Appendix 10.4

Bat Survey Report

M8 BAILLIESTON TO NEWHOUSE

HABITAT BASED ASSESSMENT FOR THE PRESENCE OF BAT ROOSTS

Final Report

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1. INTRODUCTION

1.1 Background

1.1.1 This study was undertaken as part of a suite of ecological surveys necessary to inform the Design Manual for Roads and Bridges (DMRB) Stage 3 assessment, as presented in the Environmental Statement (ES) for the M8 Baillieston to Newhouse scheme. This report presents the findings of a habitat-based assessment undertaken by a licensed bat consultant in September 2005 along the sections of the scheme that affect areas that were identified as having potential to support bat roosts by general ecologists during the extended Phase 1 habitat surveys for the DMRB Stage 2 assessment in 2004. This report also includes recommendations to limit disturbance to any individual bats, or bat roosts that may potentially be present.

1.2 Objectives of the Study

1.2.1 The objectives of the study were to:

- document the bat interest of habitats that are scheduled to the be lost as a result of the proposed improvements works to the M8 corridor;
- evaluate the bat interest of these areas;
- recommend further survey requirements, if necessary; and
- to outline mitigation measures to minimise the identified impacts.

2. SURVEY METHODOLOGY

2.1.1 A daytime visit was made at the end of September 2005 by an experienced batworker (J. Colebrook, SNH bat licence number 5499) and assistant, to evaluate the potential bat interest of the site. Bat roosts in structures on large rivers such as the North Calder Water and trees are recognised as being very difficult to detect, especially in extensive high quality habitat with a multitude of potentially suitable roost sites. Health and safety considerations precluded detailed inspection and emergence surveys at all of the trees and structures with potential to support roosting bats. For these reasons, it is considered appropriate in this case to assess the potential status of the bat population of the study area using a habitat-based evaluation, rather than relying on evidence of roosts.

2.1.2 The survey consisted of a walkover of the route alignment during daylight hours to confirm and assess habitats that have potential to support bat species, and on evening's activity survey with a bat detector. The assessment concentrated on identifying locations where combinations of potential roosts and foraging areas existed, and were linked to the wider countryside by "flight lines" such as hedges, rivers, or patches of woodland and trees.

2.2 Limitations of the Survey

2.2.1 Lack of evidence of protected species does not necessarily preclude their being present on site at a later date. Particularly in relation to use of structures and trees by bat species, use of a particular structure or area of land can significantly vary not only on a seasonal basis but also from day to day. However, it is considered that the timing of the site visit, in late autumn, was satisfactory for the habitat-based assessment.

2.2.2 The weather conditions on the night of the activity survey were sub-optimal, as it started to rain after dusk, although bat activity was recorded at several locations.

3. EXISTING CONDITIONS AND SURVEY FINDINGS

3.1 Consultation and Data Review

3.1.1 The only recent records of bats in the study area were those presented in the report on the Douglas Support Estate by Heritage Environmental Limited (HEL, 2003), confirming the presence of small numbers of foraging soprano pipistrelle bats *Pipistrellus pygmaeus* in and around the Crowflat Pond and North Calder Wood SINCs (TNs 42, 50 and 56) and along the nearby stretches of the North Calder Water, and of Daubenton's bat *Myotis daubentonii* foraging along the North Calder Water for a distance of approximately 650 m downstream from Rosehall Bridge (i.e. from where the river flows beneath the A725). No roosts were identified during that survey and no further records of bat roosts or foraging activity were held for the study area by consultees.

3.2 Survey Findings

3.2.1 The entire North Calder Water river corridor within the wider study area shown in Figures 10.2a – 10.2e represents high quality bat habitat, with many mature trees offering potential roost sites in the woodland canopy along the river (e.g. TNs 18, 19, 32, 34, 38, 65 and 67), in addition to which there are several bridges and old railway abutments throughout the area with crevices (e.g. TNs 18, 20, 23, 27 and 45) and caves and crevices in riverside rock exposures (e.g. TNs 30 and 86), all of which are potentially suitable as bat roost sites. The two tunnels under Woodhall Mill Road (TN 84) were assessed as being in good repair, with only limited potential for use as a bat roost site.

