, SAWLEY, NORTH YORKSHIRE

## 2004 ARCHITECTURAL AND ECOLOGICAL SURVEY



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## EXECUTIVE SUMMARY

*In September 2004, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by Mr Peter Gaze Pace, project architect, on behalf of Mr J F G Pilkington and the Sawley Estate, to undertake an architectural and ecological survey of Butterton Bridge, Sawley, North Yorkshire (NGR SE 23838 66468) prior to and during a programme of proposed consolidation and repair. The architectural survey was intended to provide an initial pre-intervention survey of the structure, and would be augmented by additional recording once repair and consolidation was underway. The pre-intervention survey work was undertaken in 2004, but the proposed consolidation and repair scheme never materialised, and no funds were available to produce a survey report. This report has therefore been prepared by EDAS so that the results of the pre-intervention survey can be disseminated into the public domain.*

*Even in its current ruinous state, Butterton Bridge remains an important structure of more than local significance. Although currently isolated within the valley, the bridge formed part of the once extensive network of routeways connecting the various estates of Fountains Abbey, and it carried one of the principal routes from the abbey's mid-Nidderdale and Craven properties to Fountains Abbey itself; there is surviving earthwork evidence for this route to the east and west of the bridge, and possibly also for amendments to its course. In its existing form, the bridge is most likely to have been built either in the later 12th or first half of the 13th century, when the majority of building work took place at the Abbey itself, and it can be compared to a number of surviving examples within the Abbey precinct. The bridge would have been used by horse and foot traffic, as well as wheeled vehicles such as wagons.*

*The bridge is likely to have fallen out of use at the Dissolution when the abbey's estates, and the routes which formerly connected them, were broken up. However, there is some evidence that the visual appearance of the valley in which the bridge stands was enhanced by ornamental tree planting during the 19th century, possibly by the then owners, the Barran family. A number of impressive examples of specimen trees, especially Sequoia Wellingtonia, survive to the south-east of the bridge, closer to Fountains Abbey Road. Other landscape works may also have been undertaken in the gill during the 18th and 19th centuries, and it is possible that the bridge was incorporated into this scheme as a romantic landscape feature. It may have been renovated or repaired during this period, and such works could explain the differences seen in the masonry of the bridge and some of that facing the abutments to either side.*

*The ecological survey established that there was evidence for a substantial colony of summer roosting bats, which were preliminarily identified as Natterer's bats Myotis natteri. The size of the colony suggests that it is a maternity roost and, as such, forms one of only a cluster of known Natterer's colonies in North Yorkshire. The roost is considered to be of high local (County) ecological importance. None of the flora recorded at the site is particularly rare, and most of the species recorded are relatively widespread throughout Britain. The plant communities are considered to be of low local (Parish) ecological value.*

# 1 INTRODUCTION

## Reasons and Circumstances of the Project

1.1 In January 2004, Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by Mr Peter Gaze Pace, project architect, on behalf of Mr J F G Pilkington and the Sawley Estate, to undertake an architectural and ecological survey of Butterton Bridge, Sawley, North Yorkshire prior to and during a programme of proposed consolidation and repair. The survey work was intended to provide an initial pre-intervention survey of the bridge, and would be augmented by additional recording once repair and consolidation was underway. The pre-intervention survey work was undertaken, as well as an ecological survey but, despite a specification being written (Pace 2005), the proposed consolidation and repair scheme never materialised, and no funds were available to produce a survey report. This report has therefore been prepared by EDAS so that the results of the pre-intervention survey can be disseminated into the public domain.

1.2 The extent of the survey work was defined following discussions between Peter Gaze Pace, Giles Proctor (English Heritage, now Historic England) and EDAS, but no formal methods statement was produced. The architectural survey work roughly equates to a Level 3 analytical record as defined by English Heritage (2006, 14), and includes drawn, photographic and written elements.

## Site Location and Summary Description

1.3 Butterton Bridge is located within Picking Gill, c.1.6km south-west of the village of Sawley, and some 4km south-west of Fountains Abbey, in North Yorkshire (NGR SE 23838 66468) (see figures 1 and 2); the stream through the gill is named on historic maps as Hebden Wood Beck. It lies in the modern civil parish of Sawley (North Yorkshire), at an elevation of c.175m AOD. The bridge lies within the privately-owned Sawley Estate, but is accessible via the public footpath which runs across it. Vehicle access is also possible along a forest track which has a junction with Fountains Abbey Road to the south-east; estate vehicles can also pass over the bridge itself. The bridge spans the beck in the base of Picking Gill, but has long approach abutments to either side, which cross the densely wooded slopes of the valley (see plate 1). The bridge and surrounding area was overgrown with vegetation (principally grass, brambles, ivy and bracken) at the start of the pre-intervention survey, although this was subsequently removed from one side.

1.4 The bridge is variously ascribed a 12th, 13th or 14th century date (*http://www.pastscape.org.uk/hob.aspx?hob_id=51947*; Proctor 2003, 2). It once formed part of the extensive network of medieval routeways connecting the estates of Fountains Abbey, and carried one of the principal routes from the mid Nidderdale and Craven properties of the abbey to Fountains Abbey itself; it is suggested to have become redundant after 1539 (Moorhouse 2003, 196 & 198). There is also some evidence that the visual appearance of the valley in which the bridge stands was enhanced by ornamental tree planting during the 19th century, and it is possible that the bridge itself underwent some renovation in either the 18th or 19th centuries as part of this scheme (Historic England SM Description). However, it is not believed that the bridge has undergone any repairs in recent history.

1.5 Butterton Bridge and part of the abutments to either side are a Scheduled Monument (NY 335; National Heritage List for England 1004202). The bridge is included in Historic England's National Monuments Record (site SE26NW4) and

the North Yorkshire Historic Environment Record (site MNY7306). It is also on English Heritage's most recent 'Heritage at Risk Register', where it is described as being in 'poor' condition and priority C (slow decay; no solution agreed) (English Heritage 2014, 38). Finally, the bridge and its landscape setting lie within the Nidderdale Area of Outstanding Natural Beauty.

## 2 SURVEY METHODOLOGIES

2.1 The aims of the project were to produce a detailed pre-intervention architectural and ecological record of the bridge, to provide baseline information which could then be used to inform future repair and consolidation strategies. As noted above, the extent of the survey work was defined following discussions between Peter Gaze Pace, Giles Proctor (Historic England) and EDAS, but no formal methods statement was produced.

2.2 It was also intended that the pre-intervention survey work would be enhanced by additional recording prior to and during the repair and consolidation work (e.g. from scaffolding erected for the work). However, no repairs or consolidation work were ever carried out, and no finance was available for any reporting of the pre-intervention surveys. As a result, some elements of the survey methodologies were necessarily curtailed, and are neither as detailed nor as extensive as they would have been had the project been carried through to completion.

### Architectural Survey

*Documentary Research and Collation*

2.3 Although Fountains Abbey itself (both in its own right and as part of the later Studley Royal landscape) has been subject to much previous research (e.g. Coppack 2006), as have its estates in the Yorkshire Dales (e.g. Moorhouse 1989), the intermediate landscape setting of the Abbey is less well understood. Although no new primary research was undertaken for this report, use has been made of any readily available secondary sources.

*Architectural Survey*

2.4 An accurate plan of the bridge and its abutments, at ground level, was produced at a scale of 1:100 using a combination of EDM total station equipment and traditional and electronic hand-held measuring techniques. This plan shows all significant detail such as blocked or unblocked openings, as well as structural earthworks and other features. The south side of the bridge was especially obscured by vegetation, and so it was planned to record this in greater detail once it had been removed. However, this never took place, and so it was not possible to record the earthworks forming the south side of the abutments to the same level as those on the north side. A plan, again at a scale of 1:100, was made of the features in the base of the stream bed beneath the bridge. No wider topographical survey of the bridge's landscape setting was required to be undertaken as part of the original proposed works.

2.5 The north elevation of the bridge, and both sides of the internal tunnel or vault, had accurate stone-by-stone elevations produced at a scale of 1:50, again using a combination of total station (Trimble 5600) equipment and traditional and electronic hand-held measuring techniques. Initially, a large number of measurements were taken using the total station, prior to vegetation being removed from the elevations, to provide an accurate base to be hand-enhanced after the vegetation had gone.

However, as the vegetation was only removed from the north elevation, the south elevation was never hand-enhanced.

2.6 All the major elevations and other features were photographed from vantage points as nearly parallel as possible to the elevation within the constraints of the site, and photographs were also taken of significant detail. A more general external photographic record was also made which included oblique general views of the bridge showing it within its setting.

2.7 Black and white photographs were taken using a medium format camera, and a total of 23 shots were taken, and printed to a size of 170mm by 120mm (7" x 5"). A total of 36 35mm colour slides were also taken. National photographic guidelines were followed (English Heritage 2006, 10-12) and, subject to access and other safety considerations, all photographs contain a graduated scale; artificial lighting was used as necessary. Each photograph has been catalogued and indexed, and then scanned for electronic reproduction; the resulting photographic record appears as Appendix 1. The original photographs have been deposited with the site archive (see below).

2.8 The initial on-site architectural survey was carried out on 11th March 2004, with the subsequent hand-enhancement on 8th-9th and 16th-17th September 2004.

*Written Report*

2.9 The results of the site survey work have been used to produce this EDAS archive survey report, which is illustrated by reduced versions of the survey drawings and a selection of photographic plates.

**Ecological Survey**

*Desk-top Study*

2.10 Consultation was undertaken with the following relevant statutory and non-statutory nature conservation organisations:

- English Nature;
- North Yorkshire Bat Group; and
- The North Yorkshire SINC Panel (2002)

Existing information from the North Yorkshire Bat Group regarding bat roosts within a 5km radius of the site was collected and assessed.

*Bat Surveys*

2.11 A survey of the bridge, its stonework and vegetation was undertaken on 22nd June 2004, and this was followed by a nocturnal exit survey on 27th August and a nocturnal hand net survey on 29th August 2004.

2.12 The bridge was systematically searched for bat droppings, live bats, and any other signs beneath potential bat roost sites. These included the open joints between the stones of both the south and north elevations, although extensive plants had colonised, and hence obscured, many of the spaces between the stonework on the south elevation. It also included a thorough search of all the stonework of the vault and stonework above the water – the most likely place for a bat roost.

