1 Project Details			
Project Name:	Haweswater Aqueduct Resilience Programme	Project Number:	80061155
Written:	Mark Breaks, Senior Field *Ecologist*	Approved:	Alice Helyar, *Principal Ecologist*
Report reference:	TR4 Ecology Survey Data Report_2022_Bat tree assessment Phase 2	Date:	13/10/2022

2 Project Drawings	
Bat Tree Assessment Phase 2	BOW167_HARP_TR4 Bat tree assessment Phase 2_Oct 2022 (Plans 2 of 2)

4 Ecology Surveys	
Surveyors:	Mark Breaks (NE licence: 2016-26712-CLS-CLS) Paula Hollings (NE licence: 2015- 16053-CLS-CLS) Ryan Knight (NE licence holder) Non Scott (NE licence: 2019-39208-CLS-CLS) Curtis Blank Luke Hall Sam Robinson Jordan Simpson Jack Taylor
Additional dusk emergence surveyors:	Dave Anderson (NE licence: 2015-15784-CLS-CLS) Dave Fisher (NE licence: 2015-12106-CLS-CLS) Jack Sykes (NE licence: 2015-16340-CLS-CLS) Lucy Brookfield Felicity Cunliffe Davies Joanna Day Aniela James Nina Morris Vinny Smith
Survey date(s):	July to August 2022 (see Table 4.1 and Table 4.3)
Survey Method:	This report provides details of all trees currently identified in TR4 and on Highways (TR4) survey area, which have been subject to full assessment in accordance with Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition) (Collins, 2016). A preliminary ground level assessment to identify trees supporting Potential Roosting Features (PRF's) was undertaken during the extended Phase 1 habitat survey during 2019, 2020 & 2021 (Bowland, 2020 & 2021). This Phase 2 assessment was carried out to assess in further detail the trees identified during the preliminary assessment as having Moderate or High Potential for roosting bats. The surveys aimed to search for

	bats and their field signs, such as bat droppings, urine stains, bat feeding remains (moth wings, insect cases), bat staining, a distinctive smell of bats, scratch marks and smoothing of surfaces which would indicate a roosting site. An updated assessment of the potential roosting features was also carried out, and where appropriate the bat roost potential status of the trees was updated. Surveys were aided by close focus binoculars, high-powered torches, endoscopes, ladders and rope climbing equipment. All trees retained previously assigned unique reference number and their locations marked on a plan. Trees classified as Moderate or High suitability as bat roosting habitat are shown in Table 4.1 and Table 4.2. Trees classified as Moderate suitability were subjected to two inspections and trees classified as High suitability were subject to three inspections. Inspections methods comprised ground inspection as well as ladder and rope climb inspection. Where it was not possible to closely inspect the features, dusk emergence surveys were undertaken. Upon completion of the inspections, trees that were re-evaluated as Negligible, Low or were determined to be outside the survey boundary were omitted from further surveys; these details are shown in Table 4.3 and Table 4.4. Assessments are based of The Good Practice Guidelines and are summarised below: Low – A tree of sufficient size and age to contain PRFs but none seen from the ground, or features seen with only very limited roosting potential. Moderate – A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitats but unlikely to support a roost of high conservations status. High – A tree with one or more PRFs, that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, condition and surrounding habitat.
Weather Conditions:	The surveys were undertaken in appropriate weather conditions (avoiding heavy rain or strong wind).
Limitations to the survey:	Trees adjacent to the highways survey areas were assessed from both sides where access had been arranged. However, there were two situations where only one side was accessible due to access restrictions at TR4.HBG16 and TR4.HBG44.

4.1 Survey Results – Table of Phase 2 High and Moderate Trees (Including Survey Dates)

No confirmed bat roosts were identified during any of the tree inspections.

Title	No. Trees	Section	Bat Roost Potential (Phase 1)	Bat roost Potential follow Phase 2	Phase 2 Survey Type	Visit 1	Visit 2	Visit 3
TR4.BT9	1	route	Moderate	Moderate	ladder	21-Jul	26-Aug	-
TR4.BT10	1	route	Moderate	Moderate	Emergence required	Emergence 09-Aug	Emergence 31-Aug	-
TR4.BT11	1	route	Moderate	High	climb	26-Jul	Emergence 09-Aug	Emergence 31-Aug
TR4.BT12	1	route	High	High	ladder	21-Jul	26-Jul	26-Aug & emergence 31-Aug
TR4.BT20	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG8.T1	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-

