Almond Viaduct Ecology Survey extracts. Dated 23rd February 2015.

Page 5 of 29 – Survey Methodology

2.5. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.6. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 7 of 29 – Survey Results

3.1.2. The data search conducted on the internet found that there are records of great crested newts, water voles, otters, badgers, red squirrels, grass snakes, common lizards and five species of bat within the surrounding area of the proposed worksite, although there are no specific locations for these results.

Pages 9 & 10 of 29 – Survey Results

3.3.7. Within the piers of the viaduct there are areas of stone work with mortar missing from the pointing. There were 12 piers with gaps in the pointing and these areas may provide a suitable habitat for roosting bats. None of the piers with bat roost potential were near to span 4, which has the river running beneath it. The closest span to the river with bat roost potential was span 7. The photographs below show some of the gaps in the pointing beneath spans 14 and 7.

3.3.8. The land around the site may provide a suitable foraging habitat for bats although a thorough assessment of bat foraging activity in the area of the site could not be carried out during this daytime survey of the site.

Pages 12 & 13 of 29 – Evaluation of Findings

4.6. Within the piers of the viaduct there are areas of stone work with mortar missing from the pointing. There were 12 piers with gaps in the pointing and these areas may provide a suitable habitat for roosting bats. None of the piers with bat roost potential were near to span 4 which has the river running beneath it. The closest span to the river with bat roost potential was span 7.

4.7. As the proposed works are scour repairs, the works should only affect the piers to spans 3, 4 and 5 and no bat roost potential was identified within these piers. Therefore the proposed works will not impact on bats roosting within the viaduct.

4.8. The land around the site may provide a suitable foraging habitat for bats although a thorough assessment of bat foraging activity in the area of the site could not be carried out during this daytime survey of the site.

4.9. The proposed works will not cause the loss or fragmentation of suitable foraging habitats. Therefore there will be no impact on foraging bats in the area of the site during the proposed works.

Page 14 of 29 – Recommendations

5.2. If the proposed works are to affect any span further to the west than span 6 it is recommended that further bat dusk emergence surveys are carried out on the affected spans prior to works commencing to establish a presence or absence of roosting bats.

5.3. Bat dusk emergence surveys can only be carried out in the main bat activity period which extends from May to August each year. If bats are found roosting in the viaduct a Scottish Natural Heritage EPS Licence and a mitigation strategy will be required before any works can be carried out in this area.

Appendix I. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

Over 15 species of bat have been recorded in Britain. These fall into two families, the horseshoe bats and the 'ordinary bats'. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man made structures and will readily use these to roost and to rear their young.

Bats are protected under the Wildlife and Countryside Act 1981, The Habitats Regulations 1994 and the Countryside & Rights of Way Act 2000.

It is an offence to intentionally or recklessly kill, injure or capture or disturb bats or to damage, destroy or obstruct access to any place used by bats for shelter or protection.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Blackwater Viaduct Ecology Survey extracts. Dated 18th February 2015

Page 5 of 24 – Survey Methodology

2.5. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.6. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 7 of 24 – Survey Results

3.1.2. The online data search showed recent records of pine marten and otter within 1km of the site and great crested newt, wild cat, common lizard, common pipistrelle bat and brown long eared bat within 5km of the site

Page 9 of 24 – Survey Results

3.3.3. All trees within the survey area were categorised in line with the "Bat Conservation Trust Good Practice Guidelines" protocol for the visual inspection of trees, a copy of the protocol has been included in Appendix VIII of this report.

3.3.3.1. All trees within the survey area were classified as Category 3 due to not providing any potentially suitable habitat for roosting bats.

3.3.4. No cracks or voids suitable for roosting bats were identified within the bridge structure during this survey. No bat field signs were identified on or surrounding the structure during this survey.

3.3.5. The land around the site may provide suitable foraging habitat for bats although a thorough assessment of bat foraging activity in the area of the site could not be carried out during this daytime survey of the site.

Pages 11 and 12 of 24 – Evaluation of Findings

4.4. All trees within the survey area were categorised in line with the "Bat Conservation Trust Good Practice Guidelines" protocol for the visual inspection of trees, a copy of the protocol has been included in Appendix VIII of this report.

4.5. All trees within the survey area were classified as Category 3 due to providing no potential habitat for roosting bats. Any de-vegetation work carried out within the survey area will have no impact on roosting bats.