2.13 A dusk and nocturnal exit survey was undertaken to estimate the size of the summer bat roost and any nearby foraging activities. Two surveyors with bat

detectors were positioned at the north end of the bridge between 8.15-9.35pm. The aim was to count any bats leaving the bridge and to subsequently record the foraging activities of bats close to the bridge. Each surveyor had a hand-held heterodyne bat detector tuned to between 40-60kHz and 20-40kHz respectively. The aim of the detectors was to record the foraging activity of the most common species in the vicinity of the bridge. These are the common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, *Myotis* spp. (these include Daubenton's bat, *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, Whiskered bat *Myotis mystacinus*, Brandt's bat *Myotis brandtii*, and Bechstein's bat *Myotis bechsteinii*), Noctule bat *Nyctalus noctula*, Leisler's bat *N. leslerii* and Brown long-eared bat *Plecotus auritus*. The habitat requirements for some of the rarer species, detectable at frequencies outside 20-60kHz, were not included in this foraging survey.

2.14 The subsequent hand-net nocturnal survey was undertaken to further determine the species of bats that were roosting at Butterton Bridge.

*Phase 1 Habitat Survey*

2.15 Phase 1 Habitat Survey target notes for Butterton Bridge were collected on 22nd June 2004, using the standard methodology devised by English Nature (1993). These provide information on the species composition and structure of plants recorded, evidence of management, habitats too small to map and transitional or mosaic habitats. Plant nomenclature follows that used by Stace (1997).

2.16 It must be noted that plants identified from a single field survey undertaken in mid-summer are unlikely to record every species which may occur on a site. For example, it is often very difficult to identify early spring flowers from only the vegetative features that are subsequently visible in late June. Nonetheless, sufficient detail on the composition of the vegetation was obtained to enable it to be characterised and assessed.

*Report*

2.17 An unedited version of the ecology survey report (Holloway 2005) appears as Appendix 2, while relevant results are incorporated into Chapter 5 below.

**Project Archive**

2.18 An archive for the project, comprising paper, magnetic and plastic media, has been prepared and indexed according to the standards set by Historic England (EDAS site code BBS 04). This was deposited with the North Yorkshire County Record Office on the completion of the project.

## 3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

**Introduction**

3.1 As has been noted above, although Fountains Abbey itself (both in its own right and as part of the later Studley Royal landscape) has been subject to much previous research (e.g. Coppack 2006), as have its estates in the Yorkshire Dales (e.g. Moorhouse 1989), the intermediate landscape setting of the Abbey is less well understood. No new primary research was undertaken for this report, but use has been made of any readily available secondary sources.

**The Medieval Period**

3.2 Butterton Bridge is variously ascribed a 12th, 13th or 14th century date (*http://www.pastscape.org.uk/hob.aspx?hob_id=51947*; Proctor 2003, 2). Although currently isolated within the valley, it formed part of the once extensive network of medieval routeways connecting the estates of Fountains Abbey, and it carried one of the principal routes from the mid-Nidderdale and Craven properties of the abbey (including Warsill grange to the immediate south-west) to Fountains Abbey precinct (Moorhouse 2003, 196 & 198; *http://cistercians.shef.ac.uk/fountains/lands/lands20.php*). William de la Gressuner held land in Sawley at the turn of the 13th/14th century, and had granted the abbot of Fountains and his successors the right to obtain stone in the area for their abbey. In 1502 John Norton, then Lord of Sawley, granted the abbot free entry and exit over all his land, and an easement in all his quarries to get stone (Chandler 2005, 3). It therefore seems likely that the bridge was also connected with the movement of stone to the abbey.

3.3 The name 'Butterton' is thought to stem from the 'Butterdene', mentioned in a 12th century charter of Fountains Abbey (Historic England SM Description; Wood 1946, 27). The bridge is often referred to as 'Monk's Bridge', but it is also known as 'Devil's Bridge' where robbers laid in wait for travellers (Chandler 2005, 133). The bridge is suggested to have become redundant after 1539 (Moorhouse 2003, 196), although the routeway remained in use on a more localised basis, and foot and horse traffic must have continued to pass over it.

**The Post-Medieval Period**

3.4 Detailed research into the ownership and history of Picking Gill during the post-medieval period lies beyond the scope of this report, although it is appropriate to summarise some available information to place the bridge into its later context. Sawley remained with the Nortons of Norton Conyers until they lost their estates through their involvement in the 'Rising of the North' in 1569, although Edmund Norton of Cloubeck does not appear to have been implicated and so was allowed to settle at Sawley, and he originated the Sawley branch of the family (Chandler 2005, 3-4). A Mrs Norton was still resident at Sawley Hall at the time the 1799 enclosure plan was drawn up, but the hall and estate, comprising some 1,549 acres, were later sold in 1827 to Henry Wormald Esq, although the hall was occupied by other family members and tenants. Around the turn of the 19th-20th century, the hall and estate was bought by the Barran family; Sir John Barran (1821-1905) was a Liberal politician and prominent clothing manufacturer from Leeds who was created a baronet in 1895 (Jenkins 2004). He was succeeded by his 33 year old grandson, Sir John Nicholson Barran (1872-1952), also a Liberal politician, and he and his wife employed at least 18 people on the estate which by 1936 comprised some 3,000 acres (Chandler 2005, 12).

3.5 Jefferys' plan of Yorkshire, printed in 1771, names the bridge as 'Butring Bridge' while the Sawley enclosure plan of 1799 (reproduced by Chandler (2005)), shows and names 'Butterton Bridge' together with the annotation 'Road 12 Feet wide'. This latter plan also names the stream in the gill as 'Hebden Wood Beck'.

3.6 There is some evidence that the visual appearance of the valley in which Butterton Bridge stands was enhanced by ornamental tree planting during the 19th century, presumably by the Barran family. A number of impressive examples of specimen trees, especially *Sequoia Wellingtonia*, survive to the south-east of the bridge, closer to Fountains Abbey Road. Although it is suggested that the appearance of landscape parks generally did not significantly alter in the 19th century (Williamson

1995, 163), there was an increased variety of parkland planting, with horse chestnut and lime rivalling oak and beech in many parks; more exotic trees such as Wellingtonias were also a frequent introduction of this period, and these new species were sometimes massed in the form of an arboretum or pinetum around a house (Klemperer 2010, 40).

3.7 The 1854 Ordnance Survey 6" map (sheet 136), a large sub-rectangular pond is shown slightly further up Picking Gill, to the north of the bridge. This is still extant, and has a substantial earth dam at its southern end; it is named as 'Low Fish Pond' on the modern maps (see figure 2). It is not known if this pond forms part of an ornamental scheme created by the Barran family, but it is possible that the bridge itself underwent some renovation in the 19th centuries as part of the same scheme (Historic England SM Description). The bridge is marked as 'Butterton Bridge' in 1854, and the track/path leading to and from it is clearly visible.

## 4 ARCHITECTURAL DESCRIPTION AND DISCUSSION

### Introduction

4.1 Butterton Bridge is described below, beginning with its wider landscape setting, location and plan form, the structure and materials, then proceeding to external elevations and the interior form of the tunnel/vault. The description refers to the various plans, and to the external and internal elevations (see figures 3 and 4). Throughout the following description, reference is made to the photographic record which appears as part of Appendix 1; a selection of the photographs has also been used to illustrate this report. Finally, the bridge and associated abutments are aligned slightly north-east to south-west; however, for the purposes of this description, they will be considered to have an east-west alignment.

### Landscape Setting

4.2 As has already been noted above, the bridge is located within the central part of Picking Gill, a steep-sided wooded valley with a beck running along its base (see plate 1). The gill is aligned broadly north-west/south-east; the beck which runs down its base, and which the bridge crosses, has three tributaries, one running from the large pond to the north, and two entering the Gill from the west, along two smaller valleys, one marked as 'Black Dike' in 1854. Further to the south-east, the beck becomes the Hebden Beck.

4.3 On the west side of the bridge, the route is apparent as a well-defined trackway and has a junction with another trackway, well-graded and up to 6.0m wide. The trackway does not appear to have been used recently by vehicles, and it follows the contour of the west side of the valley as it runs south-eastwards. It is not shown in 1854, but does appear on modern Ordnance Survey mapping, running into Hebden Wood West. Returning to the main route, this continues westward, curving around the north side of a disused quarry. This quarry has working faces standing up to 1.5m high, with widely separated bedding planes. To the west of the quarry, the line of the track is indistinct, and when it re-emerges, there are two possible routes, one above the other, but both following the contour as it curves around to the south-west. The upper route is terraced into the natural slope, and in places appears to be two parallel trackways. The better defined of the two is up to 4.0m wide, and has a decayed, drystone wall of large blocks surviving intermittently to the upslope (south) side; in places, worn paved trods are also visible. Further south-west, the upper route comes to resemble a holloway, up to 2.0m deep. The lower route is initially formed by a spread trackway, terraced into the natural slope

and up to 6.0m wide. As it curves first to the north-west and then to the south-west, running parallel to the beck below, it narrows to between 2.0m-3.0m in width; the beck is very overgrown in this area, but there appears to be a millstone rough-out lying in its base. As the lower route begins to climb the natural slope, it becomes a holloway, up to 4.0m wide and 2.0m deep. Both the upper and lower routes converge towards a field wall; they were not followed south of the field wall, but both are visible as earthworks beyond it.

4.4 To the east of the bridge, the main route follows the eastern abutment, until its line is crossed by the aforementioned vehicle trackway running up the east side of Picking Gill. Beyond the trackway, it is probable that the route ran along the top of a steep south-east facing scarp, with disused quarries above and below. The line of the scarp is crossed by another vehicle trackway, which has a spur to the north-east which appears to carry on the scarp's line. After crossing the field wall marking the boundary of the wooded area on this side of the gill, the line of the main route may be continued as an existing public footpath. Some 450m to the north-east of the gill, the footpath passes the base of Lacon Cross, which marked the boundary of the route towards the abbey precinct itself (*http://cistercians.shef.ac.uk/fountains/lands/lands20.php*).

