Romptickle Viaduct and Thurgoland Tunnel: survey and designation of a site for bats.

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Background Information

This document details bat survey work undertaken on a site in South Yorkshire that has highlighted the presence of a range of summer and winter bat roosts used by a number of widely occurring bat species. The bat interest of the site is considered sufficient grounds to designate it as Local Wildlife Site (LWS) with the justifications for this decision and the designation process explained. It is hoped this document may act as a spur to other bat workers to pursue designation of the best bat sites.

Our site (Central OS Grid Ref. SE280008) is located along the Trans-Pennine Trail on the boundary of Thurgoland village, Barnsley adjacent to the River Don within an upland river valley on an area with coal measures geology in the Yorkshire Southern Pennine Fringe National Character Area (Natural England, 2013). The main land uses in the local area comprise woodland and pastoral farmland with a sewage works located a short distance to the north-west. The site is located at the northern end of an extended tract of mixed-woodland, which at approximately 14km^2 comprises the largest area of continuous woodland within South Yorkshire, encompassing several Local Nature Reserves.

The site itself comprises three built structures: a former rail viaduct (Romptickle Viaduct) crossing the River Don, a disused railway tunnel (Thurgoland Tunnel) located 400m south-east of the river and a single span stone bridge (Drystone Bridge), located approximately 10m south of the viaduct. Romptickle Viaduct and Thurgoland Tunnel are both owned by Barnsley Metropolitan Borough Council (BMBC) with ownership of Drystone Bridge unknown.

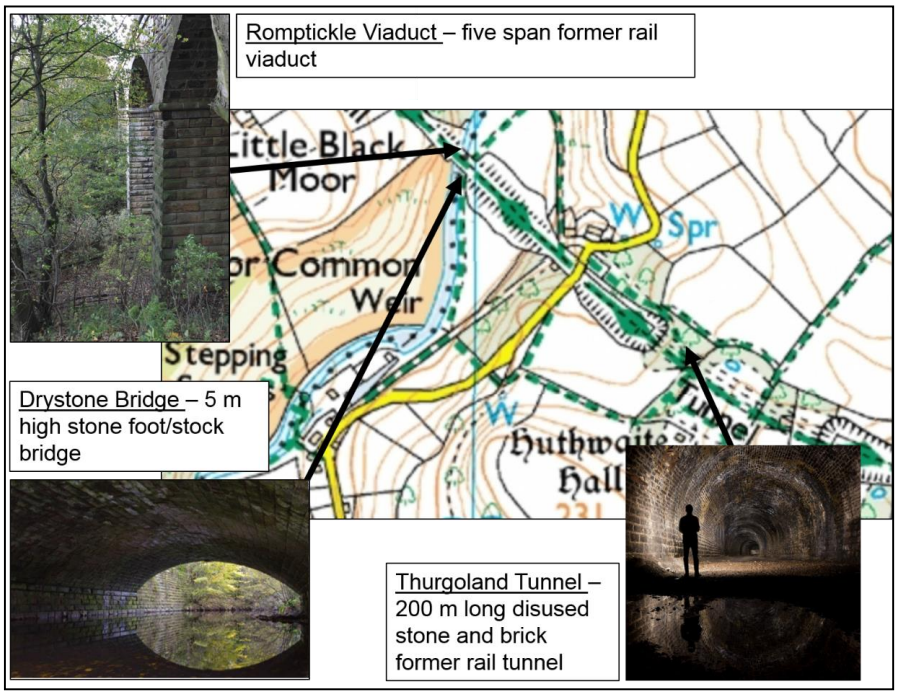

Figure 1 Site layout

Romptickle Viaduct comprises a five span stone-built viaduct built in 1844. The viaduct is approximately 25m high at its tallest point with a total span of approximately 30m. The underside of the arches is generally well pointed however the piers have numerous openings between stone blocks leading to deeper voids.