4.6. No cracks or voids suitable for roosting bats were identified within the bridge structure during this survey. The proposed works will have no potential impact on roosting bats.

4.7. The survey area and land around the site may provide a suitable foraging habitat for bats although a thorough assessment of bat foraging activity in the area of the site could not be carried out during this daytime survey of the site.

4.8. The proposed works will not cause the loss or fragmentation of suitable foraging habitats. Therefore there will be no impact on foraging bats in the area of the site during the proposed works.

Appendix IV. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

Over 15 species of bat have been recorded in Britain with 9 of these species found in Scotland. These fall into two families, the horseshoe bats and the 'ordinary bats'. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man made structures and will readily use these to roost and to rear their young.

Bats are a European Protected Species and are protected under the Wildlife and Countryside Act 1981, The Habitats Regulations 1994 and the Countryside & Rights of Way Act 2000 making it an offence to:-

- Capture, injure or kill a wild bat.
- Harass a wild bat or group of bats.
- Disturb a wild bat in a roost.
- Disturb a wild bat while it is rearing or otherwise caring for its young.
- Obstruct access to a bat roost or to otherwise deny the animal use of the roost.
- Disturb such a wild bat in a manner that is, or circumstances which are, likely to significantly affect the local distribution or abundance of that species.
- Disturb a wild bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:-

- Damage or destroy a breeding site or resting place of such an animal.
- Keep, transport, sell or exchange or offer for sale or exchange any wild bat or any part or derivative of one.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Scottish Natural Heritage.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Carronhill Viaduct Ecology Survey extracts. Dated 11th December 2014.

Page 5 of 29 – Survey Methodology

2.5. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.6. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 9 of 29 – Survey Results

3.3.4. Only the north-eastern viaduct span could be properly accessed during this survey, as a road ran underneath, and as trees masked the view of other spans. No cracks or crevices suitable for roosting bats were discovered within the stonework of the north-eastern-most span. However, due to the large size and old age of the viaduct, it is possible that features suitable for roosting bats could be present elsewhere.

3.3.5. The valley and watercourse, which structure 161-248 crosses, formed a long linear feature, the kind which is commonly used by bats to commute along as they forage. As such, it is likely that bats will feed and travel within the survey area. As this survey was carried out during the daytime, it was not possible to assess actual bat activity in the area.

Page 11 of 29 – Evaluation of Findings

4.5. The north-eastern-most span of this viaduct has been assessed as having no potential as bat roosting habitat. The remainder of the viaduct could however not be accessed during this survey, so suitable habitat could be present in these areas. If bats are roosting within the viaduct, there could potentially be associated impacts.

4.6. The vegetation located over the valley sides could potentially be utilised by foraging and commuting bats. If this vegetation is to be removed as part of the proposed works, it is unlikely that there would be an impact upon local bats, as suitable linear features would still provided by the valley and river.

Page 13 of 29 - Recommendations

5.2. As only the north-eastern-most span of the viaduct could be accessed during this survey, it is recommended that dusk emergence bat surveys are carried out upon the remainder of the viaduct, if these areas are to be included within the works. Initially it is recommended that one survey is undertaken, with further surveys carried out if bats appear to be roosting within the structure. These surveys must be carried out between May and September. If bats are found to be roosting, it will necessary to apply for a Scottish Natural Heritage European Protected Species Licence to cover the works and implement mitigation measures.

Appendix IV. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

Over 15 species of bat have been recorded in Britain with 9 of these species found in Scotland. These fall into two families, the horseshoe bats and the 'ordinary bats'. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man made structures and will readily use these to roost and to rear their young.

Bats are a European Protected Species and are protected under the Wildlife and Countryside Act 1981, The Habitats Regulations 1994 and the Countryside & Rights of Way Act 2000 making it an offence to:-

- Capture, injure or kill a wild bat.
- Harass a wild bat or group of bats.
- Disturb a wild bat in a roost.
- Disturb a wild bat while it is rearing or otherwise caring for its young.
- Obstruct access to a bat roost or to otherwise deny the animal use of the roost.
- Disturb such a wild bat in a manner that is, or circumstances which are, likely to significantly affect the local distribution or abundance of that species.
- Disturb a wild bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:-

- Damage or destroy a breeding site or resting place of such an animal.
- Keep, transport, sell or exchange or offer for sale or exchange any wild bat or any part or derivative of one.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Scottish Natural Heritage.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Castlecary Viaduct Ecology Survey extracts. Dated 16th May 2014.