**The Bridge**

4.5 Taken as a whole, both abutments and the bridge have a total length of 48.0m, although the western abutment accounts for almost 32.0m of this alone; the abutments have the appearance of a raised causeway (see figure 3). The grass-covered western abutment was constructed by dumping earth as a linear bank out from the west side of the valley towards the beck, and then facing it with stone. As noted above, the western abutment is almost 32.0m long (see plate 2). Across the top, it has an average width between the stone facings of 7.70m, although this probably increases to c.8.50m at the base due to the batter of the facings. The facing stands to a maximum height of 3.20m immediately adjacent to the bridge, but is generally less than 2.20m high. It is built of roughly coursed and squared stone rubble, largely unmortared. The top of the western abutment is relatively level, sloping slightly down towards the bridge; there is no visible evidence of paving or any other surface, although there are two well-defined modern vehicle ruts. The junction between the masonry of the bridge and that of the abutments to either side is staggered and rather crude, suggesting several different phases of repair and rebuilding.

4.6 The bridge itself comprises a single two-centred arched span; each face or elevation of the arch is of two orders, and is built of relatively well squared and coursed local gritstone, with traces of a lime mortar in places. On the north face or elevation (elevation 1 - see figure 4), both sides of the base of the arch rise from a chamfered offset (see plate 3). To the east of the arch, there is a section of very thinly coursed stone (although there appear to be levelling courses of deeper stone within this), set back slightly from the arch face. In turn, this has a slightly projecting area of collapse at its east end. To the west of the arch, there is a projecting pier of stone, possibly the remnants of a buttress (see plate 4). The uppermost course over the arch is formed by a square projecting stringcourse; there is no surviving parapet, but the stringcourse may once have carried one. The south face or elevation of the bridge appears to be similarly constructed, with the remnant of a projecting buttress to the east of the arch (see plate 5). The maximum north-south width across the top of the bridge is 5.50m, including any parapet walls that may have been present.

4.7 The span has an average east-west width of 3.45m and a maximum height of 3.60m internally above the base of the beck. The tunnel, or more properly vault, is supported by four rectangular-cut pointed ribs which die into the responds; the outer ribs are 0.55m wide, whereas the inner ribs are only 0.30m wide, but all stand 0.25m proud of the vault (elevations 2 and 3 - see figure 4) (see plates 7 and 8). The gap between the ribs is 0.95m. All parts of the bridge appear to be built of local gritstones; the ribs and voussoirs of the arch are well dressed and of relatively large dimensions, as are the lower parts of either side of the vault, while the stones of the vault arch are more thinly coursed (see plate 6). The lowest course of the vault on either side projects very slightly, and rests on a bed of smooth rectangular stones or cobbles, laid north-south along the bed of the beck. The northern edge of these stones corresponds with the north face or elevation of the bridge, and so they were almost certainly laid to form a base upon which to erect the structure, rather than forming the remains of an earlier ford, for example. Beyond the south face of the bridge, the stones are set north-south, and slope gently downwards away from the bridge to form a small weir. No masons' marks or putlog holes were noted on the bridge during the course of the field work, although there are several recesses/sockets in the vault, set above the level from which the ribs spring, which may once have housed the wooden centring or form over which the vault was constructed.

4.8 The grass-covered eastern abutment, although much shorter than that to the west, is of similar form. At the top, it has an average width between the stone facings of 6.70m, although this probably increases at the base due to the batter of the facings. The facing stone stands to a maximum height of 3.30m immediately adjacent to the bridge, but is generally less than 2.20m high. It is built of roughly coursed and squared stone rubble, largely unmortared. The top of the eastern abutment is relatively level, sloping slightly down towards the bridge; there is no visible evidence of paving or any other surface, although there are two well-defined modern vehicle ruts.

**Discussion**

4.9 There are two key time periods which would clearly benefit from more detailed research in terms of considering the bridge as part of a wider landscape rather than in isolation.

4.10 The first is the period after the founding of Fountains Abbey up to the Dissolution. The bridge formed part of an important route, connecting the abbey's properties in mid-Nidderdale and Craven to the abbey precinct itself. As such, it may have partly made use of a pre-existing route, or only developed fully as the Nidderdale and Craven properties were acquired or gained in importance. Throughout the medieval period, the route may have been modified on a local basis to cope with erosion or weathering. The earthworks noted to the west of the bridge may be evidence for a slight change in course when one branch became too worn or too poor to traverse in bad weather, or was perhaps found to be unsuitable for heavily laden horses; multiple parallel holloways, the course shifting many times, are a common feature on packhorse routes, particularly where they ascend or descend slopes. It is assumed that Butterton Bridge took both horse and foot traffic. It is certainly strong enough to have also carried wheeled vehicles such as wagons, and the substantial abutments to either side (assuming that they are contemporary with the bridge) suggest that it was originally designed to do so, as they provide a level approach to the bridge. This level approach and overall strength of the bridge might well reflect the fact that an important part of the traffic across it included the transport of stone from quarries to the west to the abbey precinct to the east.

4.11 In terms of date, the bridge is variously ascribed to the 12th, 13th or 14th centuries. It has been described as 'a duplicate of the bridge at the west end of the Abbey' (Historic England SM Description), presumably referring to the bridge close to the West Gate. In overall form, it is also similar to the bridge leading to the mill in the Abbey precinct, although this is of two spans, with both the orders and ribs being chamfered. It therefore seems most likely that Butterton Bridge was built either in the later 12th century or in the first half of the 13th century, when the majority of building work took place at the Abbey itself. The bridge could have replaced an earlier crossing point, such as a ford or wooden bridge, but this may not necessarily have been the case, and it may well have been built in stone from the start. The bridge would have been maintained by the Abbey throughout the medieval period, and it is possible that, had the entire structure been able to be recorded in detail, medieval repairs may have been differentiated from those of later periods.

4.12 The second key time period is the 19th century. As has been already noted, there is some evidence to suggest that the visual appearance of Picking Gill was enhanced during this period, possibly both by planting and landscape works, and presumably by the Barran family. Butterton Bridge may well have been incorporated into this as a romantic landscape feature (Historic England SM Description), and as such may have been renovated or repaired as part of the same scheme. Such works might explain the differences between the masonry of the bridge and some of that facing the abutments to either side.

## 5 RESULTS OF ECOLOGICAL SURVEY

### Introduction

5.1 An unedited version of the ecology survey report (Holloway 2005) appears as Appendix 2, while the results have been incorporated below for completeness. The ecology survey report also includes a section on the impact of the proposed repair and consolidation works at the bridge, and provides appropriate recommendations for mitigation measures.

### Consultation

5.2 The North Yorkshire Bat Group had only one record for Pipistrelle *Pipistrellus sp.*, at The Old Rectory in Sawley village (NGR SE 245 679) on 4th September 1985. The group note that there are very few records of bats around Butterton Bridge, largely due to its location in extensive woodland which has not been surveyed. However, due to its proximity to Fountains Abbey, where all eight North Yorkshire species are known to roost, the group believes that Butterton Bridge should have a good bat roost potential.

### Roosting and Foraging Bats

5.3 An inspection of the stonework on 22nd June 2004 revealed no signs of bats in any part of Butterton Bridge. However, during the exit count undertaken on 27th August 2004, a total of 31 bats were recorded. Of these, 15 bats emerged from under the bridge between 8.30pm-9.00pm, and the next 16 bats emerged from the bridge between 9.00pm-9.15pm. Two, very cursory, examinations of the vault during the exit survey (to minimise disturbance to bats as they emerged from their roost) revealed, each time, a single bat emerging from one of the crevices. The pink snouts and pointed tragus of the two bats that were visible indicated that they

could be Natterer's *Myotis natteri* or Daubenton's *M. daubentonii* bats. The size of the colony suggested that it was a maternity roost.

5.4 The exit survey indicated that most of the bats were emerging from a single exit hole, under the bridge. However, a subsequent hand-held net survey undertaken on 29th August 2004, revealed that bats emerged from a range of exit holes within the stonework under the bridge. Nevertheless, both surveys did indicate that the bats mostly emerged from the open-jointed stonework over the water, at the southern end of the bridge. No bats were caught for species identification.

5.5 The subsequent foraging survey of bats in the immediate vicinity of Butterton Bridge, on the evenings of 27th and 29th August 2004, recorded frequent feeding activity of *Myotis spp.* bats, identified as mostly either Natterer's *Myotis natteri* and/or Daubenton's *M. daubentonii* bats. The behaviour of the feeding bats, foraging at a height of between 1m-5m in the vicinity of the bridge, and never skimming over the water (which is a characteristic of Daubenton bats), suggest that these bats were Natterer's bats *Myotis natteri.*

**Phase 1 Habitat Survey**

5.6 Plate 2 of the ecology report shows the location of maidenhair spleenwort *Asplenium trichomanes* in one of the damp crevices between the stonework above the beck, and this plant was scattered throughout such crevices immediately above the beck. These plants are virtually confined to shaded habitats on base-rich substrata (Grime *et al* 1988), and such conditions have developed as a result of the crumbling mortar at Butterton Bridge. Along the water's edge, still directly under the bridge, were more hydrophyllic ferns such as male fern *Dryopteris felix-mas,* ladies fern *Athyrium felix-femina* and broad buckler fern *Dryopteris dilatata*. Finally, occasional wood melick *Melica uniflora* was also noted in the stonework just above the water, towards the base of the southern end of the bridge. These plants are exclusively a species of woodland and other shaded habitats on freely draining substrates.

*Target Note Information*

Target Note 1 (see Plate 3 of Appendix 2)

5.7 The main footpath over the turfed bridge (c.1m wide) was dominated by rye-grass *Lolium perenne*. The predominance of this species suggests that the sward here has been specially sown on prepared soils. Other herbs noted here were tormentil *Potentialla erecta*, greater plantain *Plantago major*, ragwort *Senecio jacobea*, daisy *Bellis perennis* and chickweed *Stellaria media*. Moving towards the edge of the deck a greater variety of herbs, often more characteristic of shady areas with base-poor soils, were noted. These included great woodrush *Luzula sylvatica*, self-heal *Prunella vulgaris*, bluebell *Hyacinthoides non-scripta*, and greater stitchwort *Stellaria holostea*. Other less common grasses and herbs noted were common bent *Agrostis capillaris*, rough meadow-grass *Poa trivialis*, creeping soft-grass *Holcus mollis,* creeping buttercup *Ranunculus repens*, bramble *Rubus fruticosus,* lesser burdock *Arctium minus* and nettle *Urtica dioica*.