3.2.2 The woodlands, scrub and grassland associated with the North Calder Water, and the river itself, are all habitats that support good densities of invertebrates that bat species feed upon. This mixture of habitats, especially where complex mosaics are present – such as at the Douglas Support Estate - also provides extensive areas of "edge" habitat, where sheltered conditions occur in the lee of taller vegetation and thus produce ideal conditions for bats to feed on swarming insects or commute between roosting and foraging areas. A small number of both soprano and common pipistrelles *P. pipistrellus* were observed foraging along the woodland edge in the vicinity of the new proposed crossing when the site was surveyed for bat activity in September 2005.

3.2.3 Towards the eastern end of the route, the plantation woodlands between the North Calder Water and the Chapelhall Junction are also areas where trees with features suitable for roosting bats exist in close proximity to habitats that represent good quality foraging habitat.

3.2.4 On the basis of the large number and variety of potential roost sites present within trees and structures along the North Calder Water, and the high quality foraging habitat represented by the mosaic of aquatic, woodland, scrub, wetland and semi-improved grassland along the river valley and extending south towards the Chapelhall Junction, it is considered highly likely that a maternity roost or other roost(s) of local nature conservation value will be present within the study area.

3.2.5 The disused Bankhead Farm on the north side of the river valley (TN 36) and other agricultural premises within the study area also represent potential bat

roosting habitat, as do the modern housing developments, especially to the south east (Bellshill), but also 1 km to the north east of Shawhead Junction.

3.2.6 An external survey of the only buildings scheduled for demolition, a house and barn at Braehead Farm, found no sign of bats accessing the property although the construction of the house in particular was considered to be suitable for use by a range of species. However, the likelihood of Braehead Farm being used by bats was assessed as low, owing to the exposed nature of this (hilltop) site and a lack of features such as hedgerows or lines of trees to act as sheltered flightlines between it and the nearest suitable foraging habitat, approximately 100 m to the south.

3.2.7 The majority of land immediately on the route alignment shown in Figures 10.2a – 10.2e supports habitat that is not ideal for bat species, due to relative lack of foraging habitat in the form of woodland and scrub. Nevertheless, small amounts of suitable bat habitat occur along the alignment, associated with rivers, field boundaries and relict estate land. Field survey identified several such locations that may be directly affected by the proposed road development and that may support bat species. These are summarised in Table 1 below and identified by their target note location (as shown on Figures 10.2) and also given a Site number, which is used in the discussion section below.

Table 1 Bat Survey Findings

Target note site no.	Location name	Comment	Potential for roosting bats	Potential for foraging bats
TN 7 (Site 1)	Baillieston Interchange	Currently the south eastern arm of the proposed road passes beneath the existing railway. The plan shows that an existing underpass, which has limited potential to support roosting bats will not be affected.	Low	None
North of TN 15 (Site 2)	Bargeddie Junction – west of the junction, south of the A8	West of Bargeddie junction and south of the A8 lies a house and barn (Braehead Farm) that are currently occupied. The many gabled house has a slate roof, eaves and in all probability, loft spaces. Its construction suggests that it is ideal for use by a range of bat species. However, the position of the house lessens the potential that bats may use it – it is set upon a hill,	Low	Low

Target note site no.	Location name	Comment	Potential for roosting bats	Potential for foraging bats
		and is isolated from the nearest foraging area as there are no hedgerows, trees or other flight-lines that may be used. Overall, it is considered to be of low potential for bats use.		
TN 27 (Site 3)	Bargeddie Junction – Luggie Burn area	The area around the Luggie Burn represents excellent foraging area for bats due to the scrub, trees and areas of grassland/tall ruderal species.	Low	High
TN 56 (Site 4)	Shawhead Junction – North Calder Wood SINC	Much of the North Calder Wood SINC is low and scrubby, of excellent potential value to foraging bats. The trees in the western part and along the southern boundary of the wood are larger and some contain features of potential use to roosting bats.	Low - Moderate	High
East of TN 58 (Site 5)	Between Shawhead and Bargeddie Junction	An avenue of lime trees will be crossed by the proposed road. This avenue is of similar character to that described below at Shawhead Junction. However, it is of limited value to wildlife, and of low potential use by roosting bats due to the good health and form of the trees.	Low	Moderate
River corridor between TN 61 and TN 65 (Site 6)	Shawhead Junction – North Calder Water SINC woodland	Substantial amounts of good quality, mature broadleaved woodland, and adjacent scrubby field are scheduled to be lost as part of the proposed scheme. Both represent excellent foraging areas, with the mature trees on precipitous slopes offering	High	High

