

**A66 Northern Trans-Pennine Project
TR010062**

**3.4 Environmental Statement
Appendix 6.10 Red Squirrel**

APFP Regulations 5(2)(a)

Planning Act 2008

**Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009**

Volume 3

June 2002

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed
Forms and Procedure)
Regulations 2009**

A66 Northern Trans-Pennine Project
Development Consent Order 202x

**3.4 ENVIRONMENTAL STATEMENT
APPENDIX 6.10 RED SQUIRREL**

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010062
Application Document Reference	3.4
Author:	A66 Northern Trans-Pennine Project Team, National Highways

Version	Date	Status of Version
Rev 1	13/06/22	DCO Application

CONTENTS

6.10	Red Squirrel Survey Report.....	1
6.10.1	Introduction	1
6.10.2	Legislation and Policy Framework	1
6.10.3	Methodology.....	5
6.10.4	Assumptions and Limitations	7
6.10.5	Results	7
6.10.6	Discussion.....	20
6.10.7	References.....	20

6.10 Red Squirrel Survey Report

6.10.1 Introduction

Project background

- 6.10.1.1 The A66 Northern Trans-Pennine Project is a programme of works to improve the A66 between the M6 at Penrith and A1 at Scotch Corner.
- 6.10.1.2 Between the M6 and the A1(M) the existing A66 is approximately 80km in length. Along this length it is intermittently dualled, with approximately 30km of single carriageway, in six separate sections, making the route accident prone and unreliable.
- 6.10.1.3 The route carries high levels of freight traffic and is an important route for tourism and connectivity to local communities. The variable road standards, together with the lack of available diversionary routes when incidents occur, affects road safety, reliability, resilience and attractiveness of the route. For a full project description see Chapter 2: The Project (Application Document 3.2).

Scope of the document

- 6.10.1.4 This report presents desk study data and baseline survey results for red squirrel *Sciurus vulgaris*. Baseline surveys were conducted in May and June 2021 and in January 2022. It is intended that the information in this report will be used in conjunction with data from other surveys to identify and assess potential implications of the Project in relation to red squirrel and inform any mitigation and compensation required. This baseline report can be used to accompany any future planning application and associated Environmental Impact Assessment (EIA) for the project

6.10.2 Legislation and Policy Framework

Legislation

Wildlife and Countryside Act 1981

- 6.10.2.1 Red squirrel are listed on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981(as amended). The inclusion of this species in Schedule 5 means that red squirrel have additional protection afforded to them under Schedule 9 of the WCA.
- 6.10.2.2 As such it is an offence to:
- intentionally kill, injure or take a wild red squirrel
 - possess or control any live or dead red squirrel or any part of it
- 6.10.2.3 it is also an offence to intentionally or recklessly:
- damage or destroy any structure or place which a wild red squirrel uses for shelter or protection
 - disturb any red squirrel while it is occupying a structure or place which it uses for shelter or protection

- obstructs access to any structure or place which any wild red squirrel uses for shelter or protection
- sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild red squirrel, or any part of, or anything derived from, a wild red squirrel
- publish or cause to be published any advertisement likely to be understood as conveying that they buy or sell, or intend to buy or sell, any of those things

Natural Environment and Rural Communities Act 2006

6.10.2.4 The UK Biodiversity Action Plan (UKBAP) covering 2011-2020 has been superseded by the UK Post-2010 Biodiversity Framework. The framework identifies 65 Priority Habitats and 1150 Priority Species that are in need of protection. This list has been used to define habitats and species of 'Principal Importance' in England (the Section 41 list) as required by the Natural Environment and Rural Communities (NERC) Act 2006.

6.10.2.5 Red squirrel are listed as rare and threatened under Section 41 (S41) of the Natural Environment and Rural Communities Act 2006¹. All planning decisions must be made with regard for the conservation of S41 species and any priority actions² associated with them.

National level policy

National planning statement for national networks

6.10.2.6 The primary policy basis for deciding whether or not to grant a Development Consent Order (DCO) is the National Policy Statement for National Networks (NPSNN) (Department for Transport, 2014)³, which sets out policies to guide how DCO applications will be decided and how the effects of national networks infrastructure should be considered by the relevant decision maker. The policies for biodiversity and ecological conservation include statements that:

"Biodiversity is the variety of life in all its forms and encompasses all species of plants and animals and the complex ecosystems of which they are a part. Government policy for the natural environment is set out in the Natural Environment White Paper (NEWP). The NEWP sets out a vision of moving progressively from net biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures..." (NPSNN paragraph 5.20)

6.10.2.7 The NPSNN also advises:

"In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other

¹ Natural Environment and Rural Communities Act 2006

² Priority Actions for S41 Species

³ Department for Transport (2014) National Policy Statement for National Networks

species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment.” (NPSNN paragraph 5.26)

6.10.2.8 Table 1: *NPSNN* of relevance to *NPSNN* of relevance to red squirrel - identifies the *NPSNN* policies relevant to red squirrel.