Target Note 2 (see Plate 4 of Appendix 2)

5.8 Larch *Larix decidua,* an introduced species commonly planted in forestry and parks, and occasional hazel *Corylus avellana,* covered the gentle slopes adjacent to the north of Butterton Bridge at this location. Larch needles had largely

smothered, and hence precluded, the development of woodland ground flora. Nevertheless, occasional herbs recorded were bluebell *Hyacinthoides non-scripta*, honeysuckle *Lonicera periclymenum* and seedling pedunculate oak *Quercus robur*. Rhododendron *Rhododendron ponticum,* another non-native plant, was also present in the understorey.

Target Note 3 (see Plate 4 of Appendix 2)

5.9 Bracken *Pteridium aquilinum* dominated the slopes to the south of Butterton Bridge at this location. Sapling pedunculate oak *Quercus robur* was also noted.

Target Note 4 (see Plate 4 of Appendix 2)

5.10 Non-native, invasive, Rhododendrons *Rhododendron ponticum* had extensively naturalised the slopes to the south of Butterton Bridge. Other shrubs and competitive plants noted included hazel *Corylus avellana*, mountain ash *Sorbus aucuparia*, sycamore seedlings *Acer pseudoplatanus,* elder *Sambucus nigra*, birch *Betuala spp.* and bracken *Pteridium aquilinum*. Further west evergreen spruces *Picea spp.* dominated the canopy.

Target Note 5 (see Plate 5 of Appendix 2)

5.11 Similar vegetation recorded to that described in Target Note 2 above. Additional herbs recorded included great woodrush *Luzula sylvatica*, wood sage *Teucrium scorodonia,* hard-fern *Blechnum spicant*, seedling holly *Ilex aquifolium*, broad buckler fern *Dryopteris dilatata*, ladies fern *Athyrium felix-femina* ivy *Hedera helix* and foxglove *Digitalis purpurea*. Sitka spruce (a non-native evergreeen tree) and rhododendron *Rhododendron ponticum* were noted in the flora further west.

Target Note 6 (see Plate 6 of Appendix 2)

5.12 Similar vegetation to that described in Target Note 1 above (along the edge of the bridge deck) was recorded on the loose stonework of the bridge, although extensive strands of ivy *Hedera helix* also trailed over these south-facing walls. Additional plants that were recorded were foxglove *Digitalis purpurea*, bilberry *Vaccinium myrtillus* and hard-fern *Blechnum spicant*. These plants are mostly found on acidic soils.

Target Note 7 (see Plate 5 of Appendix 2)

5.13 Several hydrophyllic ferns, including male fern *Dryopteris felix-mas*, ladies fern *Athyrium felix-femina* and broad buckler fern *Dryopteris dilatata* occurred on the damp soil beside the stream at this location. Other hydrophillic plants noted here were wavy bitter-cress *Cardamine flexuosa*.

**Nature Conservation Value of Butterton Bridge**

*Bats*

5.14 The exit survey at Butterton Bridge provides evidence of a substantial colony of summer roosting bats, which were preliminarily identified as Natterer's bats *Myotis natteri*. The size of the colony suggests that it is a maternity roost and, as such, forms one of only a cluster of known Natterer's colonies in North Yorkshire. Indeed, there are only around 25 known roosts of Natterer's bats *Myotis natteri*

within the whole of Yorkshire. For these reasons the summer roost at Butterton Bridge is considered to be of high local (County) ecological importance.

*Flora*

5.15 None of the flora recorded at Butterton Bridge is particularly rare, and most of the species recorded are relatively widespread throughout Britain. Nevertheless, the bridge supports an interesting juxtaposition of herbs characteristic of acid woodland in North Yorkshire as well as plants more suited to shady, calcareous, conditions (North Yorkshire SINC Panel 2002). For example, plants characteristic of acid woodlands occurring on the south-facing walls of the bridge include hard-fern *Blechnum spicant*, bluebell *Hyacinthoides non-scripta*, honeysuckle *Lonicera periclymenum*, great woodrush *Luzula sylvatica*, bilberry *Vaccinium myrtillus* and seedling pedunculate oak *Quercus robur*. At the same time, plants that were found in the crumbling limestone mortar are restricted to more base-rich conditions. The latter include maidenhair spleenwort *Asplenium trichomanes* and wood melick *Melica uniflora*, both of which were restricted to the shaded stonework above the water. Together these plant communities are considered to be of low local (Parish) ecological value.

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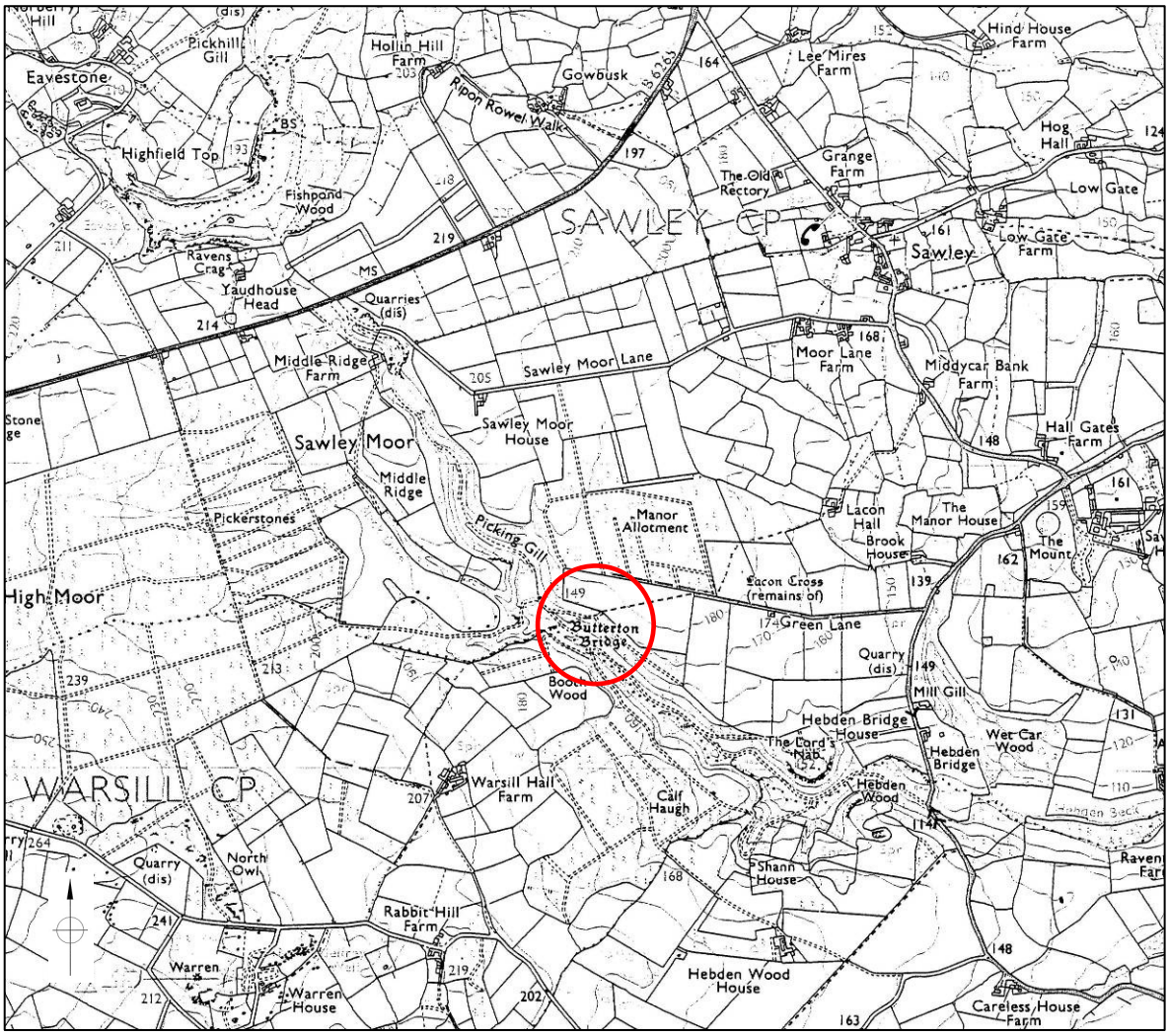
*http://www.pastscape.org.uk/* - Historic England's PastScape Archive

## 7 ACKNOWLEDGEMENTS

7.1 The architectural and ecological survey was commissioned by Mr J F G Pilkington and the Sawley Estate, through Mr Peter Gaze Pace, project architect, with funds provided by English Heritage (now Historic England). EDAS would like to thank both individuals, and Mr Giles Procter (Historic England) for their help during the survey work. The costs of producing the survey report and archive was covered by EDAS.

7.2 The initial EDM survey was carried out by Shaun Richardson of EDAS and Benchmark Surveys of Leeds, while the building recording was by Shaun Richardson and Richard Lamb. The black and while photographs were taken by Stephen Haigh. The ecological survey was undertaken by Madeline Holloway of Ecological Information Network Consultants (EINC). The final report was produced by Ed Dennison, and the responsibility for any errors or inconsistencies remains with him.

data and/or information contained in this survey report, although this will not unreasonably be withheld.