Page 5 of 24 – Survey Methodology

2.5. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.6. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 6 of 24 – Survey results

3.1.1. A desktop data search for existing records of protected species or designated sites in the area of the site was carried out using the National Biodiversity Network (NBN) Gateway and MAGIC websites.

3.1.2. The NBN Gateway holds records of water voles and otters on the Forth and Clyde Canal. There are also records of slow worms, adders, common lizards, badgers and bats within a 10km grid square around the site although there are no specific locations for these records.

Page 9 of 24 – Survey results

3.3.9. No mature trees that would provide suitable roosting opportunities for bats were identified in the area immediately surrounding the structure.

3.3.10. The around the structure may provide a suitable foraging habitat for bats although a thorough assessment of bat foraging activity in the area could not be carried out during this daytime survey of the site.

3.3.13. The structure provides little or no nesting potential for bats due to the lack of suitable voids or ledges. No existing or old nests were identified around the visible areas of the structure during this survey.

4.1. Access underneath the structure was limited during this survey due to the presence of the motorway and public roads underneath the structure. The structure is also very high making a thorough inspection of the stonework from ground level impossible. These limitations on access meant that a thorough assessment of the bat potential offered by the structure could not be carried out during this survey of the site.

4.6. A thorough assessment of the structure for bat roosting opportunities and bat field signs could not be carried out due to the limited access around the structure during this survey.

4.7. Any work that will have an impact on the stonework of the structure may have an impact on bats if they are present in cracks and voids around the structure.

4.8. Several other structures are present in the areas around the viaduct. A thorough survey of the structures was not carried out during this survey although if any work will have an impact on the structures the work will potentially have an impact on any bats present in the structures.

4.9. No mature trees that would provide suitable roosting opportunities for bats were identified within the surveyed area. Therefore there will be no further impact on roosting bats during works on the structure.

4.10. The land within and around the site may provide a suitable foraging habitat for bats although a thorough assessment of the bat foraging activity in the area of the site could not be carried out during this daytime survey of the site.

4.11. The proposed works are to the structure and should therefore not cause the loss or fragmentation of areas of suitable foraging habitat. Therefore there will be no impact on foraging bats during works on the structure.

Page 14 of 24 – Recommendations

5.2. It is recommended that full details on the works proposed for the structure are passed to the author of this report to allow a thorough assessment of the potential impact on roosting bats and the requirement for further bat surveys in advance of any works on the structure.

5.3. It is recommended that the surrounding structures, especially the structures over Red Burn, remain unaffected by the works. If there is a requirement to carry out works that will have an impact on the structures a further bat survey of the affected areas should be carried out in advance of the works.

Pages 17 & 18 of 24 – Appendix II

Appendix II. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

Over 15 species of bat have been recorded in Britain with 9 of these species found in Scotland. These fall into two families, the horseshoe bats and the 'ordinary bats'. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to manmade structures and will readily use these to roost and to rear their young.

Bats are a European Protected Species and are protected under the Wildlife and Countryside Act 1981, The Habitats Regulations 1994 and the Countryside & Rights of Way Act 2000 making it an offence to:-

- Capture, injure or kill a wild bat.
- Harass a wild bat or group of bats.
- Disturb a wild bat in a roost.
- Disturb a wild bat while it is rearing or otherwise caring for its young.
- Obstruct access to a bat roost or to otherwise deny the animal use of the roost.
- Disturb such a wild bat in a manner that is, or circumstances which are, likely to significantly affect the local distribution or abundance of that species.
- Disturb a wild bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to:-

- Damage or destroy a breeding site or resting place of such an animal.
- Keep, transport, sell or exchange or offer for sale or exchange any wild bat or any part or derivative of one.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Scottish Natural Heritage.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Coatdyke Viaduct Ecology Survey extracts. Dated 4th July 2017

Page 5 of 20 – Survey Methodology

2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)* by looking for the following signs: -

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 7 of 20 – Survey Results

3.1.1. An online data search was carried out for publicly available records of protected species and designated sites.

3.1.2. The data search revealed records of red squirrel, badger, common pipistrelle bat, slow-worm, common frog, common toad, palmate newt, giant hogweed and numerous bird records within 1km of the surveyed area. None of these records related to the surveyed area.