Table 1: *NPSNN* of relevance to red squirrel

Relevant <i>NPSNN</i> paragraph reference	Requirement of the <i>NPSNN</i> (paraphrase)
5.22	Outline any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity and that the statement considers the full range of potential impacts on ecosystems.
5.23	Demonstrate how the project has taken advantage of opportunities to conserve and enhance biodiversity conservation interests.
5.29	Ensure proposals mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site’s biodiversity are acceptable.
5.33	Development proposals potentially provide many opportunities for building in beneficial biodiversity features. Opportunities to maximise beneficial biodiversity features should be considered. Planning obligations can be used where appropriate in order to ensure that such beneficial features are delivered.
5.34 and 5.35	Individual wildlife species receive statutory protection under a range of legislative provisions. Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales. Undertake measures to ensure these species and habitats are protected from adverse effects. Where appropriate, requirements or planning obligations may be used in order to deliver this protection.
5.36	Include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured
5.37	Consider what appropriate requirements should be attached to any consent and/or in any planning obligations entered into in order to ensure that mitigation measures are delivered.
5.38	Take account of what mitigation measures may have been agreed between the applicant and Natural England and/or the Marine Management Organisation (MMO), and whether Natural England and/or or the MMO has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences.

National planning policy framework

6.10.2.9 The *National planning policy framework (NPPF)* (Ministry of Housing, Communities & Local Government, 2021)⁴ originally published in March 2012 and most recently updated in July 2021, sets out the government’s

⁴ Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework

planning policies for England and provides a framework within which locally prepared plans can be produced. The *NPPF* is “*an important and relevant matter to be considered in decision making for NSIP*”⁵.

Regional and local level policy

- 6.10.2.10 Although the UK Biodiversity Action Plan (BAP) has been superseded, BAPs are still widely used at county level to support Biodiversity 2020⁶.
- 6.10.2.11 Red Squirrel are listed as a priority species on the Durham County Council BAP (2012/13) now listed on North East England Nature Partnership website (North East England Nature Partnership, 2013)⁷ and the Cumbria BAP (Cumbria Biodiversity Partnership, 2001)⁸.
- 6.10.2.12 The following local planning policies are relevant to this report:
- *Eden Local Plan (2014-2032)* (Eden District Council, 2014)⁹ Policy ENV1 and Policy ENV4
 - *County Durham Plan (Adopted 2020)* (Durham County Council, 2020)¹⁰ Policy 26, Policy 40, Policy 41, Policy 42 and Policy 43
 - *Richmondshire Local Plan (2012-2028)* adopted 2014 (Richmondshire District Council, 2014)¹¹ Core Policy CP12
 - *Richmondshire District Councils BAP* (Richmond County Council, 2014)¹².

Other relevant policy and guidance

- 6.10.2.13 In addition to compliance with the *NPSNN* and *NPPF*, this report has been written in accordance with professional standards and guidance. The standards and guidance which relate to the assessment are:
- *Guidance for Ecological Impact Assessment in the United Kingdom Third Edition* (Chartered Institute of Ecology and Environmental Management, 2018)¹³
 - *Design Manual for Roads and Bridges (DMRB) LA 108 Biodiversity (DMRB LA 108)*, Revision 1, March 2020
 - *DMRB LD 118 Biodiversity Design (DMRB LD 118)*, Revision 1, March 2020 (Highways England, 2020c)¹⁴

⁵ Nationally Significant Infrastructure Projects (NSIP)

⁶ DEFRA (2011). Biodiversity 2020: A Strategy for England’s Wildlife and Ecosystem Services. Department for Environment, Food and Rural Affairs, London.

⁷ North East England Nature Partnership (2013) Biodiversity Priorities

⁸ Cumbria Biodiversity Partnership (2001) The Cumbria Biodiversity Action Plan

⁹ Eden District Council (2014) Eden Local Plan 2014 to 2032,

¹⁰ Durham Council (2020) County Durham Plan – Adopted 2020,

¹¹ Richmond County Council (2014) Richmondshire Local Plan 2012 - 2028 Core Strategy (Adopted 9 December 2014)

¹² Richmond County Council (2014) Richmondshire Biodiversity Action Plan

¹³ Chartered Institute of Ecology and Environmental Management (2018) Guidance for Ecological Impact Assessment in the United Kingdom Third Edition

¹⁴ Highways England (2020c) Design Manual for Roads and Bridges LD 118 Biodiversity Design, Revision 1, March 2020

6.10.3 Methodology

Desk study

- 6.10.3.1 Red Squirrel records within 2km of the Order Limits of the Project were requested from Cumbria Biodiversity Data Centre (CBDC), the Environmental Records Information Centre (ERIC) North East, and North and North East Yorkshire Ecological Data Centre (NEYDC) in October 2021 This was supplemented by road traffic accident (RTA) data supplied by National Highways.
- 6.10.3.2 Aerial imagery from Google Earth was used in conjunction with Ordnance Survey (OS) 1:25,000 scale mapping and Phase 1 habitat mapping to identify other habitats with the potential to support to red squirrel.