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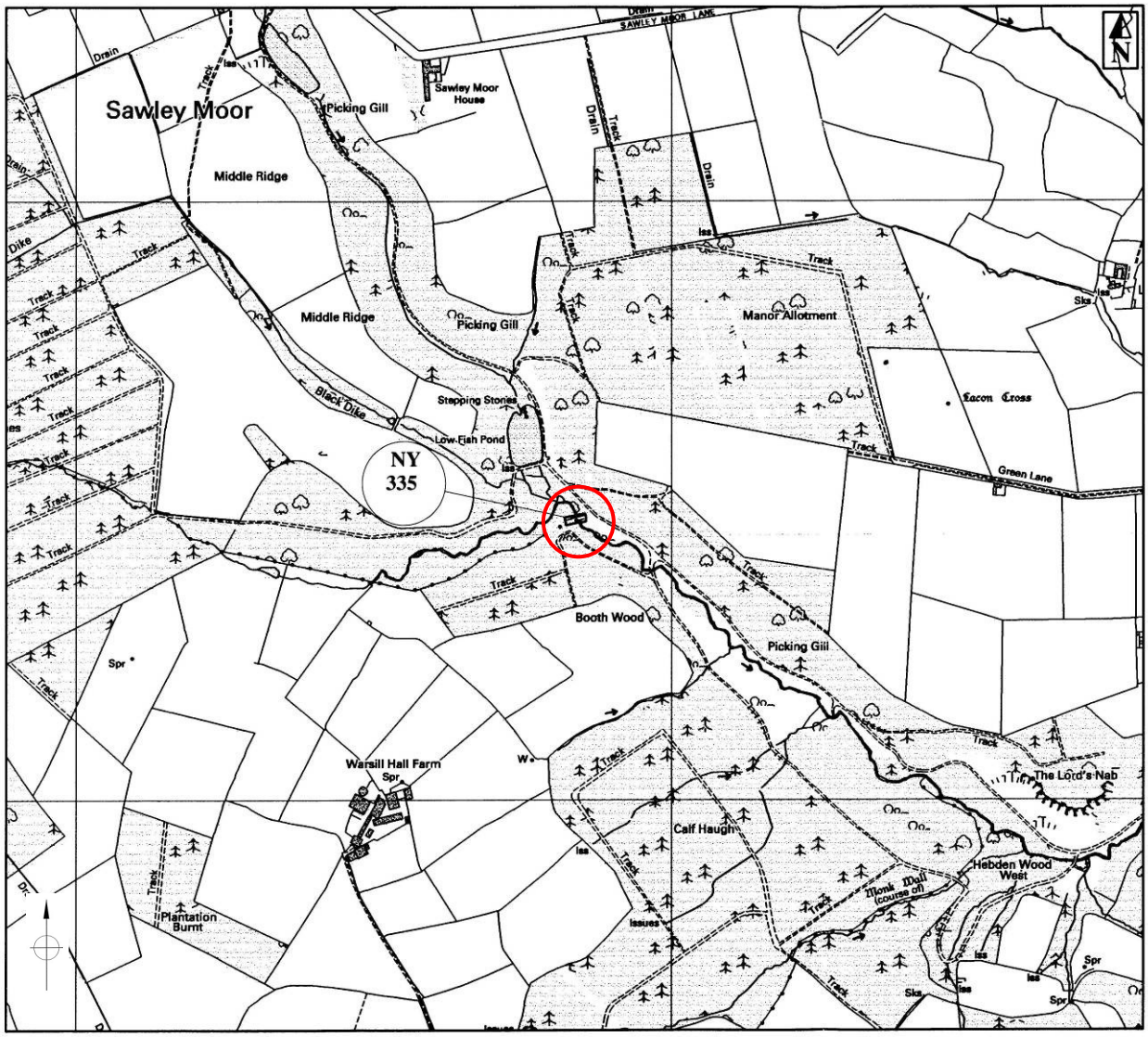


Map extract taken from Historic England's Scheduled Monument description (NHLE 1004202).

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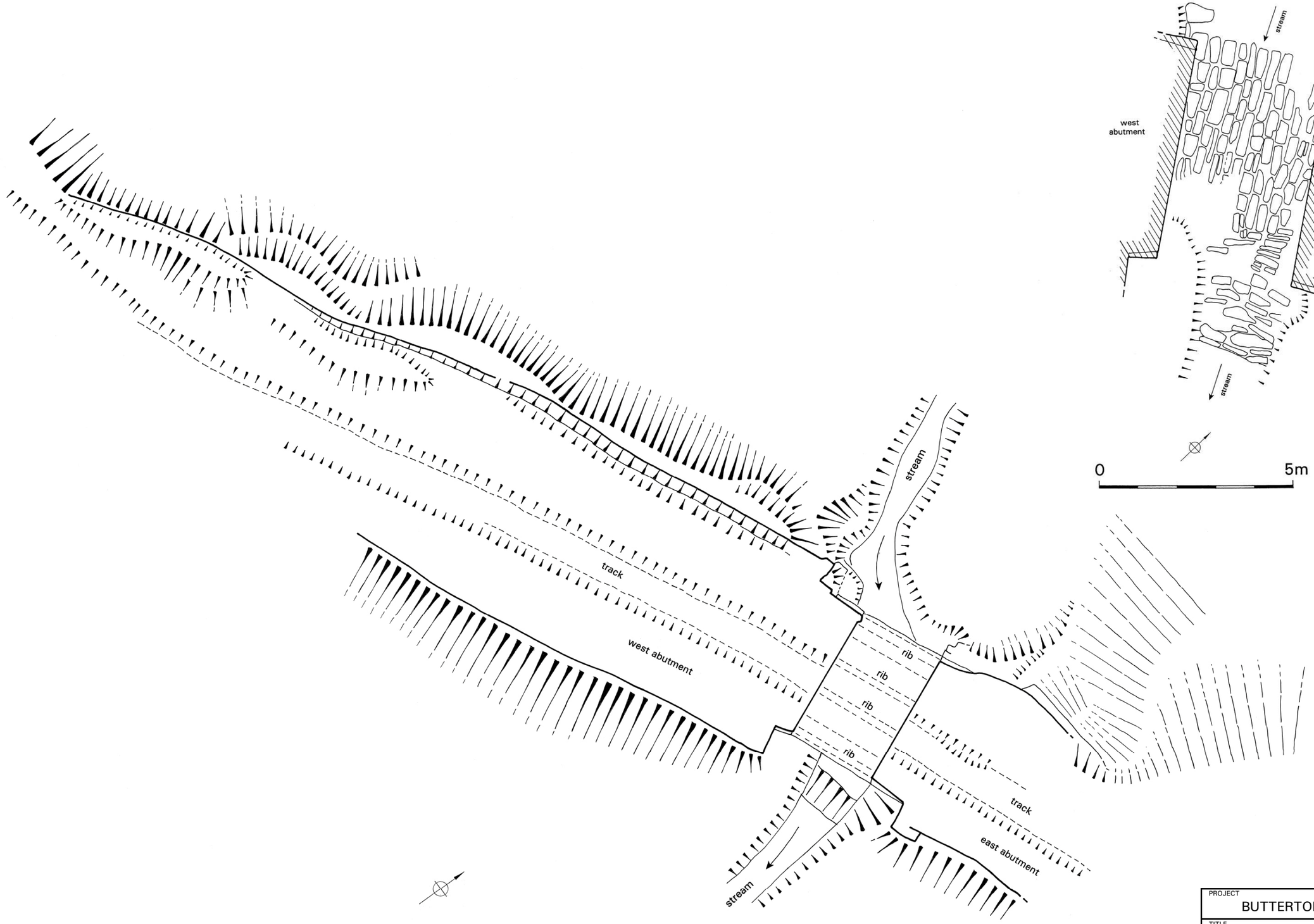


Survey data September 2004.

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| EDAS | FIGURE: 3 |

| PROJECT | |
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| BUTTERTON BRIDGE, SAWLEY | |
| TITLE | |
| ELEVATIONS | |
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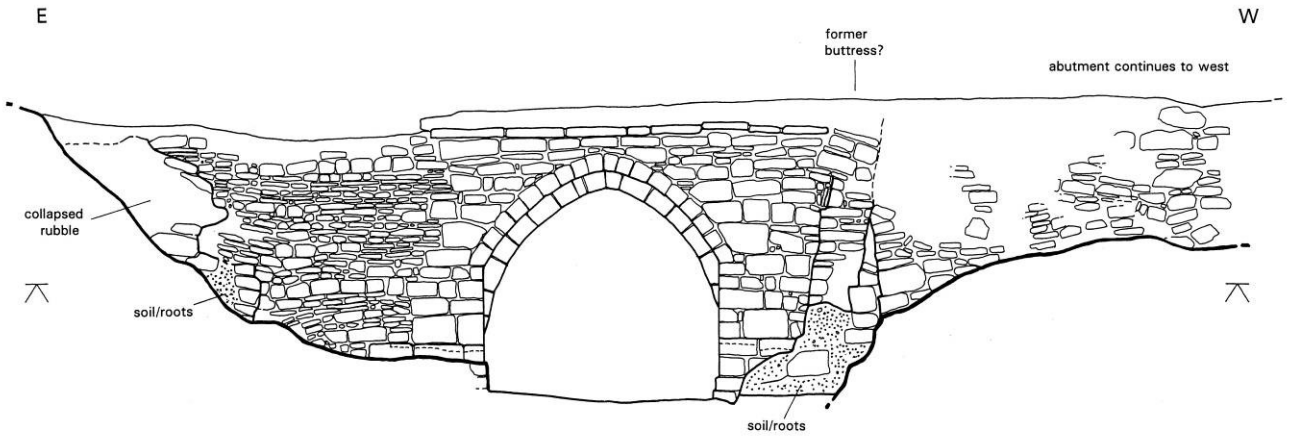
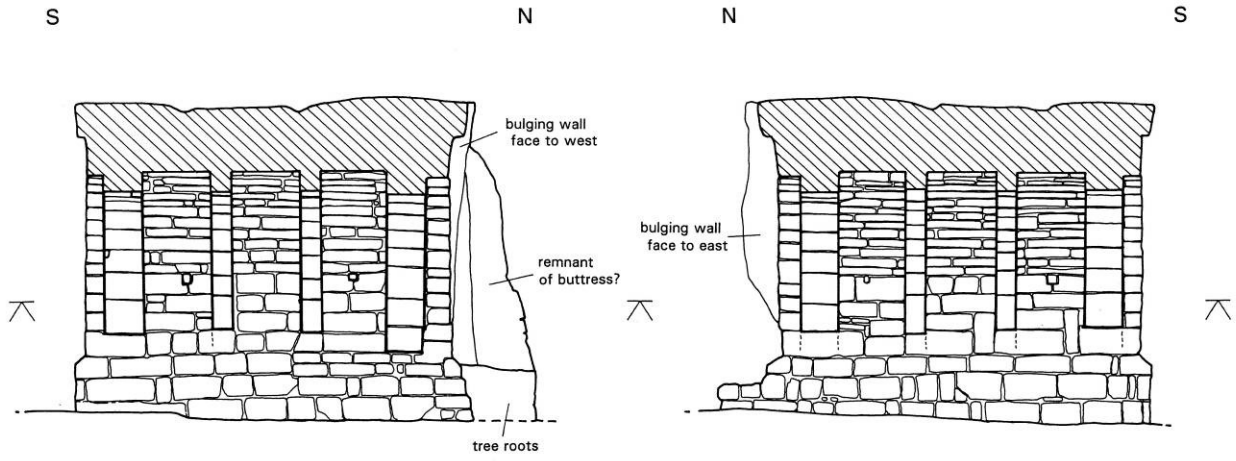
| EDAS | FIGURE<br>4 |

Survey data September 2004.