Target note site no.	Location name	Comment	Potential for roosting bats	Potential for foraging bats
		ideal roosting opportunities.		
South of TN 65 (Site 7)	Shawhead Junction – Lime tree avenue	The end of a lime tree avenue will be truncated by the proposed new road. The trees are an excellent flightline and foraging area for bats. Although roosting bats cannot be entirely ruled out due to the presence of epicormic growth around the tree bases, the potential for roosts to be present is low.	Low	High
North of TN 74 (Site 8)	Eurocentral Junction – west of the junction, south of the A8	West of the Eurocentral Junction, and south of the A8 lies an unoccupied and dangerously derelict farmhouse and outbuildings. It is currently unclear if these buildings will be affected by the scheme.	Low - Moderate	Low
South of TN 76 (Site 9)	Eurocentral Junction – small area of Faskine Estate Woodland SINC	A very small area of sycamore and birch woodland may be affected by the scheme. Many of the trees here are multi-stemmed, entire and in good health resulting in few/no roosting opportunities, however the potential for foraging bats is good.	Low	High
TN 82 (Site 10)	Chapelhall Junction – building at southern tip of woodland.	A small building exists close to the southern tip of this woodland. It has very limited bat potential as it seems secure, with no bat access points.	Low	None

Target note site no.	Location name	Comment	Potential for roosting bats	Potential for foraging bats
TN 83 and TN 82 (Site 11)	Chapelhall Junction – Blackland's Plantation SINC	A large area of old estate woodland represents ideal foraging habitat and contains trees with features of use to roosting bats. A spur of woodland extends east from the SINC woodland south of the A68 and terminates in a small wooded area dominated by sycamore (TN 82). Several trees here also have rot or woodpecker holes, and are therefore of potential value to roosting bats.	High	High
TN 86 (Site 12)	Chapelhall Junction – Maggieshaugh to Calderbank SINC	This area contains potential roosts in the largest trees within the woodland, and also represents excellent foraging for bat species.	Moderate	High
TN 93 (Site 13)	Chapelhall Industrial Estate Woodland	The woodland represents excellent foraging, and potential roosts such as woodpecker holes are present in some of the trees.	Moderate	High

4. POTENTIAL IMPACTS AND REASONABLE AVOIDANCE MEASURES

4.1.1 Although the majority of the road scheme does not deviate much from the line of the existing A8, there are areas, such as around junctions, where potential bat habitat will be lost. The loss of habitat with potential for roost sites and foraging areas, and/or severance of links between the two, is considered likely to have only a minor effect the local bat population.

4.1.2 No bat roosts were confirmed during the survey, but all features with potential to support bats must be subject to further pre-construction surveys and in order to minimise any potential for an adverse impact, it is recommended that the scope of further surveys and Reasonable Avoidance Measures (RAMs) be agreed with SNH. Mitigation measures are recommended for the current specimen design, as set out below.

4.2 Site 1 (TN 7) Baillieston Interchange Railway Underbridge

4.2.1 Potential disturbance to structure of low potential to support roosting bats.

4.2.2 If works involve changing this structure, it would be good practice to undertake a precautionary pre-construction dusk/dawn bat survey should be carried out in order to check for occupation by bats beforehand.

4.3 Site 2 (North of TN 15) Braehead Farm, West of Bargeddie Junction

4.3.1 Loss of house of low potential to support roosting bats.

4.3.2 Although it is considered that bats are unlikely to be present, the buildings should be subject to a precautionary pre-construction internal and dusk survey in order to confirm that bats are not in residence.