Field survey

- 6.10.3.3 Survey methodology was adapted from the following guidance documents:
- Forestry Commission Research Information Note 255: Practical Techniques for Surveying and Monitoring Squirrels (Gurnell et al., 2009)¹⁵
 - Red squirrel in: BAP Mammals; Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation
- 6.10.3.4 Areas of suitable habitat were identified through the desk study. All areas of continuous or semi-continuous woodland cover likely to be greater than 15 years old were considered suitable for red squirrel.
- 6.10.3.5 All suitable habitats were subject to carrying capacity assessments and visual survey transects.

Carrying capacity assessment

- 6.10.3.6 Each woodland block was systematically walked by suitably experienced ecologists. An assessment of habitat quality for red squirrel was made by recording the following features in line with *Gurnell et al. (2009)*:
- woodland type (for example, coniferous plantation, semi-natural broad-leaved woodland)
 - woodland use (for example, commercial forestry, parkland)
 - connectivity (whether or not connecting features such as canopy or thicket-stage plantations were present)
 - tree species present (for example, Scots pine (*Pinus sylvestris*), Sitka spruce (*Picea sitchensis*), birch (*Betula* spp.))
 - dominant species
 - canopy species

¹⁵ Gurnell, J., Lurz, P., McDonald, R., Pepper, H. (2009) Forestry Commission Research Information Note 255: Practical Techniques for Surveying and Monitoring Squirrels.

- age of woodland (over or under 25 years)
- understorey (presence of scrub layer providing cover)
- ground flora (whether developed or poor, or presence of other foraging opportunities)

6.10.3.7 In addition, any evidence of red squirrel activity, such as the presence of individuals, dreys, feeding signs, or ring barking were recorded and georeferenced.

6.10.3.8 The initial survey, referred to as the carrying capacity survey (Gurnell et al. 2009), was undertaken for each site to provide an estimate of the likely red squirrel density per area of woodland. The carrying capacity of each woodland is estimated based upon an adaption of standard Forestry Commission guidance (Gurnell et al. 2009). Table 2: Examples of the potential carrying capacity of forests and woodland for red squirrels in different areas details examples of the potential carrying capacity of forests and woodlands for red squirrels in different habitat types in England and Scotland. The number of squirrels per hectare is calculated from the number of squirrels observed (n) in a survey area of a known size (survey line (l) multiplied by the width of the sampling belt (w)).

Table 2: Examples of the potential carrying capacity of forests and woodland for red squirrels in different areas

Forest type/region	Dominant tree species	Number of squirrels per hectare	Indicative carrying capacity
Conifer/N. England	Sitka spruce	0.00-0.11	Low
Conifer/Scotland	Scot's pine	0.33	Low
Conifer/N. England	Lodgepole pine	0.21-0.43	Low-medium
Conifer/N. England	Norway spruce	0.21-0.41	Low-medium
Suburban/Jersey	Oak, sweet chestnut, Scot's pine	Er0.68-1.21	Medium-High
Broadleaved/S. England	Oak-hazel	0.90	High

Visual survey

6.10.3.9 Visual surveys were conducted following the protocol outlined:

- Pre-defined transect routes were walked through each area of suitable habitat
- At approximately 100m intervals surveyors stopped for a five-minute stationary observation period, then taking approximately five minutes to walk between stationary observation locations
- All squirrel sightings were recorded
- In addition to direct observations of individuals, an assessment of any potential squirrel signs (for example, potential dreys or feeding remains) identified was recorded

6.10.4 Assumptions and Limitations

- 6.10.4.1 Red squirrel are cryptic and often difficult to detect. Therefore, under some circumstances professional judgement has been used to determine whether red squirrel are likely to be present or absent.
- 6.10.4.2 Some sections were surveyed in January 2022 only, which is outside optimal survey months (October, February and March, when red squirrel are most active and foliage on the trees is not too dense). However, using professional judgement based upon the desk study data received and analysis of the presence of suitable red squirrel habitat, this is not considered to be a significant limitation. Where suitable habitat is present in areas with red squirrel desk study records, the presence of red squirrel has been assumed based upon a precautionary approach.

6.10.5 Results

Routewide

- 6.10.5.1 Red squirrel have been confirmed within the Order Limits of the Project, present within some sections and not in others. The following sections provide detailed results for each scheme.

M6 Junction 40 to Kemplay Bank

- 6.10.5.2 Red squirrel carrying capacity and visual surveys were carried out for this scheme in May and June 2021 and January 2022. These surveys confirmed the presence of red squirrel within the Order Limits of this scheme. For more detail refer to the Table 3: Survey results within M6 Junction 40 to Kemplay Bank.