Elevation 1: North side of bridge


Elevation 2: West side of vault

Elevation 3: East side of vault

Plate 1: Butterton Bridge, general view, looking N (photo 1/09).

Plate 2: View along top of west abutment, looking W (photo 1/07).

Plate 3: Butterton Bridge, north elevation, looking SW (photo 4/03).

Plate 4: Butterton Bridge, west side of north elevation, looking SW (photo 3/37).

Plate 5: Butterton Bridge, south elevation, looking NE (photo 3/23).

Plate 6: East internal side of vault, looking SE (photo 3/36).

Plate 7: West internal side of vault, looking W (photo 5/4117).

Plate 8: Upper east internal side of vault, looking E (photo 5/4119).

# APPENDIX 1
# PHOTOGRAPHIC RECORD

**BUTTERTON BRIDGE PHOTOGRAPHIC CATALOGUE**

Film 1: Black & white medium format photographs taken 11th March 2004
Film 2: Black & white medium format photographs taken 11th March 2004
Film 3: Colour 35mm slides taken 11th March 2004
Film 4: Colour 35mm slides taken 11th March 2004
Film 5: Colour 35mm slides taken 17th September 2004

| *Film* | *Frame* | *Subject* | *Scale* |
|---|---|---|---|
| 1 | 01 | West internal side of vault, looking W | 2m |
| 1 | 02 | Internal apex of vault, showing ribs, looking S | - |
| 1 | 04 | East internal side of vault, looking E | 2m |
| 1 | 05 | East internal side of vault, looking E | 2m |
| 1 | 07 | View along top of west abutment, looking W | 2m |
| 1 | 08 | View along top of east abutment, looking E | 2m |
| 1 | 09 | Bridge, general view, looking N | 2m |
| 1 | 11 | Bridge, south elevation, looking N | 2m |
| 1 | 12 | Bridge, south elevation, looking NE | 2m |
| 1 | 14 | Bridge, east side of south elevation, looking NE | 2m |
| 1 | 15 | Bridge, south elevation, looking N | 2m |
| 1 | 17 | Bridge, south elevation, looking NW | 2m |
| 1 | 18 | Bridge, south elevation, looking NW | 2m |
| | | | |
| 2 | 03 | West internal side of vault, looking W | 2m |
| 2 | 05 | East internal side of vault, looking E | 2m |
| 2 | 06 | West internal side of vault, looking W | 2m |
| 2 | 07 | East internal side of vault, looking SE | 2m |
| 2 | 08 | West internal side of vault, looking SW | 2m |
| 2 | 10 | Bridge, west side of north elevation, looking SW | 2m |
| 2 | 11 | Bridge, north elevation, looking SW | 2m |
| 2 | 12 | Bridge, north elevation, looking S | 2m |
| 2 | 14 | West abutment, looking S | - |
| 2 | 16 | Bridge, east side of north elevation, looking S | 2m |
| | | | |
| 3 | 19 | View along top of west abutment, looking W | 2m |
| 3 | 20 | View along top of east abutment, looking E | 2m |
| 3 | 21 | Bridge, general view, looking N | 2m |
| 3 | 22 | Bridge, south elevation, looking N | 2m |
| 3 | 23 | Bridge, south elevation, looking NE | 2m |
| 3 | 24 | Bridge, east side of south elevation, looking NE | 2m |
| 3 | 25 | Bridge, east side of south elevation, looking NE | 2m |
| 3 | 26 | Bridge, south elevation, looking NW | 2m |
| 3 | 27 | Bridge, south elevation, looking NW | 2m |
| 3 | 28 | Bridge, south elevation, looking NW | 2m |
| 3 | 29 | West internal side of vault, looking W | 2m |
| 3 | 30 | West internal side of vault, looking W | 2m |
| 3 | 31 | East internal side of vault, looking E | 2m |
| 3 | 32 | East internal side of vault, looking E | 2m |
| 3 | 33 | West internal side of vault, looking W | 2m |
| 3 | 34 | West internal side of vault, looking W | 2m |
| 3 | 35 | East internal side of vault, looking SE | 2m |
| 3 | 36 | East internal side of vault, looking SE | 2m |
| 3 | 37 | Bridge, west side of north elevation, looking SW | 2m |
| | | | |
| 4 | 03 | Bridge, north elevation, looking SW | 2m |
| 4 | 04 | Bridge, north elevation, looking S | 2m |
| 4 | 05 | Bridge, north elevation, looking S | 2m |
| 4 | 06 | West abutment, looking S | - |
| 4 | 07 | West abutment, looking S | - |
| 4 | 09 | East internal side of vault, looking E | 2m |
| 4 | 10 | East internal side of vault, looking E | 2m |
| 4 | 11 | Internal apex of vault, showing ribs, looking S | - |

| | | | |
|---|---|---|---|
| 4 | 12 | Bridge, south elevation, looking NW | - |
| 4 | 13 | East abutment, looking N | - |
| | | | |
| 5 | 4112 | Detail of west side of north elevation, looking SW | - |
| 5 | 4113 | West side of north elevation, looking SW | - |
| 5 | 4114 | Detail of stonework on east side of vault, looking SE | - |
| 5 | 4115 | Detail of stonework on east side of vault, looking SE | - |
| 5 | 4117 | West internal side of vault, looking W | - |
| 5 | 4118 | Upper west internal side of vault, looking W | - |
| 5 | 4119 | Upper east internal side of vault, looking E | - |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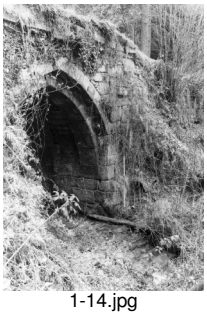
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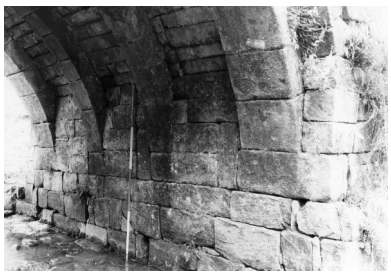
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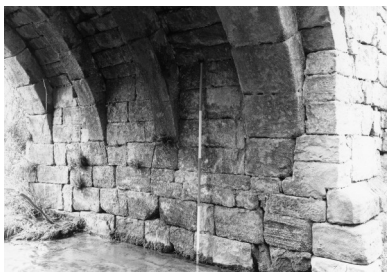
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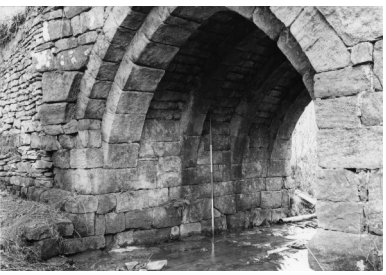
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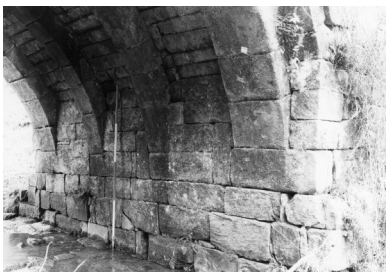
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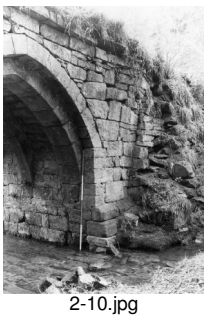
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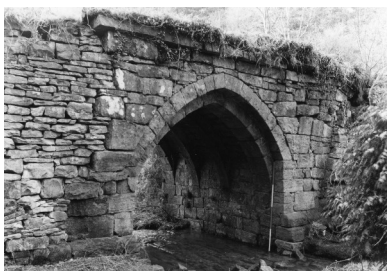
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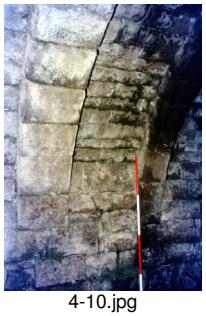

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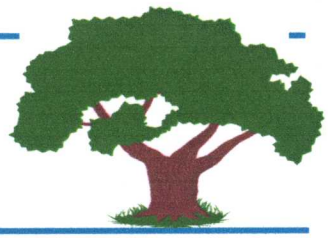
**APPENDIX 2**
**ECOLOGY REPORT**

EINC
Ecological Information
Network Consultants



# BUTTERTON BRIDGE
# NORTH YORKSHIRE

Ecology Report
(Final)

February 2005

Dr. Madeline Holloway, 19 Farfield Road, Shipley, Bradford, BD18 4QP. Phone/Fax 01274 598839. E-mail: holloway597@btinternet.com

# ECOLOGY REPORT



## PLATES

# 1 INTRODUCTION

1.1 EINC was commissioned by Ed Dennison Archaeological Services Ltd in February 2004 to undertake an ecological survey of Butterton Bridge, Sawley Estate, North Yorkshire. This report outlines the method of survey work undertaken and describes the current baseline conditions with respect to flora and flora, considering both consultation and field survey information. The aim of this report is to provide the basic information required for an evaluation of the flora and fauna at Butterton Bridge according to their national, regional, district, parish or local ecological value. This is used to inform the impact of the proposed consolidation of the structure and the recommended mitigation measures.

1.2 Below is provided a summary of the legislation pertaining to bats, a protected species that is likely to roost at Butterton Bridge, and general background information.