Thurgoland Tunnel comprises a pair of tunnels with an older double bore tunnel to the north and a more recently built tunnel, now used as a bridleway, to the south. The older stone block built tunnel is approximately 6m high and supports all the bat interest, with a variety of cracks between blockwork and beneath rough sawn wooden planks which have been nailed in place at head height more than ten years ago. All further mention of Thurgoland Tunnel refers to the northern tunnel. The south-eastern portal of this tunnel is largely blocked by a spoil pile leaving a narrow access of approximately 0.5m between the upper edge of the portal and the spoil. The north-western portal is part blocked by a breezeblock wall with a grill across the top half. In March 2014, with input from South Yorkshire Bat Group (SYBG), Barnsley Council modified the north-western portal of Thurgoland Tunnel through the addition of welded galvanised steel plate across the majority of the metal grill to reduce airflow. In October 2015, twelve 0.5m^2 panels of clear corrugated plastic were attached to walls within the tunnel to increase roosting space for bats.

Drystone Bridge is a single-span bridge approximately 20m deep, 8m wide and 5m high. There is no evidence of pointing between component stone blocks and consequently abundant crevices and voids are present between stones. The top of the bridge is earth filled, grass covered and is used for grazing.

Prior to the involvement of SYBG, use of Thurgoland Tunnel by two hibernating brown long-eared bats had been recorded in 1996. Roosting bats were not known to use Romptickle Viaduct or Drystone Bridge. Potential for the viaduct and bridge to be used by roosting bats came to light as a result of the 'Daub's on't Don' project, the objective of which was to locate one or more Daubenton's bat *Myotis daubentonii* maternity roosts on the River Don. The initial visual inspection of these structures by SYBG members took place in December 2012.

Methods

Between 2012 and 2015 members of SYBG undertook 21 survey visits to the site using a range of survey techniques targeted at locating different types of bat roost.

Romptickle Viaduct has been subject to visual inspections, nocturnal survey and survey using an Anabat SD1 static monitoring device. Visual inspections of the viaduct have been conducted from ground level using a one million candlepower torch to illuminate crevices between stone blocks, which are then inspected using binoculars. In order to allow comparison of survey results between occasions this visual inspection has targeted two piers to the east of the river which are surveyed to a set height, with the location of each roosting bat precisely recorded. Twelve visual inspections were undertaken following this system at regular intervals over a period of approximately one year from winter 2013/2014 to winter 2014/2015.

The viaduct has been subject to nocturnal survey on five occasions comprising four dusk-emergence and one dawn-return survey. One dusk emergence (19/05/2013) and one dawn return survey (17/08/2013) covered the majority of Romptickle Viaduct in addition to Drystone Bridge, with the further three dusk emergence surveys focused on an identified

Daubenton's bat maternity roost and adjacent areas (18/08/2013, 18/05/2014 and 23/07/2014). It should be noted that due to volunteer surveyor availability on no occasion have the viaduct or bridge been subject to survey with the number of surveyors that would be necessary to comply with the accepted bat survey guidance (Hundt, 2012). On 31/08/2015 an Anabat SD1 was installed for five nights at the base of the viaduct's eastern pier.

Thurgoland Tunnel has been subject to visual inspection using a one million candlepower torch and binoculars on two occasions (15/12/2013 and 21/02/2015) with an Anabat SD1 installed within the centre of the tunnel for a period of one week from 15/12/2013.

In addition to being included in one dusk emergence and one dawn return survey, Drystone Bridge has also been subject to full visual inspection, using a torch and waders on one occasion (29/06/2013).

Results

Romptickle Viaduct has been shown to support a large Daubenton's bat summer roost (maximum count = 124 bats), a large *Pipistrellus* species hibernation roost (maximum count = 30 bats), together with day and/or transitional roosts of brown long-eared bats *Plecotus auritus*, common *Pipistrellus pipistrellus* or soprano pipistrelle *P. pygmaeus* and an as yet unidentified *Nyctalus* species bat.

The large Daubenton's bat roost recorded from the viaduct is considered likely to comprise a Daubenton's bat maternity roost. Whilst Daubenton's bats are also known to form large male only bat roosts (Senior et al., 2005) the roost within the viaduct is located in close proximity to high quality bat foraging habitat within a lowland setting, both factors associated with Daubenton's bat maternity roosts (Encarnacao et al., 2005; Angell et al., 2013). In addition maternity roosts are typically located in warm settings; the observed roost is located in the southern elevation of the viaduct, possibly beneath the heat absorbing tarmac surface of the bridleway.