4.4 Site 3 (TN 27) Luggie Burn at Bargeddie Junction, South of A8

4.4.1 Potential loss of habitat of low potential to support roosting bats.

4.4.2 Relatively few large trees need felling here, however, those that do should be subject to Reasonable Avoidance Measures (RAMs) as set out below.

4.4.3 RAMs should include the following:

- All trees scheduled for felling will be inspected by a licensed bat worker/suitably experienced ecologist, and those which contain potential roost features will be marked. All potential roosts will be checked for the presence of bats by a licensed batworker immediately prior to felling the tree.

- All marked trees will be felled during suitable weather conditions in the months of September/October or mid-March to mid-May.

- All sections that contain potential roost features will be soft felled. This will involve wedging open splits or cracks to prevent them from closing and not cutting through cavities. These sections will be roped down to ensure that any hidden bats remain unharmed.

- Felled sections that contain potential roost features will be allowed to remain undisturbed on site or within the adjacent woodland for 48 hours to allow any hidden bats to escape. They will be stored in long lengths to prevent the setting of fires.

- A licensed batworker will be in attendance during felling operations. If bats are discovered at any time all work must cease. A licence from the Scottish Executive may be needed before work can re-commence – the bat worker will be able to advise following consultation with SNH.

4.4.4 In the short term, it is not possible to mitigate for the loss of established mature woodland. However, efforts can be made to maintain and increase the available roosting opportunities for bats. Mitigation should therefore include the following:

- Where possible, whole trees that already contain potential roost features will be carefully felled via winching/lowering and be retained. If practicable and possible from a safety point of view, consideration will be given to setting them upright within the retained in order to continue providing potential roosts, even whilst dead.

- As soon as possible, and in advance of any felling, a range of different bat boxes will be installed in the retained woodland. These will be installed at various heights (but above the reach of the public), and facing a range of aspects, with three bat boxes per tree if possible. Monitoring of the bat boxes will be undertaken to assess the success of the scheme.

- In the long term, the loss of the woodland foraging and roosting resource can only be mitigated by the establishment of an equal area of locally native woodland. For the 7.7 ha of woodland being lost along the alignment of the proposed scheme, 35.5 ha of new native woodland planting is proposed, including replacement woodland planting in areas adjacent to existing woodland, and as part of the hedgerow network, to encourage a native woodland flora to grow beneath the canopy. The areas chosen for tree planting are of low conservation interest in the first instance. A range of species will be planted, that will include native species appropriate to the location.

4.4.5 The habitats that will be lost to the scheme could be successfully re-created on the south facing embankment associated with the new road in this area. Himalayan balsam is prevalent along the Luggie Burn and care should be taken to ensure it does not invade new areas.

4.5 Site 4 (TN 56) Shawhead Junction, North Calder Wood SINC

4.5.1 Potential loss of habitat of low potential to support roosting bats.

4.5.2 It is recommended that all trees that contain potential roost features are subject to RAMs prior to felling. Mitigation (as described above) in the form of newly planted areas should occur on the cutting of the new road.

4.6 Site 5 (East of TN 58) Lime Tree Avenue, West of Shawhead Junction

4.6.1 Potential loss of habitat of low potential to support roosting bats.

4.6.2 Mitigation for loss of foraging area should be incorporated as new native woodland and scrub planting on the embankment adjacent to the new road.

4.7 Site 6 - North Calder Water Woodland SINC (Between TN 61 and TN 65)

4.7.1 Potential loss of habitat of high potential to support roosting bats.

4.7.2 Further pre-construction survey, which may require roped access to the specific trees scheduled for felling, will assist in narrowing down the location of tree roosts at this location, although health and safety risks are such that detailed inspection of some trees may not be possible.

4.7.3 For this reason, it is recommended that RAMs are used to fell the trees (as described above). In addition, there should be provision for closer inspection and/or survey by a licensed batworker of any/all trees found to be of high potential to be a roost. If a roost is confirmed, a licence from the Scottish Executive will be required before the tree can be disturbed.