Pages 9 and 10 of 20 – Survey Results

3.3.5. There were very small areas of missing mortar seen within the viaduct, however, they appeared to be shallow and unlikely to support roosting bats. No large gaps or crevices were identified on this structure. The photograph below highlights the shallow areas of missing mortar.

3.3.6. There were no trees within close vicinity to the structure that would provide suitable habitat for roosting bats. Therefore, all trees were assessed as having negligible bat roost potential in accordance with the Bat Conservation Trust Good Practice Guidelines.

3.3.7. The surrounding habitat was assessed as providing moderate habitat for foraging and commuting bats due to the railway corridor, watercourse and parkland.

Pages 12 and 13 of 20 – Evaluation of findings

4.6. There were very small areas of missing mortar seen within the viaduct, however, they appeared to be shallow and unlikely to support roosting bats. No large gaps or crevices were identified on this structure. Therefore, it is highly unlikely any roosting bat will be affected by the proposed works; however, caution is advised due to the height of this structure.

4.7. There were no trees within close vicinity to the structure that would provide suitable habitat for roosting bats. Therefore, the works will have no impact on roosting bats within trees.

4.8. The surrounding habitat was assessed as providing moderate habitat for foraging and commuting bats due to the railway corridor, watercourse and parkland. The proposed works will not fragment any suitable commuting or foraging bat habitat.

Appendix I. BAT INFORMATION.

Ecology

There are currently 18 species of bat residing in Britain, 17 of which of which are known to breed here. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to habitat change and shortage of food, caused by pesticides, as insects are their sole diet.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man-made structures and will readily use these to roost and to rear their young.

Surveys

During walkover surveys, bat roosts can be identified by looking for:

- Suitable holes, cracks and crevices within any building, tree or other structure.
- Bat droppings along walls, window cills, or on the ground.
- Prey remains, such as insect wings.

Further investigations can be made using endoscopes, by carrying out aerial inspections of trees or by conducting bat activity surveys during dusk and dawn over summer months.

Legislation

Bats are protected under Appendix II and III of the Bern Convention (1982), Schedule 5 and 6 of the Wildlife and Countryside Act (1981), Annex IV of the Habitats Directive (some species under Annex II), Annex II of the Conservation o Habitats and Species Regulations (2010) and EUROBATS agreement. Numerous species are also listed under section 41 of the Natural Environment and Rural Communities Act (2006) making them species of principal importance.

All bats and their roosts are therefore protected in the UK. This makes it an offence to kill, injure or take any bat, to interfere with any place used for shelter o protection, or to intentionally disturb any animal occupying such a place.

The UK has designated maternity and hibernacula areas as Special Areas of Conservation (SAC's) under the Habitats Directive. Implementation of the UK Biodiversity Action Plan also includes action for a number bat species and the habitats which support them.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

Dunninald Viaduct Ecology Survey – extracts. Dated 1st February 2016

Page 5 of 19 – Survey Methodology

2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 9 of 19 – Survey Results

3.3.5. Those sections of the brickwork of the piers that could be seen from the two ends of the viaduct were in good condition and no evidence of bat roosting potential was found using binoculars.

Page 10 of 19 – Survey Results

3.3.6. The habitat around the viaduct is a wooded ravine that is assessed to be high value foraging habitat for bats. However, a full assessment could not be undertaken during this day time survey.

Page 12 of 19 – Evaluation of Findings

4.6. There are no open joints, cracks and crevices in the brickwork of the viaduct piers as viewed from the banks that provide potential for roosting bats. The painting of the viaduct will therefore have no impact on roosting bats.

4.7. The habitat around the viaduct is a wooded ravine that is assessed to be high value foraging habitat for bats. However, the proposed works will not cause any fragmentation of habitat and will have no impact on foraging bats.

Page 16 of 19 – Appendix II

Appendix II. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

18 species of bat currently reside in Britain, 17 of which are known to breed here. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to manmade structures and will readily use these to roost and to rear their young.

Bats are protected under the Wildlife and Countryside Act 1981, Regulation 41 of The Conservation of Habitats and Species Regulations 2010, and the Countryside & Rights of Way Act 2000.

It is an offence to intentionally or recklessly kill, injure or capture or disturb bats or to damage, destroy or obstruct access to any place used by bats for shelter or protection.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Garry Viaduct Ecology Survey extracts. Dated 24th January 2018.