Table 3: Survey results within M6 Junction 40 to Kemplay Bank

Walking route (see Figure 6.12: Terrestrial Mammal Survey (Application document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR01	Mixed broadleaved and coniferous trees including Scots pine (<i>Pinus sylvestris</i>), European larch (<i>Larix decidua</i>), western red-cedar (<i>Thuja plicata</i>), beech (<i>Fagus sylvatica</i>), ash (<i>Fraxinus excelsior</i>), poplar (<i>Populus</i> sp.), Norway spruce (<i>Picea abies</i>), lodgepole pine (<i>Pinus contorta</i>) and many other species. Two red squirrel were observed during the first survey with red squirrel feeding remains were found on both surveys. A red squirrel hopper is present within the area surveyed. The area surveyed has very good connectivity to the River Eamont and other known red squirrel populations.	High (confirmed present). This strip of woodland was considered to provide excellent year-round habitat for red squirrel. Red squirrel presence was confirmed, with a peak count of two individuals being recorded. The carrying capacity for this type of habitat is considered 'High'.

Walking route (see Figure 6.12: Terrestrial Mammal Survey (Application document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR02	The woodland consists of mixed broadleaved and coniferous trees with Wych Elm (<i>Ulmus glabra</i>) being the dominant species. The area is bordered by industrial areas and busy main roads however there is connectivity into the survey area along the River Eamont. No evidence red squirrel presence was recorded.	Low Not considered to be high quality habitat due to the industrial nature of the surrounding landscape. Does have some food resources and may occasionally be visited by red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR03	The woodland consists of mixed broadleaved and coniferous trees, planted mixed native and non-native poplars and scrub habitat. The area represents low value habitat for red squirrel due to a lack of suitable food resources, although it could potentially provide transitory habitat. No evidence of red squirrel presence was recorded.	Low Possible corridor habitat but the area does not have adequate food resources to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'
WR04	Area of broadleaved and mixed coniferous woodland dominated by poplars and Scots' pine. The area represents low value habitat for red squirrel as it is fragmented by the M6, A66 and mainline railway on all sides. It could however provide corridor habitat, supporting transitory red squirrel. No evidence of red squirrel presence was recorded.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR04	Area of broadleaved and mixed coniferous woodland dominated by poplars and Scots pine. The area represents low value habitat for red squirrel due to it being fragmented by the M6, A66 and mainline railway on all sides. It could however provide a corridor habitat, supporting transitory red squirrel. No evidence of red squirrel presence was recorded.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of

Walking route (see Figure 6.12: Terrestrial Mammal Survey (Application document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
		habitat is considered 'Low'.
WR05	Roadside planting of mixed mature and semi-mature broadleaved and coniferous trees with beech and poplar dominating. Aerial imagery shows more trees in this area than what remains, with approximately 100m having been felled with only stumps left. Further along tall poplars could act as a corridor for red squirrel but otherwise the area has poor suitability. No evidence of red squirrel was recorded.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR06	Woodland consists of mixed mature broadleaved and coniferous trees including sycamore (<i>Acer pseudoplatanus</i>), Scots pine, yew (<i>Taxus baccata</i>), beech, lime (<i>Tilia x europaea</i>), cedar (<i>Cedrus sp.</i>), holly (<i>Ilex aquifolium</i>) and European larch. This area of woodland offers good habitat for red squirrel with good connectivity and heavily coned pine trees offering good food resources. No red squirrel were observed, although many cone core feeding remains suggest that squirrel are present.	High (likely present) The area represents good habitat with year-round food resources. The carrying capacity for this type of habitat is considered 'High'.
WR07	Woodland consists of mixed mature broadleaved and coniferous trees dominated by poplar, sycamore (<i>Acer pseudoplatanus</i>), beech, Scots pine and silver birch (<i>Betula pendula</i>). This area of woodland represents good red squirrel habitat but has busy main roads on either side making it an island of good habitat. Evidence of red squirrel presence was recorded including abundant chewed pinecones, although no observations of any red squirrel were made.	Moderate (likely present) The area represents good habitat but is fragmented from other suitable habitat by busy roads. The carrying capacity for this type of habitat is considered 'Medium-high'.
WR08	Mixed broadleaved and coniferous trees including Scot's pine, European larch, western red-cedar, beech, ash, poplar, Norway spruce, lodgepole pine and many other species. Two red squirrel were observed during the first survey with red squirrel feeding remains found on both surveys. A red squirrel hopper is present in the survey area. The survey area has very	High (confirmed present) This strip of woodland was considered to provide excellent year-round habitat for red squirrel. Red squirrel presence was confirmed, with a peak

Walking route (see Figure 6.12: Terrestrial Mammal Survey (Application document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	good connectivity to the River Eamont and other known red squirrel populations.	count of two individuals being recorded. The carrying capacity for this type of habitat is considered 'High'.

Penrith to Temple Sowerby

6.10.5.3 Red squirrel carrying capacity and visual surveys were carried out within the Order Limits of this scheme in May and June 2021 and January 2022. These surveys confirmed the presence of red squirrel within the Order Limits of this scheme. Many of the woodlands within the Order Limits of this scheme have excellent connectivity to Whinfell which is a Red Squirrel Reserve (Cumbria Biodiversity Data Centre, 2010)¹⁶, an area in which conservation actions for red squirrel are focussed. For more detail refer to Table 4: Survey results within Penrith to Temple Sowerby.