4.7.4 Mitigation should be implemented as described above. In the area south of the westbound off slip, earthworks are proposed to create a very large embankment. It is highly recommended that trees and vegetation are retained at the toe of the slope in order to maintain the green link for foraging bats along the river, and to prevent bank erosion. The topsoil from the felled woodland should be used on the lower slopes of the newly created embankment, to allow swift colonisation of woodland species and early establishment of a ground flora. Consideration should also be given to seed/advance regeneration collection from within the existing woodland and nursery propagation for planting into the new embankment. New locally native woodland should be planted on the embankments. Large sections of felled timber should be included in the embankment, both standing and on the ground, as valuable deadwood habitat for insects and perches for raptors, and in time, potential roosting places for bats.

4.7.5 At the top of the embankment where the ground levels out, the woodland edge should be thickened with scrub species to prevent excess light from car headlights and streetlamps penetrating the wood. The scrubby woodland edge should be scalloped to create areas suitable for invertebrate species that bats feed on.

4.7.6 In the area of the new crossing of the North Calder Water, the proposed works (including construction) will not involve the permanent removal of all vegetation for the area beneath the bridge, so this will not adversely affect bats that use the route for commuting between foraging areas. Efforts should be made to retain as much of the existing flora as possible, in order to maintain the green route along the river.

4.7.7 The construction of the bridge also provides opportunity to include bat roost features within the structure – refer to DMRB Chapter 10 Section 1 Part 8 HA 80/99 and Figures B5(i)- (iv) therein.

4.8 Site 7 (South of TN 65) Lime Avenue West of Shawhead Junction

4.8.1 Potential loss of habitat of low potential to support roosting bats.

4.8.2 These trees should be felled when bats are least likely to be in residence in September/October or mid-March to mid-May. Full RAMs are not considered necessary as there is limited potential for roosting bats to be present.

4.9 Site 8 (North of TN 74) West of Eurocentral Junction, South of the A8

4.9.1 Potential loss of habitat of low-moderate potential to support roosting bats.

4.9.2 It currently appears that the buildings at this location will not be affected by the scheme. However, if there are changes in circumstances at a later stage, a dusk and dawn survey(s) during the appropriate season and prior to demolition will be required, with provision for mitigation if any bats are found.

4.10 Site 9 (South of TN 76) Faskine Estate SINC Woodland

4.10.1 Potential loss of habitat of low potential to support roosting bats.

4.10.2 RAMs are recommended for the felling. Very little mitigation is required given the small areas and low numbers of trees likely to be involved. It would be most appropriate to plant new native woodland on the embankments north or the new roundabout and on/off slip roads.

4.11 Site 10 (TN 82) Chapelhall Junction, Small Building

4.11.1 Potential loss of roost feature of low potential to support bats.

4.11.2 If this small building is to be demolished it should first be subject to pre-construction internal inspection for the presence of bats.

4.12 Site 11 (TNs 83 and 82) Blackland's Plantation SINC

4.12.1 Potential loss of roosting habitat of high potential to support bats.

4.12.2 RAMs and mitigation as described above should be implemented for the loss of these areas. The whole felled trees and bat boxes should be installed in the retained SINC woodland to the west, and additional planting should be included to the north of the existing SINC woodland, up to the new road.

4.13 Site 12 (TN 86) Maggieshaugh to Calderbank SINC

4.13.1 Potential loss of roosting habitat of moderate potential to support bats.

4.13.2 RAMs and mitigation (as described above) are suggested for the loss of this section. In addition, the newly created embankment should be planted with locally native tree and scrub species. Scrub and hedgerows species should be planted on the new embankments associated with the roundabouts and roads to the north in order to link the woodland to the wider countryside. To compensate for the loss

of such a large area of woodland, a new woodland should be created adjacent to the existing, ideally to the west.

4.14 Site 13 (TN 93) Chapelhall Industrial Estate Woodland

4.14.1 Potential loss of roost habitat of moderate potential to support bats and loss of foraging habitat of high potential to support bats.

4.14.2 RAMs and mitigation will be implemented as set out above.

5. SUMMARY

5.1.1 The proposed road improvements are considered likely to affect the local bat population. The exact magnitude and significance of this impact can only be confirmed at the detailed design stage, once it is clear exactly which individual trees will be lost, and following detailed preconstruction survey of those trees that will be felled. Given this uncertainty, for the purposes of the impact assessment presented in the ES, it is assumed that roost(s) will be lost.