Page 5 of 26 – Survey Methodology

2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 11 of 26 – Survey Results

3.3.5. No large voids suitable for roosting bats were identified from a visible inspection during this survey. A thorough inspection of the structure could not be undertaken during this survey, due to the height of the structure and fast flowing watercourse. The steelwork does not provide suitable habitat for roosting bats and no voids suitable for roosting bats were identified within the stone work or brick work directly adjacent to the steelwork.

3.3.6. No trees containing characteristics suitable for roosting bats are located within the surveyed area.

3.3.7. The river corridor and tree lines provide suitable habitat for foraging and commuting bats, although the proposed works will have no impact on the overall vegetation within the surveyed area.

Page 13 of 26 – Evaluation of Findings

4.6. A thorough inspection throughout the stone and brick work could not be undertaken during this survey, although the steelwork does not provide suitable habitat for roosting bats and no voids suitable for roosting bats were identified within close proximity of the steelwork. The proposed works will be mainly isolated to the steelwork and will have no impact on roosting bats.

4.7. The river corridor and surrounding vegetation provides suitable habitat for commuting and foraging bats, although the works will have no impact on the overall vegetation within the area. The proposed works will not fragment foraging habitat and will have no impact on foraging or commuting bats.

Page 15 of 26 – Recommendations

5.4. In the event extensive areas of brickwork and stonework are to be affected, it is recommended a bat activity survey is completed during the bat surveying season, which is between May and August each year.

Kinclair Viaduct Ecology Survey – extracts. Dated 18th June 2015

Page 5 of 26 – Survey Methodology

2.5. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.8. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 7 of 26 – Survey Results

3.1.1. An internet desktop data search was carried out for records of protected species and protected sites within the survey area.

3.1.2. There are records of adder, slow worm, common lizard, water vole, otter and a number of species of bat within 5km of the site. There are no specific locations for these records. There are records of red squirrels within 100m of the survey area.

Page 13 of 26 – Survey Results

3.3.7. The viaduct has gaps in all spans but they are mainly shallow and provide no suitable habitat for roosting bats. Span 8 has gaps under the edge of the viaduct between the arch barrel and the voussoir on the eastern side. These gaps appear to be shallow but the span is high and the survey was carried out from ground level so the gaps cannot be thoroughly inspected. If the gaps are shallow there is no potential for roosting bats. If the gaps are deep or lead into a void there is potential for roosting bats.

Page 14 of 26 – Survey Results

3.3.8. There are no mature trees within the area around the viaduct that could provide bat roost potential. Further from the viaduct there are large mature trees which could provide bat roost potential.

3.3.9. The survey area provides some foraging potential for bats. However, a thorough assessment of bat activity could not be carried out during a daytime survey of the site.

Pages 15 and 16 of 26 – Survey Results

4.7. The viaduct has gaps in all spans but they are mainly shallow and provide no suitable habitat for roosting bats. Span 8 has gaps under the edge of the viaduct between the arch barrel and the voussoir on the eastern side. These gaps appear to be shallow but the span is high and the survey was carried out from ground level so the gaps cannot be thoroughly inspected. If the gaps are shallow there is no potential for roosting bats. If the gaps are deep or lead into a void there is potential for roosting bats. Therefore, works to all but Span 8 will have no impact on roosting bats. Works to Span 8 will have no impact on roosting bats if the gaps are shallow. If the gaps are deep there will be an impact on any bats roosting within them.

4.8. The survey area provides some foraging potential for bats. However, the proposed works will have little impact on foraging bats.

5.1. There are some gaps in Span 8 of the viaduct that could not be thoroughly inspected but these gaps appear to be shallow. It is recommended that once works begin on the masonry repairs of the viaduct that these gaps are inspected by personnel on site. If the gaps are deep, or lead into a void, the back of the gap cannot be seen or if a bat is identified in the gap works in the area must be delayed until Whitcher Wildlife Ltd has been contacted and access has been provided to allow a licenced bat surveyor to carry out an endoscope survey of the gaps to ensure there are no roosting bats.

5.2. If the gaps have no bat roost or bat roost potential works can be carried out. If bats are found to be roosting in the gaps no works can be carried to this area of the viaduct until a Natural England EPS licence has been applied for and granted and a mitigation strategy has been prepared. If the gaps are shallow and if the back of the gap can be seen and there are no roosting bats present works can be carried out.