Table 4: Survey results within Penrith to Temple Sowerby

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR09	Woodland consists of mixed semi-mature & mature broadleaved and coniferous trees with Scots pine and Sitka spruce (<i>Picea sitchensis</i>) dominating in most areas. Elder (<i>Sambucus nigra</i>) dominated a thick understorey. While the thick understorey made it difficult to survey all areas, this area of woodland represents good red squirrel habitat. Pine trees were heavily coned, and the area has good connectivity west under the A66 and toward known red squirrel populations at Brougham Hall and the Lowther Estate. To the east, this survey area is connected to the woodlands of WR11 where a red squirrel was observed on the 12/01/2022 during the winter survey.	High (likely present) High quality red squirrel habitat with excellent connectivity. The carrying capacity for this type of habitat is considered 'High'. to known red squirrel populations.
WR10	Area consists of a strip of roadside planting and a garden adjacent to the existing A66. The garden area has mature Scots pine, apple trees (<i>Malus sp.</i>), poplar and cypress (<i>Cupressus sp.</i>) The roadside planting	Low (occasional use) The woodland is somewhat isolated and has limited food

¹⁶ Cumbria Biodiversity Data Centre (2010) Red Squirrel,

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	consists of mostly semi-mature broadleaved trees dominated by hawthorn (<i>Crataegus monogyna</i>) and hazel (<i>Coryllus avellana</i>). No evidence of red squirrel was recorded.	resources. However, it is within a prime red squirrel location and occasional visits are likely. The carrying capacity for this type of habitat is considered 'Low'.
WR11	Woodland consists of extensive mixed mature and newly planted broadleaved and coniferous trees dominated by Scot's pine, Norway spruce, alder (<i>Alnus glutinosa</i>) and willow (<i>Salix sp.</i>) species. This area of woodland provides good habitat potential for red squirrel and lots of feeding remains (chewed pinecones) and a possible squirrel drey were recorded. The survey area has good connectivity along the River Eamont and to red squirrel populations south of the existing A66. One red squirrel was recorded during the winter survey.	High (confirmed present) The area represents good year-round habitat for red squirrel with good connectivity to known populations. The carrying capacity for this type of habitat is considered 'Medium-High'.
WR12	Woodland consists of areas of mixed semi-mature to mature broadleaved and coniferous trees dominated by Scots pine and alder with a hawthorn understorey. No signs of red squirrel were found but this survey area could represent good connecting habitat to other more suitable areas.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR13	Area of broadleaved woodland and conifer plantation dominated by Scot's pine within Whinfall Park, to the south of the existing A66. Habitat is isolated from more extensive and suitable red squirrel habitat and no evidence of red squirrel presence was recorded.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR14	Habitat consists of mature broadleaved woodland with oak (<i>Quercus robur</i>), hazel, beech, cherry (<i>Prunus sp.</i>), silver birch and alder. It is well connected to other suitable	High (likely present) seasonal use. Good seasonal food resources. Considered

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	areas of red squirrel habitat along the River Eamont and has high quality food resources. Although very suitable for red squirrel, no evidence of their presence was recorded.	likely that this woodland is used at times when nuts and seeds are available. The carrying capacity for this type of habitat is considered 'High'.
WR15	Area of mixed woodland dominated by Scot's pine with an understory of holly, silver birch and bilberry (<i>Vaccinium myrtillus</i> .) ground cover. Forms part of the extensive Whinfell Forest, a national red squirrel refuge. Feeding remains in the form of chewed pinecones were abundant and recorded throughout woodlands during summer and winter surveys.	High (confirmed present) A nationally important woodland for red squirrel. The woodland provides high quality food resources year-round. The carrying capacity for this type of habitat is considered 'Medium-High'.
WR16	Area of mixed woodland dominated by alder and silver birch in wet areas and in other areas Scot's pine, Sitka spruce and Norway spruce. The woodland is situated between known red squirrel populations at Whinfell Forest and along the River Eden. Red squirrel feeding remains in the form of chewed pinecones were recorded during summer surveys. Surveyors could hear squirrels feeding in the canopy but could not locate them during winter survey.	High (likely present) The woodland is considered good red squirrel habitat with high quality year-round food and drey building resources. The woodland is situated within a national species hotspot. The carrying capacity for this type of habitat is considered 'Medium-High'.
WR17a & WR17b	Coniferous woodland dominated by maturing Norway spruce with an understory of hawthorn and elder. A very dense woodland which provides good food and cover and is located very close to Whinfell Forest red squirrel refuge. Feeding remains in the form of chewed pinecones were found indicating likely presence of red squirrel. No red squirrels were observed.	High (likely present) Good habitat for red squirrel with evidence of their presence recorded. Habitat has good resources and is close to established red squirrel populations at Whinfell Forest. The carrying capacity for this type of habitat is considered 'Low-medium'.
WR18	Coniferous woodland dominated by maturing Norway spruce with an understory of hawthorn and elder. This is a very dense	High (likely present) Good habitat for red squirrel, considered to