***Legislation***

1.3 All species of bats are protected under Regulation 38 of The Conservation (Natural Habitats, etc.) Regulation 1994 (Schedule 2) (the legislative instrument for implementation of the EU Habitats and Species Directive) and under Section 9 of the Wildlife and Countryside Act 1981 (as amended by Schedule 5). A bat roost is defined as 'any structure, or place, which is used for shelter or protection', irrespective of whether or not bats are resident. The Regulation and Act of Parliament makes it illegal to deliberately kill, damage, take or disturb bats, or to destroy, damage or obstruct access to a bat roost. The UK is also a signatory to the Agreement on the Conservation of Bats in Europe (under the Bonn Convention). This Agreement places obligations on the Government to protect important bat roosts or foraging areas.

# 2 METHODOLOGY

## *2.1 Desktop study*

2.1.1 Consultation was undertaken with the relevant statutory and non-statutory nature conservation organisations: -

- English Nature
- North Yorkshire Bat Group
- The North Yorkshire SINC Panel (2002)

2.1.2 Existing information from the North Yorkshire Bat Group regarding bat roosts within a 5km radius of the site was collected and assessed.

## *2.2 Field Survey*

*Bat Surveys*

2.2.1 A survey of the bridge, its stonework and vegetation, was undertaken on 22nd June 2004 and this was followed by a nocturnal exit survey on 27th August followed by a nocturnal hand net survey on 29th August 2004. At this time of

year bats will be in their summer roosts and evidence of their presence includes:

- Visible bats
- Audible bats
- Staining – where sites are used heavily by bats the wood around the roost entrance may become stained with oil from the bats fur. Scratches on the wood and wood worn smooth by the passage of bodies would also be used as evidence where this was attributable to bats rather than roosting or nesting birds
- Droppings – bat droppings in crevices, stuck to walls below suitable crevices, and on the ground below suitable crevices. However, the presence of running water below the vault (where bats are most likely to roost) largely precludes this method of detection.

2.2.2 The bridge was systematically searched for bat droppings, live bats, and any other signs beneath potential bat roost sites. These included the open-joints between the stones of both the south and north elevations, although extensive plants had colonised, and hence obscured, many of the spaces between the stonework on the south elevation. It also included a thorough search of all the stonework of the vault and stonework above the water – the most likely place for a bat roost.

2.2.3 A dusk and nocturnal exit survey was undertaken on 27th August 2004, to estimate the size of the summer bat roost and any nearby foraging activities. Two recorders with bat detectors were positioned at the northern end of the bridge between 8.15 – 9.35pm. The aim was to count any bats leaving the bridge and to subsequently record the foraging activities of bats close to the bridge. Each surveyor had a hand-held heterodyne bat detector tuned to between 40 - 60 KHz and 20 - 40 kHz respectively. The aim of the detectors was to record the foraging activity of the most common species in the vicinity of the bridge. These are the common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, *Myotis* spp. (these include Daubenton's bat, *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, Whiskered bat *Myotis mystacinus*, Brandt's bat *Myotis brandtii*, and Bechstein's bat *Myotis bechsteinii*), Noctule bat *Nyctalus noctula*, Leisler's bat *N. leslerii* and Brown long-eared bat *Plecotus auritus*. The habitat requirements for some of the rarer species, detectable at frequencies outside 20 – 60 KHz, were not included in this foraging survey.

2.2.4 A subsequent hand-net nocturnal survey was undertaken on 29th August 2004, to further determine the species of bats that were roosting at Butterton Bridge.

*Phase 1 Habitat Survey*

2.2.5 Phase 1 Habitat Survey target notes for Butterton Bridge were collected on 22nd June 2004, using the standard methodology devised by English Nature (English Nature 1993). These provide information on the species composition and structure of plants recorded, evidence of management, habitats too small to map and transitional or mosaic habitats. Their location is shown in Plates 3 - 6. Plant nomenclature follows that used by Stace (1997).

2.2.6 It must be noted that plants identified from a single field survey undertaken in mid-summer is unlikely to record every species which may occur on a site.

For example, it is often very difficult to identify early spring flowers from only the vegetative features that are subsequently visible in late June. Nonetheless, sufficient detail on the composition of the vegetation has been obtained to enable it to be characterised and assessed.

# 3 RESULTS

## *3.1 Consultation*

3.1.1 The North Yorkshire Bat Group had only one record for Pipistrelle *Pipistrellus sp.* at The Old Rectory, Sawley (GR SE245679) on 4/9/1985. The group note that there are very few records of bats around Butterton Bridge, largely due to its location in extensive woodland which has not been surveyed. However, due to its proximity to Fountains Abbey, where all eight North Yorkshire species are known to roost, the group believes that Butterton Bridge should have a good bat roost potential.

## *3.2 Bats*

*Roosting and foraging bats*

3.2.1 An inspection of the stonework on 22nd June 2004 revealed no signs of bats in any part of Butterton Bridge. However, during the exit count undertaken on 27th August 2004 a total of 31 bats were recorded. Of these, 15 bats emerged from under the bridge between 8.30pm and 9.00pm, and the next 16 bats emerged from the bridge between 9pm – 9.15pm. Two, very cursory examinations of the vault during the exit survey (to minimise disturbance to bats as they emerged from their roost) revealed, each time, a single bat emerging from the crevice shown in Plate 1. The pink snouts and pointed tragus of the two bats that were visible during this exercise indicated that they could be Natterer's *Myotis natteri* or Daubenton's *M. daubentonii* bats. The size of the colony suggested that it was a maternity roost.

3.2.2 The exit survey indicated that most of the bats were emerging from a single exit hole, under the bridge (Plate 1). However, a subsequent hand-held net survey undertaken on 29th August 2004, revealed that bats emerged from a range of several exit holes within the stonework under the bridge (Plate 2). Nevertheless, both surveys did indicate that the bats mostly emerged from the open-jointed stonework over the water, at the southern end of the bridge. No bats were caught for species identification.

3.2.3 The subsequent foraging survey of bats in the immediate vicinity of Butterton Bridge, on the evenings of 27th August and 29th August 2004, recorded frequent feeding activity of *Myotis spp.* bats, identified as mostly either Natterer's *Myotis natteri* and/or Daubenton's *M. daubentonii* bats. The behaviour of the feeding bats, foraging at a height of between 1 – 5m in the vicinity of the bridge, and never skimming over the water (which is a characteristic of Daubenton bats), suggest that these bats were Natterer's bats *Myotis natteri.*

### *3.3 Phase 1 Habitat Survey*

3.3.1 Plate 2 shows the location of maidenhair spleenwort *Asplenium trichomanes* in one of the damp crevices between the stonework above the stream, and this plant was scattered throughout such crevices immediately above the stream. These plants are virtually confined to shaded habitats on base-rich substrata (Grime *et. al.* 1988), and such conditions have developed as a result of the crumbling mortar at Butterton Bridge. Along the water's edge, still directly under the bridge, were more hydrophyllic ferns such as male fern *Dryopteris felix-mas,* ladies fern *Athyrium felix-femina* and broad buckler fern *Dryopteris dilatata*. Finally, occasional wood melick *Melica uniflora* was also noted in the stonework just above the water, towards the base of the southern end of the bridge. These plants are exclusively a species of woodland and other shaded habitats on freely draining substrates.

Target Note Information

*Target Note 1 (Plate 3)*

3.3.2 The main footpath over the turfed bridge (c. 1m wide) was dominated by rye-grass *Lolium perenne*. The predominance of this species suggests that the sward here has been specially sown on prepared soils. Other herbs noted here were tormentil *Potentialla erecta*, greater plantain *Plantago major*, ragwort *Senecio jacobea*, daisy *Bellis perennis* and chickweed *Stellaria media*. Moving towards the edge of the deck a greater variety of herbs, often more characteristic of shady areas with base-poor soils, were noted. These included great woodrush *Luzula sylvatica*, self-heal *Prunella vulgaris*, bluebell *Hyacinthoides non-scripta*, and greater stitchwort *Stellaria holostea*. Other less common grasses and herbs noted were common bent *Agrostis capillaris*, rough meadow-grass *Poa trivialis*, creeping soft-grass *Holcus mollis,* creeping buttercup *Ranunculus repens*, bramble *Rubus fruticosus,* lesser burdock *Arctium minus* and nettle *Urtica dioica*.

*Target Note 2 (Plate 4)*

3.3.3 Larch *Larix decidua,* an introduced species commonly planted in forestry and parks, and occasional hazel *Corylus avellana,* covered the gentle slopes adjacent to the north of Butterton Bridge at this location. Larch needles had largely smothered, and hence precluded, the development of woodland ground flora. Nevertheless, occasional herbs recorded were bluebell *Hyacinthoides non-scripta*, honeysuckle *Lonicera periclymenum* and seedling pedunculate oak *Quercus robur*. Rhododendron *Rhododendron ponticum,* another non-native plant, was also present in the understorey.

*Target Note 3 (Plate 4)*

3.3.4 Bracken *Pteridium aquilinum* dominated the slopes to the south of Butterton Bridge at this location. Sapling pedunculate oak *Quercus robur* was also noted.

*Target Note 4 (Plate 4)*

3.3.5 Non-native, invasive, Rhododendrons *Rhododendron ponticum* had extensively naturalised the slopes to the south of Butterton Bridge. Other

shrubs and competitive plants noted included hazel *Corylus avellana*, mountain ash *Sorbus aucuparia*, sycamore seedlings *Acer pseudoplatanus,* elder *Sambucus nigra*, birch *Betuala spp.* and bracken *Pteridium aquilinum*. Further west evergreen spruces *Picea spp.* dominated the canopy.

*Target Note 5 (Plate 5)*

3.3.6 Similar vegetation recorded to that described in Target Note 2. Additional herbs recorded included great woodrush *Luzula sylvatica*, wood sage *Teucrium scorodonia,* hard-fern *Blechnum spicant*, seedling holly *Ilex aquifolium*, broad buckler fern *Dryopteris dilatata*, ladies fern *Athyrium felix-femina* ivy *Hedera helix* and foxglove *Digitalis purpurea*. Sitka spruce (a non-native evergreeen tree) and rhododendron *Rhododendron ponticum* were noted in the flora further west.