5.3. During works all gaps found once masonry works begin should be checked for bats. If any bats are found works in that area should stop, the bat left safe and Whitcher Wildlife Ltd contacted immediately for advice.

Appendix I. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

18 species of bat currently reside in Britain, 17 of which are known to breed here. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to shortage of food, caused by pesticides, as insects are their sole diet, and habitat change.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man made structures and will readily use these to roost and to rear their young.

Bats are protected under the Wildlife and Countryside Act 1981, Regulation 41 of The Conservation of Habitats and Species Regulations 2010, and the Countryside & Rights of Way Act 2000.

It is an offence to intentionally or recklessly kill, injure or capture or disturb bats or to damage, destroy or obstruct access to any place used by bats for shelter or protection.

A breeding or resting site of any bat is known as a bat roost. A bat roost is therefore any structure a bat uses for shelter or protection. Because bats tend to use the same roosts each year, legal opinion is that the roost site is protected whether or not the bats are present at that time.

Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Mill/Milk Water Viaduct Ecology Survey – extracts. Dated 11th April 2016

Page 5 of 27 – Survey Methodology

2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 7 of 27 – Survey Results

3.1.1. An internet desktop data search was carried out for records of protected species and protected sites within the survey area.

3.1.2. The internet data search showed recent records of otter approximately 1km south of the site within various locations along the Water of Milk, although no specific locations were provided. Records of red squirrel within various locations within 500m of the site have also been provided although the records are not site specific. The data search also provided records of various species of bat including Daubenton's bat, Noctule bat and common pipistrelle bat within 2km of the site, the closest record is within Lockerbie, although no specific location were provided for the records.

3.3.5. A number of cracks and voids suitable for roosting bats were identified within all areas of brick and stone work approximately lower than 3m from ground level. Due to the height of the structure the higher areas of the viaduct could not be safely inspected during this survey. No bat field signs were identified during this survey although a thorough inspection could not be undertaken during this survey.

3.3.6. Numerous mature and dead trees which contain characteristics suitable for roosting bats surround the viaduct. No bat field signs were identified within the lower sections of the trees although a thorough inspection of the larger trees could not be safely undertaken during this survey.

3.3.6.1. The photograph below shows an over mature ash tree approximately 10m east of the structure.

3.3.7. The survey area provides suitable bat foraging habitat although the works will be isolated to the structure and immediately surrounding vegetation and have no impact on the overall bat foraging and commuting habitat.

Pages 13 and 14 of 27 – Evaluation of Findings

4.7. A number of cracks and voids suitable for roosting bats are located within the lower sections of the structure although no bat field signs were identified during this survey. Due to the height of the structure the higher sections could not be inspected during this survey; therefore the higher sections may also provide suitable habitat for roosting bats. Any works undertaken on the viaduct structure will potentially cause direct major impact on roosting bats.

4.8. A number of mature and dead trees which provide suitable habitat for roosting bats directly surround the viaduct. Any impact on the mature or dead trees would potentially have a major impact on any bats roosting within the affected trees.

4.9. The survey area provides suitable bat foraging and commuting habitat. However, due to the nature of the proposed works, there will be no impact on foraging or commuting bats.

Page 15 of 27 – Recommendations

5.3. From the description of the works it appears inevitable that repair works will be necessary high on the viaduct and therefore it is recommended further bat activity surveys are undertaken prior to those works. Bat surveys should be undertaken during the bat active season which is between May and September.

Appendix II. BAT INFORMATION.

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Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Oakbank Viaduct Ecology Survey extracts. Dated 2nd August 2015

Page 5 of 15 – Survey Methodology

2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 10 of 15 – Survey Results

3.3.4. The viaduct was very difficult to effectively survey for potential bat roosts due to the difficulty of access under the viaduct, the height of the piers and the abundance of vegetation present. The arch barrels all appeared to be sound with no potential for roosting bats, the spandrels could not be surveyed from ground level.

3.3.5. The site is remote and sheltered with abundant trees and scrub and the river at the bottom of the ravine. Therefore the habitat was assessed to be high value bat foraging habitat although this could not be fully assessed during a day time survey.

Page 11 of 15 – Evaluation of findings

4.4. No potential bat roosts were identified in the structure although it was not possible to view all aspects of the viaduct effectively from within the ravine. If bats are roosting in the viaduct, the proposed works will have a significant impact on them.