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	woodland which provides good food and cover. It is very close to Whinfell Forest red squirrel refuge. Feeding remains in the form of chewed pinecones were found indicating likely presence of red squirrel. However, no red squirrel were observed.	be especially suitable for drey building due to the thick canopy. Evidence of use by red squirrel and close to known red squirrel population. The carrying capacity for this type of habitat is considered 'Low-medium'.
WR19	Woodland consists of two distinct areas. To the north of the B6412 is an area of mature broadleaved woodland with oak, beech, lime and maple (<i>Acer sp.</i>). A squirrel feeding hopper was present and filled with high quality squirrel feed. Summer surveys recorded sightings of red squirrels in this area. Across the road is an area of mixed young broadleaved and coniferous trees, dominated by larch, Scot's pine, spindle (<i>Euonymus planipes</i>), hawthorn, silver birch, cherry, alder and rowan (<i>Sorbus aucuparia</i>). Larch trees produce cones and therefore provide a valuable food resource for red squirrel.	High (confirmed present) This is an area of value to red squirrel providing high quality, year-round food resources and is supported by active red squirrel conservation. The woodlands are situated in a red squirrel reserve area and have very good connectivity via the River Eden. The carrying capacity for this type of habitat is considered 'Medium-high'.

Temple Sowerby to Appleby

6.10.5.4 Red squirrel carrying capacity and visual surveys were carried out within the Order Limits of this scheme in January 2022. Despite the limited red squirrel habitat present within this area, these surveys considered red squirrel highly likely to be present Suitable habitat potentially affected is limited to small woodland pockets, linear tree lines and hedgerows. For more detail refer to Table 5: Survey results within Temple Sowerby to Appleby.

Table 5: Survey results within Temple Sowerby to Appleby

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR5b	<p>An area of wet woodland dominated by willow, alder and birch with segments of mature Scot's pine and an understory of hawthorn.</p> <p>Survey efforts were constrained by waterlogged ground and so surveyors were only able to access the perimeter of the woodland.</p> <p>The survey area had foraging potential for red squirrel year-round, however, it was somewhat isolated from more extensive suitable habitat.</p>	<p>Moderate (anecdotal evidence of use from landowner)</p> <p>The woodland was considered to have medium-high carrying capacity and could be used by red squirrel. No evidence was found during the survey however the landowner reported two historic sightings.</p>
WR6b	<p>A tree-lined ancient right of way. Grown out hedgerow trees run on either side of a roman road which is now used as a bridle way and is surrounded by livestock grazing. Dominated by willow, ash, crab apple (<i>Malus sylvestris</i>) and hawthorn with occasional oaks and holly. No evidence of use by red or grey squirrel was recorded.</p>	<p>Low (seasonal habitat)</p> <p>Although somewhat isolated from more extensive areas of woodland, there is potential for use as corridor habitat with good connectivity at the eastern end. No evidence of use was recorded. The carrying capacity for this type of habitat is considered 'Low'.</p>
WR7b	<p>The area consists of a mixture of young and mature trees on a steep embankment between the existing A66 and the River Eden. The woodland is dominated by ash, alder, hazel, sycamore and Scot's pine with occasional larch and oak and an understory of hawthorn.</p> <p>A squirrel feeding station under current use was noted. The type of feeding station and the bait used is for controlling grey squirrel numbers and is part of ongoing red squirrel conservation efforts in the area.</p>	<p>High (likely present)</p> <p>The woodland has year-round food sources for red squirrel, good connectivity to the wider landscape and evidence of grey squirrel control.</p> <p>It is considered very likely that red squirrel use these woodlands, although no evidence was recorded during survey. The carrying capacity for this type of habitat is considered 'High'.</p>

Appleby to Brough

6.10.5.5 Red squirrel carrying capacity and visual surveys were carried within the Order Limits of this scheme in May and June 2021 and January 2022. These surveys confirmed the presence of red squirrel within this area. For more detail refer to Table 6: Survey results within Appleby to Brough.

Table 6: Survey results within Appleby to Brough

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR20	Area of semi-mature broadleaved woodland dominated by alder with a boggy understory. Of limited value to red squirrel due to a lack of potential food resources and being isolated from other areas of more suitable habitat. No red squirrel evidence was recorded.	Low Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR21	A linear stretch of woodland adjacent to the existing A66. The habitat consists of mixed mature broadleaved and coniferous woodland dominated by Scot's pine, silver birch and larch with an elder understory. The wider landscape consists of grazing land, conservation tree planting, wetlands and fragmented mixed broadleaved and conifer plantations. Abundant feeding remains were found throughout the woodland as well as suspected dreys.	High (likely present) Provides high quality habitat for red squirrel within a landscape which provides good connectivity. Evidence of red squirrel (chewed pinecones and suspected dreys) were recorded throughout the woodlands during both winter and summer surveys. The carrying capacity for this type of habitat is considered 'Medium-high'.
WR22	A linear stand of mixed mature woodland adjacent to the existing A66. This woodland is dominated by Scot's pine, larch, oak, beech and sycamore with occasional hawthorn and poplar. Provides good quality red squirrel habitat with good connectivity to more extensive areas of woodland. No	Moderate (seasonal/intermittent) The woodlands contained high quality year-round food resources such as coning Scot's pine