Title	No. Trees	Section	Bat Roost Potential (Phase 1)	Bat roost Potential follow Phase 2	Phase 2 Survey Type	Visit 1	Visit 2	Visit 3
TR4.BG8.T2	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG8.T3	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG8.T4	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG8.T5	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG8.T6	1	route	Moderate	Moderate	ground	21-Jul	26-Aug	-
TR4.BG20.T1	1	route	High	Moderate	ladder	28-Jul	26-Aug	-
TR4.BG20.T2	1	route	High	Moderate	ladder	28-Jul	26-Aug	-
TR4.BG20.T3	1	route	High	Moderate	ladder	28-Jul	26-Aug	-

4.2 Survey Results - High and Moderate Tree Information

TR4.BT9

NGR: SD 69795 48805

Species: Ash

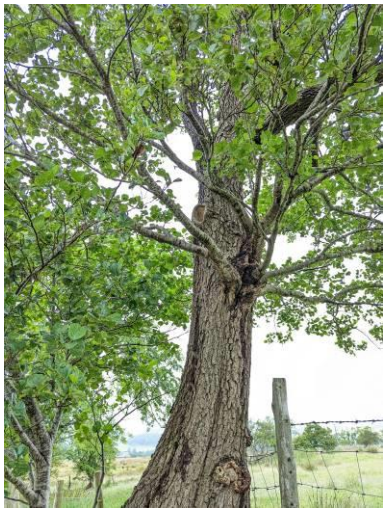
Categorisation: Moderate potential

2022 Inspection

Knot-hole at 3.5 m (S), entrance 10x10 cm, internally 30 cm height, 15 cm width and 10 cm depth.

2022 Results

- 21st Jul – close inspection (ladder) – no evidence of bats noted; and
- 26th Aug – close inspection (ladder) – no evidence of bats noted.

TR4.BT10	
	NGR: SD 69785 48808 Species: Alder Categorisation: Moderate potential 2022 Inspection Knot-hole 10x10 cm entrance at 3.5 m, unknown height, 10 cm width, >100 cm depth. Internally couldn't be fully inspected therefore two emergence surveys required, 2022 Results • 9th Aug – dusk emergence – no bat emergence; and • 31st Aug – dusk emergence – no bat emergence.
TR4.BT11	
	NGR: SD 69771 48812 Species: Alder Categorisation: High potential 2022 Inspection Knot holes at 6, 6.5 and 7 m South on limb. Lowest knot hole has 21x14 cm entrance, internally 58 cm height, 16 cm width and 0 cm depth. Tree upgraded to **High potential.** 2022 Results • 26th Jul – close inspection (climb) – no evidence of bats noted; • 9th Aug – dusk emergence – no bat emergence; and • 31st Aug – dusk emergence – no bat emergence.
TR4.BT12	
	NGR: SD 69759 48815 Species: Ash Categorisation: High potential 2022 Inspection Wound at 4 m (S) on limb with 40x10 cm entrance, internal 50 cm height, 15 cm width and 5 cm depth. 2022 Results • 21st Jul – close inspection (ladder) – no bat evidence noted; • 26th Jul – close inspection (climb) – no evidence of bats noted;

	• 26th Aug – close inspection (ladder) – no bat evidence noted; and • An extra inspection on 31st Aug – dusk emergence – no bat emergence.
TR4.BT20	
	NGR: SD 69728 48932 Species: Alder Categorisation: Moderate potential <u>2022 Inspection</u> Wound at 2 m on stem facing N. Entrance 10x5 cm, internal 45 cm height, 10 cm width, 0 cm depth, smooth, dry, wedge shaped apex and woodlice present. <u>2022 Results</u> • 21st Jul – close inspection (ground) – no evidence of bats noted; and • 26th Aug – close inspection (ground) – no evidence of bats noted.
TR4.BG8.T1-T6	
Trees 1-6    	Species: Alders Categorisation: Moderate potential Number of trees: six <u>2022 Inspection</u> Moderate potential trees on outside edge of redline boundary. Tree 1 - Alder (SD 69507 48923), 60cm Diameter at Breast Height (DBH), butt-rott entrance 70x70 cm, internal 120 cm height, 30 cm width, 0 cm depth, heavily cobwebbed. Tree 2 - Alder (SD 69519 48916), 40 cm DBH, butt-rott 60x10 cm south facing entrance, internal 120 cm height, 15 cm width, 0 cm depth. Heavily cobwebbed. Tree 3 - Alder (SD 69523 48913), 40 cm DBH, tear-out 1.5m high facing S, entrance 10x2 cm, internal 40 cm height, 10 cm width, 0 cm depth, dry, smooth, done, woodlice, slug. Additional truck cavity leading down to opening at ground. Tree 4 - Alder (SD 69539 48897), 50cm DBH, butt-rott NE, entrance 50x10 cm, internal 30 cm height, 10 cm width, 0 cm depth, heavily cobwebbed. Tree 5 - Alder (SD 69593 48863), butt-rott leading up stern with connecting wound at 1.5 m N and knot-hole at 2.5 m W.