Visual inspections have shown the viaduct is used during the hibernation period by a large number of roosting *Pipistrellus* species bats. Both common and soprano pipistrelle bats are known to roost in the viaduct however the breakdown between these two species is difficult to gauge. Given that fewer than half the bat-accessible crevices between stonework can be inspected during ground based visual inspections, the actual number of *Pipistrellus* species bats over wintering within the viaduct is likely to be at least double the total peak number recorded during inspections. Repeated visual inspection of a set range of external crevices on Romptickle Viaduct, undertaken throughout the year, has shown the structure supports a large *Pipistrellus* species hibernation roost, occupied by the peak number of bats during the coldest period of winter. The number of *Pipistrellus* species bats roosting within the viaduct drops off sharply in spring and rises sharply in late autumn with no bats recorded from the surveyed range of crevices during some periods in mid-summer.

Preliminary static monitoring survey work also suggests that Romptickle Viaduct may be used by autumn swarming *Pipistrellus* species bats, in accordance with observations collected from Holland by Erik Korsten (pers. comm).

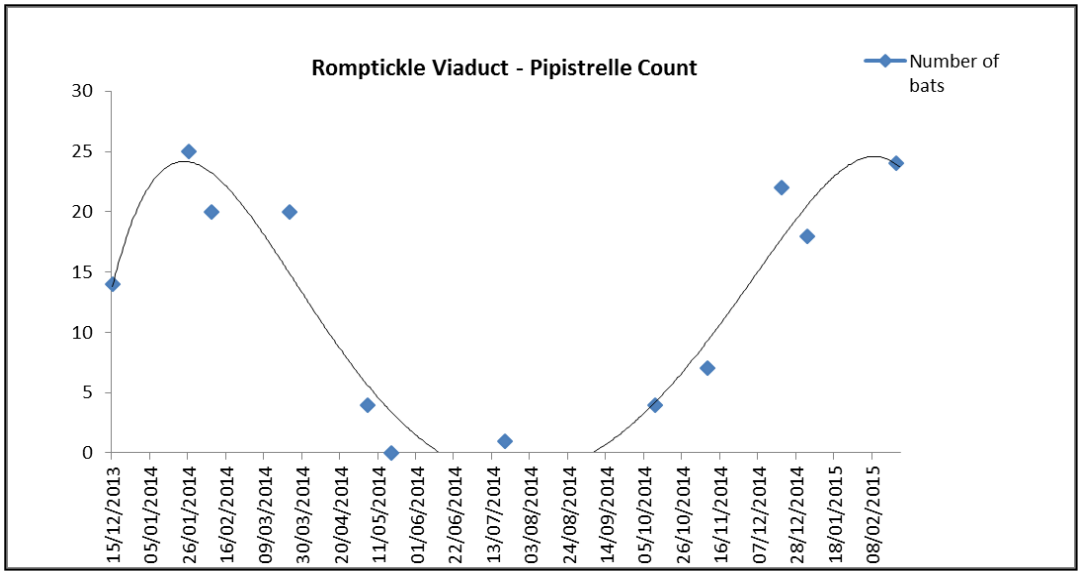

Figure 2 Annual change in roosting pipistrelle numbers at Romptickle Viaduct

Thurgoland Tunnel supports hibernating Daubenton's bats and brown long-eared bats with SYBG surveys recording a maximum count of one bat of each species using the tunnel. Drystone Bridge has been shown to support a Daubenton's bat day or satellite roost used by a maximum count of one bat.

Plates

Top left image – underside of Drystone Bridge. *Top centre image* - west portal of Thurgoland Tunnel *Top right image* – thermal image of Thurgoland Tunnel interior taken in February 2015. *Central image* – panorama of Romptickle Viaduct from top of Drystone Bridge. *Bottom left image* – red circle shows the location of the large Daubenton's bat maternity roost. *Bottom central image* – four pipistrelle bats hibernating in crevice in Romptickle Viaduct. *Bottom right image* – single hibernating brown long-eared bat behind sawn timber section in Thurgoland Tunnel.