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	evidence of red squirrel presence was recorded during surveys.	and larch, and more seasonal forage provided by broadleaved species. The higher value areas of this woodland are small relative to other woodlands within the surrounding scheme and may not support a red squirrel population all-year round. It is considered that this woodland is likely occasionally or seasonally visited by red squirrel. No evidence of red squirrel presence was recorded. The carrying capacity for this type of habitat is considered 'Medium-high'.
WR23	Area of mixed mature woodland dominated by Scot's pine, oak, ash, silver birch, beech and sycamore. Provides good connecting habitat for red squirrel, although no evidence of red squirrel presence was recorded.	Moderate (seasonal/intermittent) Provides good seasonal habitat for red squirrel, although no evidence of red squirrel presence was recorded during the surveys. It is likely that red squirrel will use these woods occasionally and may make use of them as a seasonal food resource. The carrying capacity for this type of habitat is considered 'Medium-high'.
WR24	Small area of broadleaved woodland dominated by sycamore. Provides a good	Low

Walking route (Figure 6.12: Terrestrial Mammal Survey (Application Document 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
	seasonal food resource for red squirrel, although no evidence of red squirrel presence was recorded.	Possible corridor habitat but the area is too isolated and not large enough to support a large population of red squirrel. The carrying capacity for this type of habitat is considered 'Low'.
WR25	<p>An area of mixed mature woodland containing Scot's pine, larch, Sitka spruce, Norway spruce, red cedar, hemlock (<i>Conium maculatum</i>), sycamore and beech. Two possible red squirrel dreys recorded as well as multiple observations of feeding remains throughout the wood.</p> <p>There is new mixed species planting along the northern perimeter of the woodland containing hazel, alder, cherry, silver birch, hawthorn.</p>	<p>High (likely present)</p> <p>The woodland provides very good red squirrel habitat with high quality year-round food and drey building resources. The woodland has good connectivity to the wider landscape which has been improved by recent tree planting. The carrying capacity for this type of habitat is considered 'Medium-high'.</p>
WR26	Small area of broadleaved woodland dominated by oak, ash, hazel, beech and silver birch. Provides a good seasonal food resource for red squirrel, although no evidence of red squirrel presence was recorded.	<p>Low</p> <p>Possible corridor habitat although no red squirrel were recorded during surveys. The carrying capacity for this type of habitat is considered 'High'.</p>
WR27	Small area of broadleaved woodland either side of the existing A66, dominated by ash, sycamore and hawthorn. Provides possible transitional habitat for red squirrel, although no evidence of red squirrel presence was recorded during surveys.	<p>Low</p> <p>Possible corridor habitat although no red squirrels were recorded during surveys. The carrying capacity for this type of habitat is considered 'High'.</p>

Bowes Bypass

6.10.5.6 No red squirrel surveys were carried out within the Order Limits of this scheme as there was no suitable habitat present for red squirrel. Red squirrel are considered absent from the Order Limits of this scheme.

Cross Lanes to Rokeby

6.10.5.7 Red squirrel carrying capacity and visual surveys were undertaken within the Order Limits of this scheme in January 2022. Through analysis of the survey results and considering professional judgement, it is likely that red squirrel are absent from the Order Limits of this scheme. This is due to the number of grey squirrel present despite desk study records indicating historical presence to the north and south of the A66. For more detail refer to the Table 7: Survey results within Cross Lanes to Rokeby.

Table 7: Survey results within Cross Lanes to Rokeby

Walking route (Figure X.X Terrestrial Mammal Survey (ES Volume 2, Application document Number 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
WR1b	<p>Route 1b consists of three distinct areas:</p> <ol style="list-style-type: none"> 1. Semi-mature and mature, mixed broadleaved trees flanking a track, dominated by beech, cherry and ash with an occasional red cedar. The understory includes holly and brambles. This area was considered to provide considerable food resources for squirrel. 2. A strip of young mixed broadleaf roadside planting running directly adjacent to the existing A66. This area is considered to be of low value red squirrel habitat but could be used for commuting. 3. An area of mature parkland trees. Dominated by beech, sycamore, and large leaf lime (<i>Tilia platyphyllos</i>). Surveyors observed a grey squirrel in this area. There is also anecdotal evidence of an abundant grey squirrel population. 	<p>Low (likely absent)</p> <p>Whilst this survey area has abundant food resources and has potential to support a red squirrel population, presence of grey squirrel and the distance of it from known red squirrel populations mean that red squirrel are likely to be absent.</p>
WR2b	<p>A mixed broadleaf and coniferous semi-mature woodland which follows the line of a small stream and transects agricultural land. Dominated by Norway and Sitka spruce, beech, ash, cherry, and larch.</p>	<p>Low (likely absent)</p> <p>Could support red squirrel however there are known grey squirrel populations in the wider area. This combined with a lack of known red squirrel</p>