Tree 6 - Alder (SD 69596 48859), 45 cm DBH, butt-rott SE, 30x10 cm entrance, internal 40 cm height, 15 cm width.

2022 Results

- 21st Jul – close inspection (ground) – no evidence of bats noted; and
- 26th Aug – close inspection (ground) – no evidence of bats noted.

TR4.BG20.T1-T3

Trees 1 -3



Species: Alders

Categorisation: Moderate potential

Number of trees: three

2022 Inspection

Tree 1 - Alder (NGR: SD 71669 44976), 60 cm DBH, butt-rot on both side leads up trunk cavity to top of snapped off stem at 6 m, knot-hole access at 2 m NE, 3.5 m W, spider cobwebs present. **Moderate potential**.

Tree 2 - Alder (NGR: SD 71641 44973), 50 cm DBH, knot-hole at 3 m NW leads to main stem cavity that extends up to knot-hole at 4m S but doesn't carry on. Tube rough, no smell, spider cobwebs and damp. **Moderate potential**

Tree 3 - Alder (NGR: SD 71618 44967), 50 cm DBH, butt-rott extending from 0-3 m on W that leads to a narrow tube up the main stem with connecting knot-holes at 4 (S) and 4.5 m (N and W). Heavily cobwebbed, dry, rough, no smell. No cavity extending higher, terminates at knot-holes. **Moderate potential**.

2022 Results

- 28th Jul – close inspection (ladder) – no evidence of bats noted; and
- 26th Aug – close inspection (ladder) – no evidence of bats noted, of note a **barn owl**, Schedule 1 (Wildlife and Countryside Act, 1981 (as amended)) listed bird species was roosting in Tree 1.

4.3 Survey Results - Table of Phase 2 Trees Omitted from Survey (Including Survey Dates)

Title	No. Trees	Section	Bat Roost Potential (Phase 1)	Bat roost Potential follow Phase 2	Phase 2 Survey Type	Visit
TR4.BT7	1	route	Moderate	Low	ladder	21-Jul
TR4.BT8	1	route	Moderate	Negligible	ladder	21-Jul

Title	No. Trees	Section	Bat Roost Potential (Phase 1)	Bat roost Potential follow Phase 2	Phase 2 Survey Type	Visit
TR4.BT13	1	route	Moderate	Negligible	ladder	21-Jul
TR4.HBG16	2	highways	Moderate	None in survey area	ground	13-Jul
TR4.HBG44	1	highways	Moderate	None in survey area	ground	13-Jul

4.4 Survey Results – Omitted Tree Information

TR4.BT7

NGR: SD 69863 48785

Species: Ash

2022 Inspection

Tear-out facing NE at 6 m, 40x15 cm entrance, internally 0 cm height, 10 cm width, 15 cm depth, open, damp and rough. Additional knot-holes are not features. Categorisation downgraded to **Low**.

TR4.BT8

NGR: SD 69853 48789

Species: Beech

2022 Inspection

No potential bat roost features located during ladder inspection of potential knot-holes. Categorisation downgraded to **Negligible**.

TR4.BT13	
	NGR: SD 69747 48898 Species: Alder 2022 Inspection No potential bat roost features located during ladder inspection of potential knot-holes. Categorisation downgraded to **Negligible**.
TR4.HBG16	
	NGR: SD 72414 44326 Species: Ash, sycamore and alder Number of trees: 8 2022 Inspection No trees with potential bat roost features located during ground inspection within survey boundary.
TR4.HBG44	
	NGR: SD 72331 45172 Species: Ash and alder Number of trees: 3 2022 Inspection No trees with potential bat roost features located during ground inspection within survey boundary.

References

Bowland Ecology. (2020). *TR4 Ecology Survey Data Report - Bat tree assessment V2*

Bowland Ecology. (2021). *TR4 Highways Ecology Survey Data Report - Bat tree assessment V1*

Collins, J. (Ed). (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London.