*Target Note 6 (Plate 6)*

3.3.7 Similar vegetation to that described in Target Note 1 (along the edge of the bridge deck) was recorded on the loose stonework of the bridge, although extensive strands ivy *Hedera helix* also trailed over these south-facing walls. Additional plants that were recorded were foxglove *Digitalis purpurea*, bilberry *Vaccinium myrtillus* and hard-fern *Blechnum spicant*. These plants are mostly found on acidic soils.

*Target Note 7 (Plate 5)*

3.3.8 Several hydrophyllic ferns, including male fern *Dryopteris felix-mas*, ladies fern *Athyrium felix-femina* and broad buckler fern *Dryopteris dilatata* occurred on the damp soil beside the stream at this location. Other hydrophillic plants noted here were wavy bitter-cress *Cardamine flexuosa*.

# 4 NATURE CONSERVATION VALUE OF BUTTERTON BRIDGE

## *4.1 Bats*

4.1.1 The exit survey at Butterton Bridge provides evidence of a substantial colony of summer roosting bats, which were preliminary identified as Natterer's bats *Myotis natteri*. The size of the colony suggests that it is a maternity roost and, as such, this roost forms one of only a cluster of known Natterer's colonies in North Yorkshire. Indeed, there are only around 25 known roosts of Natterer's bats *Myotis natteri* within the whole of Yorkshire (pers. comm.) For these reasons the summer roost at Butterton Bridge is considered to be of high local (County) ecological importance.

## 4.2 *Flora*

4.2.1 None of the flora at Butterton Bridge is particularly rare, and most of the species recorded are relatively widespread throughout Britain. Nevertheless, the bridge supports an interesting juxtaposition of herbs characteristic of acid woodland in North Yorkshire as well as plants more suited to shady, calcareous, conditions (North Yorkshire SINC Panel 2002). For example plants characteristic of acid woodlands occurring on the south-facing walls of

the bridge include hard-fern *Blechnum spicant*, bluebell *Hyacinthoides non-scripta*, honeysuckle *Lonicera periclymenum*, great woodrush *Luzula sylvatica*, bilberry *Vaccinium myrtillus* and seedling pedunculate oak *Quercus robur*. At the same time plants that were found in the crumbling limestone mortar are restricted to more base-rich conditions. The latter include maidenhair spleenwort *Asplenium trichomanes* and wood melick *Melica uniflora*, both of which were restricted to the shaded stonework above the water. Together these plant communities are considered to be of low local (Parish) ecological value.

# 5 IMPACT ASSESSMENT

5.1 The proposed work at Butterton Bridge would be likely to at least temporarily affect the bat roost, especially as it is proposed to rake out large voids on the south side of the bridge and deep point with a naturally hydraulic lime mortar. It is also possible, due to lack of information on the exact extent of the cavities, and their inter-connection, that some of the bridge consolidation works may permanently affect some of the bat roost site. For this reason it is recommended that a licence application from the Department of Environment, Food and Rural Affairs (DEFRA) be sought by a bat worker that already holds a bat licence issued by English Nature. This would entail submitting a detailed Method Statement in support of the application, stating the type of methods proposed to safeguard the bats and the time period in which they would be used. Details of such safeguards are given in the recommended mitigation measures described in Section 6.

5.2 The proposed work at Butterton Bridge would also adversely affect many of the plants that are currently found in the many crevices between the existing stonework above the water and along the south-facing wall. The mitigation measures outlined in Section 6, however, would help to reduce these impacts.

# 6 RECOMMENDED MITIGATION MEASURES

## 6.1 Introduction

6.1.1 This section outlines mitigation work to reduce the impact of the proposed consolidation of Butterton Bridge to the existing fauna (bat population) and flora. These should be carried out both prior to and during the schedule of works. The proposals are divided into sections on the timing of works, the methods of working and habitat creation measures.

## 6.2 Timing of works

6.2.1 To reduce the impact of the proposed work it is important that the works are timed to minimise the effects on breeding bats and/or sensitive habitats. Times for the work are listed in Table 1.

**Table 1 Timings for the works**

| Species | Sensitive period | Time for works |
|---|---|---|
| Bats | Summer and/or Winter | Wherever possible work on the bridge should only be undertaken during spring or autumn when bats would be able to feed during most nights but would either have not started or would have finished breeding. Autumn work is recommended (October) since it is possible that the bats are over-wintering in the bridge. If the latter was the case then work undertaken during Spring could adversely bats just awakening from hibernation – a time when they are at their most vulnerable and may need to be moved to a safe place. |

6.2.2 The aim of beginning work in October is that should the works need to be extended into November (and beyond) then an increasing proportion of the bridge should be re-available to bats as work proceeds.

## 6.3 Methods of working

6.3.1 A detailed Method Statement would be required to support the recommended application for a DEFRA Licence. This should cover the sequence and manner in which the contractor progresses with the consolidation work. This includes instructions as to when the contractor should undertake consolidation work on the stonework above the water, where a summer roost of bats is currently located. In addition, the method statement should instruct the contractor to minimise any re-pointing work required in the stonework above the water, pending further information regarding where and how the various cavities are inter-linked. All operations in areas where bats are known to be in the vicinity (i.e. in the stonework above the water) should be carried out under the supervision of a licenced bat worker.

6.3.2 The aim would be to ensure that bats always have exit and entrance holes to the cavities that they currently use, and that they are not inadvertently blocked either in, or out, of them. Extra precautions may be needed to provide temporary on-site shelter to, say, a bat that is accidentally dislodged from its roost and has fallen into the water below. This may entail the provision of a temporary bat box and also gloves to handle any bats that are in imminent danger of drowning. A licenced bat worker should always be on-call in case of such emergencies.

6.3.3 Finally, the contractor should ensure the retention, wherever possible, of existing vegetation within the crevices of the stonework. These areas should be agreed before work started and the stonework clearly marked out for contractors to avoid.

## 6.4 Habitat creation measures

*Bats*

6.3.1 Active measures to enhance the potential of bat roosts in the surrounding landscape include the use of ‘bat bricks’ for access to bat roosts and/or installing a ‘bat roost brick’, or bat boxes, to provide roosting opportunities. It may be possible to install such a structure within Butterton Bridge itself,

providing access to the box via hole in the stonework above the water. Alana Ecology Ltd (www.alanaecology.com) are a good supplier of such equipment and, in addition, bat boxes can be erected on adjacent trees to provide further roosting opportunities. Correct siting of bat boxes is important to increase chances of occupancy. Boxes should be sited at least 4m from the ground and species such as the noctule *Nyctalus noctula* are more likely to be attracted when placed at 5m or 6m. The boxes should be sited with the front facing SW to SE, to ensure that the box warms up during the day. Nevertheless, boxes facing other aspects may also be used and a common practice would be to site three boxes on a tree all with different aspects, giving bats a choice of roost sites with different environmental conditions.

*Vegetation*

6.3.2 Finally, the erosion of suitable foraging places is another major factor currently contributing to the decline of bats in the UK. To this end it is recommended that native trees and shrubs characteristic of acid woodlands in North Yorkshire be encouraged within the vicinity of Butterton Bridge. This is because they are host to numerous insects and are therefore an important food source for bats. Such trees and shrubs include pedunculate oak *Quercus robur*, sessile oak *Quercus petrae*, downy birch *Betula pubescens*, silver birch *Betula pendula*, holly *Ilex aquifolium*, hazel *Corylus avellana* and mountain ash *Sorbus aucuparia*. If possible, these trees and shrubs should replace some of the non-native ones that are currently in the vicinity of Butterton Bridge. These include rhododendron *Rhododendron ponticum*, larch *Larix decidua* and spruce *Picea spp.* as these non-native trees and shrubs are not good hosts for numerous insects and, therefore, do not provide a particularly good source of food for bats.

## 7 SUMMARY

7.1 EINC was commissioned in February 2004, as sub-consultants Ed Dennison Archaeological Services Ltd, to undertake an ecological survey of Butterton Bridge, Sawley, North Yorkshire. The aims of the report were to:

- Provide an overall ecological evaluation of the site
- Provide an assessment of the ecological impacts which would arise from the proposed development
- Describe measures to mitigate the impacts identified

7.2 An evaluation of the fauna and flora at Butterton Bridge was based on ecological survey work undertaken between 22nd June - 29th August 2004. This data was supplemented by information acquired from a desk-top study and consultees are acknowledged in the text wherever appropriate.

7.3 The range of remnant woodland flora (both acidic and calcareous) found in the vicinity of Butterton Bridge is considered to be of low local (Parish) ecological value.

7.4 A summer bat roost (provisionally identified as Natterer's bats *Myotis natteri*) was recorded in the stonework above the water at Butterton Bridge. This

species is covered by statutory protection and the roost is considered to be of high local (County) ecological value.

7.5 The proposed work at Butterton Bridge is likely to at least temporarily affect the bat roost and may even affect part of the roost permanently. For this reason it is recommended that a licence application from the Department of Environment, Food and Rural Affairs (DEFRA) be sought by a bat worker that already holds a bat licence issued by English Nature. This would entail submitting a detailed Method Statement in support of the application, stating the type of methods proposed to safeguard the bats and the time period in which they would be used.

7.6 Recommended mitigation measures are described in more detail in Section 6. They include recommendations for the timing of works, methods of working and active habitat creation measures. They are intended to help ensure the conservation of rare and protected species, such as bats, and to actively enhance existing habitats.

## 8 REFERENCES

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Plate 1 Butterton Bridge – southern end of the vault, supported by the southern-most unchamfered rib (stonework just above the water)

Bats were seen emerging from the crack between these stones on 27th August 2004

Southern-most, unchamfered rib

Direction of water flow

Plate 2 Butterton Bridge – southern end of the vault, supported by the southern-most unchamfered rib (stonework of the vault above the water)

Bats were seen emerging from the crack between these stones on 27th August 2004. However, the bats emerged from several other cracks and crevices within the stonework at the south end of the vault on 29th August 2004.

Southern-most, unchamfered rib

Maidenhair spleenwort *Asplenium trichomanes*

**Plate 3** **Butterburn Bridge** – view from the north-east (showing location of Target Note 1


**Plate 4** **Butterburn Bridge** – view from the south-west (showing location of Target Notes 2 - 4

**Plate 5** **Butterburn Bridge** – view from the north-west(showing location of Target Notes 5 and 7


**Plate 6** **Butterburn Bridge** – view from the south-east (showing location of Target Note 6