Walking route (Figure X.X Terrestrial Mammal Survey (ES Volume 2, Application document Number 3.3))	Visual survey results	Assessment of habitat potential and carrying capacity
		populations mean that red squirrel are likely to be absent.
WR3b	A narrow strip of mixed mature and young broadleaved trees alongside the B6277. Dominated by ash, oak, Scot's pine and bordered by a native hedgerow.	Low (likely absent) Considered to have year-round food resources. Could be used as corridor habitat however, known grey squirrel populations in the wider area and a lack of known red squirrel populations mean that red squirrel are likely to be absent.
WR4b	Mature and semi-mature mixed broadleaved woodland. Dominated by ash, oak and silver birch with an understory of hawthorn, blackthorn and brambles.	Low (likely absent) Autumn food resources could provide transitional habitat for squirrel species. Grey squirrel are present in the wider area. This, combined with the distance from known red squirrel populations mean that reds squirrel are likely to be absent.

Stephen Bank to Carkin Moor

6.10.5.8 As there was very limited suitable habitat present for red squirrel within the Order Limits of this scheme, no red squirrel records returned from the desk study search relevant to this scheme, and the presence of grey squirrel was frequently detected on camera trap footage recorded as part of the badger and other terrestrial mammal survey strategy, no red squirrel surveys were carried out within the Order Limits of this scheme. Red squirrel are likely to be absent from within the Order Limits of this scheme.

A1(M) Junction 53 Scotch Corner

6.10.5.9 No red squirrel surveys were carried out within the Order Limits of this scheme as there was no suitable habitat present for red squirrel. Red squirrel are likely to be absent from within the Order Limits of this scheme.

Future baseline

- 6.10.5.10 The ecological baseline conditions described above represent those which currently exist in the absence of the scheme and at the time of writing. As stated in section 3 of CIEEM's *Guidelines for Ecological Impact Assessment in the UK and Ireland* (Chartered Institute of Ecology and Environmental Management, 2019)¹⁷, potential changes in baseline conditions also need to be identified in order to assess impacts.
- 6.10.5.11 Based on the above information and current land use, the future baseline in the absence of the scheme is unlikely to change significantly by 2040.
- 6.10.5.12 The population of red squirrels in this area is a national stronghold but is fragile due to the potential for grey squirrel to colonise and outcompete red squirrel. The assumption that the population is not likely to change significantly is based upon the current grey squirrel control continuing to be implemented and continuing to be effective at keeping grey squirrels out of the red squirrel woodlands. If this is not maintained, the colonisation of these woodlands by grey squirrel would have a devastating impact upon the red squirrel population due to increased competition and introduction of squirrel pox.
- 6.10.5.13 The reintroduction or natural expansion of pine martens would support the red squirrel populations remain stable as pine marten predate on grey squirrels.

6.10.6 Discussion

- 6.10.6.1 Red squirrel are confirmed present within the Order Limits of two schemes, M6 Junction 40 to Kemplay Bank and Penrith to Temple Sowerby.
- 6.10.6.2 In addition, red squirrel are assumed to be present in two further sections, Temple Sowerby to Appleby and Appleby to Brough.
- 6.10.6.3 Red squirrel are likely absent from within the Order Limits of all other schemes predominantly due to a lack of suitable habitat or the presence of grey squirrel combined with a lack of records of red squirrel within the desk study data received.

6.10.7 References

Department for Transport (2014) National Policy Statement for National Networks,
Natural Environment and Rural Communities Act 2006
Natural Environment and Rural Communities Act 2006
Priority Actions for S41 Species available here
Wildlife and Countryside Act 1981

¹⁷ Chartered Institute of Ecology and Environmental Management (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland.

Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework

Nationally Significant Infrastructure Projects (NSIP)

DEFRA (2011). Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services.

North East England Nature Partnership (2013) Biodiversity Priorities

Cumbria Biodiversity Partnership (2001) The Cumbria Biodiversity Action Plan

Eden District Council (2014) Eden Local Plan 2014 to 2032

Durham Council (2020) County Durham Plan – Adopted 2020,

Richmond County Council (2014) Richmondshire Local Plan 2012 - 2028 Core Strategy (Adopted 9 December 2014)

Richmond County Council (2014) Richmondshire Biodiversity Action Plan,

Chartered Institute of Ecology and Environmental Management (2018) Guidance for Ecological Impact Assessment in the United Kingdom Third Edition

Highways England (2020c) Design Manual for Roads and Bridges LD 118 Biodiversity Design, Revision 1, March 2020

Gurnell et al. (2009), Forestry Commission Research Information Note 255: Practical Techniques for Surveying and Monitoring Squirrels.