4.5. The habitat around the site is ideal for foraging bats but the works will have no impact on the foraging habitat.

Page 12 of 15 – Recommendations

5.2. It is recommended that a further assessment of the structure for roosting bats is carried out. If the structure is to be scaffolded, it is recommended that a visual inspection survey is undertaken from the scaffold using bright lamps and an endoscope. If the structure is not to be scaffolded, further consideration as to how a further bat roost assessment can be undertaken will be necessary.

Page 12 of 15 – Biodiversity Enhancements

It is recommended that a bat box be erected on site to enhance the biodiversity of the site.

Page 13 of 15 – Appendix II

Appendix I. BAT INFORMATION.

It is necessary to understand a little about bats, their basic nature, ecology and legal protection in order to evaluate the findings of this report.

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As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

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Bat roosts can be identified by looking for:-

- Suitable holes, cracks and crevices.
- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

River Dee Viaduct Ecology Survey extracts. Dated 1st February 2016.

Page 5 of 17 – Survey Methodology

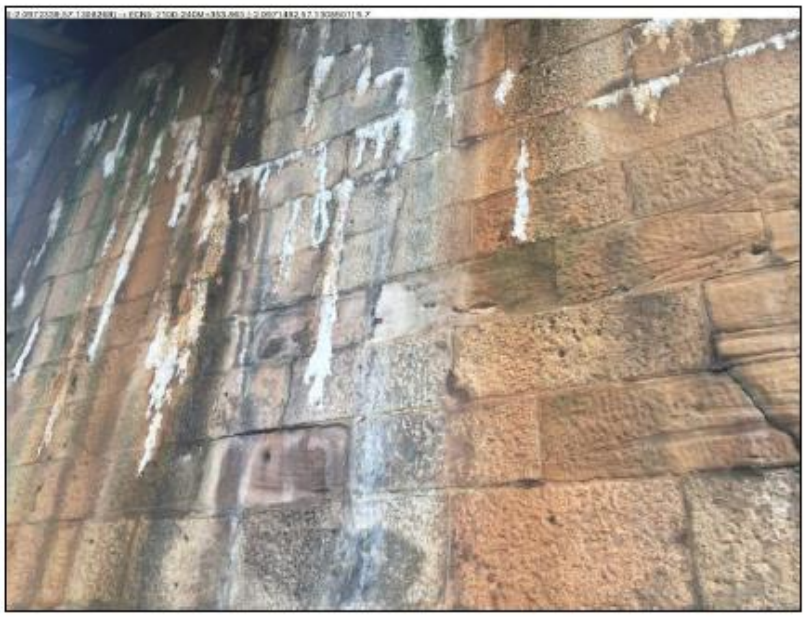
2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with L Hundt (2012). *Bat Conservation Trust Good Practice Guidelines* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Page 10 of 17 – Survey Results

3.3.5. No open joints, cracks or crevices were identified in the stonework of the viaduct piers that would provide potential for roosting bats as viewed through binoculars from the river banks. The piers are constructed from close fitting granite blocks and the joints appeared to be narrow and well sealed as shown below.



3.3.6. The habitat around the viaduct is an open commercial area around the river and is assessed to be low value foraging habitat for bats. However, a full assessment could not be undertaken during this day time survey.

4.6. There are no open joints, cracks and crevices in the stonework of the viaduct piers as viewed from the banks that provide potential for roosting bats. The painting of the viaduct will therefore have no impact on roosting bats.

4.7. The habitat around the viaduct is an open commercial area around the river and is assessed to be low value foraging habitat for bats. The proposed works will not cause any fragmentation of habitat and will have no impact on foraging bats.

Appendix II. BAT INFORMATION.

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- Bat droppings.
- Prey remains.
- By carrying out night observations using a bat detector.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.

The person applying for that licence has to be suitably qualified and experienced in bat matters. That person is then responsible for ensuring that the measures contained in the licence are carried out.