Site Designation

The decision was made to pursue LWS designation in order to formally recognise the site's significance to bats, increase the likelihood of protection from development/during maintenance, spread knowledge of bat presence in the area and promote further survey. If successful, this designation would comprise the second designation of an LWS solely or partially for bats within Barnsley and only the fourth such designation within South Yorkshire.

The LWS designation criteria adopted by BMBC were consulted. The bat section of the 'Barnsley Natural Heritage Sites: Species Designation Criteria' document (BMBC, 2011) states:

> "Sites qualifying for consideration will include one or more of the following:
>
> (a) Any breeding roost site that regularly supports a significant colony of bats (100 or more soprano pipistrelle bats *Pipistrellus pygmaeus*, 60 or more common pipistrelle *Pipistrellus pipistrellus* bats or 30 or more of any other bat species);
> (b) Any hibernation site which regularly supports at least 10 bats or 2 or more species of bat;
> (c) Any series of smaller hibernation sites which individually may not qualify as at (b) but together are considered of significance;
> (d) Any roost site which regularly supports at least 3 bat species;
> (e) Any habitat area (e.g. woodlands, river corridors, lakes/lodges/ponds) which regularly support 4 or more foraging bat species;
>
> Where breeding sites are considered for selection, the selection may include vital flight and commuting routes to and from the roost and vital foraging areas around the roost."

The Romptickle Viaduct site can be considered to satisfy all potential qualification criteria based on survey results obtained and consequently a 'Case for Designation' document was written by SYBG and sent to the BMBC Ecologist for his consideration. In February 2014 two members of SYBG were invited to a meeting of the Barnsley LWS Panel to present the case for designation in person. The proposal met with broad approval at the meeting and the Romptickle Viaduct site was accepted as a candidate LWS (cLWS). An obligatory Phase 1 survey of the potential site area was undertaken in July 2015. It remains for the boundaries of the site to be fully defined, after which stage there should be no further barriers to full adoption of the site as a LWS.

Further Work

Romptickle Viaduct has been registered as National Bat Monitoring Programme hibernation site and both this structure and Thurgoland Tunnel will be subject to two visual inspections a year for the foreseeable future, with single survey visits in January and February.

Initial survey findings suggest that Romptickle Viaduct is used by autumn swarming pipistrelle bats. Further survey targeted at confirming this use will be undertaken in autumn 2016. In order to understand the activity and arrival of hibernating *Pipistrellus* speices bats at the viaduct during the peak winter months, a static monitoring and temperature survey is ongoing, with one Anabat SD1 and a Tinytag temperature logger deployed near the base of the eastern pier to enable continuous recording between December 2015 and February 2016 inclusive. Comparisons of bat activity with temperature and date will be undertaken to try and determine patterns in activity.

In order to spread knowledge of bat usage of the area and bat conservation in general, it would be desirable to install an interpretation panel on Trans Pennine Trail railings along the deck of the viaduct. Coupled with one or more bat walks this measure would help spread knowledge of bats amongst recreational users of the trail and these options will be pursued upon formal designation of the site in order to mark this event.

References

Angell, R.L., Butlin, R.K., Altringham, J.D. (2013) Sexual Segregation and Flexible Mating Patterns in Temperate Bats. PLoS ONE 8 (1).

BMBC (2011) Barnsley Natural Heritage Sites: Species Designation Criteria. Barnsley Metropolitan Borough Council.

Battersby, J. (2005) UK Mammals: Species Status and Population Trends. JNCC, Peterborough.

Encarnacou, J.A, Kierdorf, U., Holweg, D., Jadnoch, U., Wolters, V. (2005) Sex related differences in roost-site selection by Daubenton's bats Myotisdaubentoniiduring the nursery period. Mammal Review. 35: 285-294.

Hundt, L. (2012) Bat Surveys: Good Practice Guidelines (Second Edition). BCT, London.

Natural England (2013) National Character Area Profile: 37 Yorkshire Southern Pennine Fringe. Natural England, Peterborough.

Senior, P., Butlin, R.K., Altingham, J.D. (2005) Sex and segregation in temperate bats. Proceedings of the Royal Society B. 272: 2467-2473.