Slochd Viaduct Ecology Survey extracts. Dated 30th June 2017

Page 5 of 24 – Survey Methodology

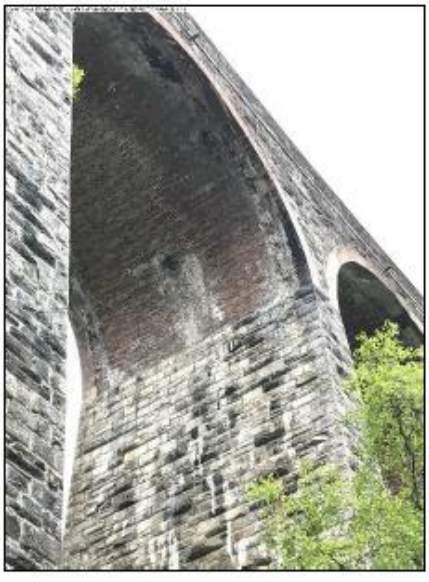
2.6. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)* by looking for the following signs:-

* Holes, cracks or crevices.
* Bat Droppings.

2.7. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

Pages 9 and 10 of 24 – Survey Results

3.3.5. The viaduct could not be fully assessed for its bat roost potential due to the height of the structure. It appeared to feature dry drainage holes, cracked stone work and potential areas of missing mortar. These features could provide suitable habitat for roosting bats. The photographs below show the features identified during the survey.



3.3.6. There were no mature trees within immediate proximity of the viaduct which would provide suitable bat roosting features. Therefore, all trees were assessed as having negligible bat roost potential in accordance with the Bat Conservation Trust Good Practice Guidelines.

3.3.7. The watercourses, woodland and railway corridor would provide suitable features for foraging and commuting bats.

Page 12 of 24 – Evaluation of Findings

4.6. The viaduct could not be fully assessed for its suitability to support roosting bats although it appeared there could be features, which would be suitable to support low numbers of opportunistic roosting bats during the active bat season. Therefore, roosting bats could be affected by the proposed works.

4.7. There were no mature trees within immediate proximity of the viaduct which would provide suitable bat roosting features. Therefore, no roosting bats within trees will be affected by the proposed works.

4.8. The watercourses, woodland and railway corridor would provide suitable features for foraging and commuting bats. The works will not fragment any foraging or commuting habitat for bats.

Page 14 of 24 - Recommendations

5.2. Due to the gaps and cracks within the viaduct it is recommended that a bat dusk emergence survey is carried out on the viaduct to establish if bats use the structure as a roosting site. Bat dusk emergence surveys must be carried out during the main bat activity period, which extends from May to August each year. If bats are found to be roosting within the viaduct a Scottish Natural Heritage Bat licence must be applied for and a suitable mitigation strategy put into place before any work can commence.

Appendix II. BAT INFORMATION.

Ecology

There are currently 18 species of bat residing in Britain, 17 of which of which are known to breed here. They are extremely difficult to identify in the hand and even more so in flight.

All appear to be diminishing in numbers, probably due to habitat change and shortage of food, caused by pesticides, as insects are their sole diet.

As their diet consists solely of insects, bats hibernate during the winter when their food source is at its most scarce. They will spend the winter in hollow trees, caves, mines and the roofs of buildings.

Certain species, particularly the pipistrelle (the commonest and most widespread British bat) can quickly adapt to man-made structures and will readily use these to roost and to rear their young.

Surveys

During walkover surveys, bat roosts can be identified by looking for:

- Suitable holes, cracks and crevices within any building, tree or other structure.
- Bat droppings along walls, window cills, or on the ground.
- Prey remains, such as insect wings.

Further investigations can be made using endoscopes, by carrying out aerial inspections of trees or by conducting bat activity surveys during dusk and dawn over summer months.

Legislation

Bats are protected under Appendix II and III of the Bern Convention (1982), Schedule 5 and 6 of the Wildlife and Countryside Act (1981), Annex IV of the Habitats Directive (some species under Annex II), Annex II of the Conservation of Habitats and Species Regulations (2010) and EUROBATS agreement. Numerous species are also listed under section 41 of the Natural Environment and Rural Communities Act (2006) making them species of principal importance.

All bats and their roosts are therefore protected in the UK. This makes it an offence to kill, injure or take any bat, to interfere with any place used for shelter or protection, or to intentionally disturb any animal occupying such a place.

The UK has designated maternity and hibernacula areas as Special Areas of Conservation (SAC's) under the Habitats Directive. Implementation of the UK Biodiversity Action Plan also includes action for a number bat species and the habitats which support them.

Where development proposals are likely to affect a bat roost site, a licence is required from Natural England.